• Commonwealth of Kentucky •

# EDUCATIONAL BULLETIN

## PLANNING
## SCHOOL PLANT CONSTRUCTION



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PI

I.

II.

III.

IV.

V.

VI.

VII.

VIII.

## PLANNING SCHOOL PLANT CONSTRUCTION

# FOREWORD

The reorganization and tremendous expansion of the physical facilities essential to meeting the needs of the children in this day of great growth in our school population places a great responsibility on all of us in positions of public trust. Frequent criticisms directed at alleged unwise judgment exercised by those of us in these positions points to the necessity of constructing school facilities in keeping with plans and specifications that are not only based upon the best health and welfare interests of the child but are also the latest and best thinking of authorities in the field of school building construction. This bulletin is designed to meet these needs.

This bulletin has been carefully prepared by the Division of Buildings and Grounds of the Department of Education. The Division has had the benefit of an Advisory Committee composed of architects, engineers, contractors, school administrators and laymen who are dedicated to the best interests of the children of our Commonwealth. It has been prepared for the purpose of assisting school administrators, boards of education, architects, engineers and other persons interested in planning and constructing school buildings to prepare plans and specifications that can be properly presented to the Department of Education for required approvals as specified in Sections 162.060 and 162.160 of the Kentucky Revised Statutes.

It is suggested that school officials throughout the Commonwealth become acquainted with the contents of this bulletin in order to facilitate the processing of submitted plans and specifications and to secure the required approvals.

The health and welfare of the child certainly should be foremost in our considerations when we plan and build those facilities most conducive to learning.

Robert R. Martin
Superintendent of Public Instruction

# INTRODUCTION

District boards of education and their executive officers, the superintendents, are charged with the responsibility of providing educational facilities for the operation of the public schools. School boards have the authority to secure property, erect buildings and provide furniture and equipment. This authority carries with it the responsibility to provide these facilities. This authority and responsibility is defined by acts of the state legislature, together with provisions and procedures for carrying out these responsibilities.

The State Board of Education has obligations in all aspects of the educational program and in various phases of pupil safety, health and welfare. The State Board of Education carries out its responsibility by the adoption and enforcement of regulations pertaining to the various phases of public education.

The responsibility of providing funds and planning and erecting school buildings rests with the local school officials. In exercising this responsibility, the local officials must comply with state laws, regulations of the State Board of Education, the State Board of Health and the office of the State Fire Marshal. The State Board of Education, through the State Superintendent of Public Instruction, has the responsibility for examining, advising on, and approving all plans and specifications of proposed school buildings. The Superintendent of Public Instruction, upon request, will provide assistance to local school officials in making surveys of needs, in developing long range school plant programs and in planning individual buildings. Advisory services will be provided for site selection, remodeling and renovation. The State Department of Education will advise, but will not assume responsibility for structural design, strength and durability of materials used, cost estimates, effeciency of mechanical installations, nor the quality of the materials and labor used in construction.

The first step in any contemplated building program, large or small, is to become familiar with the laws and regulations governing the procedures. The second step is to secure the advice of the Superintendent of Public Instruction through the various agencies in the State Department of Education. The Bureau of Instruction,

the Division of Finance and the Division of Buildings and Grounds have the responsibility for approvals under the authority of the Superintendent of Public Instruction. Other agencies such as the Division of Home Economics Education, the Division of Trade and Industrial Education, the Division of Agricultural Education, and the Division of School Lunch provide services in planning of special areas of buildings. Specialists in the Bureau of Instruction, the Supervisor of Library Services, Supervisor of Elementary Education, and Supervisor of Art and Music Education also can be very helpful in planning specialized areas.

Three major responsibilities of the local board of education and the superintendent in developing long range master plans for the building program are:

1. To determine the scope of the educational program and the ability of the community to accomplish the educational objectives.

2. To properly locate the school facilities on suitable sites of adequate size.

3. To attempt to provide school plants and installations of functional design and construction to facilitate the educational program.

# I. PHILOSOPHY AND OBJECTIVES

A program of education for a district or a school requires a frame of reference. Why have a school? What shall we teach? How shall we teach it? What are our educational beliefs? What are our objectives for the individual school and for all the schools of the district? Are our objectives consistent with — Knowledge of how children learn? Needs of children and youth? Needs of our community? and, The broader needs of society? These questions should involve the thinking of many people if we are to arrive at valid answers. The cooperative development and continuous study of a philosophy and objectives for each school and the school district are an ever-present challenge to efficient and effective educational leadership.

The following statements of viewpoint and criteria for philosophy and objectives are consistent with modern education policies and practices.

## PHILOSOPHY OF EDUCATION[1]

Education exists for two major purposes. First, to develop to the fullest extent the potentialities of the individual and second, to protect and promote the welfare of society. These two goals depend upon each other for accomplishment. The individual achieves his fullest self-realization only when serving and being served by the forces of the social interaction. In like manner society is at its best only when it is composed of socialized individuals. It should be the purpose of the school to strive toward these two goals during the time when it has the child in its care. If this is to be done effectively it is essential that the teachers understand and be in sympathy with both the child and society.

Understanding the child implies knowing his potentialities, his needs, his interests, his desires and his fears. It also includes a knowledge of his home, his family, his background and, in short, as many hereditary and environmental factors as possible.

Understanding society means not only that the school should take cognizance of our form of government but of that of other countries. It should help pupils to understand our own culture and the culture of other people as well. It should teach pupils to know

[1]Adapted from Principal, Dec., 1950

intimately the community in which the school is located and to understand the customs, standards, attitudes and aspirations of the local citizenry. Such an understanding will help the school and the community to plan and work together.

If the school is to properly develop the child's potentialities it must take into consideration the nature of his assets. These may be classified as physical, intellectual, emotional, moral and spiritual. Proper development along these lines makes for a well integrated, socialized personality satisfactory to one's own self and to society.

Progress comes through growth and growth requires experience. The child must be given experiences and must think and act upon these if he is to grow intellectually and emotionally toward maturity. Many of these experiences must deal with the concrete and tangible. Many must be firsthand for the child lives largely in the here-and-now. Experiences must be real, varied and significant. They must challenge observation, thinking and evaluation. Indeed the child must help in planning these experiences as well as in their execution for he must become adept at planning if he is to achieve maximum growth.

In order to be a good environment for growing children the school should have certain characteristics. It should possess beauty, simplicity and security. Beauty awakens in the child his potentiality for the aesthetic. Simplicity is in accord with his very nature and security gives him a feeling of being wanted. The school, which in a degree is the child's second home, should be a place where the activities of his true home and the activities of the school may be merged so that his parents and his teachers may meet for mutual understanding. The school should be a community center because it is striving to bring the welfare of the individual and that of the community into closer harmony.

## OBJECTIVES FOR THE EDUCATIONAL PROGRAM

**The Purposes of Education in American Democracy,**[1] published by the Educational Policies Commission, list four major groups of educational objectives. Perhaps these four groups of objectives are the most representative of the twelve-grade program of education. The four categories are the objectives of Self-Realization, the ob-

[1]National Education Association and American Association of School Administrators, Educational Policies Commission, **The Purposes of Education** in American Democracy, Washington, D. C.: the Commission, 1938, pp 50, 72, 90, 108

jectives of Human Relationship, the objectives of Economic Efficiency, and the objectives of Civic Responsibility.

**The Objectives of Self-Realization**

Education is concerned with the growth and development of the individual

1. who has an inquiring mind;
2. who is skilled in listening and observing;
3. who speaks his mother tongue clearly;
4. who reads his mother tongue efficiently;
5. who writes his mother tongue effectively;
6. who solves his problems of counting and calculating;
7. who understands basic facts of health and disease;
8. who protects his own health and that of his dependents;
9. who wants to improve the health of the community;
10. who participates in sports and pastimes;
11. who has the ability to think rationally; and
12. who appreciates beauty and shows character.

**The Objectives of Human Relationship**

Education is concerned with the growth and development of the individual

1. who puts human relationships first;
2. who enjoys a rich, sincere, and varied life;
3. who can work and play with others;
4. who observes the amenites of social behavior;
5. who conserves family ideals and skills in homemaking; and
6. who maintains democratic family relationships.

**The Objectives of Economic Efficiency**

Education is concerned with the growth and development of the individual

1. who knows the satisfaction of good workmanship;
2. who understands the requirements and opportunities for various jobs;
3. who selects his occupation wisely;
4. who succeeds in his chosen vocation;
5. who maintains and improves his efficiency;
6. who appreciates the social value of his work;
7. who plans the economics of his own life;
8. who develops standards for guiding his expenditures;
9. who is an informed and skillful buyer; and
10. who takes appropriate measures to safeguard his interests.

### The Objectives of Civic Responsibility

Education is concerned with the growth and development of the individual

1. who is sensitive to the disparities of human circumstances;
2. who acts to correct unsatisfactory conditions;
3. who seeks to understand social structures and social processes;
4. who has defenses against propaganda;
5. who respects honest differences of opinion;
6. who has a regard for the nation's resources;
7. who measures scientific advance by its contribution to the general welfare;
8. who is a cooperating member of the world community;
9. who respects the law;
10. who is economically literate;
11. who accepts his civic duties; and
12. who acts upon unswerving loyalty to democratic ideals.

# II. LAWS

The following pages contain the school laws that must be complied with by those who are planning school buildings to house educational programs. The laws quoted herein are only those that are concerned with the individuals doing the planning. They are presented as authority on which planners must rely for the procedures which they should follow.

## Statutes Relating to the Construction of School Buildings

**162.010 Title to School Property.** The title to all property owned by a school district is vested in the Commonwealth for the benefit of the district board of education. In the acquisition of land for school purposes whether by purchase, condemnation, or otherwise, the title obtained shall be in fee simple. Any reversionary interest in any land held by boards of education on June 14, 1934, shall not deprive such boards of the ownership of the buildings or other improvements thereon. (1954, c. 20, § 1)

**162.030 Condemnation of Property for School Purposes.** Each board of education may, when unable to make a contract satisfactory to the board with the owner for the purchase of real estate to be used for school purposes, initiate condemnation proceedings under any of the methods of condemnation authorized by KRS 416.010 to 416.080; KRS 416.120; and 416.230 to 416.310; and the title to land so obtained shall be vested in fee simple. (1954, c. 20, § 2)

**162.060 Plans for School Buildings to be Approved.** The Superintendent of Public Instruction shall be furnished a copy of all plans and specifications for new public school buildings contemplated by boards of education and for all additions to or alterations of old buildings. He shall examine or cause to be examined all such plans and specifications and shall approve or disapprove them in accordance with the rules and regulations of the State Board of Education. No board of education may award a contract for the erection of a new building or contract for an addition to or alteration of an old building until the plan has been approved by the Superintendent of Public Instruction.

**162.070 Contracts for Buildings, Improvements and Materials to be Let on Competitive Bidding; When Advertisement Not Re-**

**quired.** The contracts for the erection of new school buildings and additions and repairs to old buildings, except repairs not exceeding one hundred fifty dollars, shall be made by the board of education to the lowest and best responsible bidder complying with the terms of the letting, after such advertisement for competitive bids as the board determines, but the board may reject any or all bids. All necessary specifications and drawings shall be prepared for all such work. The board shall advertise for bids on all supplies and equipment that it desires to purchase, except where the amount of the purchase does not exceed two hundred fifty dollars, and shall accept the bid of the lowest and best bidder, but the board may reject any and all bids. In independent school districts of cities of the first class and in county school districts of counties containing a city of the first class, no advertisement for bids for repairs shall be necessary unless the amount involved exceeds two thousand dollars, and no advertisement for bids for supplies and equipment shall be necessary unless the amount involved exceeds one thousand dollars. (1954, c. 172)

**160.476 School Building Fund; Tax for, Other Resources; Investment; Expenditures; Audit.** (1) The board of education of any district may, in addition to other taxes requested for school purposes, request the levy of not less than four cents nor more than twenty cents on each one hundred dollars valuation of property subject to local taxation, to provide a special fund for the purchase of sites for school buildings, for the erection and complete equipping of school buildings, and for the major alteration, enlargement and complete equipping of existing buildings, provided, however, that such tax shall come within the maximum school tax levy provided by KRS 160.475. In addition to or in lieu of this special tax, any board of education may pay into this special fund at the close of any fiscal year the proceeds from the sale of land or property no longer needed for school purposes and all or any balances remaining in the general fund over and above the amount necessary for discharging obligations for the fiscal year in full.

(2) The special fund provided for herein shall be kept in a separate account designated as "School Building Fund." The fund shall be kept in the depository selected by the board of education, or invested in bonds of the United States, of this state, or county or municipality in this state, provided however, that such investments shall be approved by the State Board of Education.

(3) All expenditures from such fund shall be made solely for

the purposes enumerated herein and shall be made in accordance with the school laws of the state at such times as the board of education determines. The board of education shall cause to be made annually an audit of the building fund by a certified public accountant or by an accountant approved by the State Department of Education. (1946, c. 36, § 1 (3) )

**160.477 School Building Fund, Voted Tax for; Other Resources of Fund; Expenditures; Audits.** (1) (a) Upon request of the board of education of any school district, the tax levying authority of the district shall adopt an ordinance or resolution submitting to the qualified voters of the district, the question as to whether a special school building tax rate of not less than five cents nor more than fifty cents as requested by the board shall be levied on each one hundred dollars of property subject to local taxation. This tax levy shall be in addition to the maximum school tax levy provided by KRS 160.475. The income from the tax shall be used for the purchase or lease of school sites and buildings, for the erection and complete equipping of new school buildings, for the major alteration, enlargement and complete equipping of existing buildings, for the purpose of retiring, directly or through rental payments, school revenue bonds issued for such school building improvements, and for the purpose of financing any program for the acquisition, improvement, or building of schools. The question shall be so framed that the voter may by his vote answer "For" or "Against."

(b) The election shall be held at a time fixed in the ordinance or resolution, not less than fifteen or more than thirty days from the time the request of the board is filed with the tax levying authority, and reasonable notice of the election shall be given. The election shall be conducted and carried out in the school district in all respects as required by the general election laws, and shall be held by the same officers as required by the general election laws. The expense of the election shall be borne by the fiscal court except where the election is held in a district embracing a city of the first five classes, in which case the cost of the election shall be borne by the governing body of the city.

(c) If a majority of those voting on the question favor the special school building tax levy, the tax levying authority shall when the next tax rate for the district is fixed levy the special rate specified by the board of education of the school district for the school building fund in addition to the levy provided by KRS 160.475. (Subsection (1) amended, 1952, c. 77, § 1)

(2) There may be included, in the maximum levy provided for in KRS 160.475, a special levy for building fund purposes as authorized by KRS 160.476, which shall be in addition to the levy authorized by vote as provided in subsection (1) of this section.

(3) In addition to or in lieu of this special tax, any board of education may pay into this special fund at the close of any fiscal year the proceeds from the sale of land or property no longer needed for school purposes and allow any balances remaining in the general fund over and above the amount necessary for discharging obligations for the fiscal year in full.

(4) The special fund provided for in subsection (1) of this section shall be kept in a separate account designated as "Special Voted School Building Fund." The fund shall be kept in the depository selected by the board of education, or invested in bonds of the United States, of this state, or of any county or municipality in this state, provided however, that such investment shall be approved by the State Board of Education.

(5) All expenditures from such fund shall be made solely for the purposes enumerated in this section and shall be made in accordance with the school laws of the state at such times as the board of education determines. The board of education shall cause to be made annually an audit of the building fund by a certified public accountant or by an accountant approved by the State Department of Education. (1950, c. 142)

**337.510 Schedule of Prevailing Wages to be Included in Specifications.** Before advertising for bids or entering into any contract for construction of public works, every public authority shall ascertain the prevailing rates of wages of laborers, workmen, mechanics, helpers, assistants and apprentices for the class of work called for in the construction of such public works in the locality where the work is to be performed. This schedule of wages shall be attached to and made a part of the specifications for the work and shall be printed on the bidding blanks and made a part of every contract for the construction of public works.

**337.520 Determination of Prevailing Wages.** The wages paid for a legal day's work to laborers, workmen, mechanics, helpers, assistants and apprentices upon public works shall not be less than the prevailing wages paid in the same trade or occupation in the locality. The public authority shall establish prevailing wages at the same rate that prevails in the locality under collective agree-

ments or understandings between bona fide organizations of labor and their employers at the date the contract for public works is made if there are such agreements or understandings in the locality applying to a sufficient number of employes to furnish a reasonable basis for considering those rates to be the prevailing rates in the locality. If contracts are not awarded within ninety days from the date of the establishment of the prevailing rate of wages, as provided in KRS 337.510, there shall be a redetermination of the prevailing rate of wages before the contract is awarded and the schedule or scale of prevailing wages shall be incorporated in and made part of each contract.

**337.530 Contractor to Pay Prevailing Wages and Post Rates; Payroll Records.** (1) Where public authority has established and prescribed a prevailing rate of wages, the contract executed between that public authority and the successful bidder or contractor shall contain a provision requiring the successful bidder and all of his subcontractors to pay the rate of wages so established. The successful bidder or contractor and all subcontractors shall strictly comply with these provisions of the contract.

(2) All contractors and subcontractors required by KRS 337.510 to 337.559 and the contracts with any public authority to pay not less than the prevailing rate of wages, shall pay such wages in legal tender without any deductions. These provisions shall not apply where the employer and employe enter into an agreement in writing at the beginning of or during any term of employment covering deductions for food, sleeping accommodations, or any similar item if this agreement is submitted by the employer to the public authority who fixed the rate of wages and is approved by that authority as fair and reasonable. All contractors and subcontractors affected by the terms of KRS 337.510 to 337.550 shall keep full and accurate payroll records covering all disbursements of wages to their employes to whom they are required to pay not less than the prevailing rate of wages. These payroll records shall not be destroyed or removed from this state for one year following the completion of the improvement in connection with which they are made.

(3) Each contractor and subcontractor subject to the provisions of KRS 337.510 to 337.550 shall post and keep posted in a conspicuous place at the site of the construction work a copy of prevailing rates of wages and working hours as prescribed in the contract with the public authority, showing the rates of wages prescribed and the working hours for each class of laborers, workmen, mechanics,

helpers, assistants and apprentices employed by him in the work of constructing the public works provided for in the contract with the public authority.

**337.540 Limitation of Working Hours; Exceptions; Overtime.** (1) Every public authority, before advertising for bids, shall include with the schedule of wages a provision that no laborer, workman, mechanic, helper, assistant or apprentice shall be permitted to work more than eight hours in one calendar day, which shall constitute a legal day's work; nor more than forty hours in one week, which shall constitute a legal work week, except in cases of emergency caused by fire, flood or damage to life or property. This limitation of work hours shall be made a part of the specifications for the work and printed on bid blanks where the work is done by contract and shall be incorporated as a part of each contract.

(2) No laborer, workman, mechanic, helper, assistant or apprentice shall be permitted to mork more than eight hours in any one calendar day, nor more than forty hours in any one week, except in cases of emergency caused by fire, flood or damage to life or property, on the construction of public works which is being constructed under contract with any public authority.

(3) Any laborer, workman, mechanic, helper, assistant or apprentice worked in excess of eight hours per day or forty hours per week, except in cases of emergency shall be paid not less than one and one-half times the prevailing rate of wages as fixed under this chapter for all overtime worked, and each contract with any public authority for the construction of public works shall so provide.

(4) The determination of exception provided in this section of when an emergency exists shall be made by the public authority letting the contract.

**337.550 Department to Aid in Enforcement; Remedies of Laborer.** (1) Any laborer or mechanic employed on public works may file a complaint of any violation of any provision of KRS 337.510 to 337.550 with the department. The department shall assist him in the collection of claims of wages due him and shall also assist to the fullest extent in the administration and enforcement of KRS 337.510 to 337.550.

(2) A laborer or worker may by civil action recover any sum due him as the result of the failure of his employer to comply with the terms of KRS 337.510 to 337.550.

**337.990 Penalties.** (11) Any public authority who willfully fails to comply or to require compliance with KRS 337.510 to 337.550 shall be fined not more than one hundred dollars for each offense.

**322.360 Public Work Under Unlicensed Engineer Prohibited.** (1) Neither the state nor any of its political subdivisions shall engage in the construction of any public work involving engineering, unless the plans, specifications and estimates have been prepared and the construction executed under the direct supervision of a licensed engineer or a licensed architect.

(2) Subsection (1) of this section shall not apply to any public work in which contemplated expenditure for the completed project does not exceed two thousand dollars or to the maintenance or repair of any existing state or county highway.

**156.160 Superintendent to Prepare School Budget and Rules and Regulations Governing Schools, for Adoption by Board.** The Superintendent of Public Instruction shall prepare or cause to be prepared and submit for approval and adoption by the State Board of Education:

(5) Regulations for the sanitary and protective construction of public school buildings, toilets, physical equipment of school grounds, school buildings and classrooms;

(6) Regulations governing medical inspection, physical education and recreation, and other rules and regulations deemed necessary or advisable for the protection of the physical welfare and safety of the public school children;

(11) A uniform series of forms and blanks, educational and financial, including forms of contract, for use in the several school districts.

