DOCUMENT RESUME

ED 428 532 EF 005 571

TITLE	Schools of Interest 5.
INSTITUTION	North Carolina State Dept. of Public Instruction, Raleigh. Div. of School Planning.
PUB DATE	1981-00-00
NOTE	135p.; For other reports in this series, see EF 005 570-574, ED 095 661-662, and ED 159 782.
PUB TYPE	Guides - Non-Classroom (055) -- Reports - Descriptive (141)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Construction Costs; *Educational Facilities Design; *Educational Facilities Improvement; Educational Facilities Planning; Elementary Secondary Education; *Public Schools; *School Construction
IDENTIFIERS	North Carolina

ABSTRACT

North Carolina local public school boards have the statutory responsibility for operating public schools and for entering into contracts for design and construction of their schools. This document presents examples of plans for school buildings planned or constructed during the last few years, as of 1981, representing a wide range of educational philosophies and design solutions. Elementary, Middle, and High School buildings are included. Each offering provides the floor plan, photographs or line drawings of the school, and contractor information. Concluding the document are lists of schools that have: thermal storage; active solar systems; and hydronic heat pump systems. (GR)

SCHOOLS OF INTEREST

5

DIVISION OF SCHOOL PLANNING
NORTH CAROLINA DEPARTMENT OF PUBLIC INSTRUCTION

5

GARDNERS ELEMENTARY

FOREWORD

In the State of North Carolina, the statutory responsibility for operating the local public schools is delegated to county and city boards of education. A board of education is a policy-making body and has the legal responsibility and authority for entering into contracts for the design and construction of local public school system buildings.

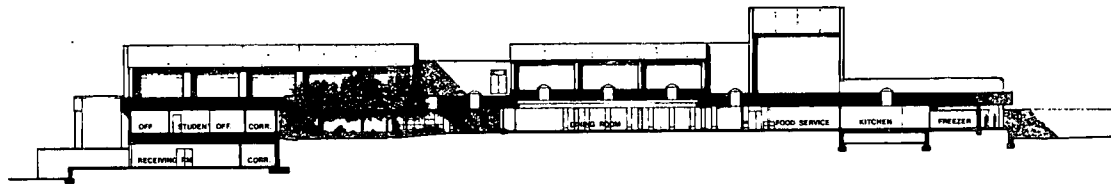
Charged with this responsibility, a conscientious school board, as well as a successful superintendent, keeps abreast of recent developments and trends in public education, utilizes every source of professional information, and plans continuously for the improvement of the educational program. Along with the highest quality of educational decision-making, the alert school board secures the best design talent available.

Effective and intelligent planning and design does not occur accidentially but through a thoughtfully-prepared process that is sensitive to local conditions. This publication presents several projects which reflect that process. The process usually includes preparation of educational specifications, analysis of educational specifications, development of a design program, design program schematic plans, plan development, and evaluation and review of plans. This process provides a framework for systematic, purposeful planning and permits the flexibility necessary for adaptation to local need or special conditions.

We commend this publication to your attention. Along with the four previous issues of SCHOOLS OF INTEREST beginning June, 1971, by the Division of School Planning, it can serve as the basis for an effective and imaginative school planning program to strengthen and improve building programs. The Staff of the Department of Public Instruction is available for consultation and assistance in any aspect of the planning process.

June, 1981

A. Craig Phillips, State Superintendent
N.C. Department of Public Instruction

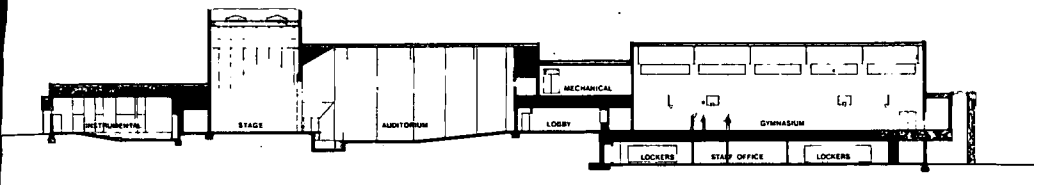


TRANSVERSE SECTION

ATHENS DRIVE HI

LONGITUDINAL SECTION

ATHENS DRIVE HIGH



ATHENS DRIVE HIGH

TRANSVERSE SECTION

We are pleased to present several examples of floor plans for buildings constructed during the last three years. Selecting just a few schools for this publication from among the many notable designs constructed in North Carolina is difficult. There are others which are worthy of presentation each time we prepare an issue of SCHOOLS OF INTEREST. Almost all administrative districts have a new school or an addition to an older school which is of particular educational or architectural interest. Quality professional planning and design services are readily available to all school boards.

The schools presented here represent a wide range of educational philosophies and design solutions. These preferences and objectives blend with the capabilities of local design services and educational objectives to produce more variety than is ordinarily believed to be the case. Each community may express its own individuality and educational preference. The public school planning process is remarkably responsive in this respect.

The process of public school programming, planning, and design has matured during the period of the 1973 Public School Facilities Fund. Plan relationships can be a matter of choice as well as tradition. Special program facilities are included or anticipated wherever local educational preferences dictate. Room sizes, arrangements, and relationships, can and do vary as much as the perceptions of educators, architects, and school boards. The latest educational or architectural trends are usually reflected in a new school building somewhere. Also, many school facility design efforts have provided experience and information which are useful when applied to other building types. This variety of building design solutions is illustrative of the democratic complexity and evolutionary responsiveness of public education.

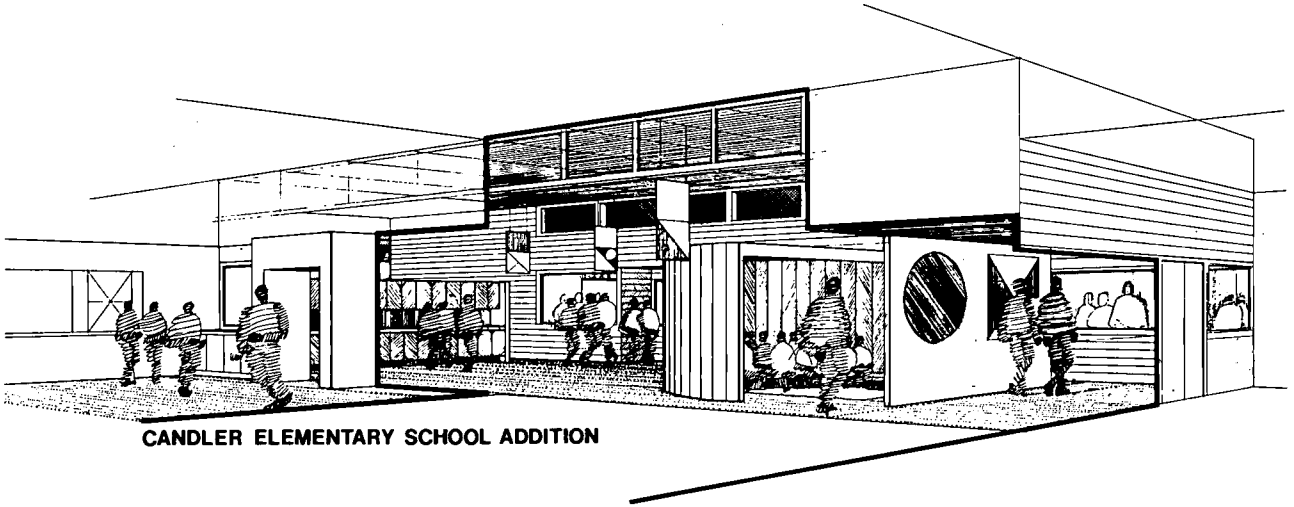
Lacy M. Presnell, Jr.

Lacy M. Presnell, Jr., Director
Division of School Planning
N.C. Department of Public Instruction

June, 1981

SOUTH ELEVATION

ATHENS DRIVE HIGH



CANDLER ELEMENTARY SCHOOL ADDITION

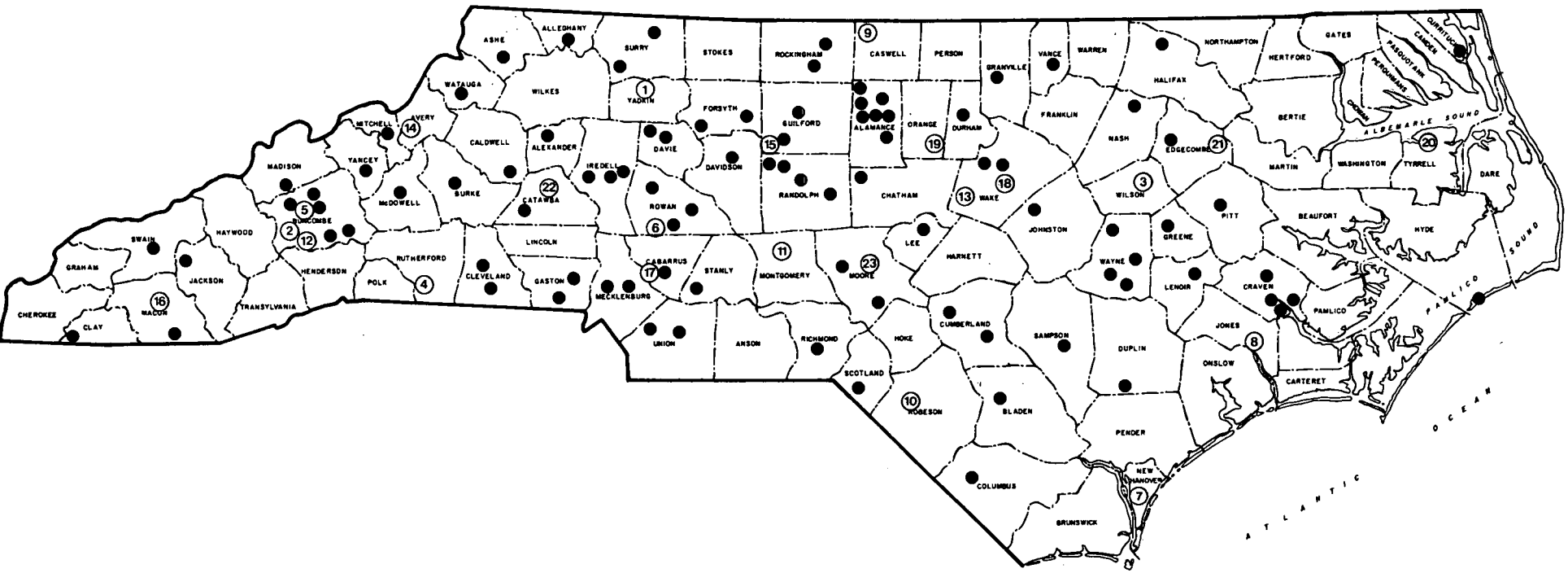
ADMINISTRATIVE UNIT	SCHOOL	CAPACITY
New Elementary Schools, 1977-80		
Buncombe County	Swannanoa	800
Buncombe County	Valley Springs	1,218
Cumberland County	District 1	624
Cumberland County	District 3	624
Davidson County	Southwood	950
Duplin County	Kenansville	410
Winston-Salem/Forsyth	Clemmons	812
Winston-Salem/Forsyth	Old Richmond	611
Guilford County	Southwest	500
Jackson County	Smoky Mountain	500
Jones County	Maysville	281
Randolph County	Ramseur	738
Robeson County	East Robeson	564
Robeson County	Pembroke	1,084
Rutherford County	Harris	750
Stokes County	King Intermediate	639
Wayne County	Spring Creek	716
New Middle Schools, 1977-80		
Brunswick County	Shallotte	1,100
Brunswick County	South Brunswick	670
Cabarrus County	Northwest Cabarrus	800
Kannapolis	Kannapolis	1,050
Carteret County	Beaufort	510
Carteret County	Morehead Central	600
Lumberton	Lumberton	1,260
New Junior High Schools, 1977-80		
Davie County	North	830
Davie County	South	830
Person County	Northern	930
Reidsville	Reidsville	830
New High Schools, 1977-80		
Guilford County	Southwest	1,000
Halifax County	Southeast	800
Warren County	Warren	888
Wilkes County	Central	950

A. CRAIG PHILLIPS, State Superintendent
North Carolina Department of Public Instruction

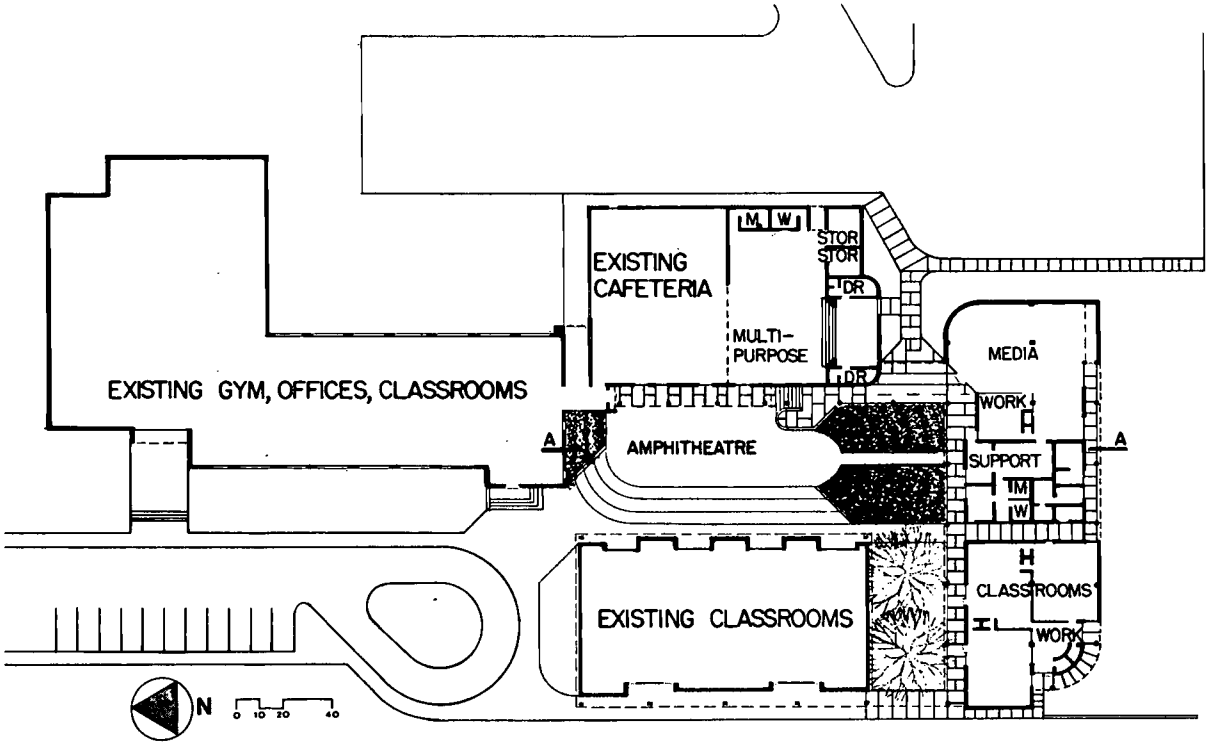
JAMES T. BURCH, Assistant Superintendent
Administrative Services Area

LACY M. PRESNELL, Jr., Direct
Division of School Planning

1 BOONVILLE ELEMENTARY	YADKIN COUNTY	13 APEX MIDDLE	WAKE COUNTY
2 CANDLER ELEMENTARY	BUNCOMBE COUNTY	14 CROSSNORE-NEWLAND MIDDLE	AVERY COUNTY
3 GARDNERS ELEMENTARY	WILSON COUNTY	15 FERNDALE JUNIOR HIGH	HIGH POINT
4 HARRIS ELEMENTARY	RUTHERFORD COUNTY	16 MACON MIDDLE	MACON COUNTY
5 IRA B. JONES ELEMENTARY	ASHEVILLE	17 WEST CABARRUS MIDDLE	CABARRUS COUNTY
6 LANDIS ELEMENTARY	ROWAN COUNTY	18 ATHENS DRIVE HIGH	WAKE COUNTY
7 MARY C. WILLIAMS ELEMENTARY	NEW HANOVER COUNTY	19 CHAPEL HILL HIGH	CHAPEL HILL
8 MAYSVILLE ELEMENTARY	JONES COUNTY	20 COLUMBIA HIGH	TYRRELL COUNTY
9 PELHAM ELEMENTARY	CASWELL COUNTY	21 TARBORO HIGH	TARBORO
10 PEMBROKE ELEMENTARY	ROBESON COUNTY	22 CONOVER SCHOOL	NEWTON-CONOVER
11 TROY ELEMENTARY	MONTGOMERY COUNTY	23 SOUTH CENTRAL REGIONAL EDUCATION CENTER	MOORE COUNTY
12 WILLIAM ESTES ELEMENTARY	BUNCOMBE COUNTY		



