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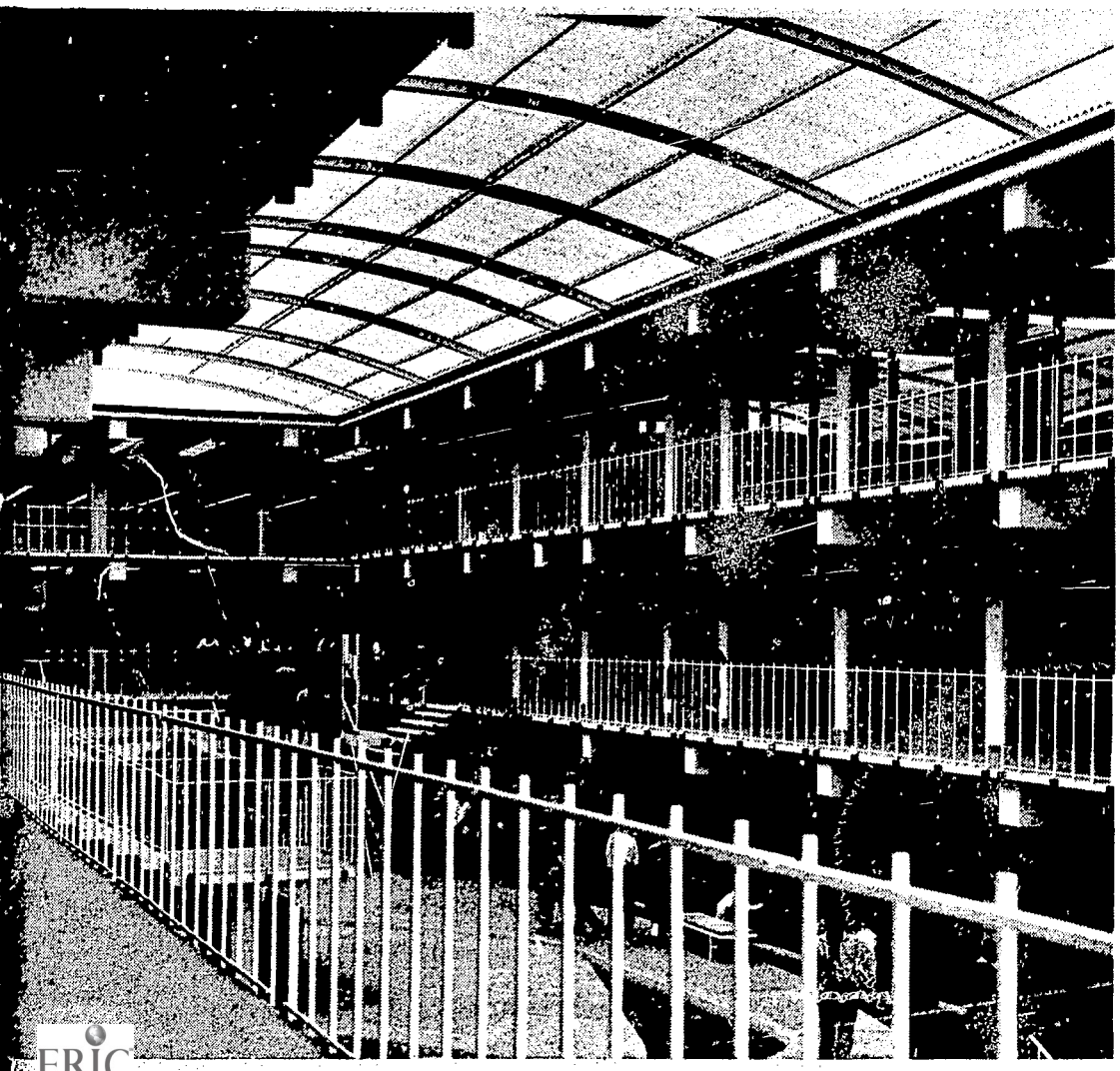
A recommendation of certain desirable standards and provisions for school structures, this guide cites basic requirements for safe and stable design and the uses of materials in construction. It also serves as an aid in the equipping, maintaining, using and occupying of all school buildings. Site sizes and location factors are included. Classroom environmental factors are presented for both elementary and secondary schools. The school building and electrical codes are reiterated so as to alert officials responsible for school construction to its provisions. (RH)

NEW MEXICO

SCHOOL BUILDING GUIDE



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SANTA FE

NEW MEXICO SCHOOL BUILDING GUIDE
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PREFACE

"These recommendations shall be known as the New Mexico School Building Guide, and may be cited as such and will be referred to hereafter as the 'School Building Guide.' The State Board of Education recommends this Guide for assistance in the proper construction of school buildings. It is not intended as a rule of the State Board of Education; however, the same will be considered in approving or rejecting plans for new construction which are submitted to the Department. Deviation from these recommended guides in construction will be approved where adequate reasons exist for such.

"All reference to the New Mexico Building Code or Electrical or Plumbing Code contained in this Guide are for informational purposes only, and reference should be made to the Code for detailed requirements which must be complied with under New Mexico law. This Guide shall not be filed with the New Mexico Supreme Court Law Library, and may be changed from time to time by action of the State Board of Education."

From the Minutes of the State Board of Education, January 25-26, 1965, page 26.

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THE NEW MEXICO SCHOOL BUILDING GUIDE

CHAPTER I

RECOMMENDATIONS

Article I - ADMINISTRATION

Section 100. PURPOSE. The purpose of this Guide is to recommend certain desirable standards and provisions and to cite certain basic requirements for safe and stable design and use of materials, in school buildings and/or school structures hereafter erected, constructed, enlarged, altered, repaired, or moved to other sites, and to aid in the equipment, maintenance, use, and occupancy of all school buildings and/or structures.

Section 101. SCOPE.

(1) This Guide shall apply to all new structures and additions used for school purposes and owned by school districts.