# III. STATE BOARD OF EDUCATION REGULATIONS

This fourth part of the bulletin contains the regulations of the State Board of Education relating to minimum standards for schoolhouse construction. The standards are liberal and the intention is to permit full play to the creative ability of the architect and at the same time permit acceptable inexpensive construction when necessary.

22.001 **Standards for Evaluating and Awarding Contracts.** (1) Boards of education should not give some companies opportunities to bid on materials and deny others.

(2) Confidential information should not be given to some companies and withheld from others.

(3) All bidders should be treated with equal fairness and consideration.

(4) A policy of fair dealing toward all should be firmly established.

(5) Local dealers should not be favored unless their products are as good as those of other competing companies.

(6) Any consideration of bids or bidders should not be influenced by any political or family connection.

(7) No special effort should be made to distribute business among the several competing companies or to give personal preference to either of these companies.

(8) Definite standards for comparison of products should be established and used in determining to whom a contract should be awarded.

(9) No superintendent or member of a board of education or employee thereof should receive any reward for service in connection with the placement of an order.

(10) Collusion among bidders should not knowlingly be condoned.

(11) The superintendent and board of education of a district are justified in taking drastic measures when the conduct of bidders falls below high standards of business practice.

(12) All activities in taking bids should be based on legal authority for such bidding and information concerning the products desired and provide bids on a definite and competitive basis. (March 18, 1958)

22.010 **Application for Construction Project.** When a board of education upon the recommendation of the district superintendent finds it advisable to erect a building or to make an addition or major alteration to an existing building, it shall submit to the Superintendent of Public Instruction an application for the proposed building or addition to be erected or alteration to be made. Said application shall be on a BG-1 form to be supplied by the Superintendent of Public Instruction, and shall provide for such information as he may require in considering said application for the new building, addition, or major alteration. Prior to the submission of preliminary plans the following items shall be Cleared: (a) The financial ability shall be determined and the financial plan approved by the Director of the Division of Finance. A copy of the approval letter shall be furnished to the Division of Buildings and Grounds. (b) The educational plan shall be considered and approved by the Head of the Bureau of Instruction. The architect and the Division of Buildings and Grounds shall be furnished a copy of the approved educational plan. (c) A site recommended by the local board of education shall be approved by the Director of the Division of Buildings and Grounds before the planning of any project is undertaken. (March 18, 1958)

22.013 **Submission of Preliminary Drawings.** (a) After approval of the application (BG-1) required in No. 010 above, preliminary drawings, outline specifications and estimated cost (BG-2 and BG-3 Forms) shall be transmitted to the Superintendent of Public Instruction for his comments, suggestions and approval. These preliminary drawings shall be submitted in accordance with instructions furnished by the Superintendent of Public Instruction and shall give such information as he may require. (b) Approval by the Superintendent of Public Instruction shall include the type of construction, location on the site, the size of the building, the educational and functional planning, and such other pertinent factors that should be considered in the cost of planning and the erection of school buildings. (March 18, 1958)

22.017 **Submission and Approval of Complete Working Drawings, Specifications and Contract Documents.** (a) Complete working drawings, specifications and contract documents shall be approved by the Superintendent of Public Instruction. They shall be submitted in accordance with instructions of the Superintendent of Public Instruction and the regulations of the State Board of Education. (b) Approval of the completed plans and specifications by the Superintendent of Public Instruction does not constitute approval by the other agencies which have by statute the right of review and approval. The State Board of Health and the State Fire Marshal must approve all plans, and in some districts other approval agencies are involved. Securing approval of all other agencies having jurisdiction, such as federal, state or local, in addition to the State Fire Marshal and the State Board of Health, shall be the responsibility of the local board and architect. Final approval of the Superintendent of Public Instruction shall be withheld until evidence in the form of copies of transmittal letters to the State Board of Health and the State Fire Marshal have been received. (March 18, 1958)

22.019 **Forms to be Used for Contract Documents.** (a) A contract between the board of education and architect for professional services shall be on a standard form furnished by the Superintendent of Public Instruction or on a standard A. I. A. form. (b) Construction contracts must be written on standard contract forms supplied by the Division of Buildings and Grounds or on standard A. I. A. contract forms. (c) A uniform performance bond shall be required covering 100% of the contract price. (d) The architect or engineer, if separate contracts are let, shall deliver to the Division of Buildings and Grounds, in addition to the approved change orders, a copy of the final construction contract or contracts and a copy of the contract between the school board and the architect. (March 18, 1958)

22.020 **Supervision of Construction.** Before construction is started, satisfactory assurance must be furnished by the board of education that adequate supervision will be provided. The contract between the board and the architect will be approved only when the contract provides for supervision of the construction by the architect. In the event

that separate contracts are awarded for mechanical installations, the supervision of such portions of the work may be the work of a qualified representative of the designing engineer. (March 18, 1958)

22.021 **Changes in Plans.** No major changes shall be made in the contract working drawings, specifications and contract documents without prior approval of the Superintendent of Public Instruction. (March 18, 1958)

22.022 **Sum Withheld Pending Approval and for Unfinished Work.** The school district superintendent and board of education shall withhold or require that the owner withhold 10% of the contract price of the building project until the work has been given final inspection by the Division of Buildings and Grounds, and the Superintendent of Public Instruction has issued a statement that the work has been completed in accordance with approved drawings and specifications. In the event there is work unfinished at the time final inspection is desired, the architect and the board shall insure that a suitable amount is withheld to secure completion of this work. (March 18, 1958)

22.023 **Procedure Upon Completion of Building Project.** The Superintendent of Public Instruction will not issue a statement concerning the completion of a building project until: (a) He has received a statement from the superintendent and board of education of the district, which has been approved by the architect, stating that the work has been completed in accordance with approved drawings and specifications. (b) The school district superintendent and board of education of the school district shall have filed, for the benefit of the state representative who inspects the project, a set of drawings and specifications of the project as it has been completed and indicating all changes which have been made from the drawings and specifications which were originally approved. The architect shall keep a set of these working drawings on file for five years. (c) He has received a statement from the Director of the Division of Buildings and Grounds to the effect that the work has been inspected and completed satisfactorily in accordance with approved drawings and specifications. (d) The Superintendent of Public Instruction shall have the authority to waive, in writing, final inspection of any completed project if he has sufficient evidence that adequate supervision and complete compliance with the contract documents has been provided. (March 18, 1958)

22.025 **Illegal Expenditure of Capital Outlay Funds.** If any portion of capital outlay funds is expended in violation of these regulations, the Superintendent of Public Instruction is hereby given authority to withhold any further apportionment for capital outlay and debt service until the funds have been reimbursed in full by the district board of education for such improper expenditure. (March 18, 1958)

22.030 **Selection of the Building Site.** The selection and purchase of school sites, or the disposal of any site or part of a site, shall first be approved by the Superintendent of Public Instruction. In the selection

of a site for school purposes, due consideration should be given the following factors: (1) Accessibility of Site—The site should be readily accessible from the main highways. There must be a sufficient distance of clear vision on the highway to permit safe ingress and egress of school traffic to the school site.

(2) Size of Site—The site should be of adequate size and shape to provide ample playground facilities. The minimum size of school sites should be as follows: (a) Elementary schools should have a minimum of 5 acres plus an additional acre for each 100 or fraction of 100 students of anticipated enrollment. (b) High schools should have 10 acres with an additional acre for each 100 or fraction of 100 students of anticipated enrollment. (c) For twelve grade centers the site should contain 15 acres plus one acre for each 100 students. (d) The trend is toward larger sites, and due consideration must be given to future expansion.

(3) Proper Drainage of Site—Under no circumstances shall a site be used that receives an excess of surface drainage from the surrounding areas. Proper drainage at reasonable cost should be possible. The site should be level enough, with reasonable preparation cost, for playgrounds and athletic field.

(4) Suitable Surroundings—The site should be free from disturbing noises, distracting influences and hazardous surroundings. Every precaution shall be taken in order that health, morals, safety and comfort of the pupils are not endangered.

(5) Water supply—A safe and sufficient water supply shall be provided on the site.

(6) Sewage Disposal—Sites shall be selected with due regard to the satisfactory disposal of sewage. (March 18, 1958)

22.035 **Position of Building on Site.** When sufficient acreage and frontage are provided, a building with the desired classroom orientation may be designed for any site. The directional axis of the site will, however, determine to a considerable degree the design of the building. When accepted recommended brightness-differences are maintained, the problem of orienting buildings in order to have sufficient daylighting no longer exists. When these recommendations are followed, buildings may be oriented so as to accomplish the best possible utilization of sites rather than being forced into an orientation pattern which is based upon unfounded preference for any particular exposure. (March 18, 1958)

22.040 **Plan in General.** New school buildings, two stories or more, shall be of fire-resistive construction. Such buildings shall not have wood studs or wood floor joists. (March 18, 1958)

22.041 **Fire Precautions.** No room shall be located under a corridor, gymnasium, auditorium or assembly room, unless it is fully enclosed (walls, floor, and ceiling) by fire-resistive construction. (March 18, 1958)

22.042 **Mechanical, Electrical and Structural Design.** The Department of Education does not assume responsibility for mechanical, electrical and structural design. (March 18, 1958)

22.043 **Boiler and Fuel Room.** The boiler and fuel room shall be of sufficient size to permit future expansion, and so planned as to provide proper light and ventilation. The floor and walls of such room shall be of incombustible material; the ceiling, if not of incombustible materials, shall be finished with plaster at least one inch thick applied to metal lath. A convenient means of access shall be provided. Ample provision shall be made for the removal of ashes if coal fuel is used. (March 18, 1958)

22.044 **Basement Rooms.** The use of any room for instructional purposes, with floor level below the finished grade, is discouraged and in no instance shall the floor of new buildings and additions be more than two feet below the finished grade. In the latter case, satisfactory provisions shall be made for waterproofing and dampproofing the foundation wall and floor slab. Proper drainage shall be provided to keep all surface and ground water away from this area. (March 18, 1958)

22.045 **Utilization of Floor Space.** The most important part of the school building is that which is used for purposes of instruction; consequently, excessive floor space in corridors, lobbies or other divisions of the building should be avoided. Every square foot of floor space should be justified by adequate utilization. (March 18, 1958)

22.050 **Administrative Offices.** In school buildings erected in permanent educational centers and in all buildings of six or more classrooms, provisions shall be made for a principal's office. Such office shall be ample in size and should be located adjacent to the main entrance to the building, where it is readily accessible to the public. Two entrances to the office are desirable. In larger school buildings, a public reception room and secretary's office, and storage room should be provided. A private toilet and lavatory, and fireproof vault should be provided where finances will permit. (March 18, 1958)

22.060 **Elementary School Classrooms.** The elementary classroom unit shall include provision for heat, ventilation, chalkboard, tackboard, storage space for children's and teachers' clothing, a minimum of one electrical convenience outlet, storage space for instructional material and book shelves. Such other special features that the school organization may need, as may be determined by the Superintendent of Public Instruction, may be required in the approval of the school plans and specifications. (March 18, 1958)

22.061 **Size of Classrooms.** It is recommended that the size of a primary classroom should be 825 square feet and the remaining elementary classrooms should be 725 square feet. The smallest classroom that will be approved, in an elementary school, will be 625 square feet. The minimum width of a classroom shall not be less than 21 feet. The ceiling height at the lowest point shall not be less than 9′-8″ clear

height with unilateral light and natural ventilation. If mechanical ventilation is used, the ceiling height may be reduced to 9 feet clear height at the lowest point. (March 18, 1958)

22.062 **Lighting of Instructional Spaces.** Not less than 30-foot candles of artificial light will be approved for a classroom when the window area is less than 1/6 the floor area. If the window area is greater than 1/6 the floor area, the 30-foot candles may be obtained by a combination of artificial and natural light. Brightness differences shall be in accordance with the recommendation of the National Council on Schoolhouse Construction. (March 18, 1958)

22.063 **Swing of Doors.** Classroom doors shall be at least 3′-0″ by 6′-8″. It is recommended that all doors swing outward and preferably be recessed. In any room where there is a chance of panic by explosion, such as science rooms, shops, etc., and in any room that houses more than 50 students, library, cafeteria, etc., these doors shall swing out. (March 18, 1958)

22.064 **Chalkboard and Tackboard.** Each classroom shall be provided with adequate chalkboard and tackboard. The mounting height of the chalk trough above the floor should be: for the first and second grades, 24 to 26 inches; third and fourth grades, 26 to 28 inches; fifth and sixth grades, 28 to 30 inches; above the sixth grade, 32 to 36 inches. A minimum of 15 linear feet of chalkboard and 15 linear feet of tackboard is required for each classroom. The minimum vertical dimension of both the chalkboard and tackboard shall be 42″. (March 18, 1958)

22.065 **Provision for Wraps.** All classrooms accommodating children of the lower six grades shall be provided with suitable provision for wraps. (March 18, 1958)

22.070 **High School Classrooms.** The same general rules that apply to elementary classrooms shall apply to high school classrooms. All rooms shall be dimensioned to provide adequate seating capacity for the classes assigned to such room. In general, the minimum size shall be 625 square feet. (March 18, 1958)

22.075 **Requirement of Lockers.** Lockers properly ventilated shall be required for high school. (March 18, 1958)

22.080 **Special Rooms—Auditoriums, Gymnasiums or Multipurpose Rooms.** All schools of eight or more classrooms shall be provided with an auditorium, gymnasium or multipurpose room unless conditions warrant the Superintendent of Public Instruction approving the plans without such rooms. When this space is provided for in the school, it shall be located on the first floor, and regardless of size, shall be provided with at least two exits. An adequate stage shall be provided.

Entrances to the auditorium, gymnasium or multipurpose room should be planned so that these rooms may be used without disturbing the remainder of the building. (March 18, 1958)

22.081 **Science Departments.** The size of rooms for teaching science should be determined by the requirements of the course of study and necessary equipment. A combination recitation room and laboratory equipped with suitable tables, chairs, shelving and cabinets for storage of books and illustrative materials for class and laboratory study shall be provided as minimum requirements. A storage room for apparatus and supplies shall be provided. A dark room is desirable. Approximately 35 to 40 square feet per child should be provided for the science room. The type of equipment will determine the correct space. (March 18, 1958)

22.082 **Home Economics Department.** The size of the room, or rooms, for teaching home economics should be determined by the requirements of the course of study and necessary equipment. A minimum of 37 square feet per pupil should be provided if separate rooms are used for sewing, and cooking and 52 square feet per child if a combined room is used. (March 18, 1958)

22.083 **Agriculture Department.** The size of the room, or rooms, for teaching agriculture should be determined by the requirements of the course of study and necessary equipment, except that no room shall contain less than 625 square feet. (March 18, 1958)

22.084 **Commercial Department.** The size of the room, or rooms, for teaching commerce should be determined by the requirements of the course of study and necessary equipment, except that no room shall contain less than 625 square feet. (March 18, 1958)

22.085 **Library.** The library should be readily accessible to all the children in the school. Quarters for the library shall include a reading room, or rooms, and an adequate adjoining workroom. The workroom shall be equipped with running water.

In the high school, the library should be large enough to accommodate at least 15 per cent of the enrollment, allowing 25 square feet per person.

In the elementary school, the reading rooms should be large enough to accommodate the largest class. In an elementary school where a central library is not planned, an adequate central book storage space shall be provided. No reading room should be planned to accommodate more than 100 pupils.

Furniture and equipment necessary to house the collection of materials and facilitate the operation of the library should be provided. (March 18, 1958)

22.086 **Shops.** The space allotted to shops will depend upon the type and amount of work offered in the course of study. Shops, as defined here, will include industrial arts shops, farm shops, and school bus garages. Each type should meet the following requirements: (a) The size and equipment for each of the above types should be determined by the requirements of the course of study. It is recommended that the minimum size of an industrial arts shop for junior high school be

40 square feet per pupil and for the senior high school 60 square feet per pupil. It is recommended that the minimum size of agriculture shop is to be 1600 square feet. (b) The shops should be segregated or located so that noise from them will not prove objectionable to other activities of the school. (c) The shop space should be specifically designed to accommodate definite activities and equipment basic to the educational program. (d) All shops should be provided with electricity, water, drainage, heating and ventilating service in keeping with the activity of the shop. (e) Adequate and convenient storage space should be provided in connection with the shop. (f) The shop areas should be planned and equipped with a view of promoting maximum safety to life and health. (March 18, 1958)

22.087 **Lunchrooms.** (a) Dining room—ten square feet per person for 40 per cent of the enrollment is recommended. (b) Storage—One-fourth the size of the kitchen with a minimum size of 75 square feet is recommended. If a walk-in refrigerator is used, additional space for this refrigerator should be provided.

(c) Kitchen areas recommended:

| Number served | Recommended space per person |
|---|---|
| 50 pupils | 3 square feet per pupil |
| 100 pupils | 2½ square feet per pupil |
| 200 to 499 pupils | 1½ spuare feet per pupil served in excess of 200 meals served |
| 500 pupils (March 18, 1958) | 750 square feet plus one square foot per pupil served in excess of 500 pupils |

22.090 **Corridors.** The minimum width of a corridor without lockers serving elementary classrooms shall be 8 feet. If an exterior exit is provided from each classroom, the corridor width may be reduced to 6 feet. Minimum width of junior high school or senior high school corridors with lockers on both walls shall be 9 feet in the clear, and should be increased to a minimum of 10 feet at all congested areas such as lunchrooms, libraries, auditoriums ,etc. (a) A ramp up to 7½ per cent slope will be approved in a corridor. If this ramp is between 5 per cent to 7½ per cent slope an abrasive surface must be used. Ramps greater than 7½ per cent slope will not be approved. Changes in direction of ramps must have level platforms or landings. (b) Each end of every corridor shall terminate on an egress or at a stairway; however, in a fire resistive building a corridor extension of one classroom not more than 35 feet in length from the stairs may be permitted beyond the stairs or exit. (March 18, 1958)

22.095 **Entrances and Exits.** (a) All exterior doors must swing out. They shall be provided with panic hardware of approved and standard construction. Exits shall be so located that there is at least one stairway or other exit way within 100 feet of an exit door of each room. Not less than two exits shall be provided for each building. (b) All exit doors other than metal shall be either recessed or protected by a canopy. (March 18, 1958)

22.100 **Stairways.** Every schoolhouse of two stories or more shall be equipped with stairways constructed of concrete or metal. No such building shall have fewer than two stairways remote from each other. All required stairways shall open directly to the outside. This shall not prohibit vestibules or other protection against the weather, provided there is no curtailment of the exit facilities. (March 18, 1958)

22.101 **Lighting of Stairways.** All stairways shall be adequately lighted. (March 18, 1958)

22.102 **Width.** Width of main stairways shall not be less than 44 inches. All stairways must be provided with a handrail on each side. If the width is 7'-4" or greater they shall be provided with an intermediate handrail. (March 18, 1958)

22.103. **Runs.** Each main stairway from story to story shall be in two runs with not more than 16 risers to the run. The intermediate landing shall be of at least the same width as the stairway. (March 18, 1958)

22.104 **Risers.** Risers for main stairways shall not exceed 7 inches and treads shall not be less than 10½ inches in width. Less rise and wider treads are recommended. (March 18, 1958)

22.105 **Door Openings.** No door shall open immediately upon a flight of stairs; a landing at least the width of the doors plus 3 feet shall intervene between the door and the first step. All exit doors shall have clear wire glass panels in fixed frames. (March 18, 1958)

22.106 **Storage.** No storage space shall be placed under or over any stairway. (March 18, 1958)

22.107 **Exterior Steps.** The use of exterior steps shall be discouraged and reduced to the absolute minimum. (March 18, 1958)

22.110 **Sanitary Conveniences—Plumbing and Sewage Disposal.** All plumbling shall be installed in accordance with the National Plumbing Code. (a) In school buildings erected in permanent educational centers and in all buildings of six or more classrooms, adequate provisions for a water supply to the interior of the building shall be made. Also, provision must be made for adequate toilet rooms located in the same building and these rooms shall be adequately heated and ventilated. Satisfactory arrangements for sewage disposal shall be made which meet requirements of the State Board of Health. (b) An approved type of plumbing fixture shall be used. (March 18, 1958)

22.115 **Water Closet, Lavatory and Urinal Requirements.** The following schedule shall be used as basis for installing the fixtures in toilet rooms:

Elementary Schools

| No. of Boys | Water Closets | Urinals | Lavatories | No. of Girls | Water Closets | Lavatories |
|---|---|---|---|---|---|---|
| 25 | 1 | 1 | 1 | 25 | 2 | 1 |
| 50 | 2 | 2 | 1 | 50 | 3 | 1 |
| 100 | 2 | 4 | 2 | 100 | 6 | 2 |
| 200 | 3 | 6 | 3 | 200 | 8 | 3 |
| 300 | 4 | 8 | 4 | 300 | 10 | 4 |
| 400 | 5 | 10 | 5 | 400 | 12 | 5 |
| 500 | 6 | 12 | 6 | 500 | 14 | 6 |

Suggested Installation Heights for Fixtures

| **Water Closet Height** | **Lavatory Height** | **Urinal Height** |
|---|---|---|
| Kindergarten and Primary—10″ Rim Height | Elementary—25″ | Elementary—15″ |
| Elementary and Junior High—13½″ Rim Height | Junior High—30″ | Junior High—30″ |

High Schools

| No. of Boys | Water Closets | Urinals | Lavatories | No. of Girls | Water Closets | Lavatories |
|---|---|---|---|---|---|---|
| 25 | 1 | 1 | 1 | 25 | 1 | 1 |
| 50 | 1 | 2 | 1 | 50 | 2 | 1 |
| 100 | 2 | 4 | 2 | 100 | 5 | 2 |
| 200 | 3 | 6 | 3 | 200 | 7 | 4 |
| 300 | 4 | 8 | 4 | 300 | 9 | 5 |
| 400 | 5 | 10 | 5 | 400 | 11 | 7 |
| 500 | 6 | 12 | 6 | 500 | 13 | 8 |

Suggested Installation Heights for Fixtures

| **Water Closet Height** | **Lavatory Height** | **Urinal Height** |
|---|---|---|
| Junior High and High School—13½″ | Junior High and High School—30″ | Junior High—15″ High School—18″ |

(March 18, 1958)

22.120 **Drinking Fountains.** Drinking fountains shall be provided in the ratio of one bubbler to 75 students—with a minimum of one drinking fountain on each floor or each wing. The minimum distance of 50 feet shall separate each drinking fountain, and not more than two bubblers shall be permitted on each fountain. Drinking fountains shall not be placed in the toilet rooms. Drinking fountains shall be recessed, if possible, and an electrical outlet shall be placed at each drinking fountain. The following heights for nozzles or drinking fountains are recommended:

Kindergarent and Primary .... 24″
Upper Elementary ..... 28″
Junior High ..... 32″
Senior High ..... 36″ (March 18, 1958)

22.125 **Shower and Locker Rooms.** Ample shower and locker rooms for each sex shall be provided in all junior and senior high schools conveniently located in relation to the gymnasium. (March 18, 1958)

22.130 **Control of Sunlight and Interior Decorations.** Every precaution should be made to control the natural light in each classroom. If window shades are used to control the sunlight, it is recommended that these shades be mounted on two rollers near the middle opening, one operating upward, and one operating downward.