● PREVIOUS SCHOOLS OF INTEREST


EXISTING GYM, OFFICES, CLASSROOMS
EXISTING CAFETERIA
M
W
STOR
STOR
DR
MULTI-
PURPOSE
DR
MEDIA
WORK
A
AMPHITHEATRE
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SUPPORT
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CLASSROOMS
EXISTING CLASSROOMS
WORK
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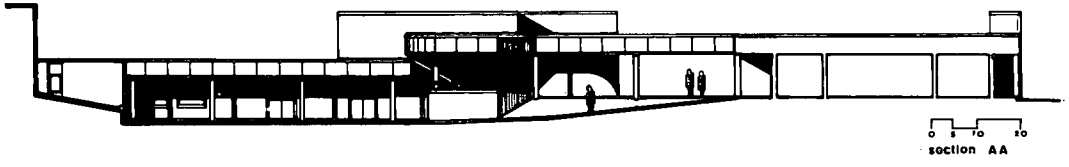
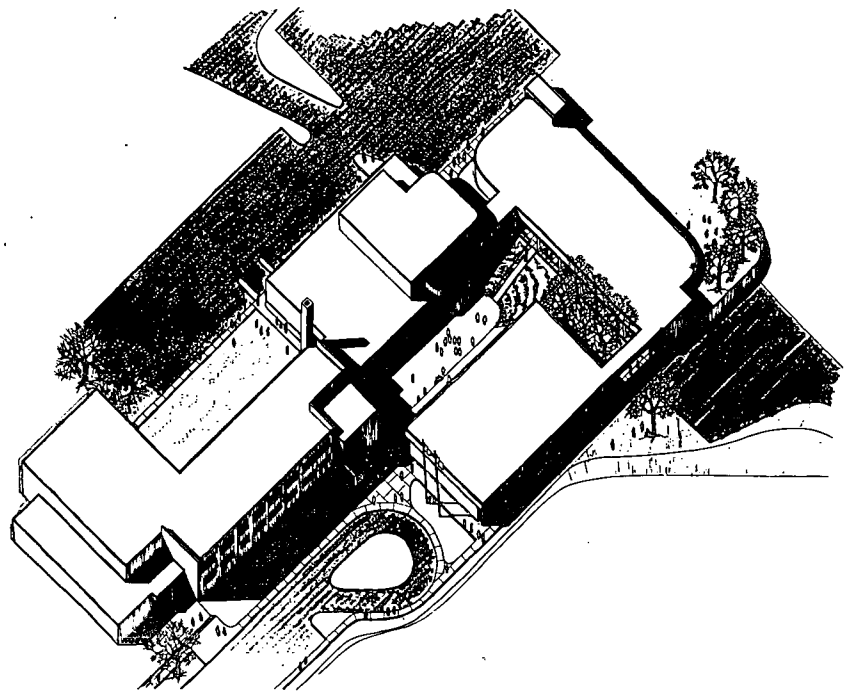
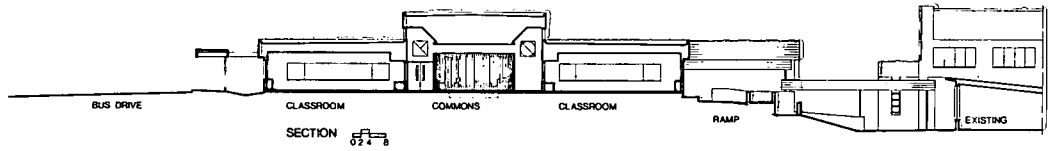
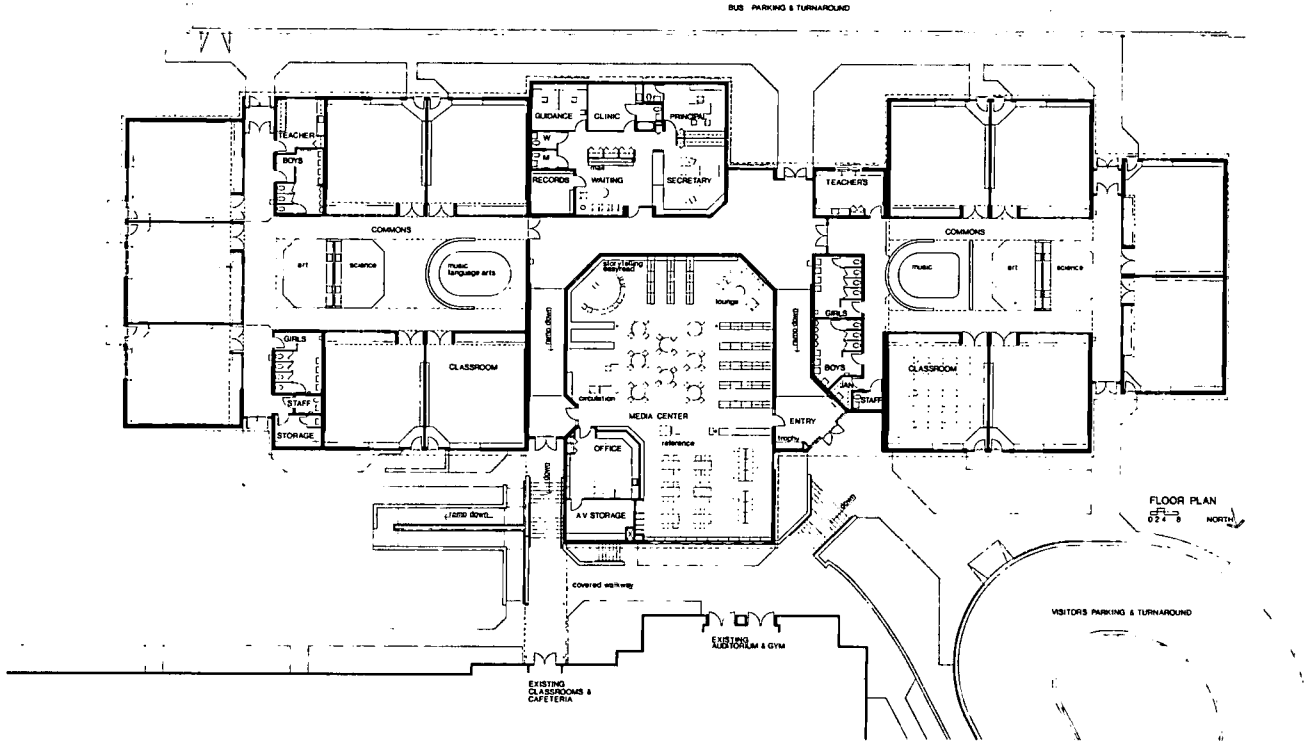

0 5 10 20
section AA

A school formerly having several substandard buildings dating to 1917 and a site divided by through drives has been transformed into a modern facility. Skillful landscape design has made this a successful project. The area between retained buildings and new construction is now the focus of the campus. In addition to functioning as a multi-purpose outdoor area, it also draws attention away from the age difference of the buildings. Specialized spaces required by a modern program were provided in the new construction.

Administrative Unit	Yadkin County
Superintendent	Paul E. Welborn
Grade Organization	K-8
Approximate Capacity	472
Square Footage	15,000 sq. ft.
Opening Date	September, 1977
Architects	Bonson Hobson & J. H. Benton
Structural Engineers	Browning-Smith Associates
Mechanical Engineers	McKnight-Smith Engineers, Inc.
Electrical Engineers	Stephen T. Hocsak & Associates

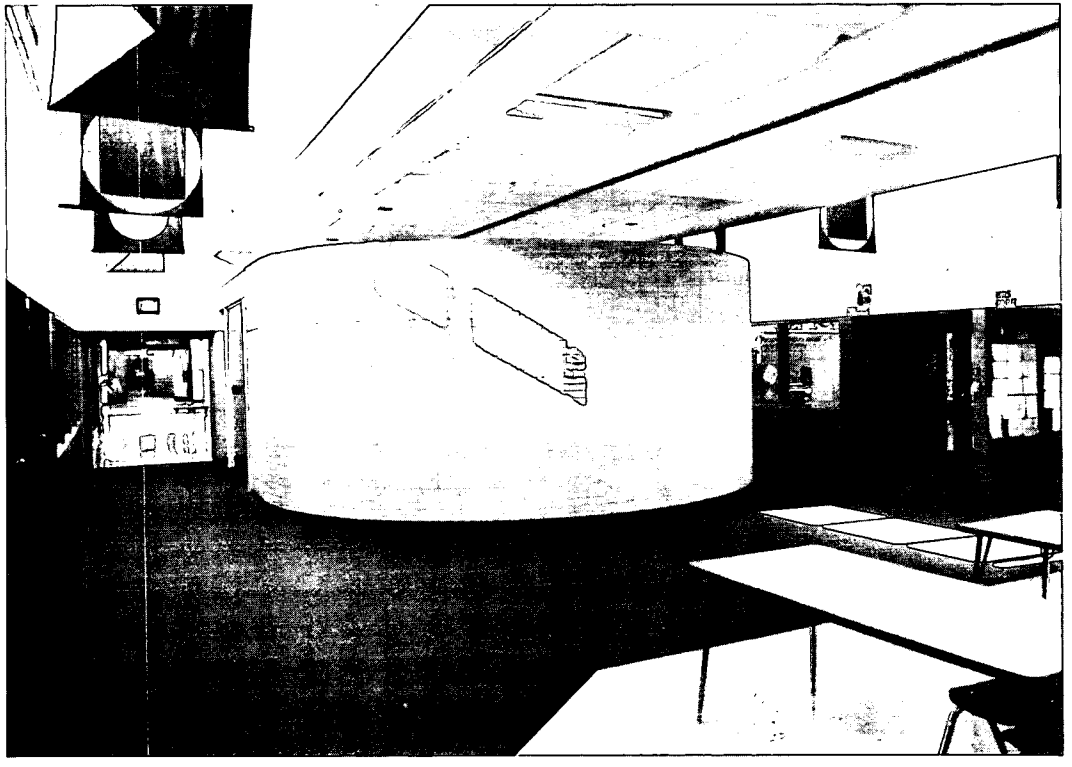



BUS DRIVE
CLASSROOM
COMMONS
CLASSROOM
RAMP
EXISTING
SECTION
0 2 4 8

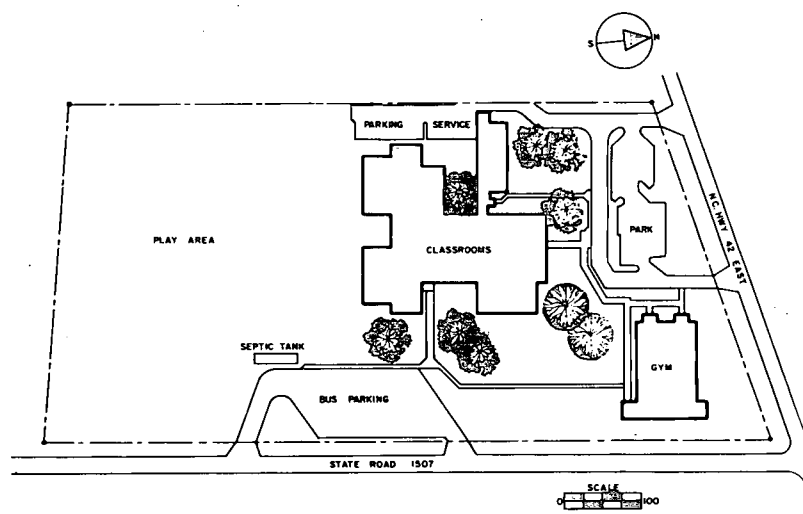

BUS PARKING & TURNAROUND
GUIDANCE
CLINIC
PRINCIPAL
TEACHER
BOYS
RECORDS
WAITING
SECRETARY
TEACHERS
COMMONS
art
science
music
language arts
GIRLS
STAFF
CLASSROOM
STORAGE
circulation
lounge
MEDIA CENTER
reference
OFFICE
A-V STORAGE
ramp down
ramp up
ENTRY
trophy
JAN.
covered walkway
EXISTING CLASSROOMS & CAFETERIA
EXISTING AUDITORIUM & GYM
VISITORS PARKING & TURNAROUND
FLOOR PLAN
0 2 4 8
NORTH

Administrative Unit ..... **Buncombe County**
Superintendent ..... **N. A. Miller**
Grade Organization **2-5**
Approximate Capacity **367**
Square Footage ..... **30,000 sq. ft.**
Opening Date ..... **August, 1979**
Architects ..... **Moore Associates**
Structural Engineers ..... **Sutton & Kennerly**
Mechanical and Electrical ... **Reece, Noland & McElrath, Inc.**

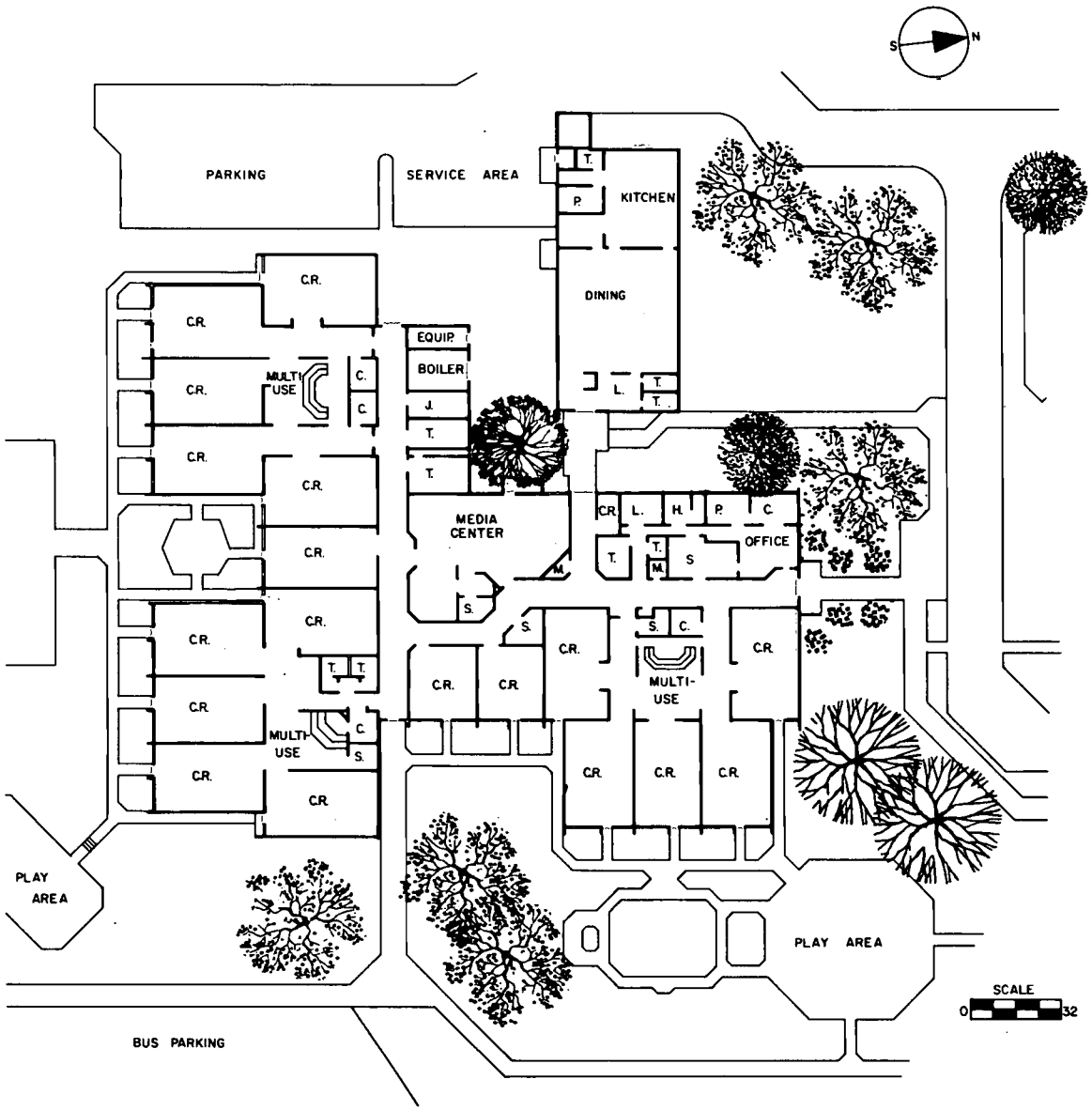
Existing buildings are characteristic of 1950's double-loaded corridor schools. The addition extends school planning tradition by using spacious central corridor commons areas around which are grouped the customary self-contained classrooms. The photograph shows one of the commons areas. Central clerestory daylight illumination is shared by adjacent classrooms by means of partial window walls which face corridors. The new library is located conveniently to new and existing classrooms. Site elevation changes are accommodated by means of exterior and interior ramps.

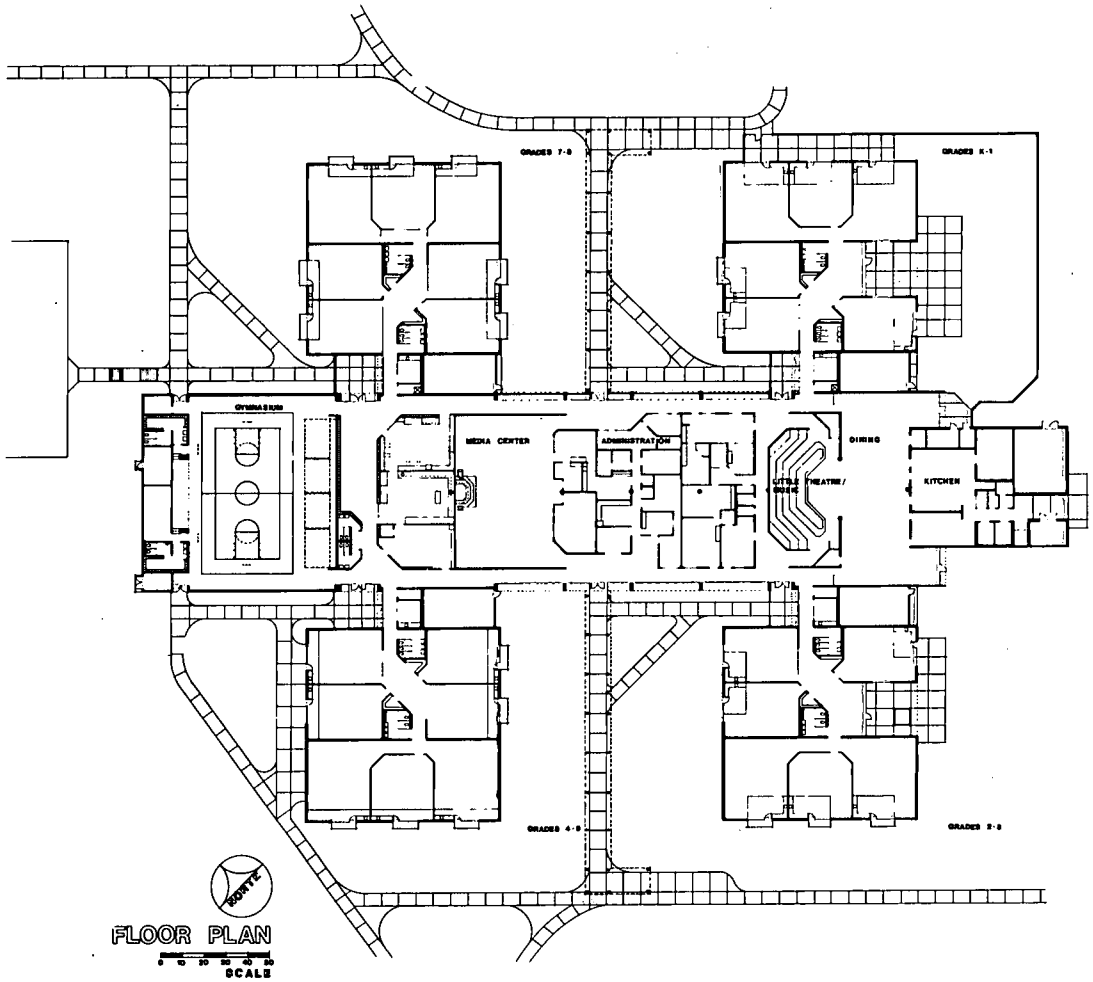


An old school site with only a gymnasium suitable for retention has been transformed into an attractive modern facility. One of the important features of this project is the carefully preserved trees. Large deciduous trees not only provide a completed landscape design, but also contribute to the energy efficiency of the building. Probably the most important feature of this plan is that there are no interior classrooms. Even the centrally located media center has a view to the outside. Thoughtful designers and school administrators do not confine students in windowless classrooms for the entire school day.