(2) This Guide shall apply to all alterations which affect the structure, strength, fire hazards, exits, lighting, or sanitary conditions of all buildings used for school purposes.

(3) This Guide shall not be understood to limit the powers of cities, villages, or towns to make or enforce additional or more stringent regulations provided the same do not conflict with the Uniform Building Code as adopted in New Mexico.

Section 102. This Guide shall supplement the Uniform building Code now used in New Mexico.

Section 103. GENERAL PROVISIONS.

(1) Educational Specifications. For every new building, addition, or alteration designed as a school structure for educational purposes, educational specifications should be prepared before the architect starts preliminary plans.

(2) Preliminary Plans and Specifications. In accordance with State Law, for every school building, addition, or alteration costing more than $5,000.00, preliminary plans and specifications shall be prepared by a resident, registered architect or engineer, depending on the type of service required. Copies should be furnished the Superintendent of Public Instruction or his designated agents for approval prior to the school board authorizing proceeding on working drawings.

(3) Final Plans and Specifications. For every school building, addition, or alteration costing more than $5,000.00, final plans and specifications shall be prepared by a resident, registered architect or engineer, depending on the type of services required, and the architect or engineer shall furnish a copy to the Superintendent of Public Instruction or his designated agents for their approval prior to the school board's requesting bids. Any major changes necessary to be made in the final plans between approval and the signing of the contract should be reviewed and approved by the Superintendent of Public Instruction or his designated agent.

(4) Licensing. All architectural and engineering services shall be rendered by New Mexico resident architects and engineers. All contractors employed to construct schools must be licensed in the state of New Mexico.

(5) Health and Safety Provisions. It is the responsibility of the Department of Health to examine all plans and specifications for those requirements pertaining to health and safety; therefore, preliminary and final plans and specifications shall be submitted to the Health Department for examination.

(6) The Fire Marshal. It is the responsibility of the Department of the Fire Marshal to examine all plans and specifications for those requirements pertaining to fire; therefore, preliminary and final plans and specifications shall be submitted to the Department of the Fire Marshal for his examination.

(7) Any major change in the plans and specifications affecting the design, materials, or the utilization of the building after final approval has been given, must be approved by the proper agency or agencies concerned.

Article II - DEFINITIONS

Section 200. Unless specifically stated, the following terms shall, for the purpose of this guide, have the meaning indicated in this section. Words used in the singular include the feminine gender and the masculine gender.

ALLEY is any public space, public park, or thoroughfare less than sixteen feet (16') but not less than ten feet (10') in width which has been dedicated or deeded to the public for public use.

ALTER or ALTERATION is any change, addition, or modification in construction or occupancy.

APPROVED as to materials and types of construction refers to approved by the building official as the result of investigation and tests conducted by him, or by reason of accepted principles or tests by national authorities, technical, or scientific organizations.

BALCONY is that portion of the seating space of any assembly room, the lowest part of which is raised four feet (4') or more above the level of the main floor.

BASEMENT is that portion of a building between floor and ceiling which is partly below and partly above grade (as defined in this Article), but so located that the vertical distance from grade to the floor below is less than the vertical distance from grade to ceiling.

BUILDING is any structure built for the support, shelter, or enclosure of persons, animals, chattels, or property of any kind.

BUILDING, EXISTING, is a building erected or one for which a legal building permit has been issued prior to the adoption of this Guide.

BUILDING OFFICIAL is the officer charged with the administration and enforcement of this Guide or his regularly authorized deputy.

CELLAR is that portion of a building between floor and ceiling which is wholly or partly below grade (as defined in this Chapter) and so located that the vertical distance from grade to the floor below is equal to or greater than the vertical distance from grade to ceiling.

CORRIDOR is a corridor open to general and common use by more than one tenant or occupancy.

CORRIDOR, PRIVATE, is any corridor other than a public corridor.

COURT is an open, unoccupied space, bounded on two or more sides by the walls of the building. An inner court is a court entirely within the exterior walls of a building. All other courts are outer courts.

DEAD LOAD in a building is the weight of the walls, permanent partitions, framing, floors, roofs, and all other permanent stationary construction entering into and becoming a part of the building.

EXIT is a continuous and unobstructed means of egress to a public way, and shall include intervening doorways, corridors, ramps, stairways, smokeproof enclosures, horizontal exits, exterior courts, and yards.

FIRE RESISTIVE CONSTRUCTION is construction resistive to the spread of fire, details of which are specified in Chapters 42 and 43 of the Uniform Building Code.

FLOOR AREA is the area included within surrounding walls of a building (or portion thereof), exclusive of vent shafts and courts.

FOOTING is that portion of the foundation of a structure which spreads and transmits loads directly to the soil or the piles.

GRADE (Ground Level) is the average of the finished ground level at the center of all walls of a building. In case walls are parallel to and within five feet (5') of a sidewalk, the above ground level shall be measured at the sidewalk.

HEIGHT OF BUILDING is the vertical distance from the "Grade" to the highest point of the coping of a flat roof or to the deck line of a mansard roof or to the average height of the highest gable of a pitch or hip roof.

LINTEL is the beam or girder placed over an opening in a wall, which supports the wall construction above.

MASONRY is that form of construction composed of stone, brick, concrete gypsum, hollow clay tile, concrete block or tile, or other similar building units or materials or combination of these materials laid up unit by unit and set in mortar.

MASONRY, SOLID, is masonry of solid units built without hollow spaces.

REPAIR is the reconstruction or renewal of any part of an existing building for the purpose of its maintenance. The word "Repair" or "Repairs" shall not apply to any change in construction.

SHAFT is a vertical opening through a building for elevators, dumbwaiter, light, ventilation, or similar purposes.

SHALL as used in this Guide is mandatory.

SHOULD is strongly recommended, but not required.

STAGE is a partially enclosed portion of an assembly building which is designed or used for the presentation of plays, demonstrations, or other entertainment wherein scenery, drops, or other effects may be installed or used and where the distance between the top of the proscenium opening and the ceiling above the stage is more than five feet (5').