All classroom walls should be of light color but not white. Pastel colors with a reflection factor of from 52 per cent to 78 per cent are recommended. In all cases the ceiling shall be white or off-white to facilitate the reflection of light.

No surface shall have a glossy finish. (March 18, 1958)

22.140 **Heating System.** (a) The heating system shall be of ample capacity and so installed as to insure uniform temperature being maintained in all occupied rooms at 70 degrees when the outside temperature is zero.

The temperature should be taken at the breathing line between 3 and 4 feet above the floor. All rooms, corridors, stairways, and space used for school purposes shall be heated. (b) An approved type of heating system shall be used. (March 18, 1958)

22.145 **Natural Ventilation.** (a) In classrooms the area of window ventilation shall be equal to 12 per cent of the floor area. (b) Each toilet room in a school building shall be individually vented by means of a vent duct. This vent should be located at or in the ceiling of each toilet room and run directly to the outside. Toilet rooms for opposite sexes shall not be connected to a common ventilation duct. Entrance and passage doors for each toilet room shall be louvered. (c) Toilet stalls should be approximately 10 inches from the floor so as to allow air to pass under. Doors to toilet stalls should be hung on gravity hinges. (March 18, 1958)

22.150 **Mechanical Ventilation.** Room air circulation in room volumes shall be a minimum of 8 air circulations per hour, with a minimum of 15 per cent fresh air introduced in the room per hour.

All mechanical ventilation in connection with educational areas should be thermostatically controlled. (March 18, 1958)

22.160 **Electric Installations.** All wires, fittings, materials, installations and construction work used in the electric wiring must be in accordance with safe practice requirements of the National Electric Code. (March 18, 1958)

22.165 **Fire Alarms.** An approved type fire alarm system shall be used in each school. (March 18, 1958)

22.170 **Modification of Regulations.** The Superintendent of Public Instruction shall have authority to modify the regulations, in minor respects and on an experimental basis, when adequate defense of the

modification is presented by the architect or the superintendent of the school district. This authority shall be used with discretion. (March 18, 1958)

## Capital Outlay Funds

22.300 **Expenditure of Funds from the Capital Outlay Account.** (1) Definition of "Capital Outlay." "Capital Outlay" is defined to mean changes in the building structure of such nature as to provide new additions or to replace a building with a new structure. It includes major remodeling jobs, such as changes in the style or structure of the building. It is the expenditure of funds for anything which increases the total amount of property controlled by the school board as follows:
(2) Definition of "New Grounds." "New Grounds" is defined to mean all land purchases for school sites, additions to school sites, playgrounds and recreation fields, together with all costs of acquiring title to same, condemnation and appraisals, deeds, abstract fees, surveying, and special legal surveys incurred in connection with the purchase of such land. All expenses in connection with improvements of new sites, such as sidewalks, drives, fences, flag poles, filling, grading, seeding lawns, setting out trees and shrubbery, and professional landscaping services, when made as an original outlay should be classified as expenses in connection with new grounds.
(3) Definition of "New Buildings." "New Buildings" includes all funds used for erecting the original structure, including painting and decorating the building, interior and exterior, advertising for bids, special bond election, and architect's fees paid by the board of education in connection with new buildings. These items should be charged to the Capital Outlay Account.
(4) Definition of "Improvements to Buildings and Grounds." "Improvements to Buildings and Grounds" includes the expenses of improvements to buildings incurred in removing old buildings, partitions or walls and all costs of adding new doors, windows, stairways, rooms, etc. The expense incurred in connection with new service system or improvements to old service systems in an old structure, such as heating and ventilating, fire protection, plumbing, and electric service, should be classified as capital outlay.
(5) Definition of "New Furniture and Equipment." "New Furniture and Equipment" includes new furniture such as tables, chairs, desks, file cabinets, and lockers. Includes also the cost of instructional apparatus for agriculture; arts, biological, home economics, chemical and commercial apparatus; industrial and physical laboratory equipment; as well as the cost of new library equipment, books for new libraries, and replacement of existing equipment regardless of where used. These items may be classified as capital outlay.
(6) Definition of "Maintenance." "Maintenance" includes all repairs and general upkeep of the plant and equipment and is not to be charged to the Capital Outlay Account. When there is a question as to whether an item is Capital Outlay or Maintenance, the item should be submitted to the Division of Buildings and Grounds for approval as Capital Outlay.

(7) Definition of "Repair." "Repair" includes replacement of broken pieces and worn parts, as well as mending of broken joints and connections, and it is not to be charged to the Capital Outlay Account.

22.310 **Construction Projects.** (1) Before proceeding with a construction project involving expenditure of funds from the Capital Outlay Account, the need for school facilities shall be determined as follows: (a) By the School Facilities Survey under authority of Public Law 815. (b) When it is determined that the facts contained in the School Facilities Survey, under authority of Public Law 815, appear to be inadequate to determine the building program for the district, the Superintendent of Public Instruction shall order a new survey to be conducted in order to secure the needed facts for determining the building program to adequately house the instruction program for the district or any part of the district. The Head of the Bureau of Instruction shall be asked for approval of any changes in the program for the particular building or location.

22.320 **Required Survey Facts and Recommendations.** (1) Some Characteristics of the Community. (a) Population and trend; (b) Industry; (c) occupations; (d) roads.

(2) Some characteristics of the school. (a) Census for past ten years; (b) Birth rate of state and district; (c) Enrollment for past ten years; (d) Future prospect.

(3) Present Educational Program. (a) Elementary schools; (b) Secondary schools; (c) Special services; (d) Adult education and community use.

(4) Proposed education program. (a) Elementary schools; (b) secondary schools; (c) special services; (d) adult education and community use.

(5) Present individual plant adequacy. (a) Type structure and facilities; (b) spaces listed; (c) rating of building and site; (d) membership by school years; (e) membership by grades.

(6) Proposed Individual Plants. (a) Elementary schools; (b) secondary schools; (c) Special services; (d) Recommended membership and building program for each plant; (e) School transportation.

(7) Assessment Value per Child in Average Daily Membership. (a) Real estate; (b) Tangible; (c) Franchise; (d) Bank shares; (e) Whiskey.

(8) Assessment Ratio and Valuation per Child in Average Daily Membership.

(9) Bonding Potential.

(10) Administration and Garage Buildings.

22.330 **Classification of School Centers.**

Class A—A center of this class is well-located and will serve the needs of the school district for many years. In this class of center, plans for adequate school facilities should be formulated in accordance with recommendations of a survey, subject to such amendments as are necessary to meet future trends and new developments.

Class B—A center of this class is one which evidence indicates will be a permanent center, but the evidence is not conclusive. It has practically the same status as Class A except the status should be reviewed before major construction is undertaken.

Class C—This class of center will probably be used for a number of years. In such a center, there should be constructed only the necessary lighting, sanitary, safety, and heating improvements. No new construction or additions should be made.

Class D—A center of this class should be discontinued as soon as adequate facilities can be provided elsewhere. If use cannot be discontinued immediately, lighting, sanitation, safety, and heating may be improved. Any improvement should be salvageable when the center is discontinued.

Class E—A center of this class should be closed in the immediate future. No capital outlay funds should be spent for such centers.

22.340 **Priority Determination.** (1) Priorities for projects shall be established by local district boards of education and approved by the Bureau of Instruction as a part of their application for approval of building projects. Priority needs of projects shall be established in the following manner:

(2) The superintendent of the district shall formulate a proposed building program to meet the foreseeable school plant needs of his district for the ensuing five years. The proposed building program shall be based on a survey as provided herein. It shall list the projects in the order of priority or need as determined by the survey and the schedule of priority. The application for approval shall show that the building program and the priority of projects conform to the provisions of these regulations.

(3) When the over-all educational program has been approved by the Bureau of Instruction, the priority shall be followed as set out for the projects. The building program proposed and the priority of projects shall remain in effect until the board of education of the district, through its superintendent, may propose that there be a change. Such changes may be made by following the procedure under which they were originally established.

(4) If it is found that the proposed building program and priorities of projects do not conform to the requirements of any proposed program or the amendment of a building program and these regulations, the superintendent of the district shall be notified of such lack of conformation giving reasons and suggesting necessary changes.

(5) If any superintendent and board of education deem that it will be advantageous to the welfare of the school district to deviate from a schedule of priorities as has been prescribed in this regulation, they may make a full statement of the facts in writing and submit them for the review of the Bureau of Instruction for its approval of the request to deviate from the priorities then in effect. This approval must be secured before proceeding with the project.

22.350 **Construction Priorities.** (1) Following is a list of five priorities which include the classification of the various projects which may be financed through the Capital Outlay Account. All projects of a higher order shall take precedence over projects of a lower order, except as stated in the order of priorities.

(2) First priority—Included in this classification are new school sites, additions to sites, and new classrooms necessary to provide each child with comfortable, reasonable, and satisfactory classrooms at the rate of thirty pupils enrolled per classroom. In determining needs for this priority, sub-standard classrooms which are comfortable, well-lighted, well-ventilated, and otherwise suitable for use as classrooms, as stated in requirements for sub-standard classrooms herein, will be considered satisfactory for only one year. If improvements in heating, lighting, ventilation, or sanitary facilities can be made which make the classrooms standard, these rooms may then be approved as standard.

(3) Second priority—Included in this classification are lunchrooms, libraries, shops, homemaking rooms, and science rooms. Physical education showers and dressing rooms when necessary for the school program for which the school center is recommended as permanent center, on the basis of the survey, may be included, also. Such facilities may be considered in First Priority when a complete new school plant is proposed for construction at one time, if recommended on the basis of the survey.

(4) Third priority—Included in this classification is the replacement of sub-standard, but usuable, classrooms and sub-standard, but usuable, heating, lighting, and sanitary facilities.

(5) Fourth priority—Included in this classification are new auxiliary facilities, as listed in Second Priority to replace unsatisfactory, but usuable, facilities.

(6) Fifth priority—Included in this classification are auditoriums and gymnasiums, special band and music suites, and other desirable, but not absolutely essential, facilities. These may be given a higher priority when part of the original plans of a new school plant.

22.360 **Standards for Remodeling.** (1) In remodeling old buildings for school use, the quantity and quality of all spaces in the remodeled buildings to be used for instructional purposes shall meet the requirements of new spaces that would be used for the same purposes. Plans and specifications must be approved under KRS 162.160.

(2) Provisions should be made at such school building for such outside, as well as inside, activities as will be needed to meet requirements for the physical education program to be conducted in the school program.

(3) Before new school plots, as well as all additions to old plots, are purchased, they shall be approved by the Director of the Division of Buildings and Grounds. This is necessary to guarantee they will meet all requirements of size for housing the program, as well as health, and safety requirements.

(4) No part of an existing school plot upon which a school building is in current use shall be sold until the approval of such sale has been made by the Superintendent of Public Instruction.

22.370 **Rented and Reoccupied Classrooms.** (1) No space of less than 480 square feet shall be approved for a classroom unit.

(2) No space shall be approved unless it provides a minimum of 16⅔ percent as much window area as floor space, unless an intensity of 30 foot candles by artificial lighting, uniformly distributed, is provided.

(3) No space shall be approved unless adequate provision is made for ventilation, either forced or by windows.

(4) No space shall be approved unless sanitary and toilet facilities are approved by the State Board of Health.

(5) No space shall be approved unless the heating and fire safety of the space is approved by the State Fire Marshall. Classroom doors shall swing outward, and exterior doors shall swing outward and be equipped with panic hardware.

(6) No space shall be approved unless some play area is provided.

(7) No classroom or other assembly area for children shall be approved above the ground floor of a frame building, or above the ground floor of a brick building which does not have fire resistive halls and stairways and two exits, separate from each other, from each floor.

(8) No classroom shall be approved unless it contains the minimum chalkboard and tackboard area.

(9) No building shall be approved for classroom space when the environment is unsuitable for school purposes.

(10) Approval of such sub-standard facility shall be for one year only.

(11) No building or space shall be rented or purchased and converted to classroom use without prior approval of the Superintendent of Public Instruction.

# IV. ROLE OF AGENCIES

## A. State Department of Education

The essential function of the State Department of Education in school plant planning is service. Those responsible for providing this service welcome an opportunity to work with local authorities. Because in Kentucky these individuals see all plans for public school construction and have served in consultative relationships in one way or another with superintendents and boards of education in planning hundreds of school building projects, they are in a position to render consultative service which may be of value to local officials in planning any school building program. In general, local officials may expect the following listed services from the officials of the State Department of Education.

1. Advice about the general steps to be taken and the legal requirements to be met in the improvement of the present school buildings and school sites.
2. Suggestions on working with architects and site planners in the designing of school buildings and school sites which will be functionally superior.
3. Help in planning public relations programs including the organization of citizens' planning groups in connection with school buildings and site projects.
4. Consultative service in working with local citizens and school personnel who are conducting their own studies for building and site needs.
5. Surveys for the location of school buildings and sites.

All sites must receive the approval of the Division of Buildings and Grounds acting under the authority of the Superintendent of Public Instruction. In addition certain agencies in the State Department of Education have the responsibility for approving various aspects of the building program. Approval of the Bureau of Instruction is necessary for the educational program, the Division of Finance the financial program and all plans and specifications must be approved by the Division of Buildings and Grounds before bids are accepted.

6. Advice on other sources of special help and technical assistance.

The advice and assistance which the State Department of Education can give will be most effective if it is used early in the plan-

ning process. The individuals of the department who assist in the planning of school building projects desire to give as much service as possible and to be available whenever they are needed. If this service is to be most effective it is desirable that local officials contact the State Department some time before work is to begin in order that the planning process may get started in the manner which will be most valuable to local officials.

## B. Responsibility in Planning

The planning and construction of a school plant in Kentucky is principally the responsibility of the officials of the district in which it is located. The people of a community are interested in having a plant which will meet their needs for safety, comfort and physical well-being of the pupils and which will be economical in cost of construction. They want plant facilities which will best serve in achieving the educational purposes of the school.

School plant planning involves a large number of decisions. All districts need expert advice in getting a building so designed as to guarantee construction to meet the particular needs and conditions. To secure the best results requires the participation of citizens as well as educational and building specialists. The services of several specialists who are not members of the community will be needed because of their technical abilities.

### Principles to be Observed in Discharging Responsibility

In working together in the planning and the designing of a school plant, responsibilities must be fixed and relationships must be determined, understood and accepted. The principles listed below are basic to the responsibilities that should exist in planning and in designing a school plant.

1. The people of a community should participate in determining the program to be housed, and any new plant to be constructed. They need technical advice in their considerations. Conclusions and recommendations should be transmitted to the board of education for appropriate action.
2. While the state is the owner, the local board of education is in control of the school plant. It, therefore, should make the final decision.
3. A local board of education employs specialists including administrators, teachers, custodians, architects, contrac-

tors and consultants to carry on its operation, to advise it on technical and professional matters and to perform other assigned tasks.

**Participants in Planning**

Who should be the participants in planning a school plant? The following is a suggested list of officials, individuals and organizations which have been found to be essential in a school plant planning program.

1. A representative cross section of the people of the community.
2. The school board.
3. The superintendent of schools, who is executive officer of the board.
4. The school staff.
5. Educational consultants.
6. The State Department of Education.
7. Architects and engineers.
8. Technical consultants.
9. Contractors and builders.
10. Local district governing body.

**Responsibilities of Each of These Groups**

1. **People of the Community.** They should assist, by a committee, in determining the need of the school plant. This should be done through a study of the community growth as well as size and condition of the present plant, educational needs, financial ability and obligations, etc. The records of this group should be passed on to the school board for action.

2. **The School Board.** The board should take action based upon consideration of facts as shown by an authorized study. It should select and appoint architects and consultants to aid in making decisions. It is the legal duty of the board to select and purchase sites after approval by legally authorized agencies. It is also legally required to authorize all contracts and accept the completed building after contracts have been completed. It should act as the legal agent for the district in all phases of planning, designing and constructing plants.

3. **The Superintendent of Schools.** As the executive officer of the board, the superintendent should recommend personnel, procedures, policies and advise the board on all phases of the building program. As the educational leader of the community he should suggest and take the responsibility for studies which should be made showing plant needs. He should direct the collecting and interpreting of data, advise and assist school and community groups in cooperative planning and act as agent of the board in all phases of the program.

4. **The School Staff.** This staff should consist of individuals from a cross section of the services to be offered. It should assist in planning and carrying out of studies, aid in the interpretation of the findings of these studies and educational specifications and space requirements of the contemplated school plant.

5. **Educational Consultants.** When these are available they should confer with the superintendent of schools, the educational staff and state authorities and advise the school board through the superintendent of schools on functional and educational layouts of floor plans and other phases essential to the school plant program under consideration.

6. **State Department of Education.** Designated representatives of this department should advise local groups on procedures, state regulations and other matters essential to the proper school building program. It should, in so far as it is equipped to do so, provide technical assistance and information. All this should be done on request. In so far as possible it should give supervision and approval of the building construction, which has been erected according to plans and specifications which have been approved as meeting requirements of law and the regulations of the State Board of Education.

7. **Architects and Engineers.** These technicians should advise the board (through the superintendent of schools) on phases of the program for which they have technical training and experience, translate the educational program for which plant facilities are needed into a building design and write specifications for same. They should advise on letting contracts, supervise or direct the super-

vision and construction and recommend approval and acceptance of the completed building.

8. **Technical Consultants.** These individuals should advise on matters for which they were employed and for which they have preparation and experience. These consultants are usually needed on such matters as landscaping, lighting, heating and ventilating, acoustical planning, legal and financial matters.

9. **Contractors and Builders.** These organizations should construct the plant in accordance with the approved plans and specifications, accept responsibility for expert craftsmanship and skilled workmanship in executing the drawings and specifications under the supervision of the architect and the owner's designated representatives.

10. **Local District Governing Body.** This body will be the fiscal court, city council or city or county commission. This body will be the owner when revenue bonds are sold to secure funds. While legally it is the owner, it should take required action only after approval of the board of education or its authorized agent.

## C. Relationships in Planning

### Relationships of the Participating Groups

The board of education is the legal agent for the community and, therefore, should act as the owner of any plant program. The board should review and approve proposals, recommendations and employ all personnel and authorize payment of employees and all work on the recommendation of its executive officer. In doing so it should proceed under the requirements of law and rules and regulations governing its action and make certain that all of these requirements are met.

The superintendent of schools, as the executive officer of the board, is responsible for seeing that the policies and decisions of the board are put into effect. All personnel are responsible to the board for work assigned them through administrative channels as required by law and established by the board.

The school board, in carrying on its school plant program, may appoint a coordinator of the entire enterprise to be responsible to the board and the superintendent for developing proper understanding of jobs to be done, allocation of tasks,

coordination of functions and jobs, and effecting orderly procedure leading to the efficient completion of the job at hand. If such a coordinator is employed, he should be the most efficient and responsible person available. When the executive officer of the board—the superintendent of schools—has the preparation, skill and experience, he is ordinarily made the coordinator. Where the superintendent of schools does not have such training and experience or the necessary time from his other duties, he should recommend to the board the appointment on his staff of the most competent person who can be secured to act as coordinator of the project.