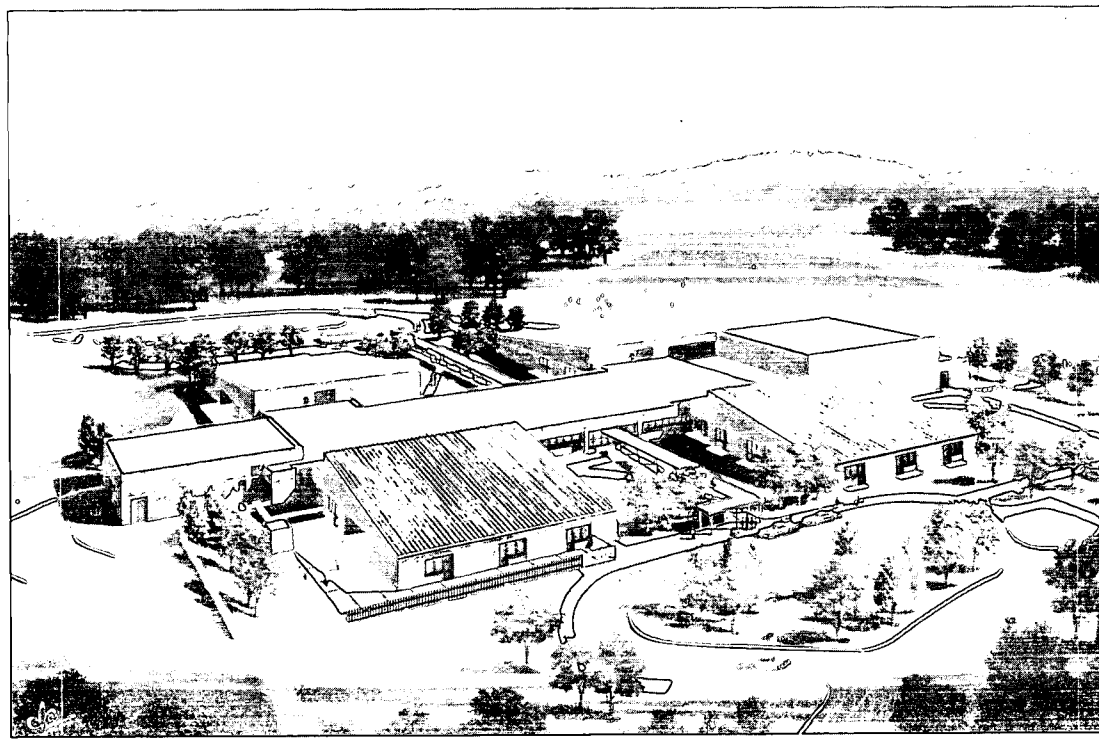


Administrative Unit ..... Wilson County
Superintendent ..... W. O. Fields, Jr.
Grade Organization K-5
Approximate Capacity 400
Square Footage ..... 32,000 sq. ft.
Opening Date ..... August, 1979
Architects ..... Skinner-Lamm
Structural Engineers ..... W. H. Gardner, Jr. & Associates
Mechanical and Electrical Engineers ... Fenner & Proffitt, Inc.

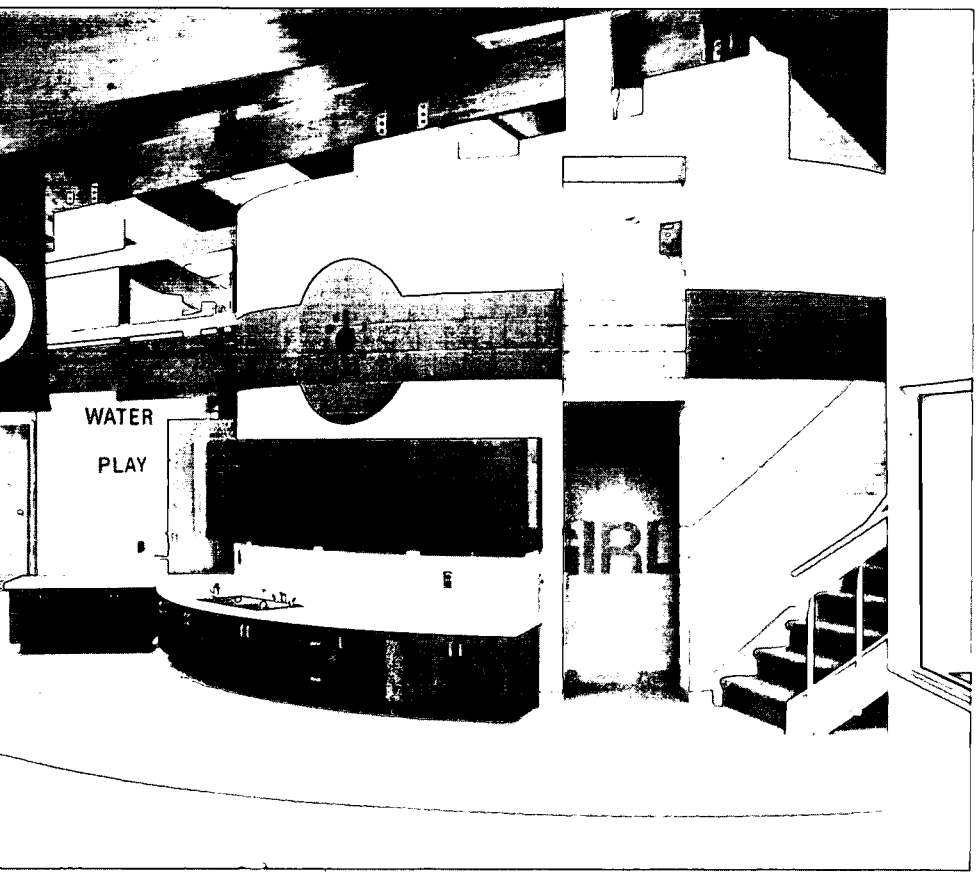

S
N
PARKING
SERVICE AREA
KITCHEN
DINING
EQUIP.
BOILER
MULTI USE
MEDIA CENTER
OFFICE
MULTI-USE
MULTI-USE
PLAY AREA
PLAY AREA
BUS PARKING
SCALE
0
32

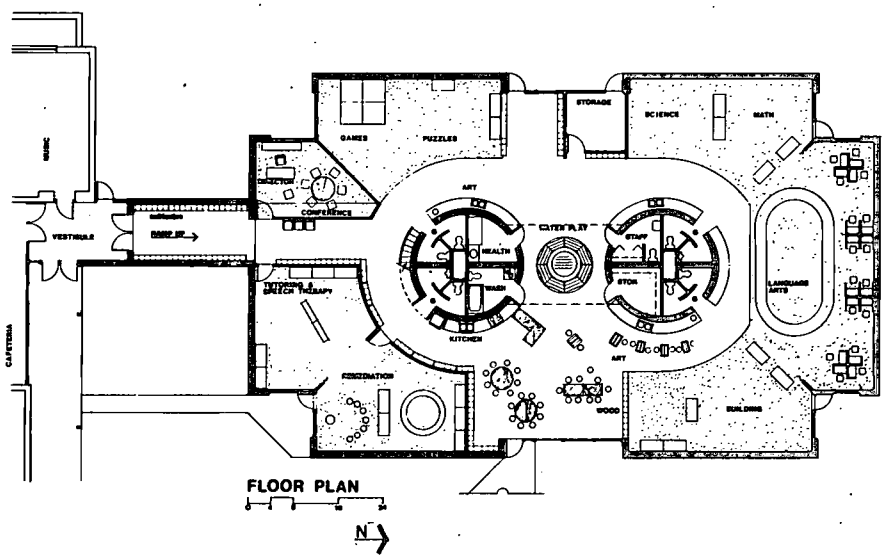

GRADES 7-8
GRADES K-1
GYMNASIUM
MEDIA CENTER
ADMINISTRATION
DINING
LITTLE THEATRE
KITCHEN
GRADES 4-6
GRADES 2-3
NORTH
FLOOR PLAN
SCALE

Administrative Unit	Rutherford County
Superintendent	Douglas L. Pearson
Grade Organization	K-8
Approximate Capacity	750
Square Footage	75,000 sq. ft.
Opening Date	April, 1981
Architects	Padgett & Freeman
Structural Engineers	Sutton & Kennerly
Mechanical Engineers	Mechanical Engineers, Inc.
Electrical Engineers	Bullard Associates

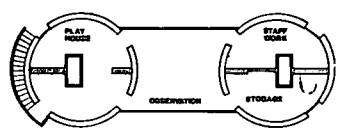


Classroom clusters attached to a central core of supporting activities could be the pattern for planning all types of schools, one that adapts to many site conditions. The cluster and core plan allows for growth and individualization of each educational program area. Floor level and ceiling height changes can be accommodated where necessary or as architecturally appropriate. The kindergarten through eighth grade organization in this school made possible the inclusion of a regular gymnasium and a little theater.





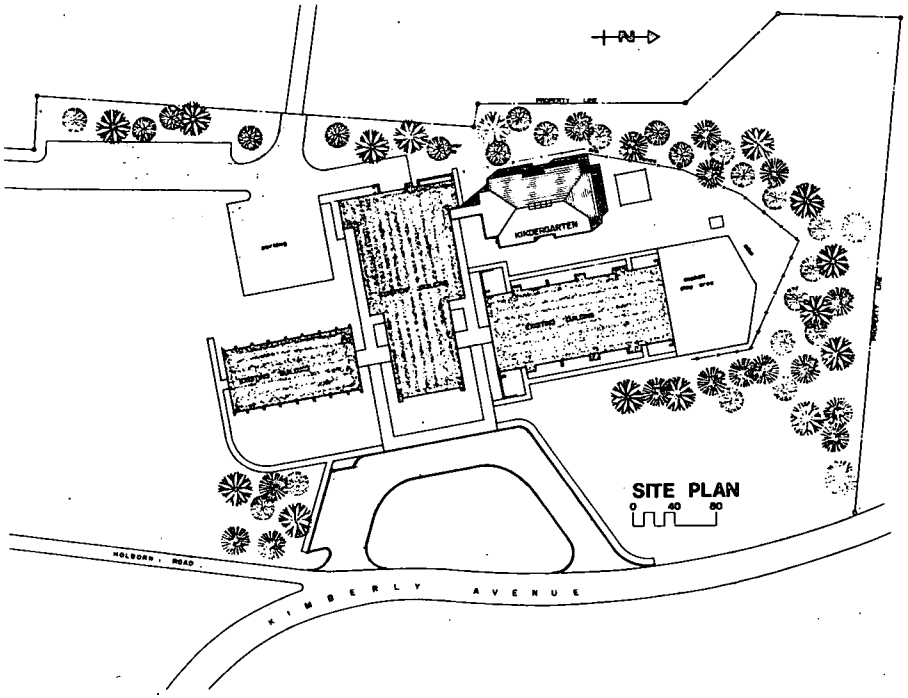
FLOOR PLAN

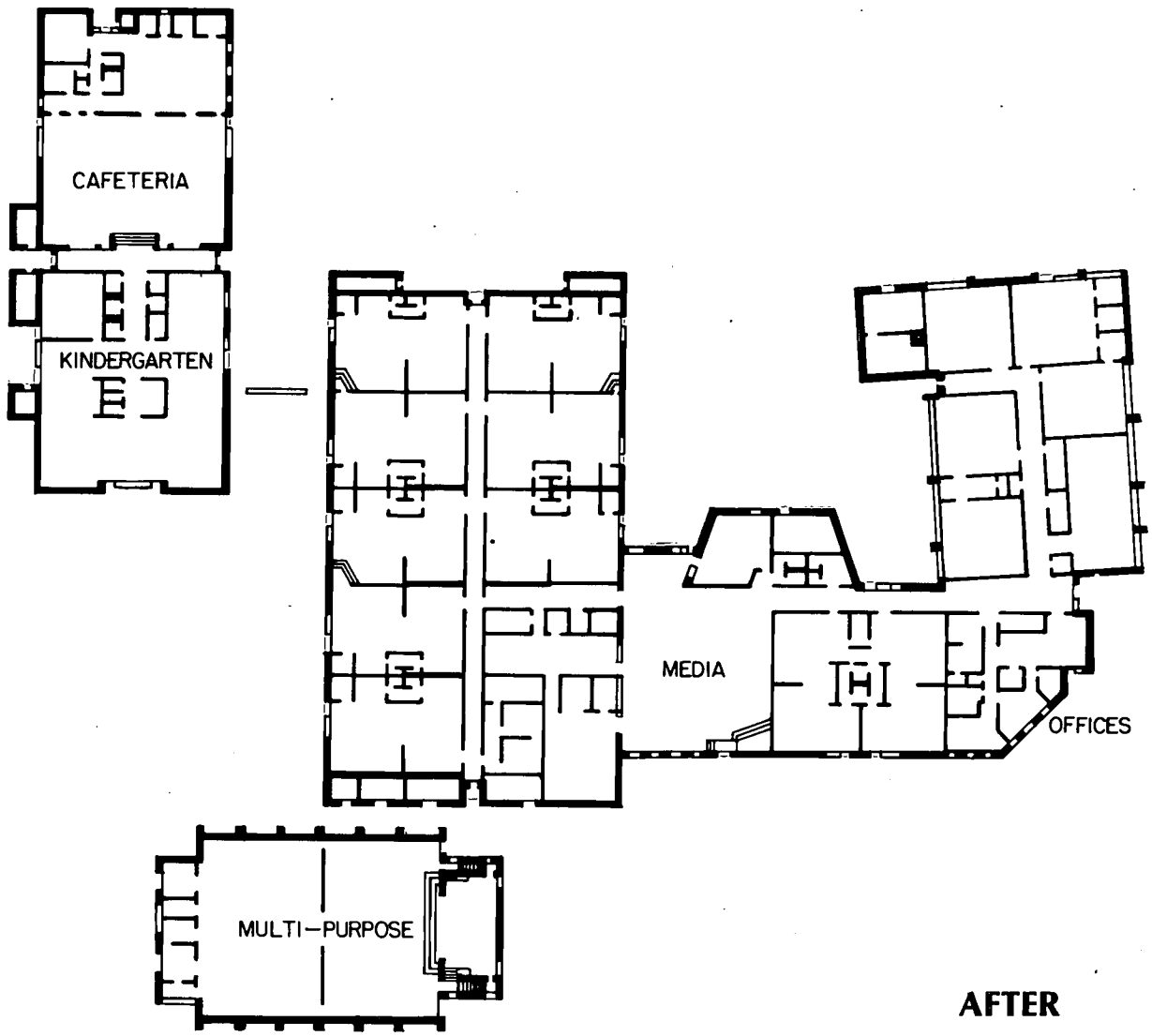


LOFT PLAN

Kindergartens always offer an opportunity to create an extraordinary environment for children. The architects met the challenge and excelled in this project. This building demonstrates the idea of children needing a school space that has visual variety, complimentary color decoration, a sense of place, and appropriate architectural scale. The laminated wood beams and wood decking contribute a great deal to the success of the project. The bilevel kiosks are strong space dividers. Kindergarten facilities need to be happy places. Ira B. Jones is a model of such a place.

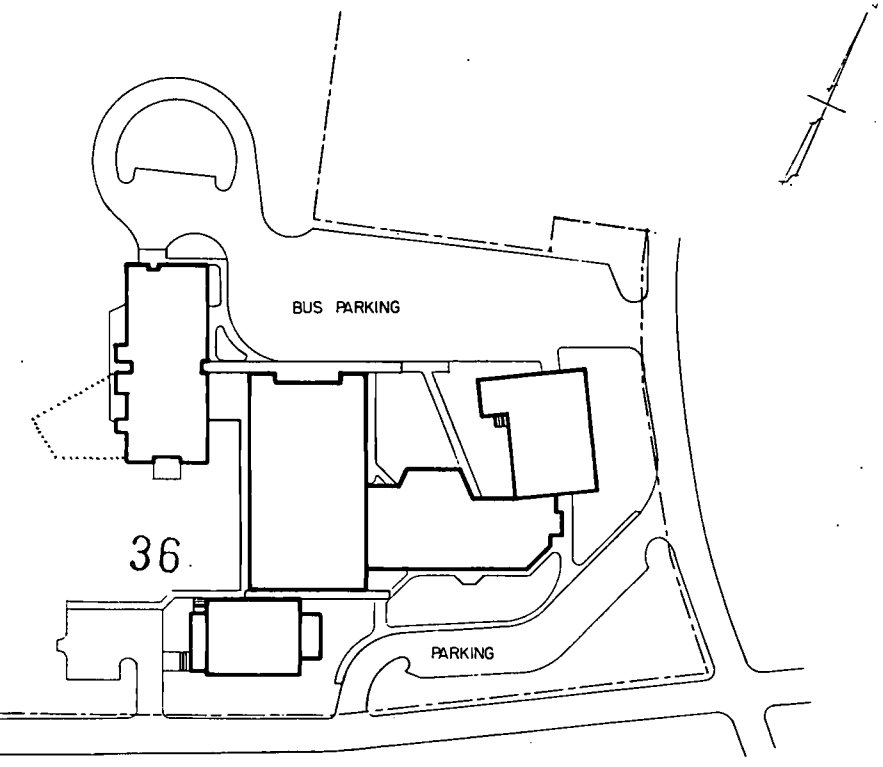
Administrative Unit	**Asheville City**
Superintendent	**Donald D. Jones**
Grade Organization	**K-5**
Approximate Capacity of Addition	**120**
Square Footage	**7,400 sq. ft.**
Opening Date	**January, 1976**
Architects	**Moore Associates**
Structural Engineers	**Sutton & Kennerly**
Mechanical and Electrical Engineers	**Reece, Noland & McElrath, Inc.**



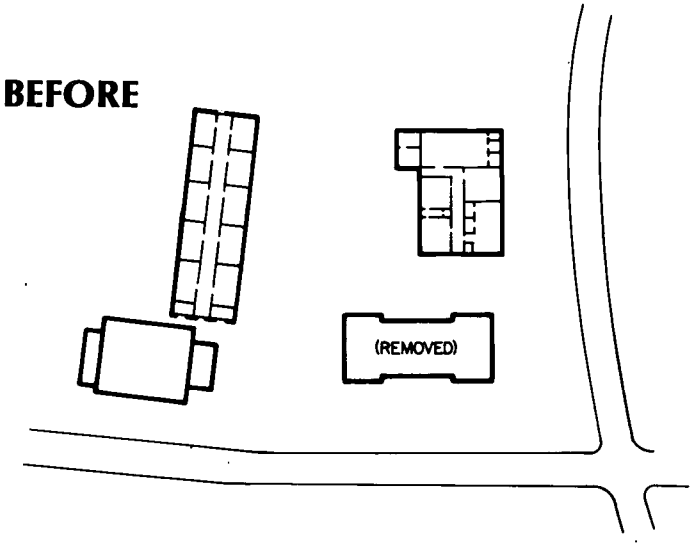


AFTER

Administrative Unit	Rowan County
Superintendent	C. Wade Mobley
Grade Organization	K-6
Approximate Capacity	800
Square Footage	72,000 sq. ft.
	41,600 new; 30,400 renovation
Opening Date	May, 1977
Architect	Robert F. Stone
Structural Engineers	Buffaloe, Morgan & Associates
Mechanical and Electrical Engineers	Buffaloe, Morgan & Associates