STAIRWAY. Two or more risers shall constitute a stairway.

STORY is that portion of a building included between the upper surface of any floor and the upper surface of the floor above, except that the topmost story shall be that portion of a building included between the upper surface of the topmost floor and the ceiling or roof above. If the finished floor level directly above a basement or cellar is more than six feet (6') above grade, such basement or cellar shall be considered a story.

STREET is any thoroughfare of public space not less than sixteen feet (16') in width which has been dedicated or deeded to the public for public use.

STRUCTURE is that which is built or constructed, an edifice or building of any kind, or any piece of work artificially built up or composed of parts joined together in some definite manner.

VENEER is a facing of brick, stone, concrete, tile, metal, or similar material attached to a wall for the purpose of providing ornamentation, protection, or insulation but not counted as adding strength to the wall.

WALLS shall be defined as follows:

(a) Bearing Wall is a wall which supports any load other than its own weight.

(b) Faced Wall is a wall in which the masonry facing and backing are so bonded as to exert a common action under load.

(c) Nonbearing Wall is a wall which supports no load other than its own weight.

(d) Parapet Wall is that part of any wall entirely above the roof line.

(e) Retaining Wall is any wall used to resist the lateral displacement of any material.

Article III - SITES

Section 300. It is recommended that the size of the sites for new elementary, junior high school, and senior high schools follow that recommended by the National Council on Schoolhouse Construction as follows:

(1) FOR ELEMENTARY SCHOOLS, it is suggested that there be provided a minimum site of five (5) acres plus an additional acre for each 100 pupils of predicted ultimate maximum enrollment. Thus, an elementary school of 200 pupils would have a site of seven (7) acres. Some freedom, however, should be given regarding size of site for new schools such as a neighborhood school of one or two grades.

(2) FOR JUNIOR HIGH SCHOOLS, it is suggested that there be provided a minimum site of 20 acres plus an additional acre for each 100 pupils of predicted maximum enrollment. Thus, a junior high school of 500 pupils would have a site of 25 acres.

(3) FOR SENIOR HIGH SCHOOLS, it is suggested that there be provided a minimum site of 30 acres plus an additional acre for each 100 pupils of predicted ultimate maximum enrollment. Thus, a senior high school of 1,000 pupils would have a site of 40 acres.

Section 301. If possible, the site should be higher than the surrounding terrain so as to provide proper drainage.

Section 302. It is recommended that the school building be located on a high spot of the site.

Section 303. No driveways which constitute a safety hazard should be permitted on any school site.

Section 304. In the long-range plan for school plants, elementary schools should be so situated that no pupil is required to walk further than three-fourths (3/4) mile.

Section 305. All general purpose walks on sites should not be less than sixty-six inches (66") in width.

Article IV - GENERAL CONSTRUCTION

Section 400. Live Loads. The minimum live loads in pounds per square feet of horizontal projections should be as authorized in the Uniform Building Code.

Section 401. Adequate fire resistive acoustical treatment should be used in all instructional areas and corridors.

Section 402. It is recommended that forty (40) lineal feet of chalk and tack board be located in each elementary and secondary classroom with no less thanfifteen feet (15') of each.

Section 403. The maximum distance allowed from classroon exit door to an outside exit or to a stairway leading directly to an outside exit should be 150 feet.

Section 404. No exit door shall be less than 36 inches in width except that double doors may each be 30 inches in width.

Section 405. All exit doors leading from pupil-inhabited rooms shall swing outward.

Section 406. No exit door from room or building shall be designed in any way so as to not make it operable from the inside without the use of key or any special knowledge or effort. This section shall apply to all school buildings within two years from date of adoption.

Section 407. All exit doors to the exterior of the building (except those leading from individual classrooms) must be equipped with operable panic hardware. This section should apply to all school buildings within two years of School Building Guide adoption.

Section 408. All buildings over one story shall be of a two-hour fire resistive construction.

Section 409. All buildings should be equipped with a fire alarm system as recommended in NFPA Bulletin 101, "Building Exits Codes."

Section 410. One unit of exit door width shall be provided as stated in the Uniform Building Code. One unit of exit door width is 22 inches.

Section 411. Proper type fire extinguishers shall be located in strategic points. There should be no point in the building over 75 feet from a fire extinguisher.

Section 412. All furnace and fuel rooms must be enclosed by two-hour fire resistive walls. All furnace room doors opening into the building must be equipped with fused self-closing fire doors, approved by the Underwriters Laboratory. It is strongly recommended that no doors from a boiler or furnace room open into the building.

Section 413. All fire doors shall be equipped with automatic closers.

Section 414. Minimum clear width of main corridors should be 10 feet.

Section 415. The minimum clear width of secondary corridors should be 8½ feet.

Section 416. The maximum projection allowed in any corridor should be 8 inches. This includes the door projections when opened.

Section 417. The minimum clear width of all required stairways shall be 44 inches. Any stairway of more than 66 inches width shall have a substantial intermediate handrail.

Section 418. All pupil-used stairways of more than 16 risers must be in two runs between floors.

Section 419. The maximum number of risers per run is 16 and the minimum is 3.

Section 420. The maximum height of risers should be 6½ inches.

Section 421. The minimum width of treads should be 11 inches.

Section 422. No winders shall be permitted in stairways which pupils use.

Section 423. All inside stairways serving buildings of more than two stories shall be enclosed with suitable fire rated walls and openings to safeguard the stairway as an exit and to prevent the passage of fire or smoke up the stairway opening. They shall be equipped with self-closing fire doors.

Section 424. Stairways shall not have storage space beneath them unless of 4-hour, fire-rated construction.

Section 425. All exits and stairways shall be plainly marked and visible at all times, and have illuminated exit signs over all exterior exits. These exits should be illuminated with an intensity of not less than one foot candle at any time.

Section 426. All electric wiring shall be in accordance with the provisions of the National and New Mexico Electric Code.