When building construction is to be financed by revenue bonds which requires action of the governing body, this body should take action required only after it receives approval for such action by the board of education or its legally authorized agent or representative. However, the local governing body, Fiscal Court or City Commissioners, should be made aware of the plans of the school board well in advance of the time for them to act. They should be informed of their legal role in the process. This will eliminate misunderstandings which would tend to delay the consummation of the plans for the project.

No person, firm or agency which might have a financial interest in the designing and construction of the school building should be legally given the responsibility for conducting a survey to determine the present and future need for building. Any coordinator should be chosen for his unique ability to organize the work of all groups and to obtain the best efforts of all people and the groups working on the program.

**Functions of the Participating Groups**

1. **The functions of school administrators and educational consultants in school plant planning.** The functions listed under this heading include those to be performed by the administrative and supervisory staff, teachers, lay groups and educational plant consultants employed by the board. Findings and recommendations resulting from these functions will be the instructions to the architect when recommended by the local superintendent and approved by the local board of education. They should proceed as follows:

a. Conduct Surveys. These surveys should include contemplated programs for the school and community services, satisfactory local school district organization and the

evaluation of existing school plants. Specialists from the State Department of Education and the architect should advise and assist in inspecting existing buildings for structural adequacy and remodeling possibilities.

b. Develop and recommend long range master program including the location, type, size and priority in constructional projects.

c. Determine adequacy of present buildings. See this topic in Principles of Planning.

d. Submit a detailed statement concerning the financial standing of the district to determine its financial ability to construct the building program, and secure approval of the financial program by the State Department of Education in order to determine what may be constructed immediately and what must be left for future construction in order that the remaining planning activities may be determined and governed.

e. Recommend the selection and acquisition of sites. In performance of this function representatives from the State Department of Education and the architect should be consulted.

f. Provide the architect with information necessary to determine property lines, ownership and other information necessary for him to construct topographic maps, make soil tests, percolation tests and locate utility lines and other features necessary to the proper construction of the building project.

g. Determine a schedule of facilities to be included in each project in terms of number, capacity and area of each type of room and other major space. Prepare and recommend to the board of education a set of instructions for the use of the architect. These should include educational specifications and design data as to space and facilities to be incorporated in the tentative sketches.

h. Determine the requirements for shelving, cabinets and closets for the storage of books, supplies, cloaks, etc.

i. Interpret State Board of Education regulations and laws governing the project.

j. Review architect's tentative sketches and suggest changes for efficiency in economy before they are submitted to the State Department of Education for review.

k. Review and approve preliminary drawings and make recommendations to the board concerning any changes that should be made before they are submitted to the State Department of Education for approval.

l. Work closely with the architect, particularly during the period of preparation of preliminary drawings, cost estimates and equipment layouts.

m. Review working drawings and specifications before they are submitted to the State Department of Education for approval.

n. Prepare advertisement bid forms and tabulate bids, recommend contractors and prepare contract documents. (These functions should be performed with the advice and assistance of the architect and legal counsel.)

o. Recommend for approval any necessary change orders recommended by the architect.

p. Inspect and recommend acceptance of the completed job with the architect's advice.

**2. Functions of the Architect in the School Plant Program:**

a. Provide consultative services to educational authorities in preparing educational specifications.

b. Review with the educational staff the educational program as well as the proposed schedule of facilities in preparation for making sketches.

c. Prepare and revise, as instructed, tentative sketches and preliminary drawings.

d. Interpret the application of building codes.

e. Recommend and give advice on structural materials.

f. Provide educational authorities with cost estimates.

g. Prepare final working drawings and specifications.

h. Aid the board of education in preparing and awarding contracts.

Such service should include:

Providing promotional materials in bond issues such as photographs and drawings which the board of education feels essential for assisting in informing the people.

Assisting in checking and preparing advertisements for bids.

Explaining and clarifying plans and specifications during the bidding period.

Tabulating bids.

Furnishing the board information on performance and financial records of the bidders and the individual to whom contracts are finally awarded.

Assisting the board in securing performance bonds of the individual corporations to which contracts have been awarded.

i. Direct supervision of the structure. This service should include:

Large scale drawings.

Check shop drawings.

Interpreting drawings and specifications for the contractor.

Making field tests for inspections.

Approving materials of subcontractors.

Making constant check to determine that the true intent of the plans and specifications is being met.

Seeing that the owner gets copies of all guarantees, route bonds, field tests, etc.

Supplying the superintendent, as executive agent of the board, with documentary material regarding the operation of maintenance of the plant and equipment.

j. Check progress of work, issue payment certificates, recommend final acceptance and in general administer the total construction process.

k. Provide educational authorities with a final set of drawings including on the job changes and corrections.

3. **Cooperative Functions.** The following lists the types of "special determinations" which must be arrived at cooperatively between the educational and the architectural specialists.

a. Determine the general type of structure and number of stories of the building.

b. Determine types of sanitary, heating and ventilating equipment.

c. Determine types of finish of flooring, interior walls and ceilings.

d. Determine orientation, fenestration pattern, classroom ceiling heights, etc.

e. Determine type and intensity of electric light installation.

# V. THE SCHOOL PLANT PROGRAM

A successful building program requires the participation of many persons, the careful co-ordination and scheduling of a great diversity of activities, and sufficient time to plan and execute the program.

Society has a right to expect that its schools will provide educational programs suitable to meet the needs of those who will attend them. Schools, therefore, are expected to give consideration to providing educational facilities for all the children. Our present society will not be satisfied with educational programs which are only academic in scope.

The school of the future will be required to furnish many services which it has not provided in the past. It will be expected to provide programs covering health, physical education, recreation, music, art, hot lunches and opportunity for wider participation in community activities and programs which involve activity as well as abstract thinking. The school of the future will be expected to be much more than a series of rooms with fixed seats. Many special rooms and equipment will be needed as instructional spaces. What once were known as classrooms will become more or less work shops with large spaces, informal equipment and mechanical and electrical facilities for audio-visual aids. Much shelving, cabinet and closet space will be needed for the protection and systematic storage for pictures, films, records and innumerable other gadgets that will become as much of the modern school as the old blue-back speller and slate of the schools of many years ago.

The educational program conducted in the building of the future will not be all indoors. Large sites will be required for school and community recreation, parking, landscaping, swimming pool and special buildings, such as shops, and recreational area. The school of the future should be the educational and recreational center not only for the children, but for the adults of the community which it serves. Functional facilities should be the guiding objective in planning the school plant. The trend is toward single story buildings of simple but dignified design, on large sites, and away from noise and confusion.

In order for the school plant to meet requirements for a future expanding educational program, it must provide more land, more

floor space, increased number of entrances and exits, natural and artificially controlled lighting, acoustical treatment, built-in features, informal furniture, instructional supplies, books, pictures, more color, tools and gadgets which we cannot now anticipate. The school plant for the future should be functional and built to accommodate groups of children busily engaged in activities which will develop minds, build bodies and form character. The building in a large measure conditions the educational program which may be operated within the spaces provided.

Major steps to be taken in securing a new school plant are:

1. Analyze the educational needs of the community and determine the future school program as a basis for the evaluation of existing facilities as well as the planning of new or remodeled ones.
2. Survey the entire school district to establish a long range plan for future school plant improvements, including a consideration for district organization where appropriate.
3. Select and acquire, with State Department approval, any sites needed to implement the long range plan resulting from the survey.
4. Develop the educational specifications for each separate project in the approved long range plan resulting from the survey.
5. Develop each separate project in accordance with the approved educational specifications, and from the approved design develop the working drawings and specifications.
6. Secure approvals required from various agencies of plans and specifications.
7. Secure bids, let contracts, and erect the building.
8. Equip the completed building and put it into use.

It is important throughout the planning, building and period of use to evaluate the process and the results and to determine procedures and features which should be modified, improved or eliminated in future buildings.

School plants become educationally obsolete before they are physically worn out, for this reason a school plant should be planned to implement the educational program as planned rather than forcing the program into a building that was not planned for it.

The analysis of the community needs may reveal that other agencies may be helping in the whole educational program. An example

is a summer recreational or swimming instruction program operated by and in city parks. It may be unnecessary to provide such facilities in the school plant or plants.

The analysis may also reveal that the school district as constituted may be unable due to size or other reasons to provide the services and facilities desired. Under some conditions in independent districts a merger with the county district may be desirable. A decision must be made regarding the total services to be provided by the school or provided in the school plant for the age groups for which each service will be made available.

When the scope of the school program has been established, decisions will need to be made regarding:

1. The type of school organization.
2. The optimum size of the school.
3. The desired size of classes.
4. The curriculum content.
5. The internal organization for instruction.
6. The teaching methods and materials.
7. The provision for health services.
8. The special facilities for shops, libraries, laboratories, music and dramatics.
9. The provision of facilities for assemblies, music and dramatics.
10. The social and extra curricular program.
11. The athletic program.
12. The lunch program.

The basic program planning should be a co-operative endeavor involving the staff of the schools, the citizens of the community, the board of education, special consultants and the State Department of Education. The approach is not an easy one for a superintendent or board of education. It requires a high order of leadership on the part of the superintendent. A clear understanding of the functions and responsibilities of the participants is important. The committees should be kept small, the meetings informal and enough time provided for a thorough study of all aspects of the problem. All members must have assurance that their ideas and proposals will be given consideration when their report setting forth the essential features of the program is presented to the board of education.

Many factors of the school system must be given consideration in the planning process. Some of these are:

1. The extent to which existing facilities can be used and for what purpose. This includes remodeling, renovation, expansion or abandonment of facilities. The characteristics of existing buildings with respect to physical condition, safety, sanitation, traffic, cost of operation and maintenance should be determined.
2. The location of buildings with respect to residences of pupils, routes of travel, areas available and costs.
3. The size of buildings for immediate use and the ultimate size.
4. The financial resources of the district. Is there enough money from present resources or must the building depend upon voting a building tax? Will it be necessary to secure an increase in the assessment ratio to provide enough funds?

When all data have been collected and analyzed regarding present and future needs, existing facilities, potential sites and financial resources, the committee is ready to begin to prepare recommendations. A specific proposal should be made regarding the use of each new facility and the future use of each existing facility. These recommendations should satisfy as far as possible the total needs of the school district and at the same time remain within its financial limitations. Care must be taken that some expedient recommendations will not block the realization of some part of the master plan. Recommendations must be tested against future changes in district organization such as mergers. Compromises may be necessary which will do the least damage to the master plan. Care must also be taken that undue influences is not exerted on committee members or the school board by pressure groups who want a certain location, an outsize gymnasium or to maintain a status quo to the detriment of the children.

### C. Adequacy of the Present Plant

An evaluation should be made of the present school plant in the light of long range planning. This should be done in order to determine ability to house the present school program and to better provide for the comfort, health, and safety of those who use the buildings. As a measure of economy, any servicable facilities should be continued in use even though funds are available for replacing them.

Many buildings that are structurally sound may be educationally obsolete. Such buildings, when they are reasonably well located, may be used in long range school plant planning even though they may have deficiencies, provided these deficiencies can be corrected at a reasonable cost. It is understood that such costs should be in line with the usefulness of the facilities which will result from the remodeling.

Even though a building may be worth remodeling, declining enrollment, shifting population and changes that should be made in the building may make it unwise to consider remodeling or making changes because of an apparent change in the educational program of the community. Two basic questions should be answered before specific improvements are made in modernizing any school building: (1) Is the building structurally and educationally worth remodeling? and, (2) is the building, if remodeled, needed in the housing of the educational program that will be carried on in the community?

In determining the answers to these questions, at least the following points should be considered:

1. **Health and Safety—**
   a. Do the exits from classrooms, assembly rooms, corridors and stairs offer the necessary protection for children and teachers? If not, can this be provided?
   b. Is the building fire-safe? Can it be made so?
   c. Does the building have proper approaches?
   d. Are adequate and functional sanitary facilities available?
   e. Are the stairways, passageways and doors large enough, fireproof and kept open?
   f. Is it free from dust, dirt, noise, unpleasant odors and gases?
   g. Is the water supply adequate and pure?
   h. Are there any other features that would hamper general safety?
2. **Site—**
   a. Are the physical features such as to permit improvement?
   b. Is it large enough for the program? (Minimum requirements for new sites are five acres for the first one hundred pupils and an acre for each additional hundred for elementary schools. For high schools, ten acres is the minimum for the first one hundred pupils with an acre for each additional hundred.)

c. Can additional desirable land be secured?
d. Can the present lot be improved by landscaping, which includes shrubbery, roads, walks, etc.?

3. **Lighting**—Is the lighting, both natural and artificial, satisfactory? Can it be made to meet minimum standards?

4. **Toilet facilities**—
a. Are the present facilities satisfactory and large enough?
b. Should they be replaced?
c. Are they well located, well lighted and ventilated?

5. **Heating**—Is the heating plant satisfactory or can it be made so?

6. **Remodeling vs. adequacy**—If the buildings are remodeled, will they be comfortable and generally satisfactory for the educational program? In other words, will the community be satisfied to continue the school for the next eight or ten years in this building, and will the cost be reasonable in the light of what the community will have when the job is done? In order to answer these questions standards suitable for pupil and program space requirements should be available for the program which is to be operated. To determine these standards one must have not only a general knowledge of the program to be housed but should consult with the staff of teachers who will use the buildings in order to get first hand information of the needs of the staff.

7. **Possible use of the remodeled building**—
a. Is the population of the community such that it is not likely to decline?
b. Will there be continued use of the building?
c. Is there any possibility that there may be an immediate increase in the population?
d. Can the children living in the territory walk or be transported conveniently to the buildings in other parts of the school district?
e. Would it be wise to add a smaller building in a nearby community in order to permit the smaller children to be nearer their homes and thereby increase the size of the school plot rather than make an addition to the present building?

8. **Economical maintenance—**
   a. Does it have space that is being unused that might be put into use?
   b. Does it permit the smooth flow of pupil traffic?
   c. Is the service system free of leaks, stoppages. etc.?
   d. Can the heating cost be reduced?
   e. Does it provide for minimum maintenance cost?
   f. Does it provide or can it be made to provide for maximum natural light?

9. **Other features—**
   a. Is the building readily accessible or can it be made as accesible as desired?
   b. What provision is made or can be made for expansion and flexibility?
   c. What is the outside appearance, and can it be improved by additions?
   d. Is the location desirable?
   e. What is the condition of downspouts, walls, foundation, and openings and the possibility for improvements?

10. **Portable buildings as a possibility**—If there is some question about the continued use of the building and there is overcrowding, would it be wise to add one or more portable one-room buildings on the plot as a temporary measure until a definite decision can be made, or to take care of a housing situation where funds are not yet available? In determining such questions, superintendents and boards of education should make themselves familiar with facts concerning standards on maximum space allotment for instruction; administration and auxiliary services; comfortable and sufficient seeing and hearing conditions; and provisions for heating and ventilating. Some plants, because of certain incorrectible defects, should be abandoned on a long range program. A schedule for abandonment should be set up in the light of urgency of need and funds available. In many instances immediate abandonment will not be possible, but in a long range program, it may be wise and necessary.

## D. The Plant Program

When the school officials of any district have determined that there is a need for the construction of one or more new buildings or

additions to two or three buildings, it will usually be wise to make a district-wide study of the school building needs.

**District Organization**

In order to approach the problem in the most efficient manner, it is necessary to know what area the school or schools will serve in the foreseeable future. Too few children and too small a tax base inevitably results in limited educational programs at high costs. This is especially true at the high school level. It is only reasonable to expect that school districts, when faced with the increased demands for services at increasing costs, will turn to ways of obtaining the needed services. Under such circumstances the planning agency is faced with the problem of whether or not action should be taken to:

1. Form larger administrative units.
2. Plan district wide services for all the schools of the district.
3. Provide for supplementary services through cooperation with neighboring districts.

In order to determine how many children will attend schools in the district in the future, planning agencies should consider the possible changes that may take place in the organization of the district and what effect this change might have on the enrollment in the school or schools.

**The Choice of a Method of Study**

There are a variety of ways in which a choice of a method of study may be made:

1. The necessary information may be gathered within the community by educational leaders of the community or district.
2. Outside experts may be employed for this service.
3. Local school officials serving on a committee with community leaders may gather the information necessary and consult with outside authorities.

It is possible that the method used may be determined by availability of local personnel, the amount of research to be done and the money available to pay for outside services.

**Other Planning Groups**

In considering the school building plan there should be taken into consideration any pertinent information available from:

1. Other planning groups.
2. Other community groups such as private and parochial schools.

3. Other agencies of the community such as city planning boards and commissions.

Where there are no other planning agencies, the school planning agency should consider such factors as:

1. The possible effect on the schools that the city planning policy may have on industry and resultant population changes.
2. The probable direction of growth in the community.
3. The probable future location of business, manufacturing and residential areas.
4. The American Association of School Administrators in their publication, "American School Buildings," suggests that the following information should be shown on maps:
   a. Number and kind of residential buildings erected over a ten-year period.
   b. Zoning provisions where they may affect the school program.
   c. Location of all public parks and playgrounds.
   d. Spot maps of the district showing the location of each pupil to be enrolled.
   e. Location and area of school district property.
   f. The location of each school building and its attendance area.

**Future Enrollments**

When the district organization has been determined and the effect of any planning groups, on population changes, has been studied, forecasts of enrollment by grades may be predicted with a fair degree of accuracy for the task at hand. It is suggested that all estimated future enrollment figures should be used with caution. Enrollment conditions, wars, legislation, birth rates and other factors are sometimes difficult to estimate. There are listed below a few suggestions based on known births which should be of assistance in predicting future enrollments.

1. Take an accurate pre-school census of all the children in the district for computing the survival rate of ages from one year to six. Include those areas which are served by the district on a tuition basis if there is a considerable number of tuition pupils involved.
2. Determine by estimate or questionnaire the number of children in each age group who attend school.
3. Estimate the percentage of children who can be expected to continue from one grade to the next. Past enrollment should be helpful in making this estimate. If tuition pupils

are involved in enrollment it will be wise to make some estimate of the number of these who may be enrolled and what grades of the school program they may appear in.

**Other Community Data**

In addition to these data, maps or a series of annual comparison maps might be prepared to show how the different land areas of the district are being used with respect to business, manufacturing, dwellings, large real estate subdivisions and farming. Such maps will bring together useful information that will answer questions on the following points:

1. Where the young married couples are living who will rear the children who will have to be cared for by the school system in the near future.

2. The areas where the number of pupils of the district is declining, is stable or is growing.

3. The location of air ports, manufacturing industries, and any other factors which may either form a nuisance or hazard to existing schools or schools contemplated for future construction.

4. Existing and future traffic arteries which may be formed as a result of growth. Some investigation should be made of the likelihood of new traffic arteries which may be formed by the rerouting of highways.

Forms should be developed and maps prepared for the following information:

1. Pupil trends.
2. School population trends.
3. Business and industrial trends and housing conditions.
4. Existing school facilities and services they render.
5. Educational facilities and opportunities in the community other than public schools.
6. Attendance and census service.
7. Retention in school.
8. Local employment of the graduates; migration of graduates.
9. The social, spiritual, recreational, civic and vocational pattern of the community.
10. All school organizations.
11. Changing emphasis on education—national, state and local.

12. Educational problems confronting the community such as community use of school facilities, education of adults, etc.
13. Financial resources of the community; ability and willingness to pay.

**Predicting Population**

Predicting the number of pupils who will be in school in a particular district ten years hence is a difficult undertaking, but the responsibility for making such estimates must be assumed by those charged with the planning of school building programs. Gross errors in predicting enrollments lead to waste or to overcrowded buildings. A careful study should be made of the local situation and of methods of estimating the school population.

Predictions of total population must be based on birth and mortality rates and also on factors which determine the flow of population into and out of the particular school district. The Bell Telephone Company has developed an index-analysis method of prediction which takes account of the major factors in population changes. Indices have been set up to show the normal survivorship from any group of newborn babies at any given age in the future and also to show the probable net migration into or out of each area under consideration. When such information is available for a school district, it should be obtained and studied. It should not be assumed, however, that such calculated estimates possess a greater validity than they really possess. Such a method of prediction may give quite good results in one district and be far from accurate in another. It is necessary for school officials to study the data on which the estimates are based, to insure that the limitations and special problems of the particular district have not been ignored.

When calculated estimates of future population are not available or when such predictions are considered unreliable, local school officials must devise their own procedures for forecasting. Refined statistical techniques are not necessary. It is much more important that accurate data be obtained and used as a basis for prediction. If all of the pertinent facts are known, a common-sense inductive approach will give a reasonably accurate estimate of the total population trend.

The school census can be forecast on the basis of predictions concerning changes in the total population and in the ratio of number of children to number of adults. Such predictions can be made on the basis of observed trends in the flow of families into and out of the district and in the birth rate. National and state as well as

local trends should be noted in regard to birth rates. Analysis should be made of the survivorship of different groups of children, also. That is, the number of children at age six should be checked against the number at age seventeen, eleven years later, for several different groups. Such analyses will reveal a trend in survivorship in the district and will constitute an important factor in estimating the school census ten years hence. Since conditions may have changed, the estimates must also take into account any factors which may have a bearing on future trends.

In addition to all of the other factors which affect school population trends, another variable must be considered when an attempt is made to forecast school membership. This new factor is the holding power of the school. Whether the school will enroll a larger or small percentage of the future population depends upon several factors, some of which are not controlled directly by school officials.