BEFORE

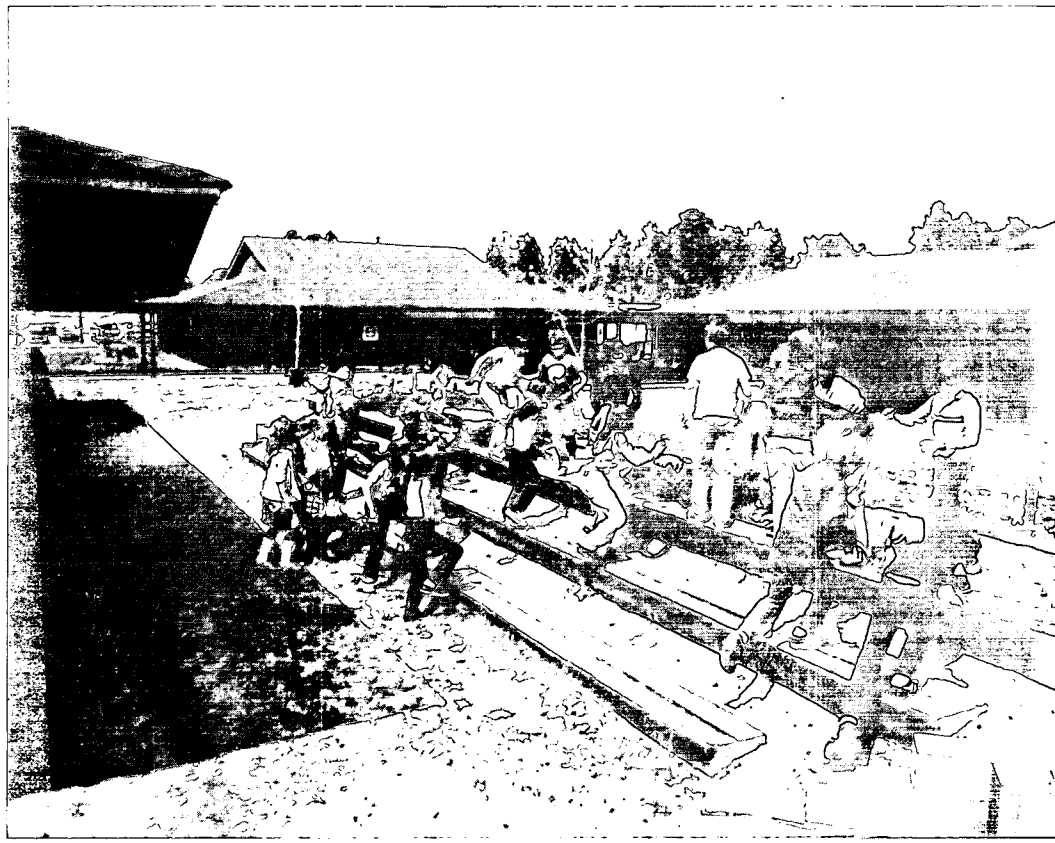


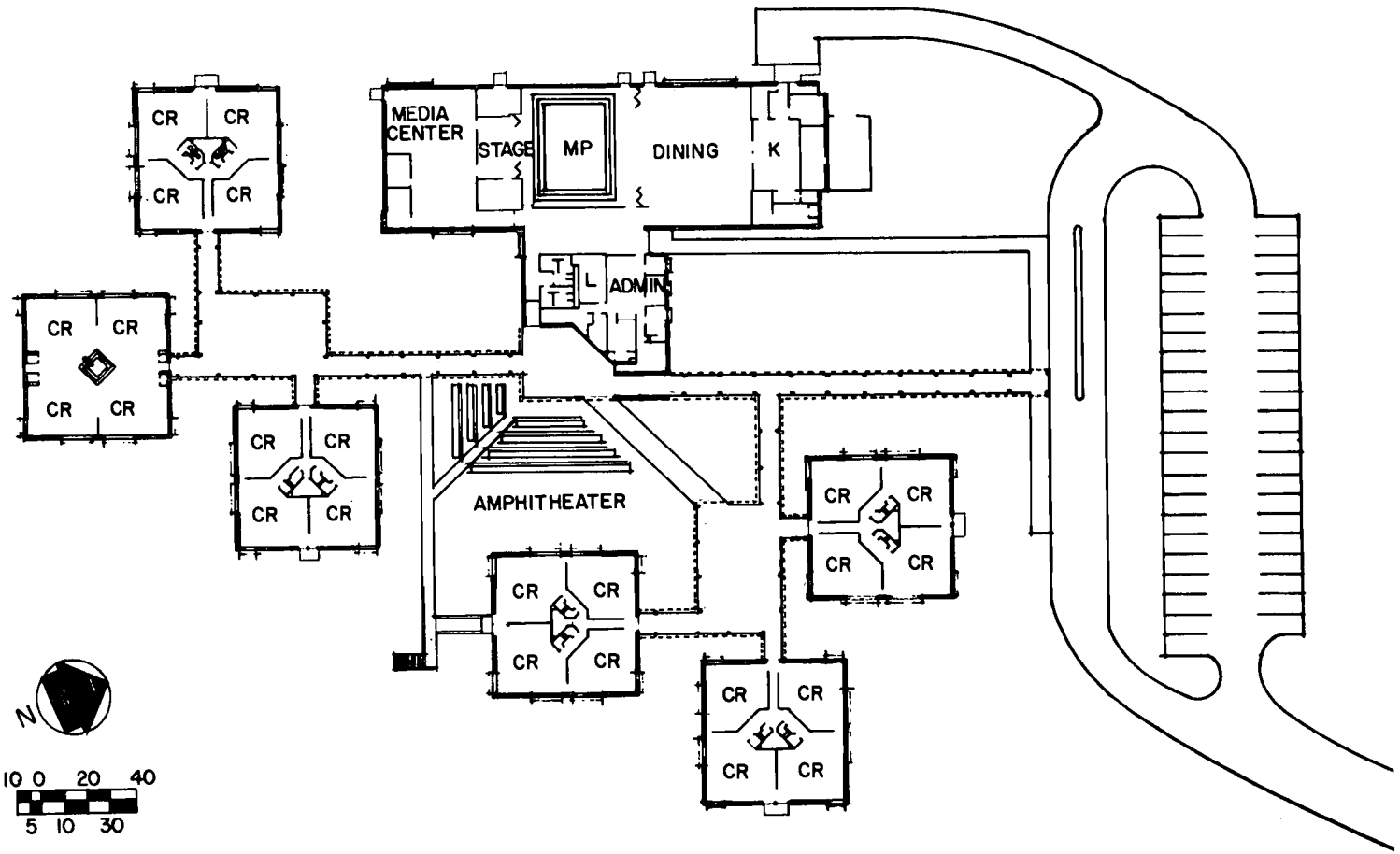
Landis Elementary School previously consisted of four buildings of various construction dates. Planning on this site was difficult. The existing buildings were close to a highway intersection at a congested part of the property, and only one of those buildings was to be removed. The success of the project is due in large part to the modification of a ten-classroom building located north of the multi-purpose area. The standard double-loaded corridor classroom plan was widened to provide large semi-open primary spaces. The result is that three marginal facilities have been salvaged to become part of a modern facility.

MARY C. WILLIAMS ELEMENTARY

Administrative Unit	**New Hanover County**
Superintendent	**Heyward C. Bellamy**
Grade Organization	**K-4**
Approximate Capacity	**650**
Square Footage	**42,950 sq. ft.**
Opening Date	**September, 1976**
Architects	**Jefferies & Faris**
Structural Engineers	**Henry Von Oesen & Associates**
Mechanical and Electrical Engineers	**Steuer-Cheatham Association**

Sometimes repetition of a single planning element can result in design and construction economies. Although a campus plan does not always relate well to a complex educational program, it can be used to advantage where a more structured program is expected to prevail. This school has an advantage in that each four-teacher pod is built with flexible partitioning to facilitate temporary changes. Covered walks connect all pods to the central library and activities building. An unusual feature throughout is the use of wood siding to clad the exterior of the concrete block buildings. Hip-roofs shelter all buildings.




CR
MEDIA CENTER
STAGE
MP
DINING
K
ADMIN
AMPHITHEATER
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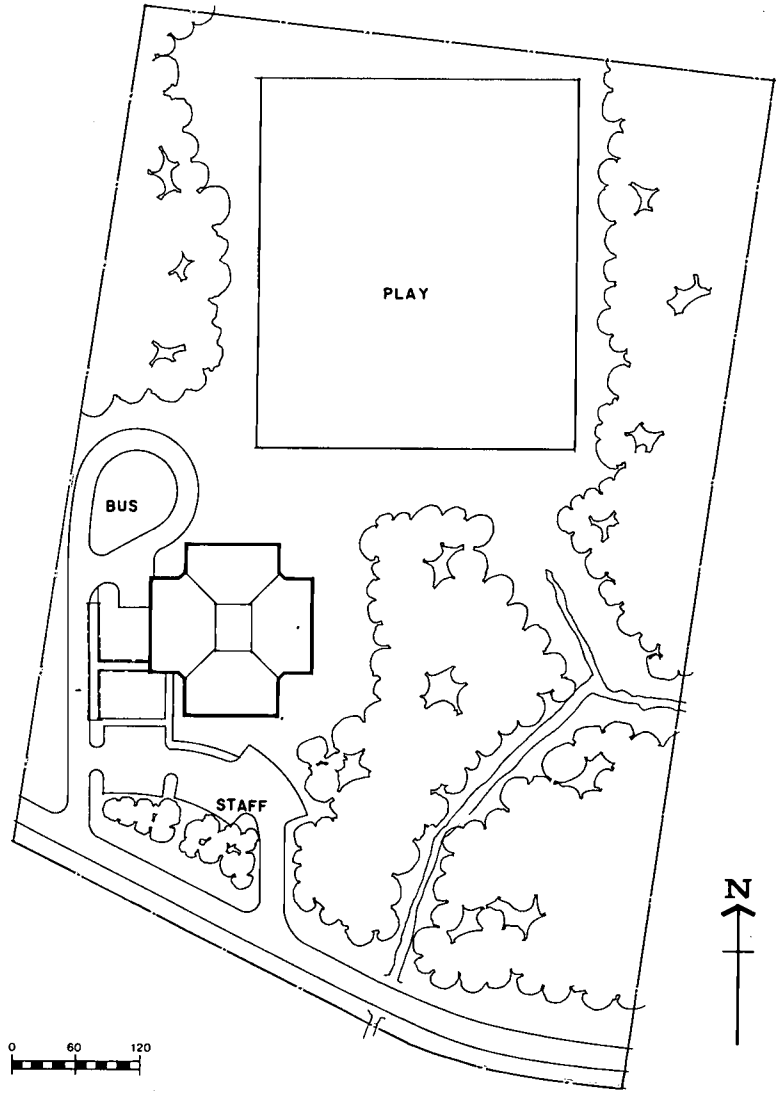
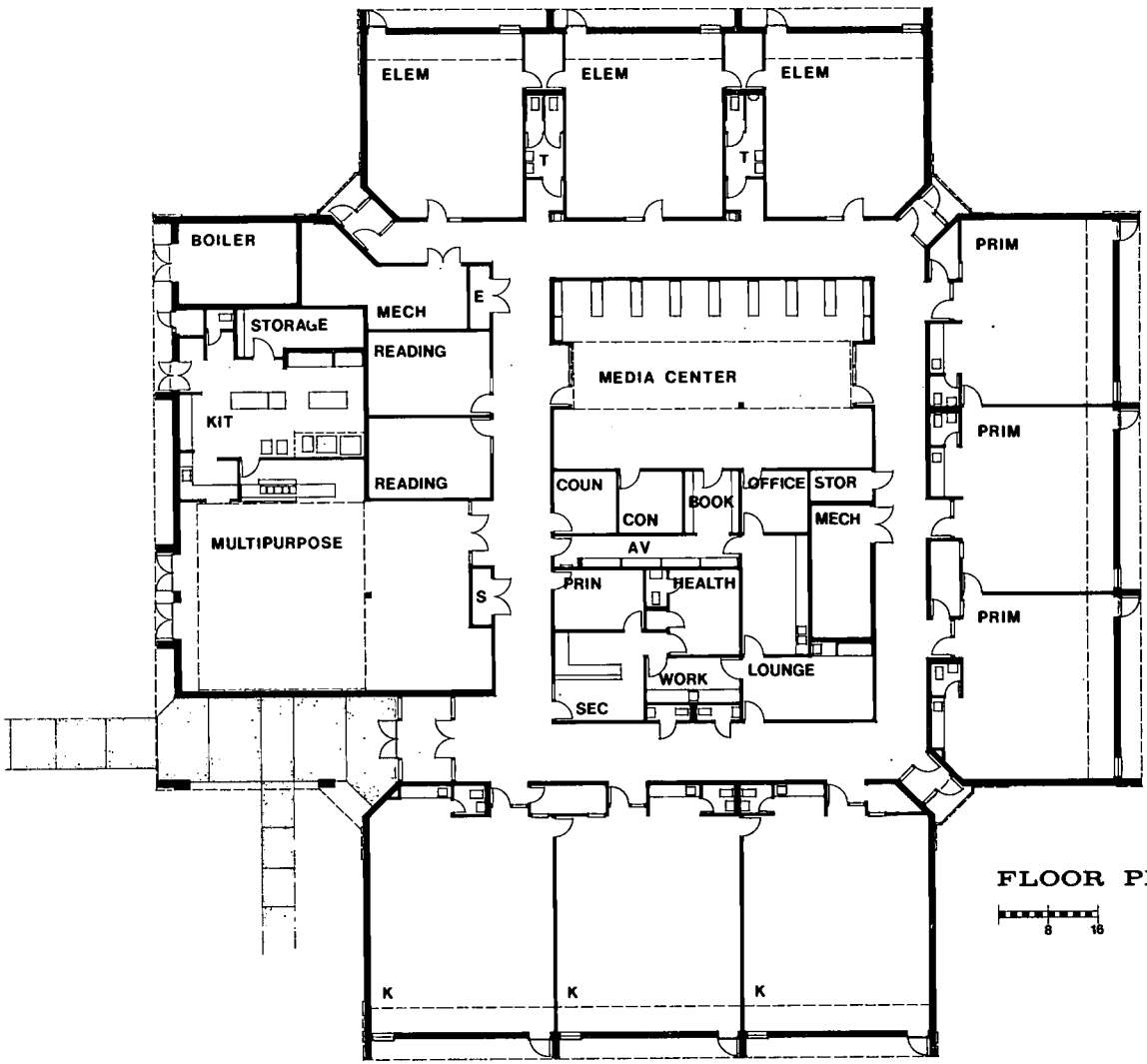
10 0 20 40
5 10 30

Administrative Unit ..... **Jones County**
Superintendent ..... **J. S. Collins**
Grade Organization **K-6**
Approximate Capacity **198**
Square Footage ..... **20,235 sq. ft**
Opening Date ..... **August 31, 1979**
Architects ..... **Theodore J. Peters/Jerry A. Cook, Associate**
Structural Engineers ..... **Kimley-Horn & Associates, Inc.**
Mechanical and
Electrical Engineers ..... **Buffaloe, Morgan & Associates**

Limited school construction budgets are always an opportunity for unconventional planning, regardless of the educational program to be housed. In this case, the designers responded by creating an architecturally simple building without resorting to the usual double-loaded corridor plan. Original site planning intended to take advantage of a nicely wooded site by using the trees for shading the building and retaining the soil. This part of the project was postponed by premature use of the bulldozer.