Section 427. There should be at least one convenient electrical outlet per wall or a minimum of 4 per room. There should be at least one 120/240 outlet in each 60 feet of corridor length.

Section 428. Electric poles and guys should be kept at a minimum. If required, they should be kept away from play areas and/or fenced in. Underground installation is recommended.

Section 429. Rough-in provisions should be made in all new schools for radio and television.

Section 430. Toilet rooms should be equipped with a positive exhaust system.

Section 431. Proper provision should be made for easy access to electrical wiring and equipment as well as plumbing fixtures, pipes, and valves. Pipe chases wide enough to provide working room are strongly recommended.

Section 432. All materials used in finishing restrooms and shower rooms should be non-absorbent.

Section 433. Each building more than one story in height should be equipped with enclosed smoke-proof and fire-resistive stairways.

Section 434. It is recommended that mechanical ventilation be used throughout the school building, especially in the restrooms and locker rooms.

Section 435. No gas or water supply line shall be embedded in concrete or placed under slab without access facilities.

Article V - ELEMENTARY SCHOOLS

Section 500. It is recommended that no elementary classroom for general use be less than 900 square feet, or 30 square feet per pupil, whichever is the greater.

Section 501. Rooms should be decorated in such a manner so as to give proper reflectance factors to walls, floors, and ceilings.

Section 502. The lighting in each elementary classroom should have a maintained minimum foot candle rating of 50 at desk level.

Section 503. All lighting quality should meet the standards of the American Standard Guide for School Lighting, jointly issued by the A.I.A., the I.E.S., and the N.C.S.C.

Section 504. The number of water closets for girls in the elementary schools shall be at the ratio of one fixture for 35 girls.

Section 505. The number of water closets for boys in the elementary schools shall be at the ratio of one fixture for every 100 boys. (It is recommended that the ratio be at the rate of one fixture for every 75 boys).

Section 506. The number of urinals for boys in the elementary schools shall be at the ratio of one fixture for every 30 boys.

Section 507. The number of lavatories for elementary pupils should be at the ratio of one fixture for each 60 pupils.

Section 508. All water closets should be divided by partitions having lockable doors.

Section 509: The number of drinking fountains in the elementary school shall be at the rate of one fixture for each 75 pupils. No drinking fountain shall be located in the restrooms. Each self-contained elementary classroom should include one drinking fountain. All drinking fountains shall be of the angle-nozzle type.

Section 510. The number of shower heads should be in the ratio of one for every 5 pupils in the largest physical education class.

Section 511. It is recommended that the first three grades be in self-contained classrooms. Self-contained classrooms should serve six functions:

(1) Individual formal work.
(2) Group formal work.
(3) Individual informal work.
(4) Group informal activity.
(5) Clothing care.
(6) Toilets.

Article VI - SECONDARY SCHOOLS

Section 600. The following room sizes are recommended as minimum for secondary schools:

General Use Academic Classrooms	30 sq. ft. per pupil of anticipated maximum enrollment
Science, General	30 sq. ft. per pupil of anticipated maximum enrollment
Science Labs., Chemistry and Physics	35 sq. ft. per pupil of anticipated maximum enrollment
Business Education	20 sq. ft. per pupil of anticipated maximum enrollment
Home Economics, Foods	30 sq. ft. per pupil of anticipated maximum enrollment
Home Economics, Sewing	30 sq. ft. per pupil of anticipated maximum enrollment
Shops, General (Complete Area)	100 sq. ft. per pupil of anticipated maximum enrollment
Art Rooms	35 sq. ft. per pupil of anticipated maximum enrollment
Arts & Crafts Rooms	40 sq. ft. per pupil of anticipated maximum enrollment
Music Rooms, Vocal	16 sq. ft. per pupil of anticipated maximum enrollment
Music Rooms, Instrumental	20 sq. ft. per pupil of anticipated maximum enrollment
Auditorium	7 sq. ft. per pupil of anticipated maximum enrollment
Library	20 sq. ft. per seat per 10% of enrollment

Section 601. Rooms should be decorated in such a manner as to give proper reflectance factors to the walls, floors, and ceilings.

Section 602. The lighting in each classroom should have a maintained minimum foot candle rating of 50 at desk level except as follows:

Drafting, Typing, Sewing, and Sight-Saving Classrooms	100
Corridors and Stairways	15
Restrooms	15
Auditorium (unless used as a classroom)	10

Section 603. All lighting quality should meet the standards of the American Standard Guide for School Lighting, jointly issued by the A.I.A., I.E.S., and the N.C.S.C.

Section 604. There shall be a restroom for each sex on each floor. Distribution of rest rooms shall be in manner to best accommodate students.

Section 605. The number of water closets for girls in the secondary schools shall be at the rate of one fixture for every 45 girls.

Section 606. The number of water closets for boys in the secondary schools shall be at the rate of one fixture for every 100 boys.

Section 607. The number of urinals for boys in the secondary schools shall be at the rate of one fixture for every 30 boys.

Section 608. The number of lavatories shall be at the rate of one fixture for every 60 students.

Section 609. The number of drinking fountains should be at the rate of one fixture for every 75 pupils. All fountains shall be on the angle-nozzle type. There shall be at least one fountain on each floor.

Section 610. There should be one shower head for every four boys or girls in the largest physical education class.

Section 611. All water closets in girls' restrooms shall be divided by partitions with doors. All existing schools must comply with this section within two (2) years from date of School Guide adoption.

Section 612. Sanitary napkin dispensers and waste receptacles should be in all girls' restrooms in junior and senior high schools.

Section 613. Hair dryers should be located in all girls' dressing rooms.

Section 614. Modesty shower stalls should be provided in the girls' dressing rooms.

CHAPTER II

SCHOOL BUILDING CONSTRUCTION UNDER THE UNIFORM BUILDING CODE OF THE STATE OF NEW MEXICO

The following outline is designed to alert officials and others responsible for school construction to the parts of the present State building codes applying particularly to school plant design.