Those responsible for planning the school building program must be as realistic and practical in estimating school enrollment as in predicting total population. Again, past trends provide the best guides in forecasting, but the probable effects of new factors such as enrichment of the program or increased efforts to enforce attendance laws, should also be considered. No method of predicting enrollments can yield good results unless accurate data are obtained and analyzed in the light of local conditions.

### Estimating Plant Capacity Needed

On the basis of anticipated population and school membership, the local school officials should arrive at a careful estimate of the number of children for whom the total school plant will be planned. It will be desirable, because of the long life of good school buildings, to be able to predict the needs of the district for thirty or forty years in advance. Since such long-range forecasting is impractical in most districts, and because predictions made for even a few years ahead may prove inaccurate, provision must be made for expansion or contraction of the planned school plant. Buildings should be so planned and should be located on sites in such a way that expansion is readily possible. Financial resources must be conserved to meet unanticipated demands. Even the most carefully prepared estimates of needs may be rendered inaccurate by unpredictable influences. Hence flexibility in planning is a necessity.

## E. The Educational Program

Any recommendations for schoolhouse construction should be based upon a complete understanding of the educational program.

School life today includes many factors not included in the past. Educational experiences are expanding and changing along with changes in the economic and social order. They vary widely in different communities, and much more than in the past when the traditional "three R's" constituted the principal part of the course of study.

In most cases a school district considering a building program is already operating schools. For that reason an educational program has already been set up and defined. This does not mean that such a district is justified in assuming that the existing program does not need to be reviewed. The planning of buildings or the making of additions to old buildings will offer an excellent opportunity to review and re-evaluate the present program and to do a great deal toward making the necessary improvements.

In view of the fact that it may be wise to re-evaluate the existing educational program and the further fact that the success requires the support and participation of the citizens involved, it is suggested that the board of education should have a committee or advisory council consisting of some faculty and a group of some members of the community to assist in the re-evaluation of any present educational program. This committee or council should assist the board of education in determining:

1. The end products of the school program such as the skills to be developed in the pupils, and the competencies and the attitudes to be attained by the students.
2. The kinds of instructional material which will be needed.
3. The building program that will be needed in terms of the objectives of the educational program.

In applying these terms in the building program, it is necessary to keep in mind the following:

1. The general characteristics the building should have that will be influential in child development.
2. A building planned in such a way that the maintenance and operation may be carried out in an efficient manner.
3. The nature of the activities, both administrative and operational, which will be carried on in the building.
4. The characteristics of the rooms which will be necessary for carrying out the educational purposes of the educational program for the children to be housed.
5. The structural details of the service systems which are desirable for effectiveness in the educational program.

### Educational Policies of the Board and Staff

It may be well for the board and the staff to agree upon an educational policy or objective. This objective might be formulated in a written statement. (See Appendix B for such a statement.) The instruction program should be developed in terms of the philosophy of the objective. The school program should be a means of putting into effective operation the ideas expressed in the policy or objective. (See Appendix E for an example of objectives.)

### Quantity vs. Quality in Building Construction

It is recognized in many instances that a desirable building program must be cut because of limited funds. It is often necessary to plan building construction where there are insufficient funds to provide the buildings which are essential for the type of program to be housed. In such cases the quantity and quality of the building construction should be given much thought.

Since the quality of the facilities affects the desirable development of the individuals using them, it is always wise to weigh well the desirability of limiting quality in favor of quantity of school building space. If at all possible, it is more important to limit quantity and hold to a minimum quality. The quantity can be achieved over a long period of time, but it is difficult to increase the quality after the first unit of the building has been constructed.

### School Organization

As the educational needs are being expressed in terms of the educational program, there should be a clear outline of the objectives of each school. They should answer such questions as:

1. What is the general purpose of the particular school building?
2. What organizational pattern will be used, such as K-8-4 or K-6-3-3?
3. What special services will be provided? For example, what provision, if any, is to be made for teaching handicapped children, for adult education, for evening classes or for health services?
4. What will be the policies concerning walking distances for the various age groups?
5. What will be the policies on transportation time and distances?
6. Will there be reorganization or will there be added facilities provided?

7. What use will be made of the school facilities by the community?

**Larger Schools**

A number of studies have been made during the past twenty years concerning the most effective size of school centers. Each of these state that there is a high relationship between small schools and meager educational opportunities. School leaders generally recognize the difficulty of providing a satisfactory educational program with small enrollments.

1. Some reasons for larger schools are:

a. They require a larger and more permanent type of school building which is more economical to construct and maintain than several small one-and two-teacher schools of the same type of construction and in which an attempt is made to render the same quality of service.

b. The school buildings and grounds for larger schools are more likely to be classified as outstanding beauty spots in the community.

c. Better qualified teachers are more likely to be attracted to larger, well-planned and well-equipped schools.

d. Transportation, if properly carried out, is likely to prove less hazardous than if children are required to walk to schools on the dangerous highways.

e. A broader educational program may be offered, and, consequently, the children will be given greater educational opportunities.

f. The holding power of larger schools tend to be greater than those of smaller schools. This should result in a larger percentage of the school children being given the opportunity, as well as the desire, to obtain a more desirable and useful education.

2. Some procedures in increasing the size of the school are:

a. The only means whereby the rural territory will have an opportunity to provide a school which can be economically operated and at the same time be efficient in providing instructional opportunities for the pupils who are to use it by combining the smaller units into larger units. The size and organization will depend a great deal on the location, roads and the program to be operated in the district.

b. There are many instances in the state where the present twelve-grade centers might be combined in such a manner as to make a larger high school center of a more economical and efficient type and leave the grade centers essentially as they are.

c. There are other types of organizations where it may be wise to leave the lower grades in the present location and combine the upper grades into a larger, more efficient and economical school organization.

**Characteristics of an Effective School Center**

1. Some Factors which Alter Desirable Situations:

There is a trend toward reduction of the number of small schools and increasing the size of the school centers. Since this movement has a direct relation to the economy and adequacy of the educational services which may be rendered, any center should have a sufficient number of pupils to justify an adequate instructional program.

Certain physical factors may force modification of a desirable situation. For example, it is generally agreed that the school should be located so as to allow the maximum number of children of an attendance area to walk to school. In many instances, existing facilities are too good to be abandoned, thereby making it necessary to depart from the desirable situation. Geographic factors and highway conditions, together with the location of residence of school age children, are related to factors which often force a departure from the most desirable.

2. Setting the Limits of Attendance Areas:

Guides in setting the limits of attendance areas may include such items as walking distance, time on the school bus, class size and area of school sites. To determine logical attendance areas and the location of school centers to serve them, there must be brought together facts concerning:

a. Location of pupils housed.
b. Direction of residential development.
c. Location and use of existing school facilities.
d. Location and conditions affecting present and planned transportation routes.
e. Any other factors which may affect the conditions mentioned herein.

**Desirable Minimum Enrollment**

Whether the school is organized as a twelve-grade center, a high school or an elementary center, the approximate minimum enrollments of a satisfactory center should be considered on the following basis:

1. Elementary—Elementary schools should have a sufficient number of pupils to require a minimum of one teacher for each grade. The total number of pupils per center will be affected by the teacher load or by the number of grades to be located in the center, such as 1-4, 1-6, or 1-8. The distance the pupils live from the center and the transportation facilities will affect the minimum enrollment. There will be instances where an elementary school must be maintained that has smaller than the desirable minimum enrollment. There may be neighborhoods both in the city and rural territory which wish to maintain primary schools, grades 1-2 and 1-4, located near the homes of the children. Where such schools are maintained it is desirable to have a minimum enrollment of 100 pupils with 4 teachers employed.

2. High School—The high school should have at least ten to twelve instructional fields such as agriculture, commerce, English, health, history, government and citizenship, home economics, languages, mathematics, music and art, physical education, science, shops and manual arts. There should be at least one full-time teacher for each instructional field. A teaching load of 25 pupils would thus require a minimum enrollment of 300 pupils. As the school approaches 25 pupils in the smaller classes, such as certain electives, it may be necessary to have two or three teachers in English, mathematics, history, agriculture and home economics.

   It will be seen that if economy of organization is to be maintained, a minimum of about five to six hundred enrollment is desirable.

   For these reasons, a minimum, desirable high school of 300 pupils with twelve teachers is recommended. In some districts conditions may be such that a sufficient number of high school students cannot be brought together to justify the twelve teachers. In this case, however, high

school service cannot be denied, but a minimum organization should be maintained. A five teacher high school organization with about 100 pupils might be recognized.

## F. Educational Specifications

The main function of the educational specifications is to provide a written guide to assist the architect and others interested in planning the building. One of the most difficult considerations in planning the school building program is the translation of the school program into building needs. This means that the plan must determine the right number and size of classrooms, laboratories, shops, health and physical education facilities, study rooms, service rooms, office rooms, general purpose rooms and a multitude of other important items. The better job done in this planning means the better school facilities that will be made available. Lowering costs is not so much in the use of materials as it is in the planning. Occasionally there is a tendency to overload schools with more facilities of a certain type than the program requires. If this is done it produces an unbalanced school building which is more expensive to build and operate than is necessary. This can be avoided by careful preparation of educational specifications which will list the needs for spaces and facilities for each building.

Educational specifications may be prepared in one of several ways. They may range from a simple statement of classrooms needed to complete discussions of the relationship that should exist between the different arrangements of the building and may include a complete description of the activities to be conducted and the spaces needed. Such specifications may include lists of equipment and supplies. The more complete they are, the more help the architect will have in designing the building to meet the needs.

The greatest share of the responsibility in describing the needed building in terms of organization, personnel, curricular activities and present facilities of the district in terms of functions, activities, programs and equipment is that of the professional school staff. This professional planning, which is subject to the approval of the board of education and acceptance of the people of the district, should involve at least a cross section of the school staff.

These specifications should state preference rather than describe specific materials and dimensions except in rather unusual situations. They should provide answers to such questions as:

1. What groups will be served in this building?

2. How will the groups using the building be organized? (This information should include such factors as class size, home room organization, departmentalization, self-contained classrooms.)
3. What curriculum or program will be housed in specific areas?
4. What special activities will require especially designed facilities? This information should state if there will be a kindergarten, special education, nursery and the like.
5. What equipment, including built-in equipment, and furniture will be in the proposed new building?
6. What special services will be provided in the building, if any? These should include such things as library, audio-visual aids, music, time clocks, fire alarms, storage space for supplies, storage space for books, extra equipment and furniture.

The following prescribed course of study and set of educational specifications should be considered in the organization of a curriculum for a comprehensive high school. The district should set up specifications for each building for the guidance of the architect in planning the facilities to be provided. It would be well to write specifications in much more detail than those presented here.

## THE HIGH SCHOOL EDUCATIONAL PROGRAM AND SPECIFICATIONS FOR HOUSING IT

We believe in good foundation and general education for all students. No all out attempt should be made to train each individual student for a particular occupation. We take as our general objectives the following:

1. Education for citizenship.
2. Education for a career.
3. Education for character.
4. Education for family living.
5. Education for enjoyment.

These objectives should be constantly in the minds of each teacher and all endeavor should be pointed toward the accomplishment of these objectives in the lives of the students.

**Curriculum**

1. English
2. Social Studies
3. Mathematics
4. Science
5. Foreign Languages
6. Fine Arts
7. Vocational Agriculture
8. Vocational Home Economics
9. Industrial Arts
10. Business Education
11. Health-Safety-Physical Education
12. Trades and Industries

**Specific Course of Study**

I. English

1. English 2. Public Speaking 3. Journalism 4. Dramatics 5. Creative Writing

II. Social Studies

1. Citizenship 2. World Geography 3. Ancient-Medieval History 4. National and/or Regional History 5. World History 6. Modern History 7. U. S. History 8. Problems of American Life 9. Advanced Government 10 Economics 11. Sociology 12. International Problems 13. Social Psychology

III. Mathematics

1. General Mathematics 2. Algebra 3. Arithmetic 4. Plane Geometry 5. Solid Geometry 6. Trigonometry 7. Advanced General Mathematics

IV. Science

1. General Science 2. Biology 3. Chemistry 4. Physics 5. Advanced Physical Science 6. Aeronautics

V. Foreign Languages

1. General Language 2. Latin 3. French 4. Spanish 5. German

VI. Fine Arts

1. General Music 2. Instrumental Music 3. Music Appreciation 4. Advanced Theory of Music 5. General Art 6. Art Appreciation 7. Ceramics-Modeling-Sculpture 8. Vocal Music

VII. Vocational Agriculture

VIII. Vocational Home Economics

IX. Industrial Arts

1. General Shop 2. Mechanical Drawing 3. Woodworking 4. Metalworking 5. Electrical Work 6. Automotive Shop 7. Printing

X. Business Education

1. General Business 2. Typewriting 3. Economic Geography 4. Business Arithmetic 5. Accounting 6. Shorthand 7. Salesmanship 8. Commercial Law 9. Business English 10. Secretarial Office Practice 11. Business Economics 12. Consumer Education

XI. Health-Safety-Physical Education

1. Health Education 2. Physical Education 3. Driver Education

XII. Trades and Industries

1. Industrial Electricity 2. Machine Shop 3. Carpentry 4. Cabinet Making 5. Automobile Mechanics 6. Distributive Education 7. Diversified Occupations 8. Sheet Metal Work 9. Radio

**Housing the Program**

Site—40 acres—including small model farm. One-story building of modern type red brick. May be partly two storied and flat roof. Construction details to be worked out with architect. (Walls, floors, height of ceiling, etc. Should use as low ceiling as possible).

**Specific Areas Needed**

1. Auditorium—pitched floor—no balcony—stage dressing rooms with toilets—stage storage—movie projection—seat about 1000. Should be very attractive area.
2. Gymnasium—no balcony—portable seating—folding wall in center to allow boys and girls to use gym at same time—use glass boards on the goals—having seats at each end if this holds down size of building—to seat 2000. Emphasize economy, utility, and spaciousness rather than beauty in this area.
3. Cafeteria—Kitchen—Storage—To seat or feed 300. This should be general recreation and social room for community. Tables and chairs should be folding type and storage provided for same.

4. Auditorium lounge with toilets, easily accessible from auditorium, gym and cafeteria. All the above area should be within a few feet of the main public vestibule. Auditorium and Gym should have two directional approaches.
5. Conference room for students' use.
6. Teachers' lounge.
7. Principal's office with vault.
8. Clerk's office with supply room and general storage.
9. Guidance or counsel room.
10. Clinic for nurse and ailing students.
11. Janitor's room with storage and workship facilities.
12. Visual Aid Room—Wired table in center—to be used for film storage and previews by teachers. Visual aid materials will be shown in each class room when needed.
13. Music Room—Instrumental and Vocal—Auditorium stage might be used for this by the use of separate heat and folding door.
14. Art Room.
15. Library—for 100 readers.
16. Study Hall—could be adjacent to or a part of library.
17. Agriculture class room and shop with wide doors.
18. Home Economics Department—Three teachers—three rooms (a) foods and laundering (b) clothing, consumer buying, home nursing (c) child development and home improvement.
19. Science—22 x 44—locker space—storage—small dark room—general science, biology, grouped together. Physics and chemistry grouped together.
20. Industrial arts shop—32 x 60—Printing, electricity, auto repair, cabinet making, home mechanics, photography, etc. This might be included in the garage structure.
21. Bus Garage—size depends on how many buses the Board decides to house .
22. Long all weather porch for loading buses.
23. Boiler room and fuel storage—might be oil—shouldn't depend on gravity to clear pipes but use pump.
24. English Room—22 x 40—should have stage.
25. Fifteen (15) class rooms—22 x 32—Provision for visual-aid in all areas. Some display cases, tackboards and full-length mirrors at strategic places in the corridor. Proper closets, storage, and lockers in each room.

26. Devote lots of study to accessibility, lobbies, corridors and student traffic, storage, toilets, lockers and locker rooms, playground, athletic fields, parking areas, drives, landscaping, sewage disposal, equipment, and water supply including water fountains.
27. Carefully plan acoustics, lighting, heating, ventilation, floor covering, fenestration or arrangement of windows.
28. Provide for master program clock and inter-communication system.
29. Wherever economy is secured by using the same area for various activities this should be done. The element of cost will dictate procedure.
30. Part of building might be two stories. However by using one story we get better light, better ventilation, greater safety, easier service entrances, segregation of activities, and a more flexible structure in that it is easier to add to it or leave off certain areas.

**Note:** The above listed specified areas are suggestive of a method to be used in translating the educational program into plant requirements. This is a means of transmitting to the architect the information that he needs in order to plan areas necessary to implement the educational program. The specified areas are examples only and should be properly defined in terms of the school's specific needs and in accordance with regulations of the various agencies who have authority over school plant construction.

# VI. CHARACTERISTICS OF A GOOD SCHOOL BUILDING

The school building should be constructed to adequately house the educational program to be carried on in it. Ample provision should be made for spaces suitable to house the various services to be offered. The building should be so designed as to have an inviting and attractive appearance. It should have architectural excellence without undue decoration.

The site on which a building is to be located should be large enough to furnish adequate space for physical education, recreation and other activities which should be carried on outside the building. The school grounds should provide not only for present needs, but for future development of the school and community needs. Clean buildings and attractive grounds lend much to the wholesome appearance of the total school plant.

**Use and Design**

The kind of activities that will be carried on in the building has a direct bearing upon its design and construction. During the past several years, increased use has been made of the school plant as a community center. These activities include not only courses in academic and vocational subjects, but opportunities for recreation including dramatics and athletic activities.

The broadening of the school curriculum to include a wide variety of activities requires a type of building that contains rooms especially planned and equipped for these activities. When a modern high school educational program is to be housed, the building should contain not only classrooms and spaces for community meetings and athletic activities, but space for art, music, science, shops, vocational studies, home economics, agriculture, social science and, in some communities, trades and industries. Without these facilities for a high school program it is impossible to effectively house the program that is necessary to meet the requirements of the changing world. The planning of school buildings to carry out the requirements of educational programs becomes a matter of first importance in the successful development of a modern school curriculum. The biulding may be architecturally attractive and yet not be functionally well-planned. Superintendents who have carried on extensive

school building programs realize that if they are to get the full value of every dollar invested in their buildings, it is important that they plan their educational program before building plans are drawn. This means that the architect should be given specific data on the program to be housed before he begins the drawings for a building that will properly house the educational program to be carried on both inside and outside the building. In general, the following points should be included in the planning:

1. The immediate and ultimate capacity of the building must be anticipated. If it is to be erected in units, the first unit should be planned with reference to its possible function when the complete building is made available.

2. The policy as to classroom size must be determined. Class size will influence the floor area that is needed. The type of activities that will be carried on in the classroom will affect the amount of floor area that will be needed.

3. The kind of organization that will be housed in the building should be given serious thought. If a school is operating on one type of educational program, a given number of rooms of certain size will be needed, but if a different type of program is to be used, rooms of an entirely different dimension may be needed for the same number of pupils.

4. The methods of teaching to be used and the curricular or the extracurricular activities to be provided may have an important influence on the building planned. Activities will determine the type of built-in and movable equipment to be used. Equipment tends to determine floor space. Fixed equipment is economical of floor space but many times less efficient instructionally. Specialized and movable equipment require more space, but conform more nearly to modern instructional requirements.

5. If a school plant is to be a community center, it will require a definite type of educational planning. In providing adult classes the possibility of avoiding duplication of facilities needed for the children must be given due consideration.

**Sites and Design**

A site for the school building is as important to the educational program as are classrooms and other instructional spaces. Three trends in the development of school grounds are:

1. More acreage is needed.
2. Greater utilization of the site is being made.
3. School and community use is on the increase.

## Architectural Features

The architectural features should be planned in terms of:

1. Maximum educational activities both within the building and on the school plot.
2. The space that will be required for the building, parking area, walks, landscaping, etc.
3. Expansibility sufficient for future needs.
4. Maximum natural ventilation and lighting.
5. Maximum provision for reducing or separating from noisy areas.
6. Without excessive ornamentation.
7. Convenience and safety.
8. The suitability of the soil for educational purposes.
9. The location should fit into the regional highway planning and community street plan.
10. Whether or not the site will be used for community activities.
11. Adapting the building to the site. Economy may be achieved by carefully utilizing the building site. Land contour must be known and considered before plans are made for foundations, so that the floor will not be too far above the grade or below grade level. If the contour is such that one level near the building location is somewhat lower, it may be advisable to construct units requiring high ceilings, such as gymnasiums, auditoriums, etc., at this point.

## Layout

Much thought should be given to the general layout of the building. The range in this connection is from a multi-storied block type plan of building to a one-floor open type. The trend is toward the one-floor type of building.

In the multi-storied type, economy may be achieved in terms of limiting roof foundation costs and in heating expense. This reduction in cost, however, may be considerably increased by the added expense of strength in foundation, duplicated corridors and necessary stairways.

A few of the advantages of the one story or open type plan are the following:

1. Reduce fire hazards.
2. Better provision may be made for natural light and ventilation.

3. More desirable access to all parts of the building from the outside.

4. Greater flexibility and ease of expansion.

5. Easier to isolate primary area.

These advantages are so outstanding that an effort should be made to keep the number of stories to a minimum.