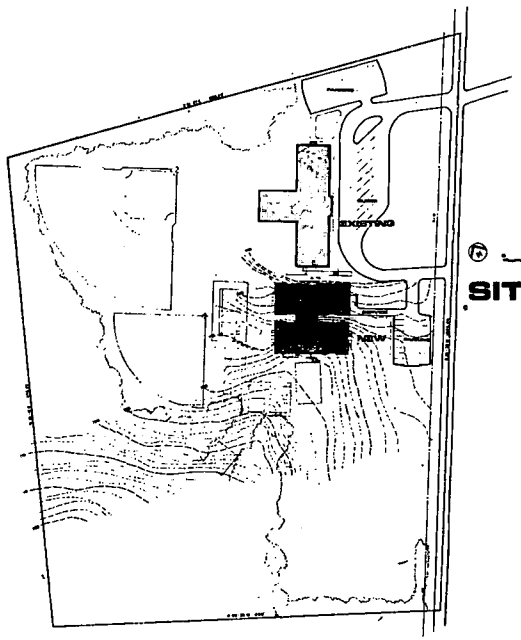
SITE PLAN



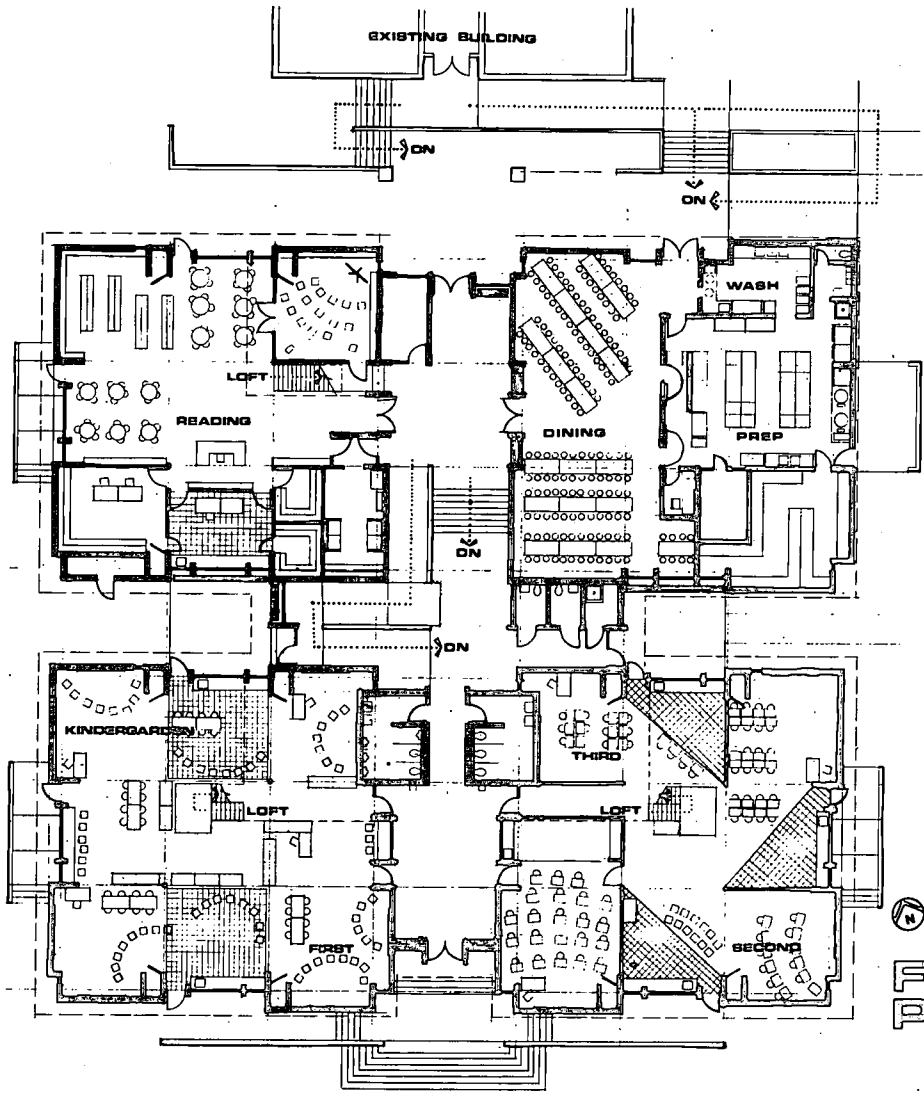
FLOOR PLAN

N

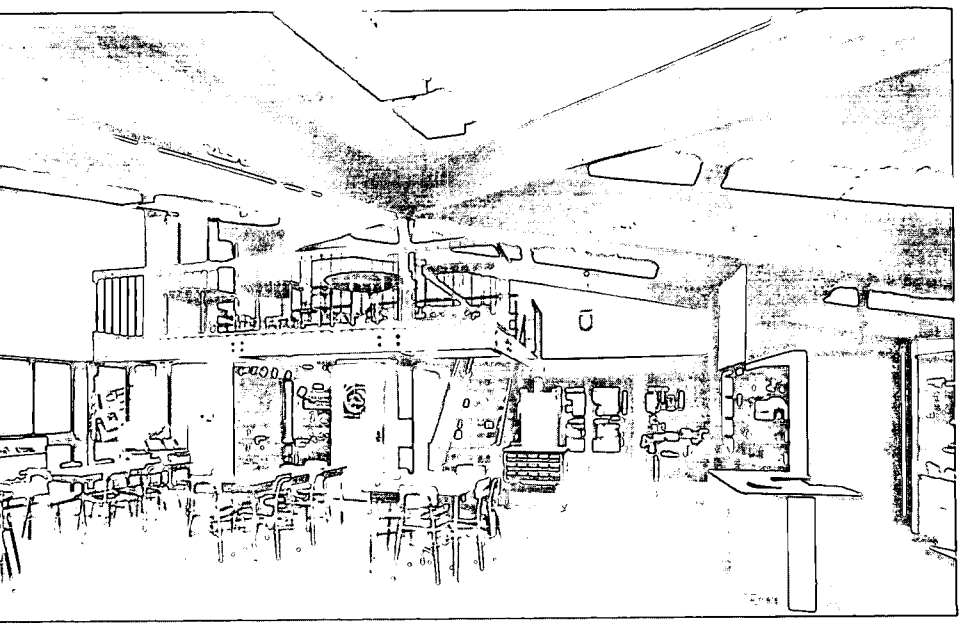
8 16



SITE



FLOOR PLAN



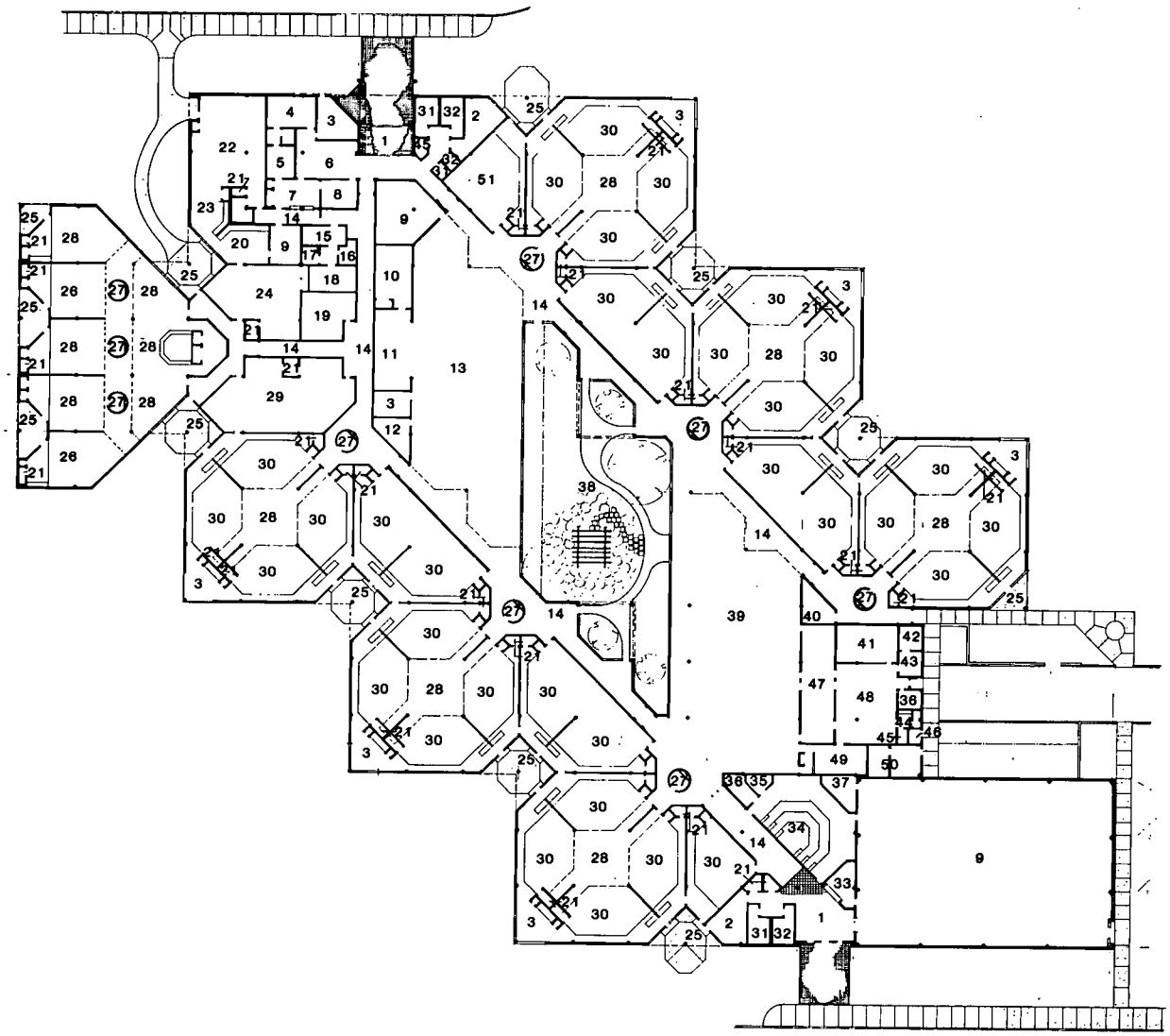
Administrative Unit	Caswell County
Superintendent	W. Willard Woodard
Grade Organization	K-7
Approximate Capacity	240 (Addition) 400 (Total)
Square Footage	15,105 sq. ft.
Opening Date	January, 1978
Architects	George M. Smart-Architects, Inc.
Structural Engineer	Fikri Saleh
Mechanical and Electrical Engineer	G.W. Francis

Here is another example of laminated wood beams and wood roof deck construction used to provide an educational setting with more than the customary architectural affects. The high sloping roofs provide space for a loft area in each of the four pods. The photograph shows the library and a special activity loft area. Additional spatial variety is expressed by means of relating floor level changes to site contours. The visual complexity of the pods and the ramped level changes are not what one expects to see in an elementary school.

PEMBROKE ELEMENTARY

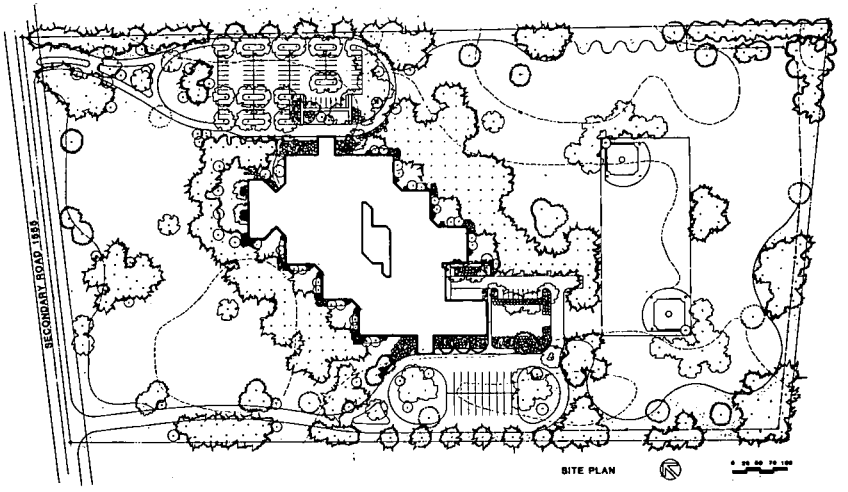
LEGEND

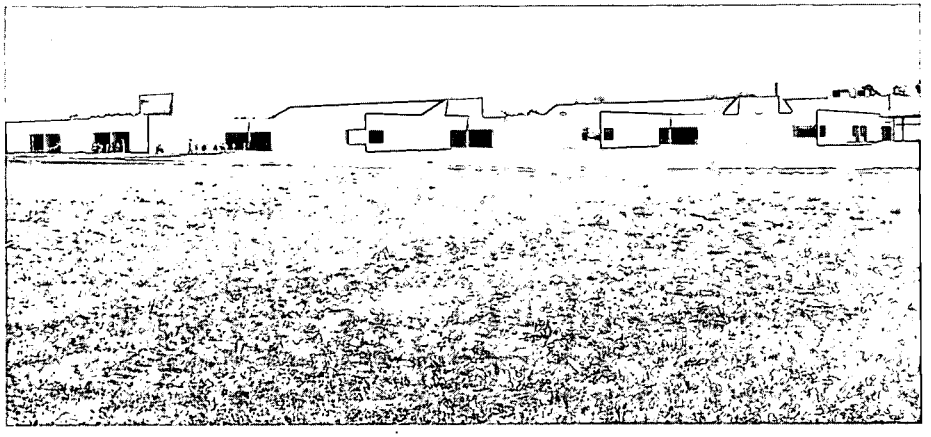
1 LOBBY
2 LOUNGE
3 CONFERENCE
4 PRINCIPAL
5 STORAGE
6 SECRETARY/RECEPTION
7 WORK ROOM
8 ASSISTANT PRINCIPAL
9 MULTIPURPOSE
10 AV STORAGE
11 OFFICE WORKROOM
12 SPEECH & HEARING
13 MEDIA CENTER
14 CORRIDOR
15 NURSE
16 EXAM
17 BATH
18 SICK BAY
19 GUIDANCE
20 SPECIAL PROJECTS
21 TOILETS
22 TRAINABLE MENTALLY RETARDED
23 KITCHEN
24 EDUCATABLE MENTALLY RETARDED
25 PORCH
26 KINDERGARTEN CLASSROOM
27 KIOSK
28 SHARED SPACE
29 REMEDIAL MATH & READING
30 CLASSROOM
31 MEN
32 WOMEN
33 SUPPLY STORE
34 MUSIC
35 PRACTICE
36 OFFICE
37 OFFICE/STORAGE
38 COURTYARD
39 DINING HALL
40 CUSTODIAN
41 STOREROOM
42 FREEZER
43 REFRIGERATOR
44 LOCKERS
45 JANITOR
46 CANWASH
47 SERVING
48 KITCHEN
49 DISHWASHING
50 MECHANICAL
51 GIFTED & TALENTED

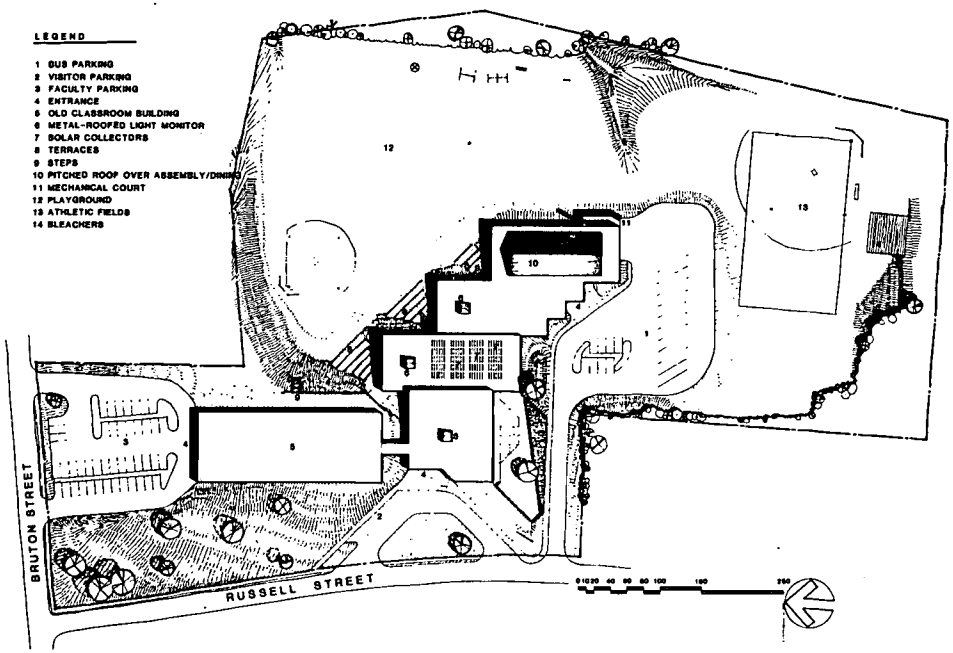


Designing a large school that avoids the look and impersonality of an institution is difficult. This large school succeeds in establishing architectural scale suitable for small children by repeating a pattern of two-classroom and four-classroom clusters around a spacious core of open areas and gardens. The diagonal juxtaposition of similar areas is particularly effective. Although there is a relationship between educational programming and architectural design programming, it is not a binding relationship. School buildings are seldom used as originally intended. Education objectives change. Personnel change. Children come and go. The school building remains. It needs to have some personality of its own in order to continue to be an interesting place.

Administrative Unit ..... **Robeson County**
Superintendent ..... **Purnell Swett**
Grade Organization **K-6**
Approximate Capacity **1,150**
Square Footage ..... **84,000 sq. ft.**
Opening Date ..... **May, 1980**
Architects ..... **Hayes, Howell & Associates**
Structural Engineers ..... **W. H. Gardner, Jr. & Associates**
Mechanical and
Electrical Engineers ..... **McMichael, McCracken**
Landscape Architect ..... **Eden Planning Group**

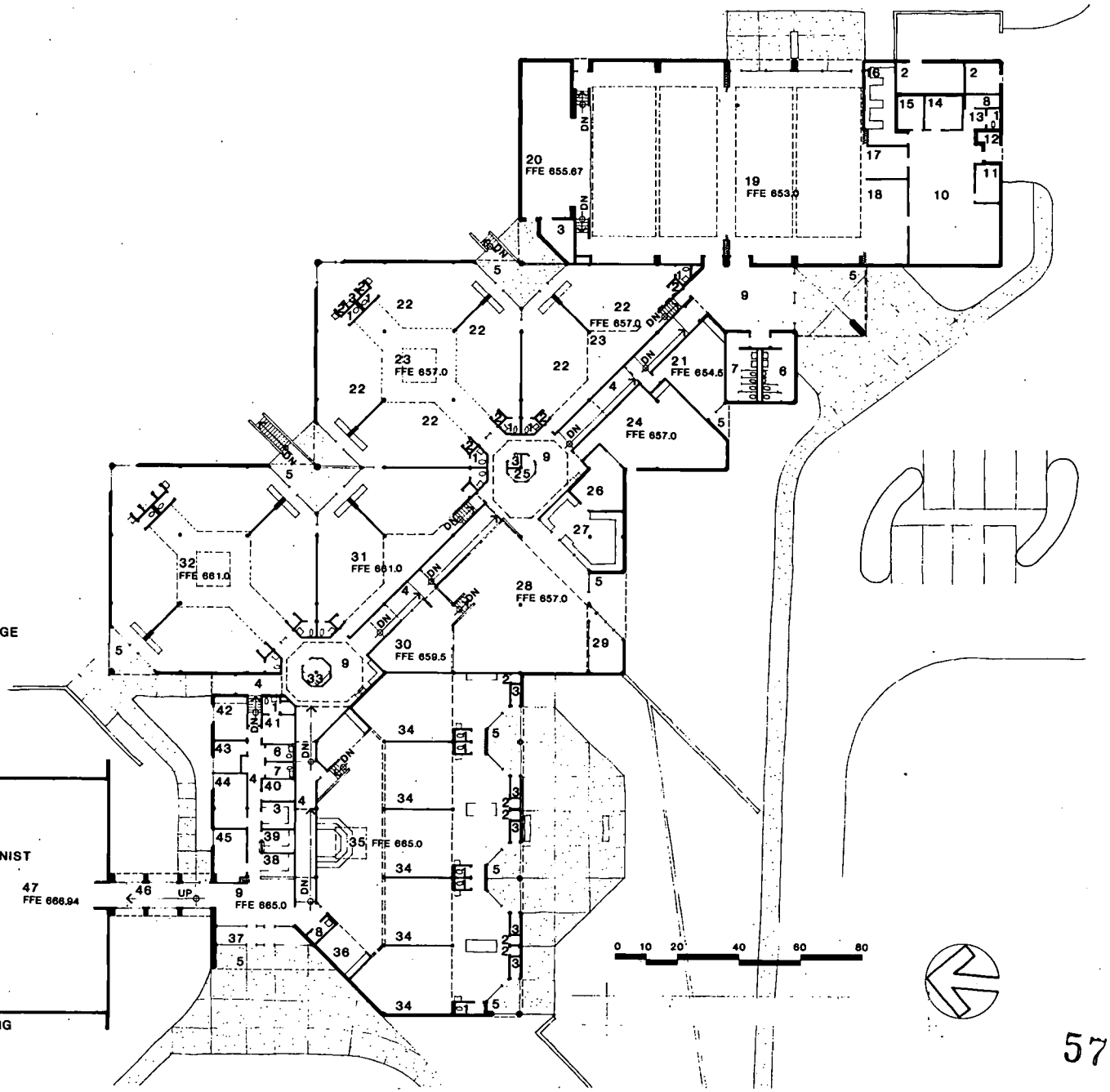


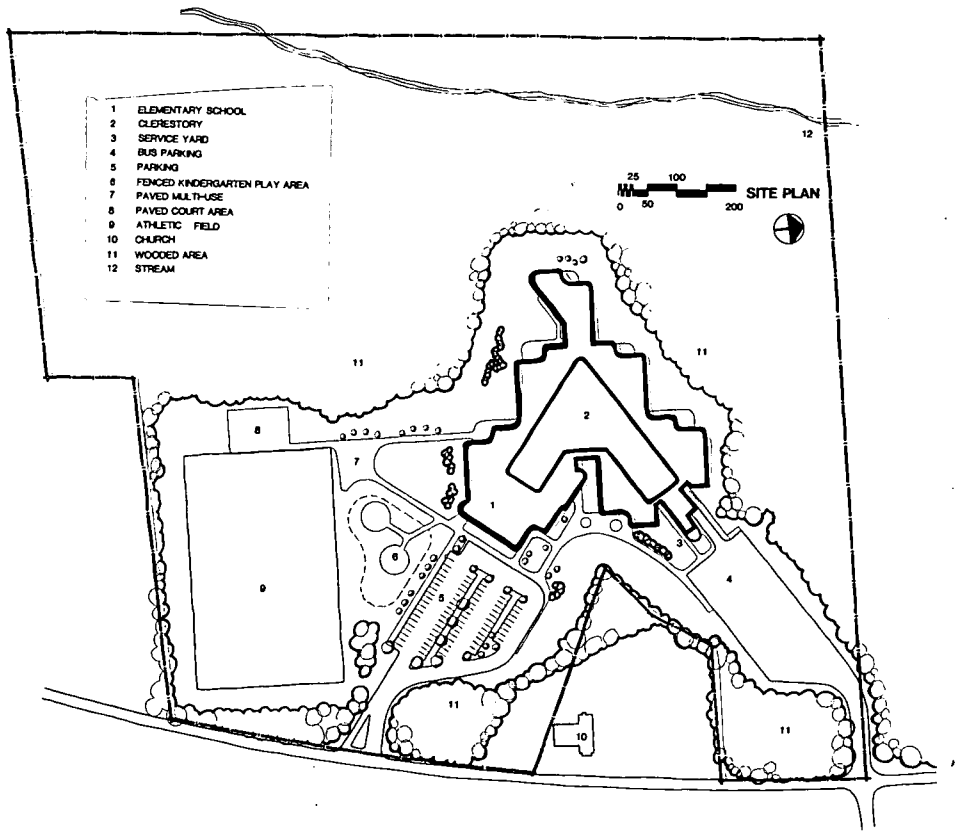




The initial educational and architectural program called for an open plan school with provisions for partitioning if self-contained classrooms are needed. Each classroom has an exterior door as a secondary exit. The overall plan is compact without resorting to the negative aspects of confining children to interior classrooms. Spatial variety results from rooms of many shapes, even though the basic planning groups are rectangles formed by standard column and beam construction. Here is more evidence of imaginative planning that begins with a standard educational program and a reasonable construction budget.