Pertinent sections relating to engineering features common to all building types are found in the Uniform Building Code and are not included in this presentation. There may be minor variations in any given plan or proposal which will not be covered in this outline, but it is considered that most situations will be covered herein or the source of the answer to the problem pointed out.

Article I - SCOPE

Section 100. This digest will be known as the School Building Guide, an interpretation of the Uniform Building Code of the State of New Mexico, as prepared by the International Conference of Building Officials.

Section 101. The purpose of this Guide is to provide minimum standards for school plant construction and acquaint school building officials with the principal features of the existing code in a compact and easily read presentation.

Section 102. This code does not cover individual municipal codes, and it is incumbent upon the school building official to verify the various parts of this code against the municipal code. By law, no municipality will alter any provision of the State Code to make any section less restrictive.

Section 103. Additions, alterations, or repairs to be made shall comply with all requirements for new buildings except as noted in Section 104, Uniform Building Code.

Section 104. The Uniform Building Code does not prevent the use of any material or method of construction not specifically prescribed by this Code, provided such alternate is approved.

Section 105. Such alternate may be accepted in accordance with the provisions of Chapter 23 of the Uniform Building Code, providing the building officials find the alternate material, method, or work offered are the equivalent for the purpose intended. The evidence of such proof must be presented to the satisfaction of the building official.

Section 106. Tests may be required and the expense of such tests will be borne by the owner or his agent.

Article II - ENFORCEMENT OF THE UNIFORM BUILDING CODE

Section 200. Enforcement is handled by the duly constituted building officials of the city or municipal government.

Section 201. Unsafe buildings or structures for reasons given in Section 203, Uniform Building Code, may be declared as such, and shall be abated by repair, rehabilitation, demolition, or removal in accordance with procedures listed in Section 203 of said Code. Such costs of demolition shall be charged as an assessment against the owner.

Section 202. A Board of Appeals should be constituted in municipalities to provide for interpretations of the Code.

Section 203. Violations and penalties for infractions of the Code shall be as in Section 205, Uniform Building Code, and shall be punishable by a fine of not more than $300 or 90-day imprisonment, or both.

Article III - PERMITS

Section 300. Section 301, Uniform Building Code, requires that a building permit be obtained for all work as noted--no person, firm, or corporation shall erect, construct, enlarge, alter, repair, move, improve, remove, convert, or demolish any building or structure without first obtaining a separate building permit for each such building or structure.

Section 301. When required by the building official, plans and specifications for such work will be presented, and such plans and specifications will have been prepared by a licensed architect or engineer

(licensed by the State of New Mexico). Plans and specifications need not be submitted for a one-story building of Type V construction under 600 square feet in area or small and unimportant work.

Information required on the plans and specifications is outlined in Section 301, Uniform Building Code.

Article IV - DEFINITIONS

Refer to Uniform Building Code as necessary for clarification.

Article V - OCCUPANCY

Section 502, U.B.C.: Change can be made so less hazardous occupancy based on life and fire risk.

Section 503, U.B.C.: When more than one occupancy is used, it shall be based upon most restrictive requirement. Exceptions as noted where areas are low. Separations and types permitted in this section.

Section 505, U.B.C.: Floor areas permitted by types of use.

Section 506, U.B.C.: Increases allowed in above.
Table 5A: Wall and opening protection.
Table 5B: Required separations.

Article VI - GROUP A OCCUPANCIES, SPECIAL CASE

Section 601, U.B.C.: Building with a stage and occupant load over 1,000 (all restrictions listed this section and see below).

Article VII - GROUP B OCCUPANCIES, SPECIAL CASE

Section 701, U.B.C.: Buildings as listed:
Division 1. Stage and occupancy load less than 1,000.
2. Assembly building with 300 occupants or more.
3. Not applicable.
4. Stadiums, reviewing stands, bleachers.

Section 702, U.B.C.: Div. 1 and Div. 2 occupancy shall be of not less than one hour fire resistive construction throughout with exceptions as noted including gymnasiums construction.

Section 703, U.B.C.: Location on property.

Section 704, U.B.C.: Exit facilities.

Section 705, U.B.C.: All dressing rooms, other portions of building used by human beings shall be provided with light and ventilation as per Sec. 605 and 1711, Uniform Building Code.

Section 706, U.B.C.: Exits as required by Chapter 33, Uniform Building Code.

Section 707, U.B.C.: Fire protection as specified by Chapter 38, Uniform Building Code.

Section 708, U.B.C.: Boiler room restrictions and regulations as to design and construction.

Section 709, U.B.C.: Running tracks in gymnasiums may be built of wood, unprotected steel, or iron. In gymnasiums or school multi-purpose rooms of not over 3,200 square feet, use of wood is allowed in lieu of fire-resistive plaster for one-hour construction.

Article VIII - GROUP C OCCUPANCY

Section 801, U.B.C.: Any building used for school purposes and not otherwise covered is in this group.
Occupancy separation Table 5-B, Uniform Building Code.
Occupant load (3301)

Assembly areas	7 sq. ft./occupant
Classrooms	20 " " "
Dining rooms	15 " " "
Gymnasiums	15 " " "
School shops and vocational rooms	50 " " "

Section 802, U.B.C.: Buildings or parts thereof not to exceed area or height as set forward in Sections 505, 506, 507, Uniform Building Code. All buildings shall be not less than one-hour fire resistive construction.

Exceptions: (1) Where open frame roof in one-story building not required.

(2) One-hour construction not required where one door from such space leads directly outside.

Special Considerations

(1) Rooms having 100 or more load not over first story. Same for kindergarten, first, or second grade pupils.

(2) One-hour fire resistive separation (walls) between laboratories, wood working and metal shops, storage rooms (see Chapter V, Uniform Building Code).

(3) Where basements in two (or more) story buildings of Type III, IV, and V buildings construction to be Type I with no passage or access between basement and first floor.