**Basements**

It is not recommended that basement areas be provided in school buildings except occasionally for heating plants when the slope of the plot gives advantage. The use of rooms below grade level tends to reduce the natural light and ventilation. This makes the rooms undesirable for instructional or recreational purposes.

**Areas Subject to Concentrated Occupation.**

Those areas, which are mainly auditoriums, gymnasiums and cafeterias, should be located so that they are easily accessible from within the building as well as from the outside of the building. Safety and convenience dictate that these rooms should be located on the ground floor.

**Non-usable Spaces**

Economy in planning requires that much thought be given to the reduction of such spaces for the use of both man and materials in such a way as to secure the lowest possible construction cost. This should be done without sacrificing quality of construction and with due thought to the grouping of rooms requiring special facilities. Such grouping is important and is recommended in order to increase the flexibility of the building and to reduce the cost of maintenance.

**Space Requirements**

Economy in planning may be achieved through careful consideration of space requirements. Classroom space should be adequate to meet the needs of the program. The size of the auditorium in relation to enrollment and expected community use must be carefully considered. The amount of spectator space in the gymnasium is always a problem to be considered. The various unit sizes should be planned in relation to each other so that neither is too large nor too small. Wherever possible, units should be used for more than one purpose. Some authorities suggest that the floor area be divided on approximately the following percentages:

1. Instructional spaces—at least 55%
2. Stairs and corridors—not more than 20%
3. Administrative space—not more than 12%
4. Walls and accessories—not more than 13%

## PLANNING FOR MAINTENANCE AND OPERATION

Although the cost of school plant construction has not increased at the rate of general construction, school administrators are eager to take advantage of all feasible school plant economics. Some of these construction economics are sound and functional but others are false and result in added or unusual costs of maintenance and operation. In terms of the per pupil cost during the life span of the building, the cost of a school plant represents only a small percent of the expenditure for education. If construction features result in unusual requirements for maintenance and operation, initial cost of construction often represents only a "down payment" on the total plant expenditures and the accumulated cost of maintenance and operation becomes an ever increasing factor. The control of maintenance and operation requirements by the use of durable and functional plant construction is sound economy and reflects good educational planning.

School plant engineers and operators are in general agreement on many construction features that enable functional and economical plant operation. Some of these may not be applicable in specific situations. However, the following suggestions should receive careful consideration in situations where they are feasible, applicable and within the limits of financial possibilities.

1. Provide adequate instructions for the use and occupancy of the plant and installations to all persons who will participate in the operational program.
2. Preserve architectural and mechanical plans and specifications of all school plants and installations as they provide essential information for possible additions, renovations, and maintenance problems.
3. Require adequate operation instruction for all mechanical installations and preserve these for instruction and refference.
4. Maintain accurate information as to the source of repair parts and service for all mechanical installations.
5. Maintain an adequate supply of critical replacement parts for mechanical installations.

6. Use only standard parts, sizes, finishes and colors to facilitate repairs, replacements, renovations and additions.
7. Provide adequate inspection and work space about all mechanical installations.
8. Do not enclose service and utility lines in walls, floors and ceilings.
9. Provide adequate roof projection to protect walls and openings.
10. Expose as little as possible outside surface material that will require painting, caulking and repairs.
11. Provide adequate storage and work room space for the custodial program.
12. Provide adequate utility and service installations for the custodial program.
13. Install terrazzo or ceramic type tile floors in toilet rooms.
14. Install terrazzo floors on corridors and stairs. Provide metal nosing on stair treads. In terms of the accumulative cost of installation, maintenance and cleaning, terrazzo is less expensive than other type floor surfaces.
15. Provide adequate floor pitch in all areas that contain plumbing facilities so that floors will readily drain.
16. Provide adequate floor drains and clean-cut plugs in connection with all plumbing installations.
17. Install only wall-hung toilet fixtures (urinals and commodes) with flush valve water controls. Install a six-inch curbing in a corner around a floor drain instead of a service sink.
18. Install key operated cut-off valves on water supply lines to all toilet facilities.
19. Install key operated electric lamp switches in toilets, corridors and other strategic areas. Use only metal cover plates on electric switches and outlets.
20. Provide a separate light switch for an inside light near each exit door as such lights discourage night vandalism.
21. Install an alarm system for office, cafeteria, bookstore, and other such areas that are subject to frequent vandalism.
22. Install locks on only such doors as are essential for locking. Most inside doors should not be locked at night as vandals who enter the outer doors usually destroy interior door locks and cause much damage to doors and hardware.

23. Provide for a careful key control system and do not issue master keys or the last duplicate key for any lock.
24. Install only high quality hardware fixtures and attempt to standardize such items as door locks, door closes, panic hardware, etc.
25. Toilet and shower partitions in boys' toilet and shower rooms are of questionable value, impede cleaning operations and add to maintenance problems.
26. Install steel or cast iron down spout sections that extend about 60″ above ground level for all roof drains and attach these securely to the building wall.
27. Install traffic soil traps with metal grills at all main entrance and provide a method of cleaning and draining these traps.
28. Sharply inclined or rounded inside window sills catch less dust, are easily cleaned and discourage placing objects in the windows that cause deterration of the sills and obstruct the light.
29. Install approved window shades on only such windows as are necessary for classroom light control. Do not allow other light obstructing installations on the windows.
30. Remove any smoke stacks that have been discontinued for use as they soon become serious hazards.
31. Approved built-in floor loading incinerators provide safe ready disposal for waste material and require no maintenance as contrasted with the constant maintenance that is required on outside incinerators.
32. Provide for approved garbage disposal areas with facilities for storing and cleaning garbage cans.
33. Hard surface outside play areas will greatly reduce the cost of housekeeping services and floor maintenance requirements.
34. Install galvanized steel or aluminum window sash, doors and trim that require no painting. They are less expensive than other types in terms of the accumulative cost of installation, maintenance, and cleaning. Install only recessed or flush type trim.
35. Install light fixtures that are relatively simple to maintain and require a minimum of man hours to service and clean.
36. Install heating equipment that requires a minimum of man hours to operate and can be readily serviced and maintained.

Some of the above suggestions will result in immediate savings while others will reflect savings over a period of time. The cost of construction must be viewed in terms of (1) initial cost, (2) maintenance cost and (3) operational cost during the life of the plant. In the case of school plants this life span usually exceeds fifty years. The annual cost of maintenance and operation multiplied by the life span of the plant often exceeds its initial cost, thus, becomes of primary consideration in school plant construction.

The annual or accumulative cost of maintenance and operations will be influenced not only by the quality of the initial installations but also by the quality of the maintenance and operation services provided for the plant. High quality maintenance and operation services resulting from carefully planned programs and well trained personnel is sound economy and reflects good educational planning. To compromise on these essential services is to invite unnecessary expenditures and reduce the efficiency and functionality of the school plant.

**Expansibility**

During the life of any school plant many changes occur that will affect the number, size and type of classrooms as well as other spaces needed for the school program. Some of these changes may be anticipated by a study of population and enrollment trends. Many others cannot be foreseen. The educational program is constantly changing and facilities constructed today may not be the type that will best meet the needs of the educational program ten years later.

Because of the changes in school programs and the unreliability of enrollment, predictions beyond a reasonable length of time cannot be made. All school plants should, therefore, be planned for ultimate expansion.

The following points should be given consideration in designing school plants to house increased enrollment and changed program needs.

1. The school site should be sufficiently large to provide play areas for increased enrollment. The building should be so placed on the site that additions can be made without encroaching upon these areas.
2. The building should be so located on the site that property lines will not interfere with future expansion and so that permanent walks, driveways, and service drives will not have to be radically changed when additions are made.

3. Septic tanks and drainage fields, when required, should be carefully located to avoid the areas that may be needed for future additions.
4. Corridors should be extended to outside walls where future additions are planned.
5. Stairs should be placed in separate enclosures at right angles to the corridor. Placing them at the end of the corridor often requires that they be removed before an addition can be made to the building.
6. Windows should not be located in walls against which a future addition is likely to be constructed.
7. Boiler rooms should be sufficiently large to allow the installation of a larger or additional boiler that may be tied to the present installation. As a rule, one heating system is more efficient and economical than two small ones working separately.
8. Electric wire sizes and switches should be sufficiently large to take care of a reasonable extention without being overloaded. All entrance switches should allow a few unused circuits for future use.
9. The size of the sewage disposal system should be based on the ultimate expected enrollment.
10. Locate entrances so they will not be eliminated by additions.

**Flexibility**

There is nearly always a need for alterations and changes in the internal arrangement of the building. The ease with which these changes may be made depends, to a large degree, upon the original design of the building.

Often school rooms must be altered in size in order to adapt them to program changes and to the different activities. Achievements in connection with flexibility cannot be left to chance but must be given positive consideration in the planning process.

In planning for flexibility the following points should be considered:

1. Internal partitions should be non-load-bearing as far as possible.
2. Windows should not be grouped for each room but should be continuous along the entire wall.
3. Conduits, vents, heating and water pipes, etc., should, so far as possible, be located in the corridor and outside walls instead of in partitions between rooms.

4. Rooms should be grouped in series to allow maximum space for alterations. Inflexible installations such as toilet room, stair walls, etc., should be grouped with these requirements in view.
5. Interchangable lockers, shelves, cabinets, etc., might be planned in order that they may be shifted from one room to another as changes demand.

Careful planning in this connection makes it possible to achieve a high degree of flexibility without sacrificing arrangements and provisions that best serve the need of the program.

### Circulation

Student traffic usually results in a series of peak loads during the day. This means that the design for student traffic within the school must be carefully planned to meet the needs for these peak periods. There should be no bottlenecks where traffic must go through a narrow passageway from one part of the building to another. It is essential that pupils be able to move freely from one part of the building to another. Corridors should be planned for easy flow. The following points should be considered in planning good circulation in school buildings.

1. Eliminate corridor crossings.
2. Group allied rooms.
3. Allow no fixtures to protrude into the corridor.
4. Provide enough inside stairways.
5. Reduce verticle traffic as much as possible.
6. Have some lobby space for dispersal of incoming crowds.
7. Provide sufficient corridors inside.
8. Do not allow instructional or general service rooms to be used as passageways.
9. Lunch room, auditoriums, cafeterias and general service rooms should be so located that they are accessible from more than one corridor.
10. One toilet for each sex on each floor should be considered a minimum.

### Sanitary Conditions

Well arranged sanitary conditions are essential for the health and comfort of the pupils. The following list of principles provide the necessary sanitation in the good school:

1. The water supply should be adequate and safe.
2. Toilet rooms should be sufficient in number and convenient in location to accommodate the enrollment.
3. Plumbing facilities should be such that maximum sanitation may be attained.
4. Toilets for both sexes should be located on all floors.
5. Drinking fountains should be available on each floor and it is recommended that they be recessed for convenience and safety.
6. The sizes and heights of all facilities should be adjusted to the age to be served.
7. Adequate electrical outlets should be provided.
8. All materials should be selected in terms of the ease of cleaning and maintenance, as well as durability.

**Heating and Ventilation**

The following guiding principles for heating and ventilation should be observed:

1. The temperature of the room should be such as to prevent excessive loss of heat from the human body. This necessitates higher temperature in such areas as dressing rooms, showers, etc.
2. Such atmospheric conditions should be maintained in all usable spaces so as to make safe and comfortable breathing possible at all times.
3. Areas where odors are prevalent and sanitation is paramount such as toilets, cafeterias, etc., should have independent exhaust openings.

**Visual Conditions**

Eye strain due to glare or dimness, poor eye sight and improper type on the page is a major cause of fatigue where close work is to be done. In recent years a number of careful experiments have revealed that proper lighting will reduce fatigue, will aid in the educational processes, and will help to improve certain eye difficulties.

The quantity of light necessary depends upon the task to be done. The more detailed and precise the tasks, the more light is required. In general, however from 30 to 40 foot-candles are desirable in regular classrooms and at least 50 foot-candles in classrooms where close work is done.

The Illuminating Engineers Society recommends the following intensities in foot-candles:

| | |
|---|---|
| Classrooms, libraries, shops, and laboratories | 30 |
| Sightsaving classes, drafting and sewing rooms | 50 |
| Gymnasiums and pools | 20 |
| Auditoriums, cafeterias, corridors with lockers, and stairways, etc. | 10 |
| Corridors and general store rooms | 5 |

Improvement in lighting, however, does not merely mean more light; there are many factors other than intensity of light which can contribute to producing a well-lighted room. The quality of light depends upon the source and the intensity of the light, and the general environment, insofar as colors, brightness, and reflection are concerned. When one discusses the quality of light, it brings into consideration brightness-difference. This is defined as a difference in brightness among various reflecting surfaces within the visual field. Only within the visual field of the immediate task does the brightness-difference need to be high. For example, it is easiest to read black type on a white page. Neither very dark nor very bright objects away from the central task are desirable.

The National Council on Schoolhouse Construction proposes the following recommendations on brightness-differences:

1. Within the peripheral field the brightness of a surface should not be more than 10 times or less than 1/3 of the task.
2. Within the adjacent field the brightness should not exceed that of the task.

In attempting to meet these recommendations it will be found that the reflection factor of surrounding areas control the quality of light. To obtain the above ratios it is necessary to have paint of about the following reflection factors:

| | |
|---|---|
| 1. Ceiling | 85% or more |
| 2. Sidewalls | 60% |
| 3. Wainscot and baseboard | 40-50% |
| 4. Floor | 30-40% |
| 5. Furniture and equipment | 30-50% |

Some provisions for artificial lighting in the school room is usually necessary because of the uneven distribution of daylight,

the size of the room and the use of the buildings in the evening. In choosing the kind of artificial light to be used, the following should be used as guiding principles:

1. Sufficient light for ease of seeing.
2. Absence of glare or bright spots in visual field.
3. Softness of shadows.
4. Attractive installation.
5. Ease of maintenance.

The above conditions may be met by either fluorescent or incandescent lighting. The installation of fluorescent lighting usually costs three or four times as much as incandescent. The school should be lighted adequately with natural light and, therefore, there should be very little use for artificial lighting except on dark days. Where artificial lighting must be constantly used and over a long period of time, fluorescent light will usually give cheaper service because of lower current consumption. The school is not usually a major user of artificial light. If such is the case, it may be cheaper to install incandescent lighting.

Within recent years attention has been given to methods of securing natural light other than by means of the standard bank of windows. Various plans of bilateral and multi-lateral lighting have been proposed. These methods tend to diffuse the natural light more evenly throughout the room. In most cases such lighting plans can be established easily in the one-story buildings because of the necessity for stepped-up ceilings and skylights. Particular care must be taken that all glass panels and sky-lights be shielded to eliminate glare.

Directional glass blocks have also been introduced for unilateral lighting. The principle involved in the use of glass block is that regardless of the height or direction of sunrays, prisms within the blocks will direct the light upward so that diffusion and reflection from the ceiling may be secured. Regardless of this quality of the block, there appears to be a certain amount of undesirable glare under most conditions. Window shades are therefore necessary to control the light in practically all cases. Shades should be mounted at the mid-point of the windows for separate control of the upper and lower half of the window area. Light-colored translucent material should be used. Venetian blinds, although easily operated, require considerable maintenance and adjustment. Draperies are not considered to be as worthwhile because of their inflexibility.

The skillful use of color will also enhance the quantity and quality of light and will serve to establish the proper brightness-differences. The reflection factors for different colored paints, etc., can only be secured through the correct color selections. For an 85% or more ceiling reflection factor, colors close to white will be necessary. Warmer colors such as cream, canary, peach, coral and certain tints of green and blue will give a 50-60% reflection factor to side walls. On the wainscot, complimentary or contrasting colors to the sidewalls will maintain the 40-50% reflection factor. Floors, in order to meet the 30-40% recommendations, must have finishes of light maple, oak or tile, or light linoleum or plastics. Dark floors and finishes as well as dark brown furniture are not considered to be satisfactory. Any trim should maintain the same reflection factor as the immediately surrounding walls.

**Auditory Conditions**

In all classrooms and auditoriums the acoustics should be such that the children will be able to hear with ease. At the same time, provisions must be made so that noisy areas such as corridors, gymnasiums and lunchrooms will not disturb the other areas where quiet is necessary.

In order to insure conditions of this sort, acoustical treatment of the building may be necessary or removal of these noisy areas to some territory where they are not close enough to disturb classroom work. Some procedures of obtaining good auditory conditions are listed below.

1. Isolate or insulate noisy areas, walls, ceilings, and floors so that the desirable quiet condition may be attained.
2. Reduce noise through the use of quiet floor materials.
3. Treat all instructional rooms and circulation areas with proper sound absorbent material.
4. Locate the school building itself as far away as possible from congested and noisy areas.

**Safety**

Safety is a characteristic of the good school plant. One phase of safety has to do with the danger of fire. Fire resistive materials should be used in the construction of the building. Stairway, corridors and means of egress must be laid out with care in terms of fire and panic hazard. A recent comprehensive study of the National Safety Council reveals that a large percent of accidents occur to the

pupils in the seventh, eight and ninth grades. Here thirty-five per cent of all accidents occur, and in the upper three grades, twenty-six per cent. This leaves only thirty-nine per cent for the kindergarten and first six grades. This study shows further that over half of the accidents occur in connection with physical education. Of the total accidents inside the school building, thirty-nine per cent occur in the gymnasium. Statistics such as these give a guide in planning the operation of a safe school building.

**Community Use**

The school building should be erected for community use. Facilities in all schools, whether in large or small communities, should be made available for community use and appreciation.

The planning of buildings for community use will be related to two general areas.

1. Spaces such as those contained in gymnasiums, auditoriums, cafeterias, libraries, recreation areas and grounds which may be used by groups in connection with civic, social and recreational activities.

2. Other instructional areas such as homemaking, science laboratories, shops and certain types of business education may be used by adults after the normal school day activities have been concluded.

As these areas are made available to the community and as the people in the community realize the school's usefullness and importance it will assume its rightful place in the interest of the community. It will then become a community school whose activities are embraced and endorsed by the residents of the community.

It is usually wise, where only certain parts of the buildings are used by the community for evening classes or meetings, to provide corridor gates to close off the rest of the building. These gates should be located so as not to block off toilet facilities needed in the program for adult education and work. It also may be wise to plan service facilities so that areas subject to extensive community use may be used independently of the rest of the building.

# VII. FINANCING AND CONSTRUCTING THE BUILDING

A. Determining the Financial Ability and Providing Funds

The information needed in determining the ability of a district to construct a building is contained in the sections of school law referred to in the following paragraphs. This ability should be checked with the Division of Finance acting for the Superintendent of Public Instructions, and approval obtained for the expenditure if cash or tentative approval for a bond issue if necessary.

A school district may be able to finance the construction of a building from the following sources or a combination of the sources.

1. By paying all costs from current income
2. By using the proceeds of the sale of school district voted bonds KRS 162.80 through 162.100
3. By current use of the Foundation Program capital outlay allotment of $400 per classroom unit
4. By funds accumulated by a tax authorized by a vote of the people in accordance with KRS 157.440 or 160.477
5. By funds from the sale of school building revenue bonds sold by the governing body of the city or county and authorized by funds from one or more of the above sources.

### Current Income

There are a few districts where it is possible to secure enough funds from current income to provide for building needs. The number of districts that may do this is decreasing. Where such a plan is followed, the districts have so arranged their financial affairs that they may set aside annually an amount sufficient to pay for the construction of some, if not all, of the building needs.

This is a commendable plan where it can be done. It avoids the expense of financing and interest costs. This reduces the obligation for capital outlay.

### School District Voted Bonds

The method to be followed in securing funds through this type of financing may be found in detail in Sections 162.080 through 162.100, Kentucky Revised Statutes.

This type of financing has certain limitations. It requires two-thirds of those voting on the question to favor the proposition before it carries. The amount of bonds that may be issued in any district shall not exceed the limit provided in the Constitution, which is two per cent of the assessments next preceding the vote on the bond issue. In most instances the amount of money that may be raised by the two per cent constitutional limit is not sufficient to meet the necessary building requirements.

**School Revenue Bonds**

Sections 162.120 through 162.300, Kentucky Revised Statutes, provide that the governing bodies of county or independent districts may issue bonds for the erection of school buildings. The bonds issued are not chargeable to the governing body of the county or city district, but are really obligations of the school district. Actually, the governing body of the district is nothing more than a governmental holding corporation. When a buliding is erected in the manner provided by these sections, the title is vested in the governing body. This body leases the building to the board of education on an annual rental basis. A contract is entered into between the board of education and the governing body whereby an annual rental is paid which is sufficient to take care of the interest and bond retirement at the end of a definite period of years. When the board of education has paid into the treasury of the governing body sufficient funds to pay all interest charges and costs involved, the title is returned to the board of education by the governing body of the district.

The current basis of approval for the total value of school building revenue bonds to be issued is 6% of the assessment of the district or the value of bonds that can be amortized from the capital outlay allotment, whichever is the smaller. Where a district has a special voted school building tax the limit is the amount of bonds which the tax will amortize, not to exceed 8% of the assessment.