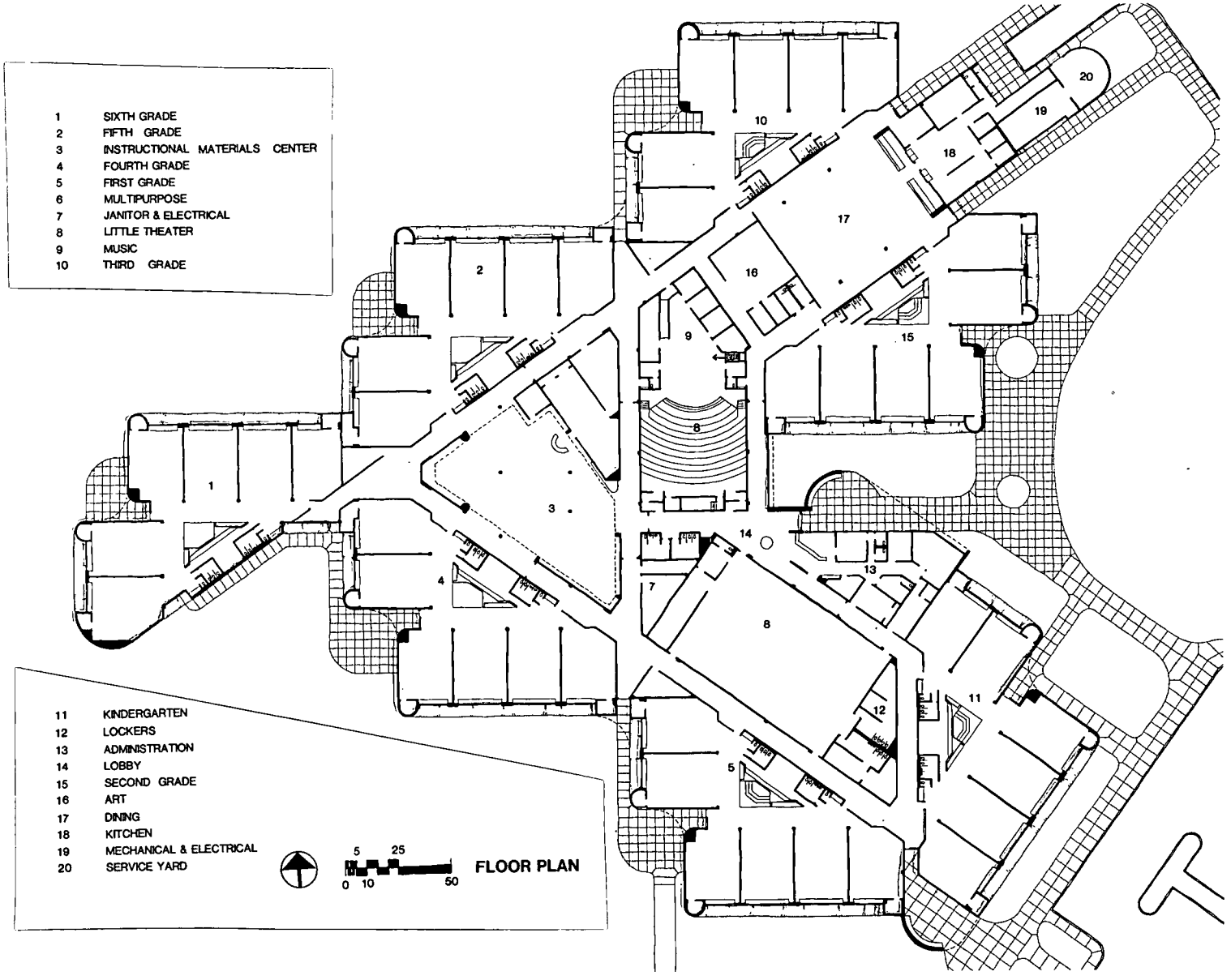
Administrative Unit ..... Montgomery County
Superintendent ..... John T. Jones
Grade Organization K-5
Approximate Capacity 700
Square Footage ..... 43,500 sq. ft.
Opening Date ..... March, 1980
Architects ..... Hayes, Howell & Associates
Structural Engineers ..... W. H. Gardner, Jr. & Associates
Mechanical and Electrical Engineers ..... McMichael, McCracken

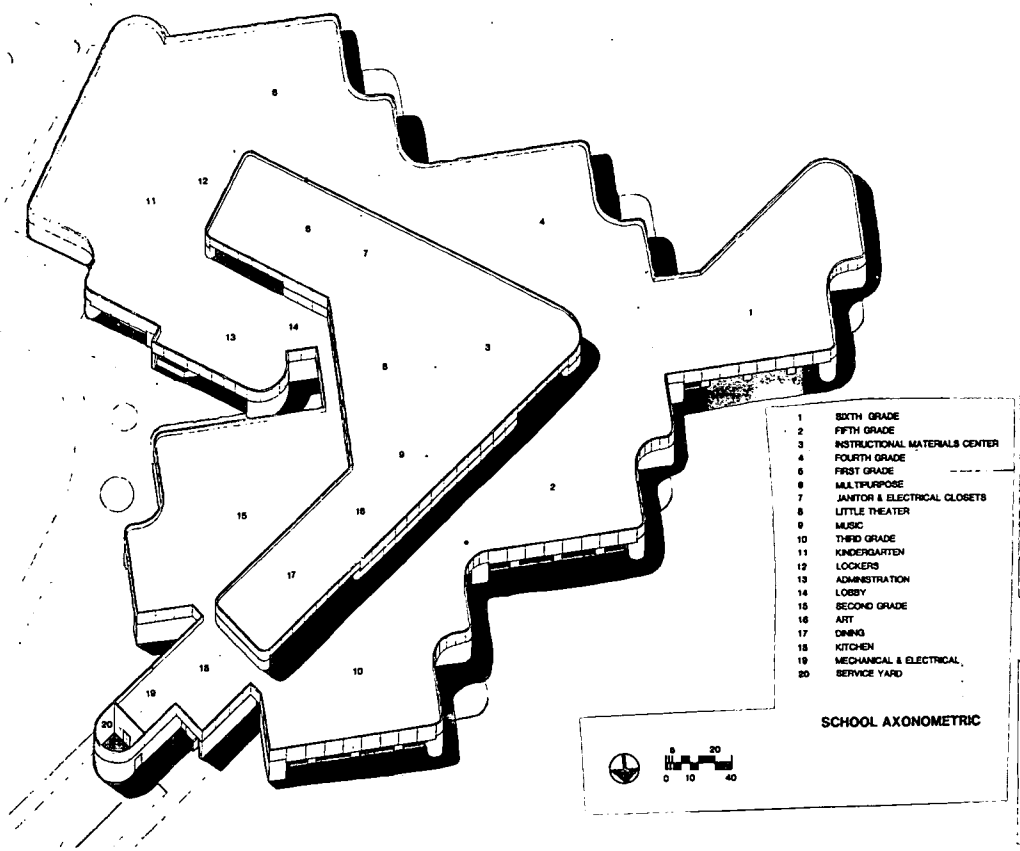

LEGEND
1 TOILET
2 MECHANICAL
3 STORAGE
4 CORRIDOR
5 COVERED PORCH
6 MEN'S TOILET
7 WOMEN'S TOILET
8 JANITOR
9 LOBBY
10 KITCHEN
11 OFFICE
12 CAN WASH
13 LOCKERS
14 REFRIGERATOR
15 FREEZER
16 DRY STORAGE
17 DISHWASHING
16 SERVING
19 ASSEMBLY/DINING
20 STAGE
21 SPECIAL EDUCATION
22 CLASSROOM
23 SHARED SPACE
24 MEDIA MULTI-USE
25 SOLAR DISPLAY KIOSK
26 A.V./ PERIODICAL STORAGE
27 OFFICE/ PRODUCTION
28 MEDIA CENTER
29 CONFERENCE
30 STORY AREA
31 TWO CLASSROOM POD
32 FOUR CLASSROOM POD
33 STORAGE KIOSK
34 KINDERGARTEN
35 STAGE & SHARED AREA
38 TEACHERS' WORKROOM
37 VESTIBULE
38 SECRETARY / RECEPTIONIST
39 WORKROOM
40 RECORDS
41 HEALTH
42 TEACHERS' LOUNGE
43 COUNSELING
44 PRINCIPAL
45 CONFERENCE
46 CONNECTOR
47 OLD CLASSROOM BUILDING
20 FFE 655.67
19 FFE 653.0
22 FFE 657.0
23 FFE 657.0
21 FFE 654.5
24 FFE 657.0
32 FFE 661.0
31 FFE 661.0
28 FFE 657.0
30 FFE 659.5
35 FFE 665.0
47 FFE 666.94
9 FFE 665.0
DN
UP
0 10 20 40 60 80

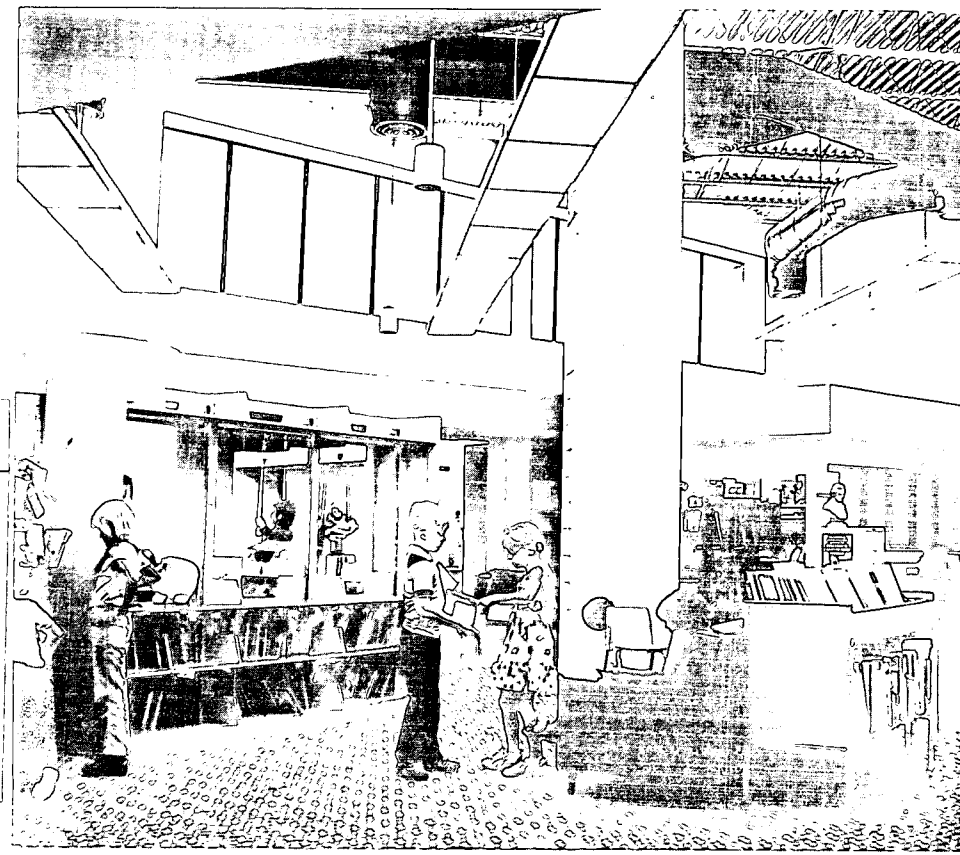


Administrative Unit ..... **Buncombe County**
Superintendent ..... **N. A. Miller**
Grade Organization **K-6**
Approximate Capacity **980**
Square Footage ..... **92,000 sq. ft.**
Opening Date ..... **August, 1980**
Architects ..... **Six Associates, Inc.**
Structural Engineers ..... **Six Associates, Inc.**
Mechanical and Electrical Engineers ..... **Six Associates, Inc.**

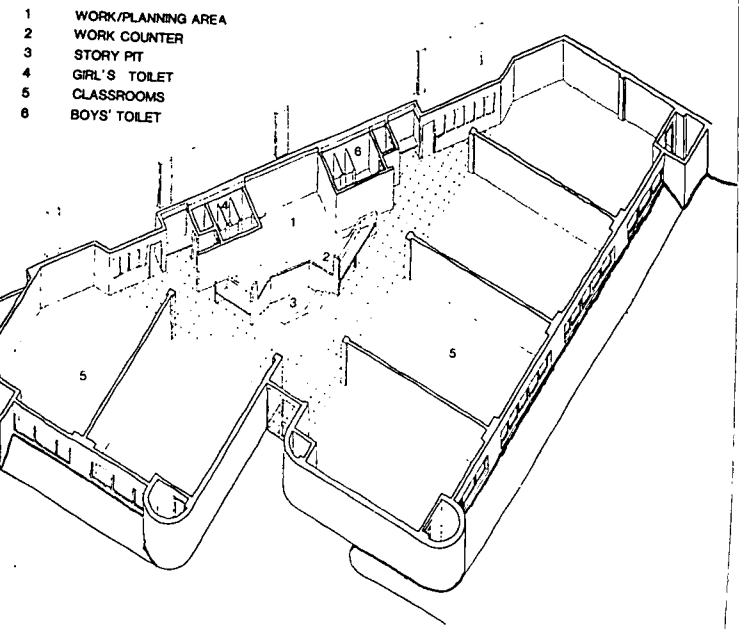
All classrooms are clustered around shared work and toilet areas. These clusters provide some of the territorial identity necessary for children in large elementary schools. The clusters are arranged in a variety of patterns for spatial richness. Clusters are used as a way of planning for self-contained classrooms without the repetitiveness of a typical double-loaded corridor school. A continuous band of clerestory windows is the daylight source for major interior rooms such as the cafeteria, library, and gymnasium. The exterior shape is distinctive because of the rounded corners and because of earth bermed to windowsill height. See the energy section of this book for additional information.


1 SIXTH GRADE
2 FIFTH GRADE
3 INSTRUCTIONAL MATERIALS CENTER
4 FOURTH GRADE
5 FIRST GRADE
6 MULTIPURPOSE
7 JANITOR & ELECTRICAL
8 LITTLE THEATER
9 MUSIC
10 THIRD GRADE
11 KINDERGARTEN
12 LOCKERS
13 ADMINISTRATION
14 LOBBY
15 SECOND GRADE
16 ART
17 DINING
18 KITCHEN
19 MECHANICAL & ELECTRICAL
20 SERVICE YARD
5 25
0 10 50
FLOOR PLAN


1 SIXTH GRADE
2 FIFTH GRADE
3 INSTRUCTIONAL MATERIALS CENTER
4 FOURTH GRADE
5 FIRST GRADE
6 MULTIPURPOSE
7 JANITOR & ELECTRICAL CLOSETS
8 LITTLE THEATER
9 MUSIC
10 THIRD GRADE
11 KINDERGARTEN
12 LOCKERS
13 ADMINISTRATION
14 LOBBY
15 SECOND GRADE
16 ART
17 DINING
18 KITCHEN
19 MECHANICAL & ELECTRICAL
20 SERVICE YARD
SCHOOL AXONOMETRIC
0 10 20 40