(4) Balconies, bleachers over usable space and all janitor closets to be of one-hour fire resistive construction.

(5) All curtains, drops, and drapes to be flame proofed.

(6) Stages and enclosed platforms to be built according to Chapter 39, Uniform Building Code.

Section 803, U.B.C.: Location on Property

(1) Buildings to face at least one public street (at least 20 ft. wide) with at least one required exit.

Section 804, U.B.C.: Exits as in Chapter 33, Uniform Building Code (stairs, exits, smoke-proof closures).

Exits, Stairs, Occupant Loads

A. Exits, Doors, and Corridors.

1. Minimum of two per building with load of 50 or more.

2. Where two stories or more--two exits from each floor located remotely. (Occupant load of 500 to 999 not less than three exits, over 1,000 not less than four exits.)

3. Width is determined by the total occupant load divided by 50. Where two stories or more exit width is total load of floor served plus half the load of the above floor.

4. Where two exits are required they shall be placed a distance apart equal to not less than one-fifth the perimeter of the room. Other exits placed a reasonable distance apart.

5. When not equipped with a complete automatic fire extinguisher, no point to be more than 150' from an exit, measured along line of travel. (If Type I or II construction, above distance may be increased to 200' and building must be equipped with automatic fire extinguisher system).

6. Exit door (all doors) must swing in direction of egress. Plate glass doors to have center bar or decorated to make door visible.

7. Exit doors shall be openable from the inside without use of key or any special knowledge or effort.

8. Width of door shall not be decreased more than 3" by any projection.

9. No required exit door shall be less than 36", nor more than 48".

10. No revolving, vertical sliding, or rolling doors shall be used as an exit door.

11. Doors into stairways shall not reduce the landing width by more than 6" nor be more than 2" above the floor of the landing.

B. Corridors Only.

1. Trim and handrails only may project into the corridor 3½".

2. When two exits are required, exit doors must be arranged so that it is possible to go either direction from any point in a corridor to an exit stair or door. (Dead-end corridors not longer than 20' permitted only when serving ten people or less).

3. One-hour fire resistive construction for all openings, walls, and ceilings. Glass to be ¼" thick wire glass in steel frames. Ventilation louvres are to be equipped with fire shelters of approved automatic type.

C. Stairways.

Due to infrequency of this type of construction, pertinent material is not presented here. Refer to Section 3305 of Uniform Building Code for code on stairs.

D. Ramps.

1. Width of ramps shall be as for corridors when used as an exit.

2. The slope of a ramp shall not exceed 1 foot of rise for 8 feet of horizontal travel.

3. Handrails shall be supplied where ramps exceed 1 foot in 10 feet slope (see Sec. 3305 of Uniform Building Code on handrails).

4. Ramps shall be constructed as required for stairways.

5. Surface of ramps shall be roughened or shall be of non-slip material.

E. Exit Signs and Illumination.

1. Exits shall be illuminated at all times with light having an intensity of not less than one foot candle at floor level.

2. Signs are required for exits with occupant load of 50 or over.

3. Letters in signs to be of at least 5 inches in height.

4. Separate electrical circuits shall be provided for these buildings where occupant load is over 300.

5. Each sign shall have at least two 15-watt lamps or equivalent.

F. Aisles.

Where fixed seating is planned, refer to Section 3313 of the Uniform Building Code.

G. Special Exit Requirements - Group C Occupancies.

1. No corridor shall be less than 6 feet wide. Corridor width when computed for exits shall be as noted above.

2. Ramps must be used for all changes in elevation under 2 feet.

3. Exit corridors serving an auditorium and classrooms are computed for the facility requiring the greater width.

4. Stair widths are to be not less than 5 feet exclusive of rails where occupant load is over 100.

5. Exit width of doors shall be not less than 2 feet narrower than corridor width.

6. Any room below grade shall have an exit door leading directly outside. Such exit shall be not less in width than one-half the required aggregate width of exits.

7. Exit doors from rooms having an occupancy load of more than 100 and from corridors shall not be provided with a latch or lock unless it is panic hardware.

8. Fences and gates with locks are permitted, provided a discharge area is provided for with a distance of at least 50 feet between the gates and the exits. Discharge area is to be computed on 3 square feet per occupant.

9. Gates are not permitted in buildings across passageways or corridors unless they comply with item 7 above.

H. Boiler Room Exits.

1. Any room with an oil-fired furnace and/or an incinerator shall have at least two exits, one of which may be a ladder.

Section 805, U.B.C.:

(1) All portions of this occupancy to be provided with both light and ventilation, either natural or artificial.

(2) Water closets to be on the following basis:

	Girls	Boys
Elementary Schools	1:35	1:100
Secondary Schools	1:45	1:100

(3) Urinals for boys on the basis of 1 to 30.

(4) There shall be one lavatory for each two water closets or urinals.

(5) There shall be one drinking fountain per floor.

(6) See Section 1711, Uniform Building Code, for requirements for floors and walls of toilets.

A. Water closet compartments to be at least 30 inches in width.

B. Floors and walls (and walls within 2 feet of urinal fronts and sides) to be finished with hard, non-absorbent surface of cement, tile, or approved equal.

C. Wainscots of such materials to be at least 4 feet high.

D. Shower areas same as (C) but 6 feet in height.

E. Shower doors to be hinged outward and made of shatterproof materials.

F. If glass is used, it is to be at least 7/32 inches thick, and wire reinforced.

G. All plastics in doors or panels of shower enclosures to be shatter-resistant.

Section 806, U.B.C.: Elevator shafts, vent shafts, other vertical openings to have two-hour fire resistive construction for Type I and II construction, one-hour construction in Types III, IV, and V buildings.

Section 807, U.B.C.:

(1) Fire extinguishing systems (automatic type) required in enclosed spaces under stairways and in all portions of basements or cellars used for storage or maintenance work rooms.