**Holding Building Tax Elections**

The preceding paragraphs set out the ways of securing money and the authority for the procedures as outlined. Very careful preparation should be made in holding bond elections. The people must be informed. It is usually a good idea to have a planning committee. This committee will play an important part setting up the procedures to be followed and keeping the public informed. As preparations are made for the election, the functions of the com-

mittee may logically extend to include many of the activities necessary to get the voters acquainted with the needed facilities that are to be purchased and with the way of securing the funds.

It may be necessary to have an intensive campaign over a period of weeks. A definite program should be worked out for getting out the vote. The following activities should form part of the work of the committee:

1. Visit other communities in order to study other building programs.
2. Have a selected group of speakers to inform the members of the community of the needs of the building program.
3. It may be necessary to have a house-to-house canvass in order to determine the number of preschool children who will be entering the schools in future years.
4. Prepare publicity, arrange for car pools to take the voters to the polls and baby sitters where needed.
5. Under the leadership of the superintendent, it could study the educational program of the schools and make recommendations for changes.

**Fiscal Agent**

There are many times during a school building program when service of a legal advisor is needed. Some of these are when questions of property acquisition arise such as easements, condemnation proceedings, examination of abstracts and deeds; when questions concerning the school law arise; when contracts with architects and contractors are made; when the necessary procedure for bond elections is carried out; and when conflicts arise between the owner and other agencies or persons.

Before bonds can be sold, a legal opinion is required certifying that everything in connection with the issue is in order. Since the attorneys usually employed are not bond specialists nor have had experience in carrying out the details of issuing school bonds, it is suggested that boards of education secure a fiscal agent to prepare all forms in connection with the bond issue and secure an opinion on the bond issue from an authority that is satisfactory to the prospective bond buyers. The fiscal agent should be responsible for preparing all legal forms necessary for carrying out the purposes of the bond issue. These will consist of the notice of election, forms of ballot, bond forms and such abstracts, statute citations and

legal opinions as will be necessary to carry out the purposes of the bond issue for the information and protection of the owner and the bond buyer.

A list of approved fiscal agents can be obtained from the Division of Finance, State Department of Education.

**Definitions—Capital Outlay, Maintenance and Repair**

In dealing with the problems of school construction it is often difficult to determine the difference between capital outlay, maintenance and repair for school plants.

The school law, in Section 160.477, provides that taxes may be voted for financing capital outlay or paying for bonds for capital outlay, equipment and for purchase of school plots. It may be noted that there is nothing in this law authorizing the expenditure of the funds for maintenance and repair of school plants.

The Court of Appeals of Kentucky, in the case of Ewing et al. v. Peak et al., 266 S. W., 2d, 300, said that none of these funds may be spent for maintenance and repair purposes. This means that none of the funds raised by authority of Section 160.477 may be used for repair or maintenance purposes in providing school buildings.

For the purpose of allocating funds secured by authority of Section 160.477, capital outlay, maintenance and repairs should be understood to mean the following:

**Capital Outlay**—By capital outlay is meant changes in the building structure of such nature as to provide new additions or to replace a building with a new structure. It includes major remodeling jobs such as changes in the style of the structure of the roof or removing partitions in the buildings to make one room out of two. It is the expenditure of funds for anything which increases the total amount of property controlled by the school board.

New Grounds—This should include payments for all land purchased for school sites, addition to school sites, playgrounds, recreation fields together with all costs of acquiring title to same, condemnation and appraisals, deeds, abstract fees, surveying, and special legal surveys incurred in connection with the purchase of such land. All expenses in connection with improvements of new sites such as filling, grading, seeding lawns, setting out trees and shrubbery, sidewalks, drives, fences, flag poles, and professional landscaping services when made as an original outlay should be classified as an expense in connection with new grounds.

New Buildings—All funds used for erecting the original structure including painting and decorating of the building, interior or exterior, advertising for bids, special bond election and architect's fee paid by the board of education in connection with new buildings should be charged to capital outlay.

Improvements of Grounds and Buildings—There should be charged to this item the expenses of improvements to buildings incurred in removing old buildings, partitions or walls and all costs for adding new doors, windows, stairways, rooms, etc. The expense incurred in connection with new service systems or improvements of old service systems for an old structure, such as heating and ventilating, fire protection, plumbing and electric service should be classifed as capital outlay.

New Furniture and Equipment—There should be included in the item of capital outlay the cost of new furniture such as tables, chairs, desks, file cabinets and lockers when purchased as original equipment. Include also the cost of instructional apparatus for agriculture, arts, biological, chemical, and commercial apparatus, industrial and physical laboratory equipment as well as the cost for new library equipment. The replacements for these items should not be included in capital outlay.

Any school construction must conform with the laws, rules and regulations of the State Board of Education governing school construction. For more detailed requirements refer to the detailed statement of these regulations. (Department of Education Bulletin, Volume XXI, Number 7, September, 1953.)

**Maintenance**—Maintenance includes all repairs and replacements and general up-keep of the plant.

**Repair**—Repair includes replacement of broken pieces and worn parts as well as mending of broken joints and connections.

### B. Securing Bids

The School Law in KRS 162.070 requires that boards of education take bids on school building construction. The procedure to be followed should be such as will make well known the fact that the board of education will receive bids for a particular project. This can be done in several ways—by the use of local papers, trade magazines and personal contact of contractors. A competent architect will see that notices are published in trade journals and will send letters to contractors he believes may be interested in bidding

on the project. Such advertisement will help to insure that competition will be keen enough to assure letting the contracts under favorable conditions. The architect should also assume the responsibility for seeing that interested bidders are furnished plans for estimating purposes.

**Contractor**

The contractor, who is a specialist in building construction, agrees to erect the building as specified by the architect on the basis of competitive bidding. The contract should be awarded on the basis of the amount of the bid and the contractor's reputation and ability. Because there is sometimes confusion as to the relationship that should exist between the school board, the architect, and the contractor, the following three statements are made:

1. The contractor should receive directions only from one of the following: the architect himself, the architect's supervisor, or the clerk-of-the-works.
2. On many occasions the question is asked whether it will be best to have one general contract or three separate contracts, namely, one for masonry work, one for carpentry work, one for heating, plumbing and ventilation, and electrical work. Separate contracts may work with experienced contractors, but the problems of clean-up, responsibilities of coordination and timing always arise. For that reason it is usually not wise to let separate contracts. Generally speaking one general contract rather than several will prove more satisfactory.
3. It is recommended that the architect handle all the details of awarding contracts subject, of course, to the approval of the superintendent and board of education.

**C. Awarding Contracts**

This discussion gives suggested procedures which will assist the owner in awarding contracts for school buildings as authorized by Section 162.070 and Sections 162.120 to 162.300, KRS.

Contract awards should be predicated upon the assumption that proper competition has been invited and that prices quoted are reasonable and fair. Provision should always be made and so stated in securing bids that any and all bids may be rejected.

Tie-bids submitted by two or more prospective contractors may be the result of deliberate price fixing or by accidental coincidence

rather than premeditation. Care should be exercised to eliminate, as far as possible, what is sometimes known as complementary bids,

Those who indulge in deliberate price fixing or complementary bidding are, therefore, conspiring to the disadvantage of the board and deserve no consideration in awarding contracts under such circumstances. Sometimes prospective bidders "sound out" the owner in advance of bidding in order to anticipate what action may be expected in tie or complementary bids. In case of uniform bids where there is evidence of collusion and price fixing and where competition is not available, all bids should be rejected even though proper advertising has been given.

A contract is illegally awarded if discrimination has been exercised against the "lowest responsible bidder" who has complied with the terms of the specifications. The importance of accuracy in handling bids should be kept constantly in mind and the awarding of contracts should be simplified as much as possible. A meeting of minds is essential to the contract.

**The Lowest Responsible Bidder**

Laws which have been enacted and procedures of boards of education which have been adopted, to govern their action, were devised to protect taxpayers and to secure standards by which awarding of public contracts can be made economically and efficiently with fairness to both bidders and taxpayers.

After bids have been received, opened and tabulated, it becomes the duty of the school board, on the advice of the executive officer and others in authority or who have been employed to advise it, to determine the "lowest responsible bidder." To do this, two things must be determined in order to make a valid award: (1) Determine the responsibility of the bidders and which of the responsible bidders has submitted the lowest bid. (2) Compare the figures contained in the bids. This does not usually involve the exercising of judgment or discretion. Failure to make the award to the "lowest responsible bidder" may result in an invalid contract which the courts would not sustain.

A determination of the responsibility of the bidder requires the exercising of some judgment and discretion. Honesty and fairness must be based on the facts found after investigating the responsibility of the bidders.

In deciding upon the "lowest responsible bidder," the owner is not required to give bidders a hearing. It is recognized that there are practical difficulties in determining the "lowest and best bidder."

The term "lowest responsible bidder" has been generally interpreted by courts as requiring the successful bidder to possess financial ability to complete the contract, integrity and trustworthiness, skill, judgment, ability to perform satisfactory and conscientious work, promptness, experience, necessary facilities and equipment for doing the work efficiently, previous performance of satisfactory work, together with any other essential factor or factors which may be dependent upon type and kind of contract involved. In other words, the lowest bidder is not necessarily the "lowest responsible bidder," and the ability to furnish a bond does not alter the situation. Even though required, financial responsibility in itself is not sufficient to make the lowest bidder the "lowest responsible bidder" within the meaning of that term.

The factors which should be used to determine the responsibility of the lowest and best bidder shall be understood as follows:

1. **Financial Ability**—It is taken for granted that in order to be able to complete or perform any project, financial resources are required by the party undertaking a contract. It should be understood that the nature and type of contract should be taken into consideration in determining financial ability. It may only be necessary to require a performance bond. This is usually considered sufficient evidence that the bidder will carry out the contract. This performance bond should cover at least 100 per cent of the bid price. All policies covering builders' risk should be paid for by the contractor and the building should be his until completed and accepted by the board of education or any agency acting for the board on recommendation of the architect.

2. **Integrity and Trustworthiness**—The contractor most likely to give a full performance is one who has reputation from previous actions, a man who has integrity, honesty and trustworthiness. One may be justified in considering the bidder not responsible if he has previously defrauded in this contract, or if there is bona fide evidence which leads to the belief that the bidder has commited fraud despite the fact that there is no judicial information to that fact. Any previous actions of the bidder in connection with awarding of the contract which is indicative of a want of moral worth appears to be sufficient basis for considering such a bidder of doubtful responsibility.

3. **Skill, Judgment and Experience**—Skill, judgment and experience are three important factors which, by their very nature, are mingled with each other. It is usually considered that skill is acquired by experience. The bid of a contractor should be rejected, if in the judgment of those who are responsible for awarding contracts, the bidder does not possess skill, judgment and the experience necessary to perform satisfactorily the work anticipated.

4. **Promptness**—Bids and contracts invaribly state the time in which the contractor agrees to complete performance of the work. Time of performance is very vital to school boards, particularly in case of large improvements which are financed by bond issues. Delays in the performance of contracts result in the payment of interest charges without the securing of any benefit of the improvements that are being constructed. A low bidder can be rejected even though he is financially responsible, and he has all the work he can presently handle with his equipment and facilities, if those who are responsible for awarding the contract believe that they have evidence that such bidder cannot complete the contract within a stipulated time.

5. **Performance of Previous Satisfactory Work** — Common knowledge, as well as personal experience, shows that businessmen do not continue to maintain business relations with persons or organizations which have previously failed to perform contracts in accordance with their intent and requirements. When the low bidder, though otherwise responsible, has a record of unsatisfactory work the application of the above mentioned principle by officials awarding contracts with such bidders, has generally been upheld by the courts. Definite facts must be available to the board before reaching such a decision.

6. **Necessary Facilities and Equipment**—In almost every contract, except one exclusively for personal services, the contractor must possess the necessary equipment and supplies to perform the contract. Failure to award the contract to a bidder lacking the essential facilities and equipment has been upheld by the courts as a justifiable reason for refusing to grant the contract to the "lowest bidder." It is always necessary to have definite facts of the nature men-

tioned herein when the owner refuses to award a contract to the "lowest bidder" on this basis.

7. **Special Factors of Responsibility Dependent Upon the Nature of the Contract**—Where the responsibility of bidders is decided by the common, ordinary factors of responsibility above discussed, there are, by the very nature of some contracts, additional elements that must be considered. This can be illustrated by the bidder for the transportation of school children. It is imperative, in awarding this type of contract, that a driver of a school bus be physically fit in all particulars. An award to one whose right leg is missing is not an award to a responsible bidder according to law. It has been judicially expressed that on this kind of a contract a bidder should be tested by "sufficiency of his equipment, his morals, his care and skill as a driver, his satisfactory fulfillment and regularity in the discharge of his duties, his ability to control a group of children, and his ability to protect them at all times." Specific connection in this case is found in the case of Hutts v. State Board of Education, 165 S. C. 37, 42, 162 S. E. 751, 753, 1932.

**The Lowest Dishonest Bidder**

The rejection of the lowest bid is proper when the awarding officials believe that beyond a reasonable doubt, the bid of the contractor cannot be completed for the bid price. There are situations where a bidder is low because he feels that he may be in a position to get a contract where he does not intend to comply with the law or plans and specifications or where he believes he is in a position to avoid compliance for lack of enforcement. Under such circumstances this individual should be considered the "lowest dishonest bidder." While he appears to be responsible in every detail, he, in fact, does not expect to carry out the contract as required. Under such circumstances the bid of the honest bidder is invariably higher because he includes exactly what the dishonest bidder omits. The acceptance of the bid of a dishonest contractor puts an honest contractor at a disadvantage and, if such practices were permitted to prevail, would ultimately force the honest bidder out of business. This type of bidding may come up more often than may be anticipated by officials who are not in the habit of awarding contracts on the basis of the principles herein stated.

If the principles stated herein, as standards for the "lowest responsible bidder" are followed by officials who are responsible for awarding contracts, they will tend to eliminate, from the field of public construction, the bribe giver and the defrauder. It is admitted that this discussion of the "lowest responsible bidder" is more or less legal in nature. For that reason it is usually wise to have good counsel in deciding who is the "lowest responsible bidder" when the amount of the contract and the nature of the bidders will justify expenditures for such counsel. This discussion is presented with hope that it will call attention to the more important phases of awarding contracts as is contemplated by the Statutes and rules and regulations governing the awarding of contracts.

**D. Procedures Following Awarding of Contracts**

1. Supervision of construction—Since the superintendent and board of education are limited in their knowledge of building construction, it is very important that some arrangements be made for proper supervision during the construction period. The board's knowledge of the reliability and responsibility of contractors and the advice of the architect should determine what supervision should be given by the school district. The function of the architect in this connection should be thoroughly understood. The architect should supervise and be responsible to the owner for all work provided under contract. He should check all shop drawings and materials used in the work. He should check and approve all payments made to the contractor. It should be definitely understood as to the amount of time which will be spent by the architect, architect's supervisors, or clerk-of-the-works, as the case may be, during this construction period. The supervision and inspection should be sufficient to obtain for the owner full compliance of all parties concerned with the drawings and specifications of the building project.

The suggested form of contract between the architect and the owner can be found in the appendix.

2. Construction started—Before the building construction is begun, the architect will have made certain that all legal requirements have been met, that all contracts have been properly executed, and that the contractor has made the proper layout of the job.

3. Accepting the building—After the construction has been completed, the architect should make final inspection and certify approval of the project for final payment. When the school board receives this information from the architect the Superintendent of Public Instruction should be notified through the Division of Build-

ings and Grounds and a final inspection requested (SBR 22.023). Final settlement should not be made prior to this inspection. If it becomes necessary to use any part of the building before construction is completed, before this final inspection and before the building is completed to the satisfaction of the architect, a definite understanding should be had between the owner and the contractor and agreements entered into as to the responsibility of the two parties in case of accident, fire or other catastrophe.

4. Giving instructions for occupying and using the building—The school is a tool to be used by the children and the teacher. Like any other tool, it must be used properly. New floor finishes, new chalkboard surfaces, new wardrobes, new heating systems and new electrical systems and equipment are just a few of the features in school buildings of which teachers, custodians and pupils should be instructed in the manner of proper use. Prior to occupying the building, all those who will use it should be given complete instructions concerning its maintenance and operation. The superintendent, the board and the architect should cooperate in developing a list of the items that are important to be included and the procedure to be followed in giving this information to all those who should have it.

# VIII. APPENDIX

A. Agreement Between Owner and Architect

B. Building Application Forms: BG 1, BG 2A, BG 2M and BG 3

C. Requirements for Submission of Preliminary Drawings

## A. *Agreement Between Owner and Architect*

THIS AGREEMENT ENTERED into this the.....day of....., 19....., by and between....., hereinafter referred to as the Owner and....., of....., hereinafter referred to as the Architect or Engineer.

WHEREAS, the Owner intends to construct a.....

.....

at an estimated cost of $....., for the complete construction of said building, including all plumbing, heating, ventilating and electrical design, which estimated cost is used for the purpose of determining the fee or amount of this contract, which fee or amount is as follows:

.....% of $..... — Amount — $.....

HOWEVER, it is agreed and understood that the basic (or estimated) cost of $..... is used to base the Architect's fee for the purpose of this contract only, and it is further provided that before final payment is made that this basic cost shall be adjusted to the actual amount of the bid accepted for the work herein above referred to as arrived at by competitive bids and the fee paid to the Architect shall be ..... of said legitimate low bid and all payments made prior to said adjustment shall be entered as a credit on this contract in arriving at the balance due the Architect at the time of adjustment, which adjustment shall be made prior to final payment herein provided.

HOWEVER, it is further provided that should the Architect complete the plans provided for in this contract to the satisfaction of the Owner and other agencies required to approve said plans and should the Owner fail within a reasonable length of time not exceeding twelve months from delivery of completed and approved plans and specifications to advertise and receive bids, then, and, in that event, the Owner, on demand of the Architect, shall make final payment for preparing plans and specifications as provided for in this contract and not including the fee for supervision.

NOW THEREFORE, in consideration of the mutual covenants and agreements herein contained, the parties hereto do hereby covenant and agree as follows:

**Section 1.** The building or repair work as is hereinbefore set forth and as shall be authorized by the Owner shall not include in the estimated or basic cost set out above any architectural or engineering fees.

**Section 2. Architect's Professional Services.** The Architect agrees to perform all professional, architectural and engineering services as may be required by the Owner for the proper preparation of completed drawings and specifications pertaining to the foresaid construction and which is hereinafter set forth.

1. **Professional Services Defined.** Professional services shall consist of the necessary conferences, the making of necessary investigations, surveys and reports, the preparation of preliminary studies, preliminary working drawings, as are required, large scale and

full-sized completed details and drawings, full and completed specifications and the drafting of all forms of proposals and contracts.

2. **Approval by other Agencies.** The Architect shall submit the necessary drawings and the specifications as soon as the same are available to all agencies of the Local, State, or Federal Government which have jurisdiction in any matter over the Project, and shall have the right to require such submission to them for approval. The Architects shall make such changes on the drawings and specifications as may be necessary to obtain the approval stated above.
3. **Services during Construction.** The Architect shall prepare such drawings as may be needed to supplement the working drawings to permit the proper completion of the Project; check Contractor's shop and detail drawings; make interpretations of the Contract Documents and approve the materials used in the construction of the Project. The Architect shall attend, or be satisfactorily represented at conferences, with regard to the above items.
4. **Supervision of the Work.** The Architect shall supervise and be responsible to the Owner for the supervision of all work provided for under this Contract. The Architect shall check and approve all shop drawings and materials used in the work. The Architect shall check and approve all payments made to the Contractor or Contractors. It is understood and agreed by the parties hereto that supervision shall not require the continuous services of a resident inspector but shall require sufficient inspection to obtain for the Owner full compliance with the drawings and specifications by the Contractor.
5. **Revisions.** The Architect shall make such changes in, or revision of any of the instruments of work required under Item 2 of Section 2 in order to meet the approval of the Owner or any other Agency required to approve the plans.

**Section 3. Payment for Professional Services.** Payment to the Architect or engineer on account of the fee set forth herein shall be as follows:

1. Payment of 20% of the fee shall be made upon acceptance by the Owner of preliminary drawings and estimated cost for the building or repairs and approval in writing by any other agencies required to approve plans for this construction.
2. Upon approval by the Owner and any other agencies required to make approval of completed plans and specifications of said buildings or repair payment shall be made of a sum sufficient to increase the payment on the Architect's fee to 60% of the fee provided for by this agreement.
3. The remaining 40% of the fee shall be paid as the work progresses in the same proportion that payment is made to the Contractor.

**Section 4. Surveys, Borings and Tests.** The Architect shall, so far as the work under this Agreement may require, furnish the following in-

formation: A complete and accurate survey of the building sites, giving the grades and lines of streets, roadways, pavements, sewers, water mains, electric services, etc.; percolation test of soil, and location of adjoining structures. The Owner shall pay for chemical or mechanical or other tests as required and supervised by the Architect.

**Section 5. Preliminary Estimates.** When requested to do so the Architect shall furnish to the Owner preliminary estimates on the cost of the construction being planned, but the Architects shall not be required to guarantee the accuracy of such estimates; however, the estimates furnished shall be as reasonably accurate as possible.

**Section 6. Definition of the Cost of the Work.** The cost of the work, as herein referred to, means the cost to the Owner, but such cost shall not include any Architects' or Engineers' fees, cost of furnishing or equipment, except such equipment as may be constructed from drawings and specifications made and furnished by the Architect.