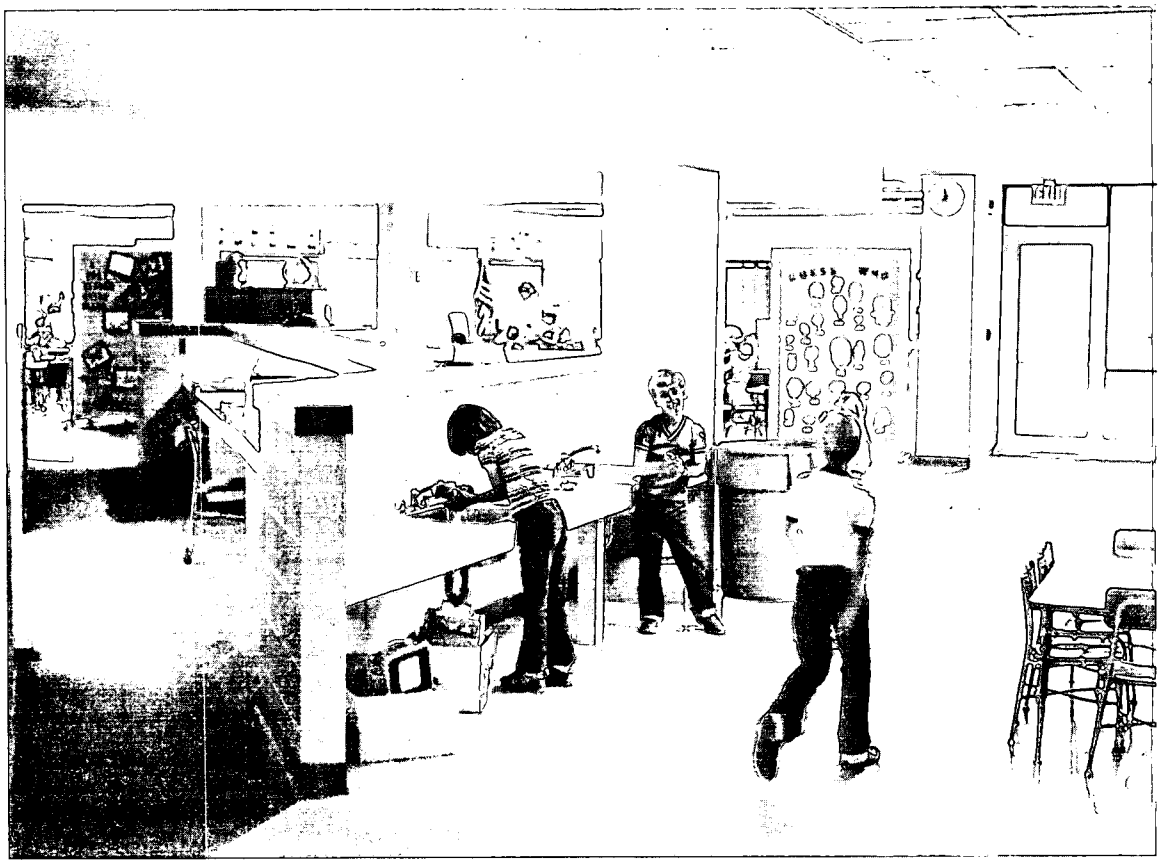


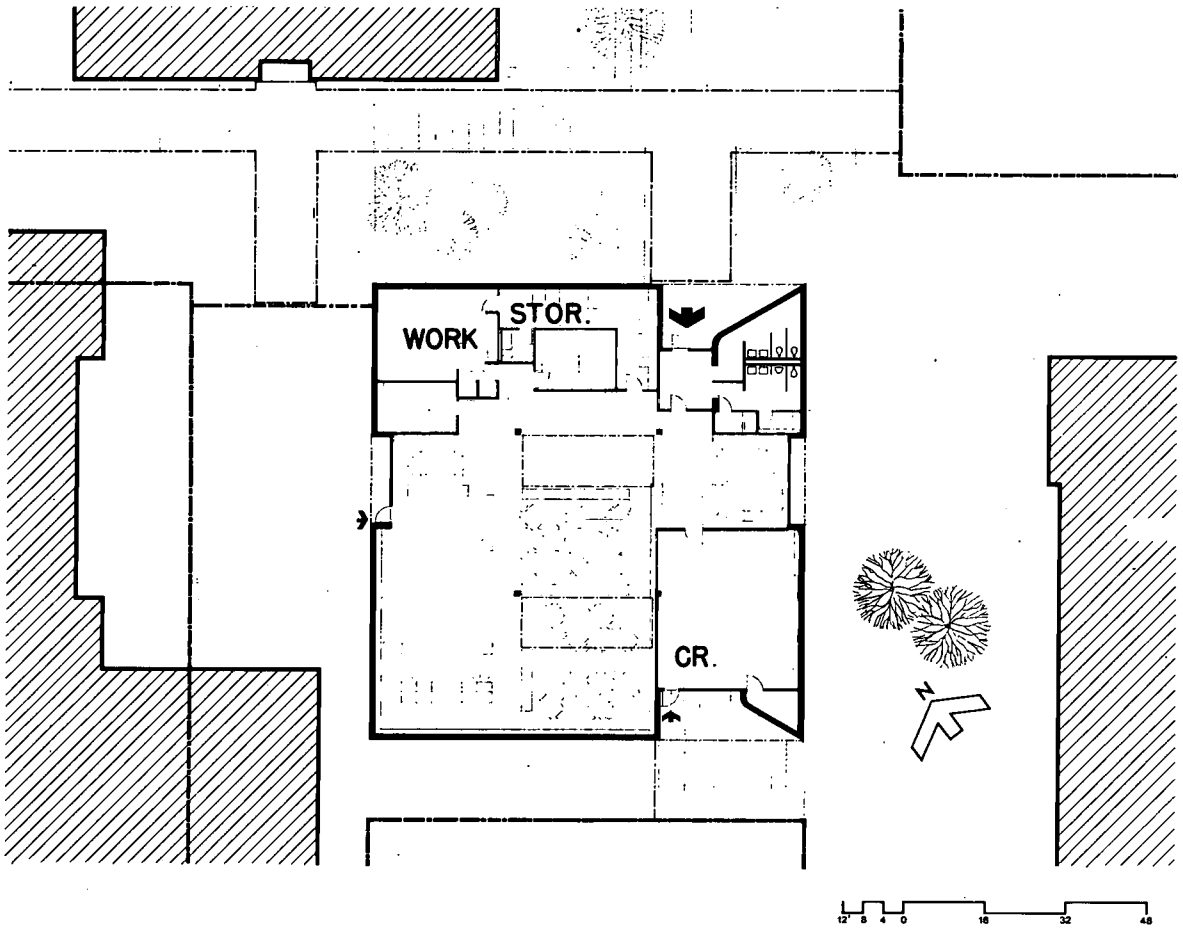
1 WORK/PLANNING AREA
2 WORK COUNTER
3 STORY PIT
4 GIRL'S TOILET
5 CLASSROOMS
6 BOYS' TOILET



TYPICAL CLASSROOM POD AXONOMETRIC

5 20
0 10 40




WORK
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CR.
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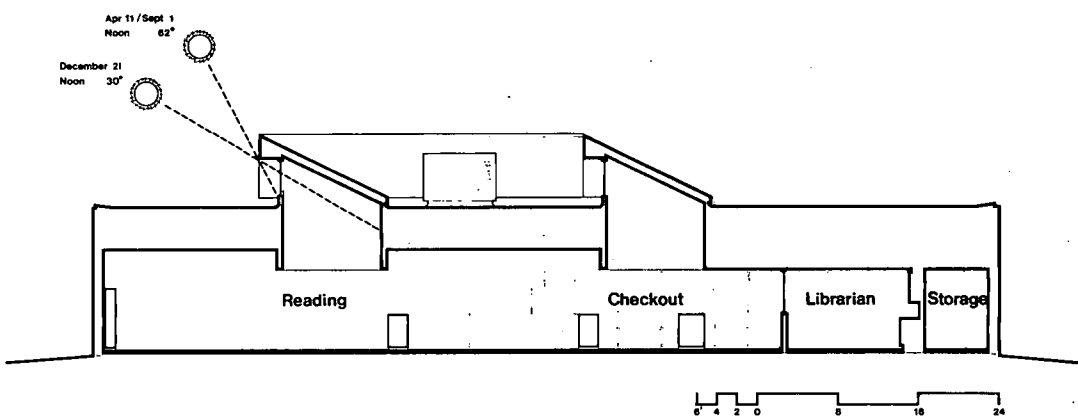
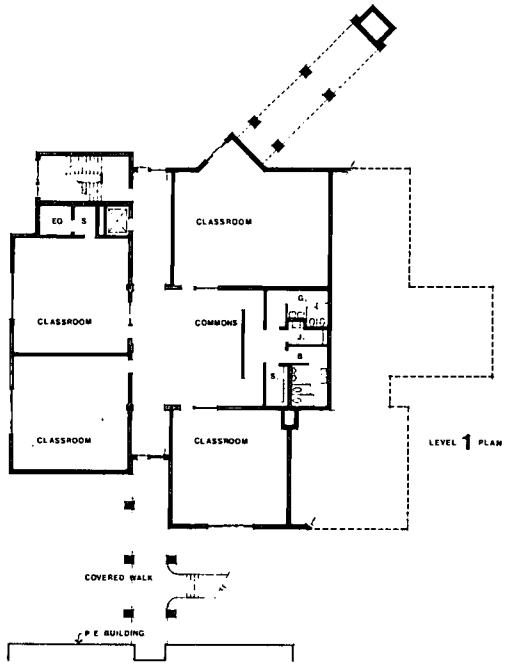
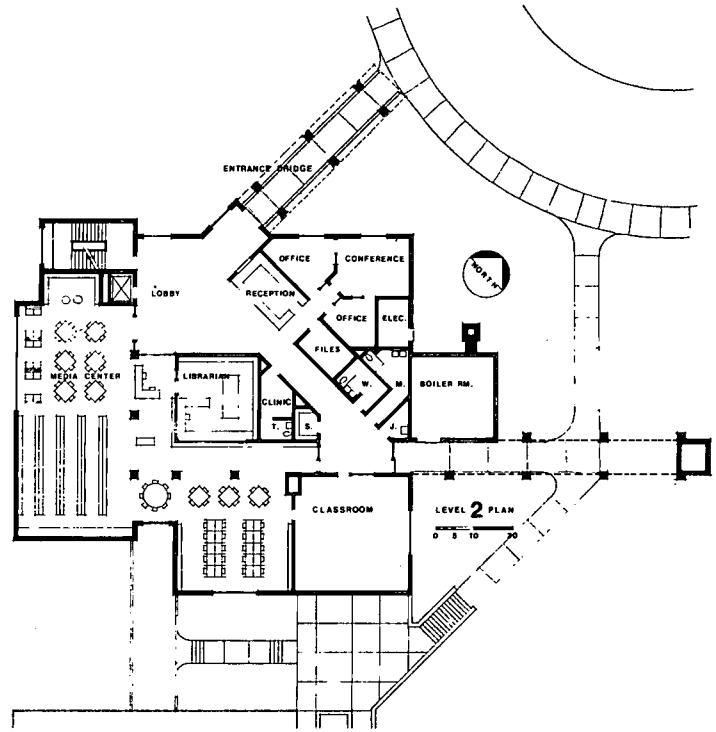
12' 8 4 0 16 32 48

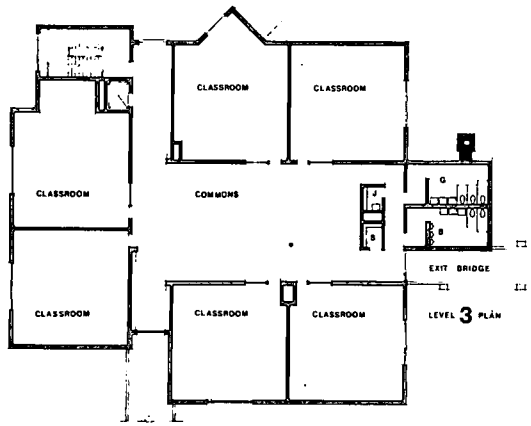
Administrative Unit ..... **Wake County**
Superintendent ..... **John Murphy**
Grade Organization **6-8**
Approximate Capacity **850**
Square Footage ..... **7,228 sq. ft.**
Opening Date ..... **January, 1981**
Architects ..... **Shawcroft-Taylor**
Structural Engineers ..... **David Fischetti**
Mechanical and Electrical Engineers ..... **Progressive Design Collaborative, Ltd.**

The old Apex School is characteristic of many schools in North Carolina. It consists of well-maintained buildings from several eras. Its use has changed from a high school to an elementary school to a middle school. The site is very small. Cost studies suggested that old and educationally obsolete facilities could be replaced on a regular basis by modern buildings. Intensive site planning was required so that buildings and traffic patterns could be built in an orderly way without disrupting the many good educational programs already in operation. Also, the community will not lose a landmark. Good programs can continue and building design quality can be improved by means of long-range planning.



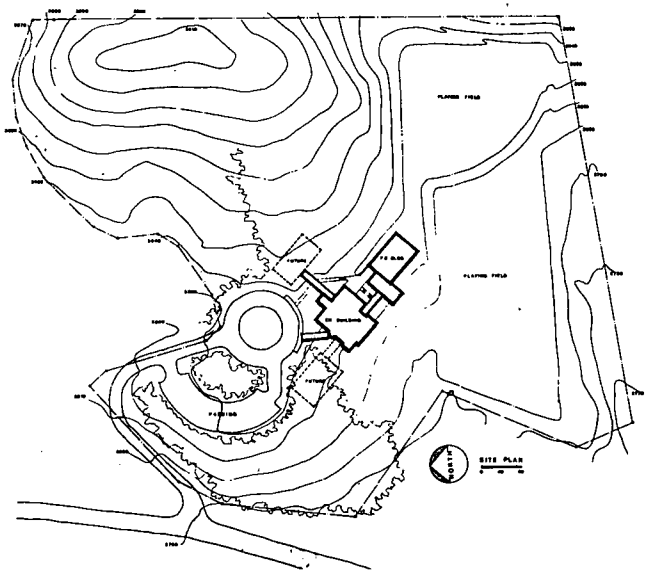

CLASSROOM
EQ
S
CLASSROOM
COMMONS
G
I
O
S
CLASSROOM
CLASSROOM
LEVEL 1 PLAN
COVERED WALK
P E BUILDING

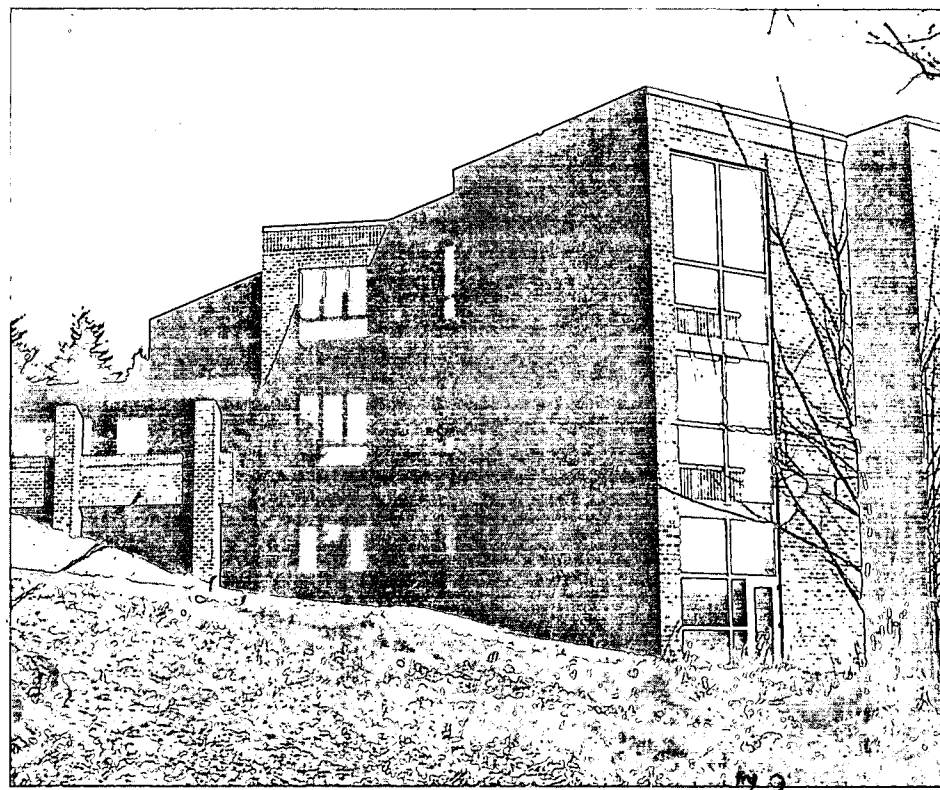

ENTRANCE BRIDGE
OFFICE
CONFERENCE
LOBBY
RECEPTION
NORTH
OFFICE
ELEC.
FILES
MEDIA CENTER
LIBRARIAN
CLINIC
T.
S.
W.
M.
BOILER RM.
CLASSROOM
LEVEL 2 PLAN
0 5 10 20

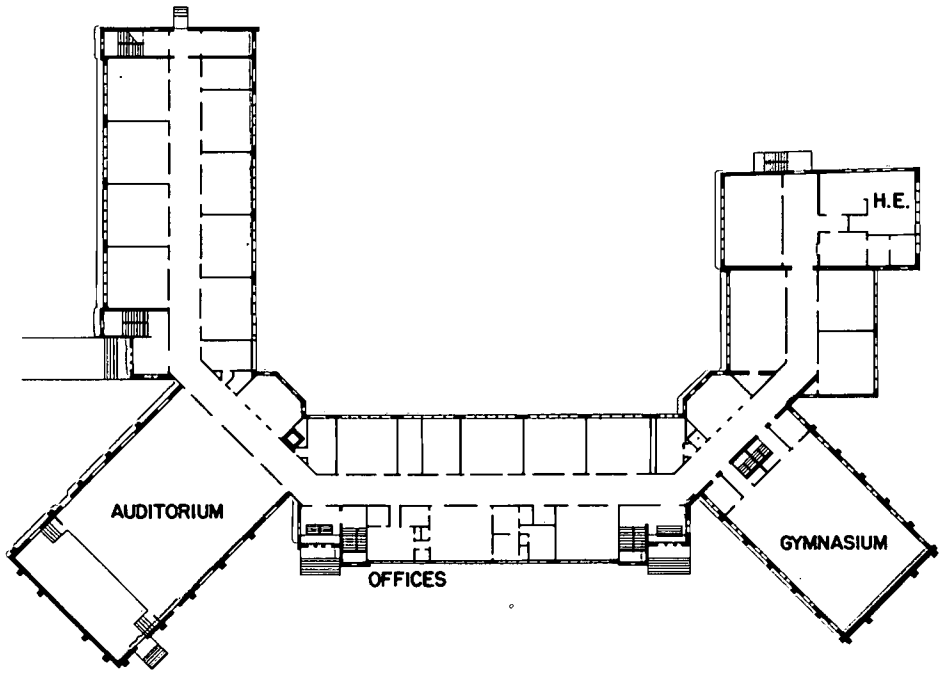

CLASSROOM
CLASSROOM
CLASSROOM
COMMONS
G
EXIT BRIDGE
CLASSROOM
CLASSROOM
CLASSROOM
LEVEL 3 PLAN

Administrative Unit	**Avery County**
Superintendent	**Harry McGee**
Grade Organization	**7-8**
Approximate Capacity	**300**
Square Footage	**33,000 sq. ft.**
Opening Date	**August, 1979**
Architects	**Padgett & Freeman**
Structural Engineers	**Padgett & Freeman**
Mechanical Engineers	**Mechanical Engineers, Inc.**
Electrical Engineers	**Register & Cummings**

The chief determinant of a school plan is frequently the extreme change of elevation on a site. In this case, a cross slope of one hundred fifty feet determined the three-story scheme used for the Crossnore-Newland Middle School. A standard educational program is housed in a compact building which will be the hub for three adjacent buildings. The gymnasium is part of first phase work.