(2) For detailed requirements, see Chapter 38, Uniform Building Code.

(3) Every building four or more stories in height shall have one or more dry standpipes. Number and location shall be as shown in Section 3804, Uniform Building Code.

(4) Every building two or more stories in height shall be equipped with a wet standpipe.

(5) Gymnasiums and auditoriums with or without a stage and having an occupant load of 500 or more shall have interior wet standpipe system as detailed in Chapter 38, Uniform Building Code.

(6) Where such facilities have dressing rooms, workshops, etc., such areas shall be equipped with a system as noted in Chapter 38, Uniform Building Code.

Section 808, U.B.C.:

(1) Incinerators, vent stacks for furnaces, fireplaces, etc., are covered in Chapter 37, Uniform Building Code. All such installations must conform with the many sections of this chapter.

(2) Motion picture films shown with electric arc equipment and film over 7/8 inches wide shall be shown only in a projection booth or room constructed as specified in Chapter 40 of the Uniform Building Code. This is applicable for Group B and Group C occupancy uses.

(3) There shall be an outside gas shutoff valve (when natural gas is used) located in accessible position and conspicuously marked.

(4) Boiler room exterior openings, if less than 10 feet from other openings in the building or directly under another opening, shall have fire resistive assemblies for these openings rated at 3/4 of an hour. If solid fuel or liquid fuel is burned, all walls, ceilings, etc., shall be of 3/4-hour fire resistive construction. At least a one-hour fire rating is recommended. If gas is the fuel, all construction including walls, ceilings, etc., to be of one-hour fire resistive construction. (See Chapter V and Table 33-B, Uniform Building Code, for proper definitions for occupancy separation).

(5) Where boiler room doors are in a pair configuration, one leaf is to be normally inoperable except by special tool, and operable leaf is to have an astragal attached. This operable door is to have a closer.

(6) No flammable liquids may be placed or stored in any building except in approved utility rooms and laboratories and stored in approved amounts. All containers to be tightly sealed when not in use.

Section 809, U.B.C.: All roofing shall be fire-retardant type as listed in Section 3203, Items 1 through 7, Uniform Building Code.

Article IX - FIRE ZONES

Attention is hereby called to the fact that buildings or parts of buildings falling in fire zones as established by the state or municipal authorities must be erected to conform with construction specified for the applicable fire zone. (See Chapter 16, Uniform Building Code).

Article X - REQUIREMENTS BASED UPON TYPES OF CONSTRUCTION

For classification of all buildings by types of construction and general requirements, see Chapter 17, Uniform Building Code.

(1) Summary of Types:

Type I Structure--steel, iron, concrete, or masonry walls and partitions of incombustible fire resistive materials. (Chapter 18, U.B.C.)

Type II Structure--steel, iron, concrete, or masonry walls and partitions of incombustible fire resistive materials. (Chapter 19, U.B.C.)

Type III One-hour fire resistive construction throughout or heavy timber construction. (Chapter 20, U.B.C.)

Type IV One-hour fire resistive construction throughout (Chapter 21, U.B.C.)

Type V See Chapter 22, Uniform Building Code.

(2) Floor Area and Heights Allowed by Type of Construction:

A. Type of Construction - Floor Area:

Occupancy	I	II***	III***	IV***	V***
B 1-2*	unlimited	13,500	10,100	10,100	7,900
B 3-4**	unlimited	13,500	10,100	10,100	7,900
C	unlimited	20,300	15,200	15,200	11,800

Note--See Table 5-C, UBC for minor variations in table.

* See Definition B 1, 2, above.

** See Definition B 3, 4, above.

*** If located in Fire Zone 3, increase amount 33-1/3%.

B. Height Allowable in Feet:

Occupancy	I	II	III	IV	V
B 1-2	unlimited	95	65	65	50
B 3-4	unlimited	95	65	65	50
C	unlimited	95	65	65	50

Note--See Table 5-D, U.B.C. for variations in this table.

(3) Additional Data:

A. Table 5A, Table 5B, U.B.C. gives additional information for variations in basic uses and necessary separations in wall construction as occupancy is a factor.

B. Table 17A, U.B.C. gives data on types of construction necessary to qualify for Types I-V. Table 43-B gives fire ratings of specific materials. Table 43-A gives coverings required fire resistive ratings.

CHAPTER III

SCHOOL BUILDING CONSTRUCTION UNDER THE NEW MEXICO AND NATIONAL ELECTRICAL CODES

The following outline is not meant to be all inclusive, but instead is offered as a guide to those responsible for school plant construction. Reference numbers listed herein are chapter or item numbers of the 1962 issue of the National Electrical Code (National Board of Fire Underwriters Publication No. 70).

Introduction - National Electrical Code

The purpose of the Code (hereinafter referred to as N.E.C.) is specifically covered in Article 90 - Introduction, which is as follows:

"90-1 - Purpose

"(a) The purpose of this Code is the practical safeguarding of persons and of buildings and their contents from hazards arising from the use of electricity for light, heat, power, radio, signalling, and for other purposes.

"(b) This Code contains basic minimum provisions considered necessary for safety. Compliance therewith and proper maintenance will result in an installation essentially free from hazard, but not necessarily efficient, convenient, or adequate for good service, or future expansion of electrical use.

"Hazards often occur because of overloading of wiring systems by methods or usage not in conformity with the Code. This occurs because initial wiring did not provide for increases in use of electricity. For this reason it is recommended that the initial installation be adequate and that reasonable provisions for systems' changes be made as may be required for future increase in the use of electricity.

"(c) This Code is not intended as a design specification nor an instruction manual for untrained persons."

90-9 Wiring Planning states:

"(a) It is recommended that electrical engineers and other when drawing plans and specifications make provision for ample raceways for wiring, space for equipment, and allowances for future increases in the use of electricity."