**Section 7. Ownership of Documents.** The Architect shall furnish to the Owner ..... sets of blueprints and ..... sets of specifications for this project. All drawings and specifications as instruments of service shall be the property of the Owner whether the work for which they are made be executed or not.

**Section 8. Successors and Assignments.** The Owner and the Architect each bind themselves, their partners, successors, executors, administrators, and assigns to the other party to this Agreement, and to the partners, successors, executors, administrators and assigns, of such other party in respect of all covenants of this agreement.

Except as above, neither the Owner nor the Architects shall assign, sublet or transfer their interest in this Agreement without the written consent of the other.

**Section 9. Arbitration.** All questions in dispute under this Agreement shall be submitted to arbitration at the choice of either party.

**Section 10.** No parts of any liquidated damages that may be collected from the Contractor by the Owner will be payable to the Architects for additional services.

**Section 11.** The selection of materials and architectural design and type of construction shall be at the Owner's option and direction.

**Section 12.** This agreement contemplates the furnishing of complete plans and specifications necessary to the complete general construction of the work and including plumbing, heating, ventilating and electrical design. No additional expense incurred by the Architects in having such plans prepared shall be borne by the Owner. All construction details shall be submitted for and approved by the Owner .

**Section 13. Separate Contracts.** It may be the desire of the Owner that separate contracts may be let for parts of the construction, such as heating, ventilating, plumbing and electrical.

**Section 14.** If the Architect shall fail to submit within a reasonable time drawings and other documents, or through any cause shall fail

to carry out this Contract within a reasonable time, or if the Architect shall violate any of the covenants, agreements or stipulations of this contract, the Owner shall thereupon have the right to terminate this Contract by giving three days' notice to the Architect in writing of the fact and time of such termination. In such event, the Architect shall be entitled to receive just and equitable compensation for services already satisfactorily performed. Nothing set forth in the Contract shall be construed to relieve the Architect of liability for damages sustained by the Owner by virtue of any breach of this Contract by the Architect.

**Section 15.** It is mutually understood and agreed that in case the preliminary studies or drawings as submitted by the Architect are not satisfactory to the Owner or if for any other reason the Owner does not care to continue the erection of the building, he may abandon either entirely or for any indefinite time the construction of the building or any substantial part thereof, and this Contract may be terminated by the Owner upon written notice to the Architect and upon payment to the Architect by the Owner of the amount due for preliminary plans and the Architect hereby agrees that he shall be entitled only to an equitable compensation for any part of the work satisfactorily performed on said preliminary plans. It is also understood and agreed that the Architect after submitting the preliminary studies and drawings will not do any further work in the performance of this contract unless and until he is notified by the Owner in writing to proceed with the work.

It is further understood and agreed that in case the complete working drawings and specifications as provided for in this contract are not satisfactory to the Owner or for any other reason the Owner desires not to continue the erection of the building, he may abandon either temporarily or for an indefinite time the construction of the building or any substantial part thereof and this Contract may be terminated by the Owner upon written notice to the Architect and upon payment to the Architect for completed plans if they have been completed to the satisfaction of the Owner. It is further understood that the Architect agrees to accept an equitable compensation for any work satisfactorily performed on the completed plans. After submitting completed plans and working drawings and specifications as required, the Architect agrees that he will not do any further work in the performance of the Contract unless he is notified by the Owner in writing to proceed with the work.

It is also further agreed that if the building provided for in this Contract is erected that additional payments for supervision under the terms of the Contract will be made in accordance with Item 3 of Section 3 of this Contract.

**Section 16.** Architects shall provide the services of a capable consulting engineer or engineers, well versed in all utilities, such as water supply, sewerage, sewage treatment, electric distribution, heating, ventilation, roads and pavements, to either supervise and develop the plans and specifications for such utilities, or, as an alternative, the

Architects may furnish their own engineers for this work and have the plans approved by such consultant or consultants before submission to the Superintendent of Public Instruction. It is agreed that the name of the consulting engineer or engineers selected for this work shall be submitted by the Architects to the Owner for his approval.

**Section 17.** It is understood by and between the parties hereto that the Architect will observe all laws and all legal rules and regulations of the State Board of Education for making and approving plans and specifications in erecting the school buildings or making of repairs provided for by this Contract.

**Section 18.** It is further understood and agreed that the Architect shall prepare sketches, estimates, and such other preliminary information as may be necessary for the promotion of the proposed project with the

..... It is also understood that the
(Fiscal Court or City Council, etc.)
construction of this project is dependent upon the approval of the said
....., since the construction is to
(Fiscal Court or City Council, etc.)
be financed by authority of Sections ....., KRS
It is also understood and agreed that in the event the said
..... fails to approve the project,
(Fiscal Court or City Council, etc.)
this contract shall be null and void and the Owner shall have no obligation to the Architect for any services rendered under the terms of this contract.

IN WITNESS WHEREOF the parties hereto have executed this agreement on the date first above written.

.....
FISCAL COURT OR CITY COUNCIL

.....
JUDGE

.....
CLERK

.....
BOARD OF EDUCATION

.....
ARCHITECT

.....
CHAIRMAN

.....
SECRETARY

(Submit This Form In Duplicate) Form BG-1
Rev. 9-10-57

# B. *School Building Application*

Architect..... District.....

## A. GENERAL INFORMATION

1. Name of School .....
2. Nature of proposed work: New building ( ); addition ( ); alteration ( ); repairs ( ).
3. If the building is for the pupils of several small schools, list such schools and give latest school census of each on separate sheet.

## B. SITE

1. Nature of traffic: Heavy ( ); Light ( ). Visibility at site entrance: Good ( ); Poor ( ).
2. Is the site free from disturbing noises? ..... hazardous surroundings? .....
3. Is the site at or near the center of the school population served? .....
4. Do you have a clear title as required by Section 162.010, KRS?.....
5. Size in acres: ..... Please attach a copy of the deed.

## C. BUILDING

1. Anticipated teachers and enrollment for this school:

| | Total Enrollment | No. of Teachers | Pupils Per Teacher |
|---|---|---|---|
| Elem. | | | |
| H. S. | | | |

2. Rooms for the project: (Specify number of each kind of room)

| | | | |
|---|---|---|---|
| Elementary Classrooms | ( ) | Lunchroom | ( ) |
| High School Classrooms | ( ) | Multipurpose Room | ( ) |
| Library and Workroom | ( ) | Gymnasium | ( ) |
| Science Room | ( ) | Auditorium | ( ) |
| Dark Room | ( ) | Auditorium-Gymnasium | ( ) |
| Science Storage Room | ( ) | Lock Room | ( ) |
| Home Economics Room | ( ) | Lobby | ( ) |
| Music Room | ( ) | Toilets | ( ) |
| Band Room | ( ) | Boiler Room | ( ) |
| Vocational Ag. Shop | ( ) | Storage—General | ( ) |
| Industrial Arts Shop | ( ) | Storage—Janitor | ( ) |
| Clinic Room | ( ) | ..... | ( ) |
| Audio-Visual Room | ( ) | ..... | ( ) |
| Office | ( ) | ..... | ( ) |
| Vault | ( ) | ..... | ( ) |
| Teachers' Lounge | ( ) | ..... | ( ) |
| Kitchen | ( ) | ..... | ( ) |

3. Number of stories above grade level: ..... Will you have a basement? Yes ( ); No ( ). A basement should be constructed only when necessary. If the basement is used for any other purpose than for the heating plant or storage, indicate the use:

.....

4. Type of Construction:
   a. A building constructed entirely of fire resistive materials, including its roof, windows, floors, doors and finish. ( )
   b. A building of fire resistive construction in its walls, floors, stairways and ceilings, but with finish, wood or composition floor surfaces and wood roof construction over fire resistive ceiling. ( )
   c. A building with masonry walls, fire resistive corridors and stairways, but with ordinary construction otherwise; i.e., combustible floors, partitions, roof and finish. ( )
   d. A building with masonry walls, but otherwise ordinary or joist construction and wood finish. ( )
   e. A building of frame construction with wood above foundation with or without slate or other semi-fireproof material on roof. ( )

D. **SERVICE SYSTEM**

1. Plumbing:
   a. At present time, which is used: Sewer ( ); Septic Tank ( ).
2. Electrical:
   a. Is electric power available at site: Yes ( ); No ( ).
   b. Is present building wired: Yes ( ); No ( ).
3. Water Supply:
   a. Well ( ); Municipal ( ); Cistern ( ).

E. **PLAN OF FINANCING**

1. District Levy
   a. Cash on Hand ( )
   b. Bonds Financed by District Levy ( )
2. Building Tax under KRS 160.477
   a. Current ( )
   b. Bonds under 160.477 ( )
3. Voted Bonds ( )
4. Foundation Program Capital Outlay
   a. Current ( )
   b. Bonds Financed by Capital Outlay ( )
5. Additional Tax under KRS 157.440
   a. Current ( )
   b. Bonds Financed by 157.440 ( )
6. Other—Explain .....
   ..... ( )
7. Present Outstanding Bonded Indebtedness .....
8. Present Assessed Valuation of District .....
9. Estimated Cost of this Project .....

..... .....
Date Superintendent

Rev. 5-21-54
BG-2A

# TENTATIVE OUTLINE SPECIFICATIONS

(Architectural)

DISTRICT ..... Date.....

SCHOOL .....

1. Type of Construction:

Foundation

Soil bearing pressure (tons per sq. ft.) .....

Footings..... Reinforced.....(Yes) .....(No)

Foundation .....

Superstructure

Exterior wall (Parapet wall should be avoided unless there is some special reason for its need) .....

.....

Exterior trim .....

.....

Interior wall and trim .....

Floor construction and covering

| | Construction | Covering |
|---|---|---|
| Corridor: | ..... | ..... |
| Classroom: | ..... | ..... |
| Gymnasium: | ..... | ..... |
| Gymnasium Locker Room: | ..... | ..... |
| Auditorium: | ..... | ..... |
| Kitchen: | ..... | ..... |
| Cafeteria: | ..... | ..... |
| Stairs: | ..... | ..... |
| Toilet Rooms: | ..... | ..... |

If concrete is used in the toilet rooms, what method of hardening the concrete will be used .....

.....

How is the under side of the gymnasium floor ventilated.....

.....

Doors—Material of Construction

Exterior .....

Interior .....

Size of glass in classroom doors (Suggested size no larger than 12″ x 12″ in upper panel) .....

Type of Panic Hardware .....

Where located .....

2. Roof Covering:

Pitch of Roof (Flat roof should be avoided) .....

Composition.....; Gravel.....; Compo. Shingles.....;

Shingles.....; Other.....

3. Type of Windows:
Double Hung.....; Awning Type.....; Casement Type.....;
Steel.....; Wood.....; Other Types.....;
Window Make and No. .....
Kind of Glass .....

4. Daylight Control in Instruction Areas:
Venetian Blinds.....; Window Shades.....; Fixed Louvers.....;
Adjust. Louvers.....; Darkening Shades.....; Others.....
.....

5. Classrooms:

Floor Finish:
Hardwood.....; Asphalt Tile.....; Cement.....; Linoleum.....;
Other .....

Wall Finish:
Sand Finish Plaster .....
Smooth Finish Plaster .....
Other Finishes .....

Wainscot Finish:
Sand Finish Plaster .....
Smooth Finish Plaster .....
Other Finishes .....

Ceiling Finish:
Sand Finish Plaster .....
Smooth Finish Plaster .....
Fibreboard..... Acoustical.....
Kind..... Other Finishes.....

Chalkboard:
Composition.....; Color.....; Slate.....; Other.....;
Explanation of Other .....
Length..... (Chalkboard shall be located in front of room)

Tackboard:
Fibreboard.....; Cork Carpet.....; Length..... (Tackboard shall be located on side of room) Other.....
Explanation of Other .....

Wraps Storage:
Cloak Room ( ); Lockers ( ); Wardrobe ( ).
Where will the above be located? .....
.....
How will the above type be ventilated? .....
.....

General Storing:
For students .....
For teachers .....
Instructional material .....
Stage equipment .....
Athletic equipment .....

6. Paint or Surface Finish Schedule:

Exterior Walls .....
Corridor Walls .....
Corridor Ceilings .....
Classrooms: Ceilings..... Walls.....
Wainscots..... Trim.....
Casework..... Floors.....
Other Rooms: .....
.....

(Give approximate reflection factors of paint)

7. Acoustical Treatment:

Kind and Where Used:

.....
.....

8. Gymnasium:

Bleachers:

Types.....; Seating Capacity.....

List below or attach a separate statement covering specifications for other special features included in the project, such as auditorium, gymnasium, cafeteria, shops, etc.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Signed .....
Architect

---

APPROVED:

.....
Superintendent of School District

.....
Date

Rev. 5-21-54
BG-2M

## TENTATIVE OUTLINE SPECIFICATIONS

(Mechanical)

DISTRICT..... Date.....
SCHOOL.....

1. Heating Systems:

Gas Radiators:

(Kind)..... (Size) ..... (No.).....

Hot Air Blower Units:
(Kind)..... (Size) ..... (No.).....

Central Steam Plant:
(Kind)..... (Size) ..... (No.).....

Central Hot Water Circulating System:
(Kind)..... (Size) ..... (No.).....

Electric Heating System:
(Kind)..... (Size) ..... (No.).....

Panel Heating System:

.....

Others:

.....

2. Ventilating System:
Mechanical:

.....

Natural:

.....

3. Electrical Work:
Wiring in Conduit.....; Underground Service.....;
Overhead Service.....; Conduit for public telephone service .....

Provision for Future Additions:
Space in service conduit .....
Space for expansion of main dist. panel .....
Conduit stubs for future expansion .....

Circuit Switching for Classrooms:
All lights on one switch:.....; Inside wall lights and outside wall lights switched in groups separately.....

.....

Lighting Fixtures for Classrooms: (only shielded lamps approved)
Incandescent.....; Semi-indirect.....; Indirect.....;
Fluorescent.....; Troffers.....; Indirect.....;
Semi-indirect .....

Mounting Height from Ceiling and Floor:

.....

Special Fixtures:

.....

Estimated Foot-Candle Intensity:
Classrooms.....; Enclosed Corridors.....;
Administrative Offices.....; Auditorium.....;
Gymnasium.....; Cafeteria.....; Library.....;
Shops.....; Sewing Rooms.....; Drawing and Art Room.....; Others.....

4. Toilet Room:

Finish and Materials:

Floors .....

Walls .....

Wainscots .....

Ceilings .....

5. Special Items Contemplated:

| | Conduit Only | Conduit and Wiring | Complete with Equipment |
|---|---|---|---|
| Audio Visual Aids | ..... | ..... | ..... |
| Germicidal Lamps | ..... | ..... | ..... |
| Photo-Cell Control | ..... | ..... | ..... |
| Program Clock System | ..... | ..... | ..... |
| Program Bell System | ..... | ..... | ..... |
| Fire Alarm System | ..... | ..... | ..... |
| Public Address System | ..... | ..... | ..... |
| Inter-phone System | ..... | ..... | ..... |
| Border Lights | ..... | ..... | ..... |
| Footlights | ..... | ..... | ..... |
| Floor Pockets | ..... | ..... | ..... |
| Dimmers | ..... | ..... | ..... |
| P. A. System for Aud. | ..... | ..... | ..... |
| M. P. Sound Wiring in Auditorium | ..... | ..... | ..... |
| OTHERS: | | | |
| ..... | ..... | ..... | ..... |
| ..... | ..... | ..... | ..... |
| ..... | ..... | ..... | ..... |
| ..... | ..... | ..... | ..... |

Water Supply:

From Water Mains.....; From Wells.....; Pneumatic pressure.....; Tank.....; Elevated Tower.....; Others.....

.....

Plumbing:

No. of Water Closets: ..... Large ..... Small;

Hot Water to all Lavatories: .....Yes; .....No; if No, Why? .....

Sewage Disposal:

Into sanitary sewer.....; Septic tank with overflow to cesspools.....; Field Drain Lines.....;

Has soil percolation test shown soil to be suitable to absorb effluent? ..... Into Cesspools.....

List below or attach a separate statement covering specifications for other special features included in the project, such as auditorium, gymnasium, cafeteria, shops, etc.

.....

.....

.....

.....

.....

.....

.....

.....

Signed .....

Mechanical Engineer

APPROVED: .....

Architect

APPROVED: .....

Superintendent of School District

Date .....

Form BG-3

## COMMONWEALTH OF KENTUCKY
## DEPARTMENT OF EDUCATION
### Frankfort

## BUDGETING ON A PROJECT BASIS

**Cost Estimates:** Name of School .....

1. General construction ..... $.....
2. Heating and ventilating ..... .....
3. Plumbing ..... .....
4. Electricity ..... .....
5. Sewer system ..... .....
6. Other contracts:
   A. ..... .....
   B. ..... ..... $.....
7. Sub-total (building only) ..... $.....
8. Architects' and engineers' commissions ..... .....
9. Legal service (if any) ..... .....
10. Site: purchase price ..... .....
11. Site: development (including roads and walks) ..... .....
12. Other cost items:
    A. ..... .....
    B. ..... ..... $.....
13. Total (estimated cost of building and site) .. $.....
14. Furniture and equipment ..... .....

15. Grand total (estimated cost of project) ..... $.....

16. Calculated square feet, excluding auditoriums, gymnasiums and general purpose rooms ..... .....

17. Calculated cost per square foot, excluding item sixteen and furniture and equipment ..... $.....

18. Calculated square feet of auditoriums, gymnasiums and general purpose rooms ..... .....

19. Cost per square foot of item eighteen, excluding furniture and equipment ..... .....

..... ..... .....

District Date Architect

## C. *Requirements For The Submission of Preliminary Drawings For Proposed Building Projects*

The following forms **shall be** with the Preliminary Drawings when they are sent to the Superintendent for approval:

a. BG 1 (Application)
b. BG 2 (Tentative Specifications)
c. BG 3 (Estimates Costs)

These forms shall be furnished by the Department of Education.

The Preliminary Drawings, when submitted, **shall** include the following:

1. PLOT PLAN—showing clearly the following information:
   a. The entire plot giving **all** dimensions, the point of compass, pertinent contour lines, **existing growth,** and outside **activities.**
   b. **Proposed** building, possible **future** additions, and **existing** structures.
   c. All walks, service roads, and parking areas.
   d. Adjacent **streets, highways, sidewalks, railroads,** etc.

2. FLOOR PLAN—(To scale **not less than** ⅛" to 1') showing:
   a. The complete floor plans of the existing building (if any) together with floor plans of any new structures. In **these** plans ALL spaces should be **identified** and **dimensioned.**
   b. All proposed lockers, wardrobes, storage cabinets, chalkboards, tackboards, plumbing fixtures, doors, and windows.

3. ELEVATION—(Same scale as floor plan) of **all** sides and giving:
   a. The elevations or comparative heights of all floors, ceilings, window sills, roofs, etc.

4. SECTIONS—showing:
   a. Foundations, partitions, roofs, and stairs
   b. Lateral lighting
   c. Height of window sills.

## REQUIREMENTS PERTAINING TO THE SUBMISSION OF FINAL DRAWINGS AND SPECIFICATIONS FOR PROPOSED BUILDING PROJECTS

The final drawings and specifications, when submitted to the Superintendent of Public Instruction for approval, **shall completely describe everything required to be performed.**
These drawings shall also include **all items** asked for in the **preliminary requirements** plus such items **as are listed below:**

1. PLOT PLAN
   a. **All** service lines.
   b. Any water supply or sewage disposal systems.
   c. Finished contours and general landscaping.

2. FLOOR PLAN
   a. Built-in equipment.
   b. Notation of wall thicknesses.
   c. Finished contours and general landscaping.

3. FRAMING AND STRUCTURAL
   a. Roof and floor.
   b. Schedule and/or detail of beams, columns, slabs, lintel, trusses, joists, rafters, etc.

4. ELEVATIONS
   a. Depth of footing below finished grade.

5. SECTIONS
   a. Classrooms, corridors, stairs, or any special conditions.
   b. Equipment and fixtures, chalkboard and tackboard height, floor, wall, and roof construction.

6. DETAILS, showing:
   a. Exterior wall sections, footings, windows, doors, cornice, stairs, chalkboards, tackboards, built-in equipment, etc.

7. PLUMBING
   a. The complete water system including the hot water heater piping and all plumbing fixtures, and the sewage disposal system including the **foundation drain line.**

8. HEATING AND VENTILATION
   a. The complete heating plans including the heating unit, radiators, fans, pumps, valves, lines, ducts, etc. These plans should note, as far as practical, the type and size of all materials.

9. ELECTRICAL
   a. Lable all outlets, receptacles, and switch panels.
   b. Show size of all conduits.
   c. Locate and lable all light fixtures.

10. SPECIFICATIONS
   a. Complete any information that may be needed for the proper fulfillment of the contract, such as construction materials and methods, and the mechanical equipment and installation.
   b. All accessories and any permanent equipment.
   c. Prevailing wage scale — schedule
   d. Contract document forms.
   e. Provision for supervision by architect or engineer.
   f. Provision for **contractor** to carry **Builders Risk Insurance** and all other insurance required by Statue.
   g. Performance Bond.