Introduction - New Mexico Electrical Code

The New Mexico Electrical Code, 1963 edition, (hereinafter referred to as N.M.E.C.) lists the following two paragraphs as part of its introduction:

"The 1962 National Electrical Code (NFPA No. 70) together with the exceptions and additional provisions herein contained shall constitute the New Mexico Electrical Code."

"The National Electrical Code is as near a perfect set of rules for minimum standards as is available to the electrical construction industry of today. Time spent in familiarizing oneself with the Code will pay dividends in satisfaction and efficiency."

Chapter 1 - General: N.E.C.

Article 100 - Definitions:
Only those considered essential for the proper use of N.E.C. are included in this outline and the Codes should be referred to when clarification is necessary.

Item 110-3. The use of the word "shall" indicates rules that are mandatory. The use of the word "should" covers advisory rules or recommendations.

Chapter 2 - Wiring Design and Protection:

Items 200-2 and 200-3 cover grounding of interior wiring systems.

Item 210-5 covers color coding of branch circuits.

Item 210-6. The maximum voltage to ground permitted on branch circuits is listed in this item.

Items 210-23 and 210-24 indicate the maximum and permissible loads for branch circuits.

Item 215-3. Allowable feeder voltage drops are listed herein.

Items 220-3 and 220-4 cover the number of branch circuits required as well as the feeder load demand factors, including fixed electric space heating.

Item 230-2 lists the number of services permitted to one building.

Item 230-32. Underground service must be protected against physical damage as listed herein.

Item 230-44. Wiring Methods. The N.M.E.C. definitely limits types of service entrance wiring to N.E.C. Items 338-1c, 346, 347, or 348.

Items 230-70 and 230-71 cover location, types, and ratings of service disconnecting means.

Item 230-90. The requirements of overcurrent protection for service conductors are listed herein.

Article 240 provides general requirements and location of overcurrent protective devices.

Article 250 treats of protection of electrical circuits and equipment by grounding.

Section 250-F lists methods of grounding.

Item 250-81 on water pipe grounding states such a ground shall always be used when available, but the N.M.E.C. deletes the word, "available" and substitutes, "within twenty-five feet---."

Chapter 3 - Wiring Methods and Materials:

This chapter covers the requirements for the various methods of installing fixed electrical conductors, having a voltage not to exceed 600 volts.

Item 300-17 covers the number of conductors permitted in raceways.

Article 310 covers insulation, mechanical strength, and current carrying capacity of conductors.

Item 310-8 (N.E.C.) states conductors shall not be smaller than #14, but Item 310-8 (N.M.E.C.) states "in other than residential occupancies, conductors smaller than No. 12 shall not be installed."

Article 320. Open wiring on insulators is deleted by N.M.E.C. and should not be used without written permission.

Concealed knob and tube wiring (Article 324). Metal clad cable (Article 334) and non-metallic sheathed cable (Article 336) are restricted by N.M.E.C. for use only in family dwellings outside of high value mercantile districts.

Article 348 covers the use of Electrical Metallic Tubing.

Item 348-1 N.M.E.C. does not permit EMT to be used underground.

Article 350 outlines uses of flexible metal conduit.

Item 350-2 N.M.E.C. limits its use in new work only to the extent of flexible connections--as needed.

The following articles cover the installation and use of various raceway systems and equipment often used in school buildings.

352 - Surface Metal Raceways.
353 - Multi-outlet Assemblies.
354 - Underfloor Raceways.
356 - Cellular Metal Floor Raceways.
358 - Cellular Concrete Floor Raceways.
362 - Wireways.
364 - Busways.
370 - Outlet, Switch and Junction Boxes. Item 370-6 N.M.E.C. limits fixture outlet boxes to minimum of 4" trade size.
373 - Cabinets and Cutout Boxes.
374 - Auxiliary Gutters.
380 - Switches.
384 - Switchboards and Panelboards.

Chapter 4 - Equipment for General Use:

Article 410 covers installation and construction of lighting fixtures, lampholders, lamps, receptacles, and rosettes.

Item 410-4 N.M.E.C. states, "All bathroom and/or washroom lights shall be controlled by one or more wall switches."

Item 410-52(b) states that non-metallic receptacle faceplates shall be made of non-combustible materials.

Item 410-62 covers special provisions for the installation of flush and recessed fixtures.

Item 410-71 N.M.E.C. Fixtures containing ballasts that are recessed or installed in contact with combustible material must have individual fuse and fuseholder, or built in thermal protectors.

Item 410-74(b). Fixtures containing ballasts when installed on low-density cellulose fiberboard, with a density of 20 pounds per cubic foot or less, shall be approved for such installation or shall be spaced not less tha 1½ inches from such material.

Item 410-91 covers the grounding of fixtures and lighting equipment.

Article 422-40 lists the special provisions covering fixed indoor electrical space heating.

Article 430 details the general requirements covering motors, motor circuits and controllers.

Article 450. Installation requirements for transformers and construction details of vaults are outlined herein.

Chapter 5 - Special Occupancies:

Article 516. Wiring and equipment for spray booths and locations where paints, lacquers, and other flammable finishes are applied must be installed in accordance with this Article and NBFU Bulletin No. 33, "Standard for Spray Finishing."

Items 520-21, 520-41, 520-51, and 520-61 cover fixed and portable stage equipment.

Item 520-71 details specific requirements for lighting and receptacle installations in dressing rooms.

Chapter 6 - Special Equipment:

Article 640 applies to installations of wiring and equipment for sound recording and reproduction, centralized distribution of sound, public address, speech-input systems, and electronic organs.

Article 680. The provisions of this Article apply to the construction and installation of electric wiring for equipment in or adjacent to Swimming Pools.

Chapter 7 - Special Conditions:

Article 700. Emergency Systems, where required by the Building Code (see Section 804 E on Exit signs) shall be installed in accordance with this article.

Article 720 covers Circuits and Equipment operating at less than 50 volts.

Chapter 8 - Communication Systems:

Article 800 lists provisions for Communication Circuits.

Article 810 covers radio and television receiving equipment.