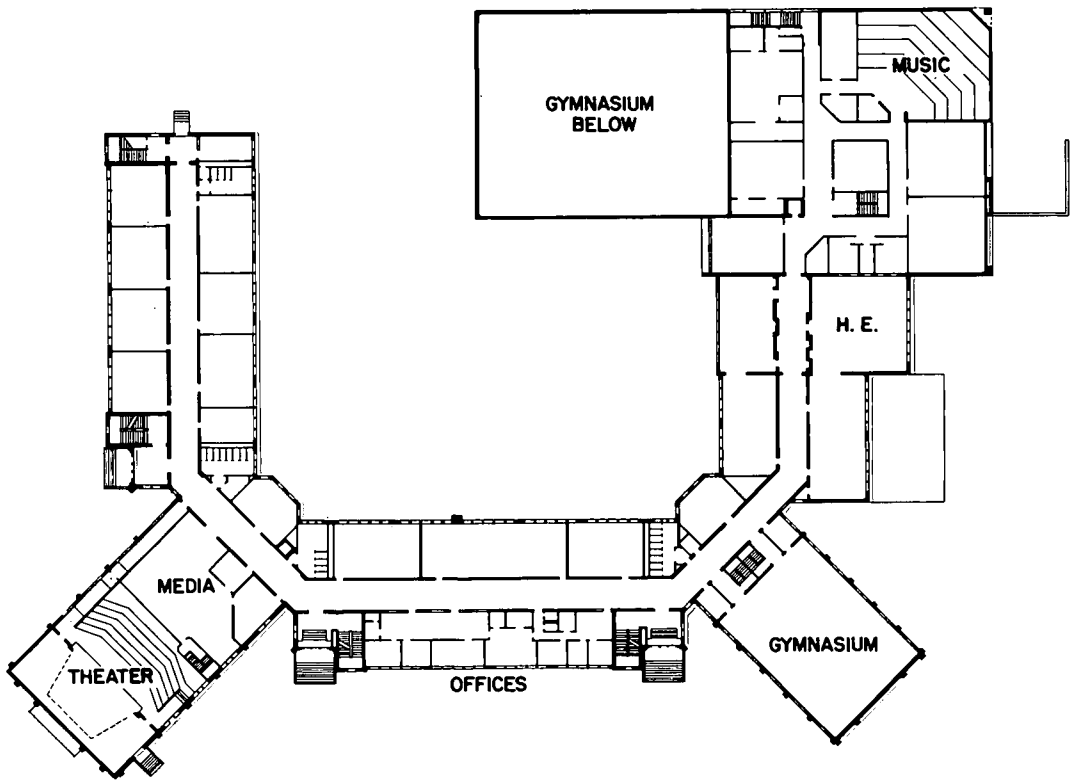




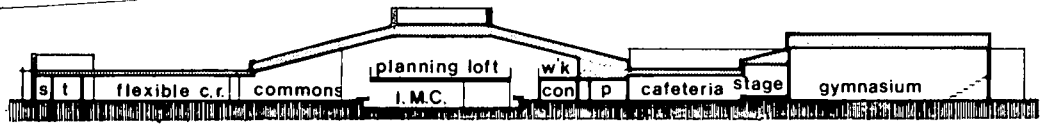
MAIN FLOOR BEFORE

Administrative Unit	**High Point City**
Superintendent	**Edwin L. West, Jr.**
Grade Organization	**6-8**
Approximate Capacity	**900**
Square Footage	**78,000 renovated; 32,000 new**
Opening Date	**Fall, 1982**
Architects	**Hyatt Hammond & Associates**
Structural Engineers	**Hyatt Hammond & Associates**
Mechanical Engineers	**Wilson & Lysiak, Inc.**
Electrical Engineer	**William H. Johnson**

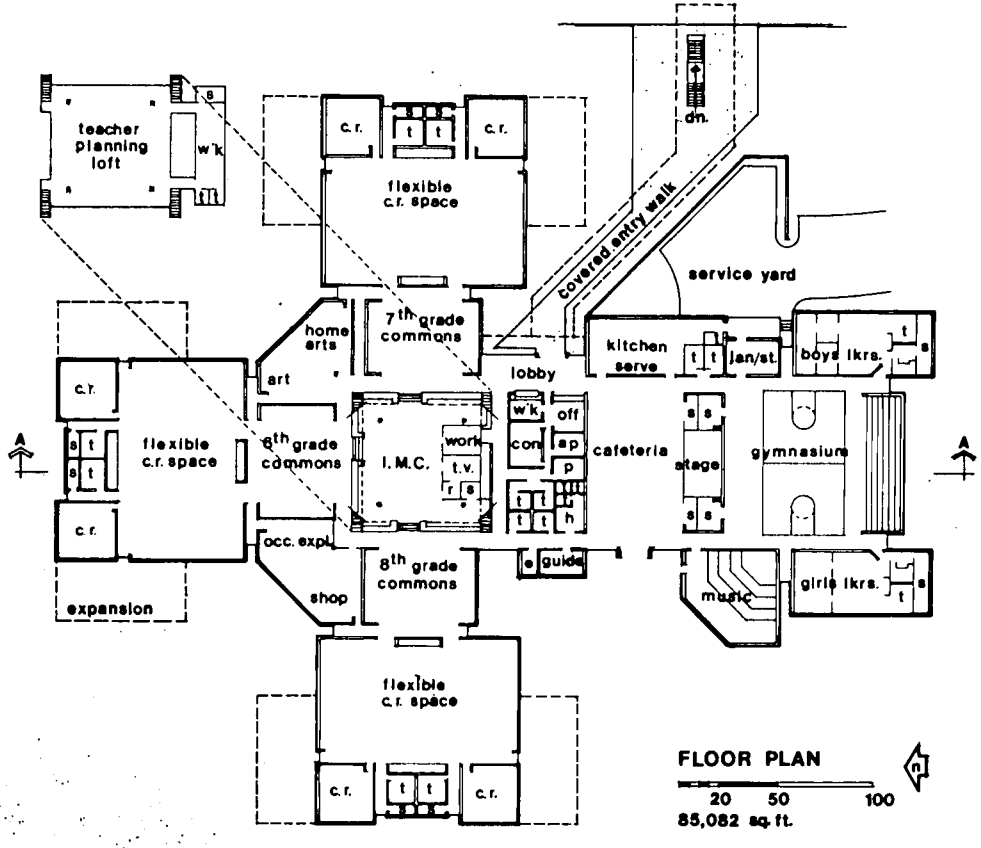
This school is an example of major renovation of an old facility. Several cities have similar 1920's style school buildings. Many of them have reinforced concrete frames and masonry walls, which would be expensive to duplicate at today's prices. Renovation and remodeling to accommodate changing educational programs frequently can be economically justified. Converting the Ferndale High School structure into a junior high is recycling at its best when one considers the high cost of building a new school of similar quality. Site renovations include reorientation of traffic patterns and main entrances to accommodate the gymnasium and cafeteria addition.



MAIN FLOOR AFTER



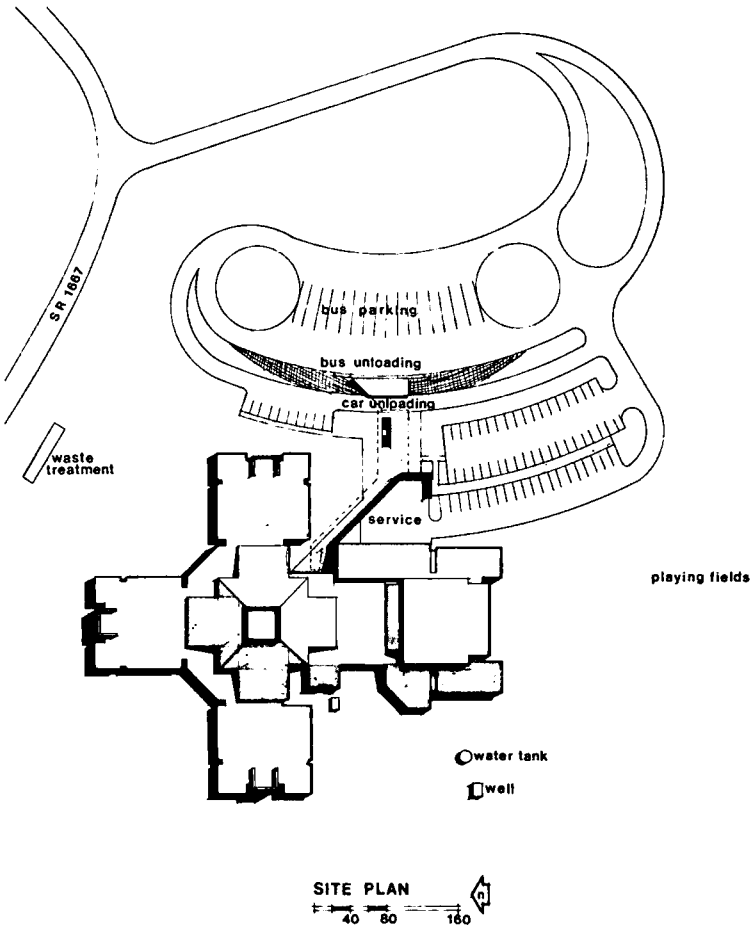
SECTION "A-A" 20 50 100

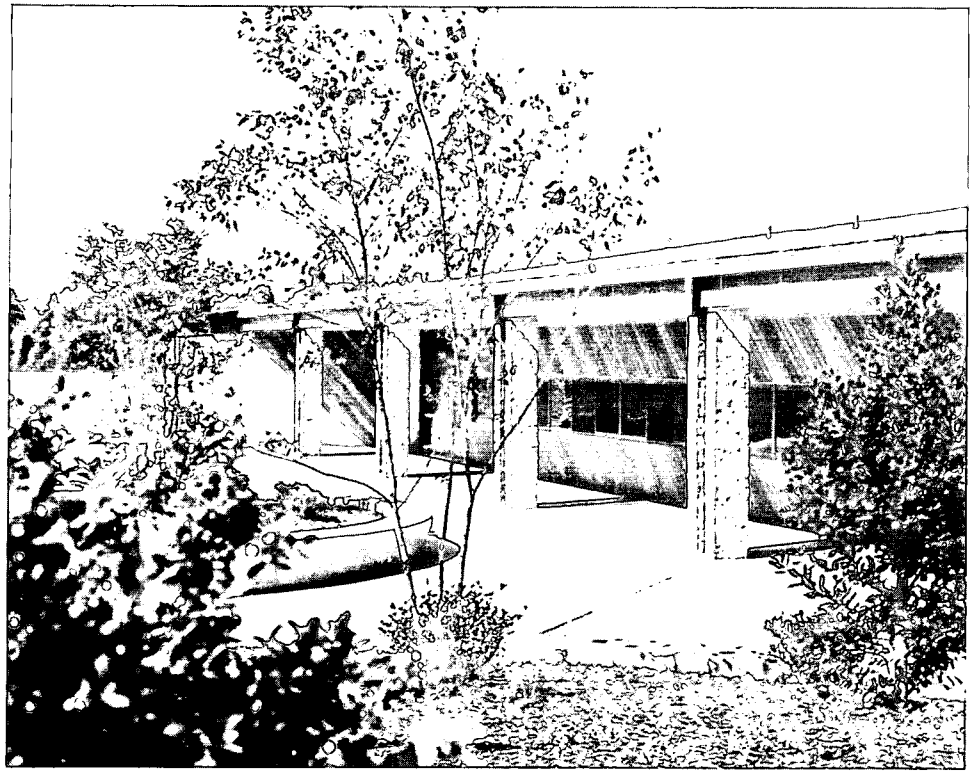


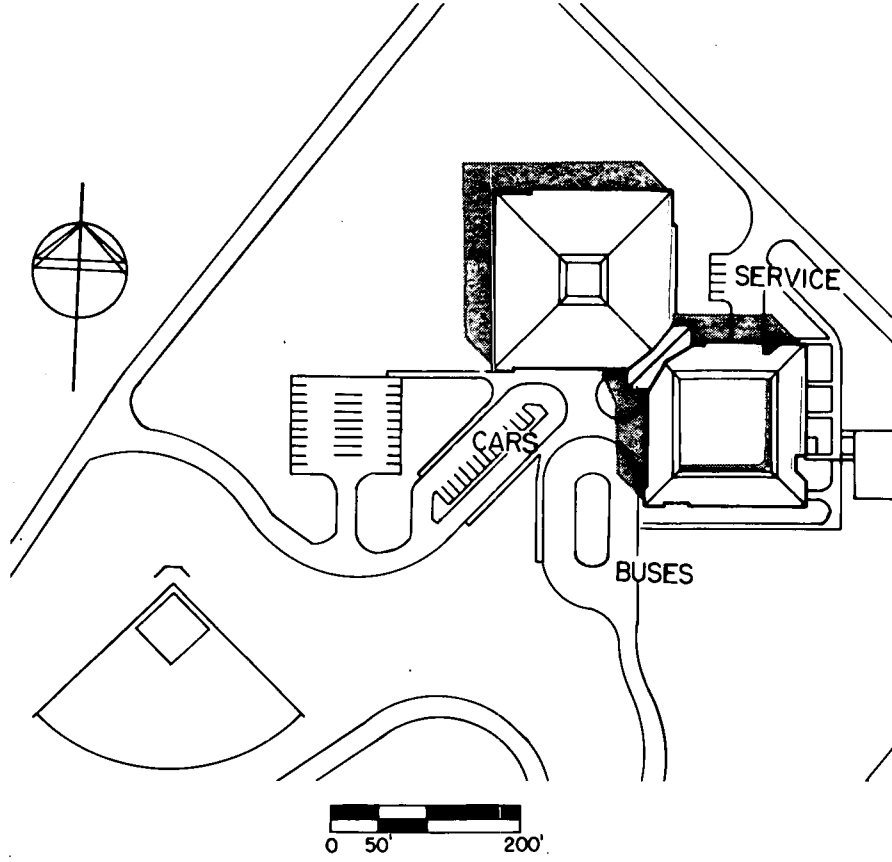
FLOOR PLAN
20 50 100
85,082 sq. ft.

The distinguishing feature of this school is a large three level central core containing the library and other support facilities. The photograph shows the spaciousness of this area. Ceilings and roofs slope downward from the core to classroom houses or pods. Each pod contains a flexible open floor area to be divided as teachers require. Each grade connects to the central core through its own multi-use commons. Second phase construction will include the cafeteria, gymnasium, and music cluster, as shown on the plan.

Administrative Unit ..... **Macon County**
Superintendent ..... **Lonnie H. Crawford**
Grade Organization **7-8**
Approximate Capacity **500**
Square Footage ..... **50,000 sq. ft.**
Opening Date ..... **August, 1975**
Architects ..... **Kyle C. Boone**
Structural Engineers ..... **Bowen & Feinberg**
Mechanical and Electrical Engineers ..... **Reece, Noland & McElrath, Inc.**

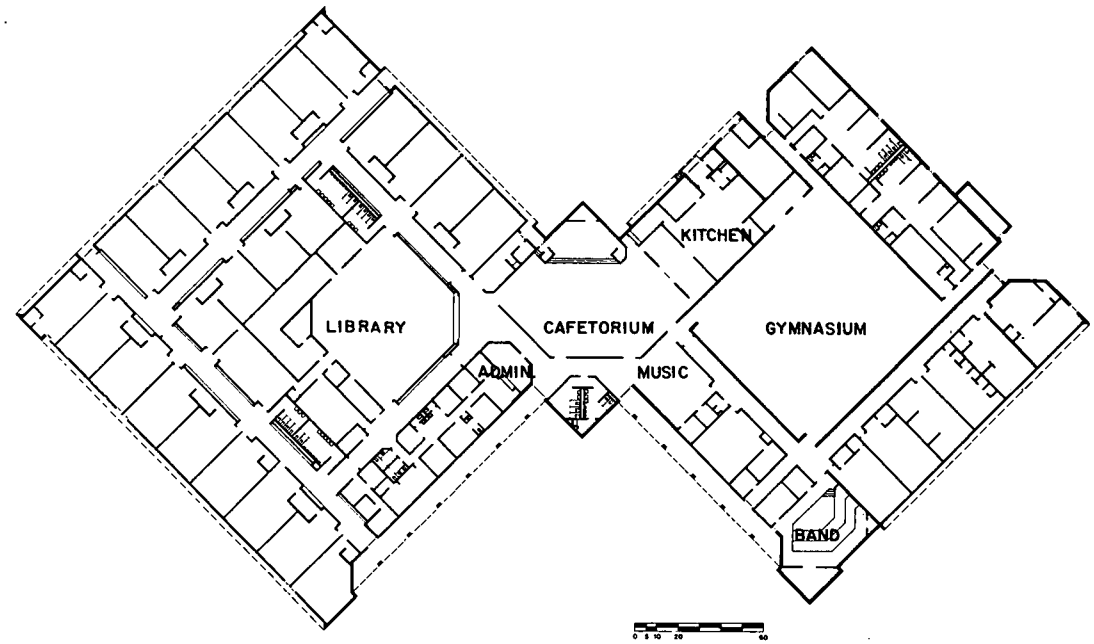

SR 1667
bus parking
bus unloading
car unloading
waste treatment
service
playing fields
water tank
well
SITE PLAN
40 80 160



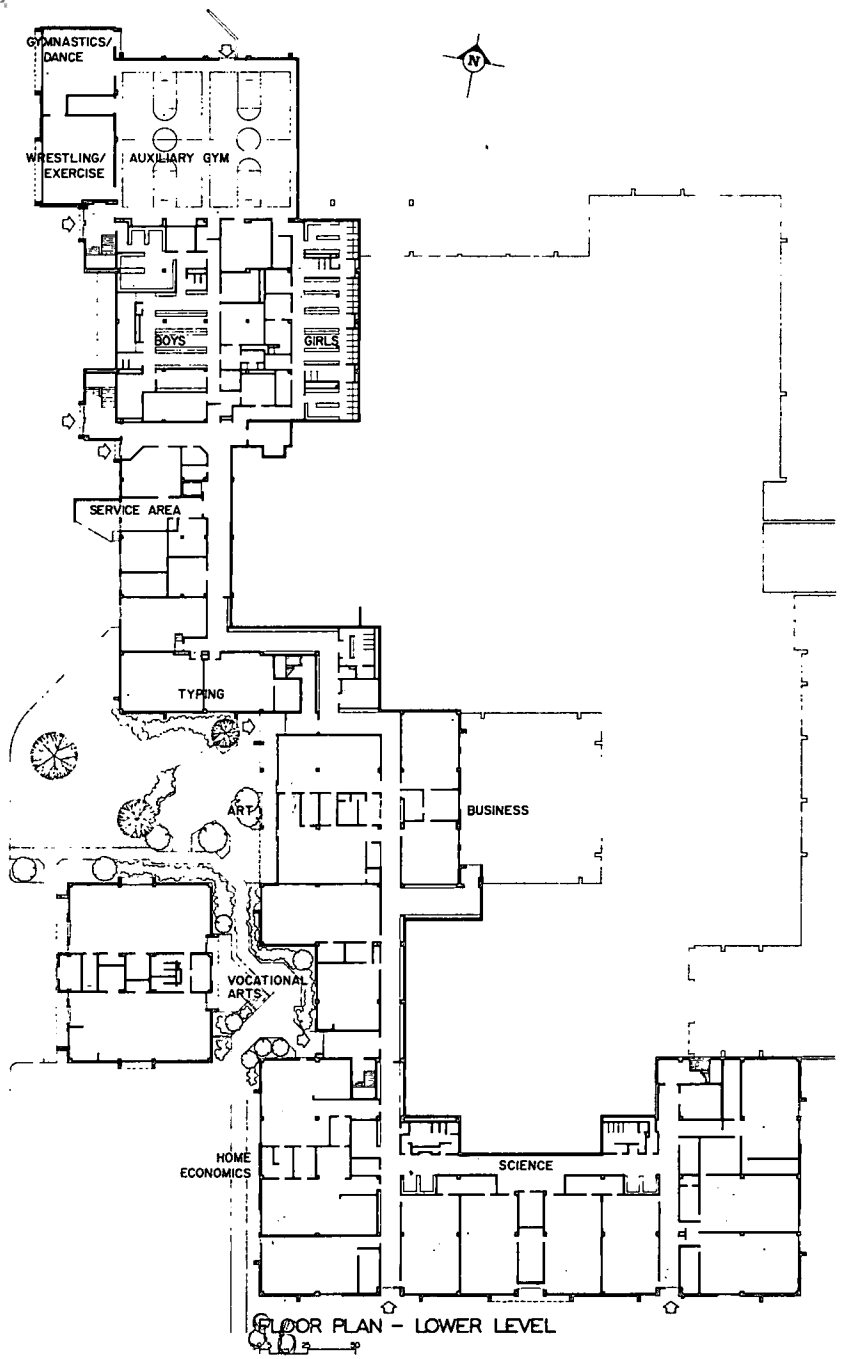

SERVICE
CARS
BUSES
0 50' 200'

Administrative Unit ..... Cabarrus County
Superintendent ..... Joseph N. Fries
Grade Organization 7-8
Approximate Capacity 800
Square Footage ..... 78,350 sq. ft.
Opening Date ..... August, 1980
Architects ..... Little and Associates, Inc.
Structural Engineers ..... Little and Associates, Inc.
Mechanical and Electrical Engineers ..... Schultz and Associates

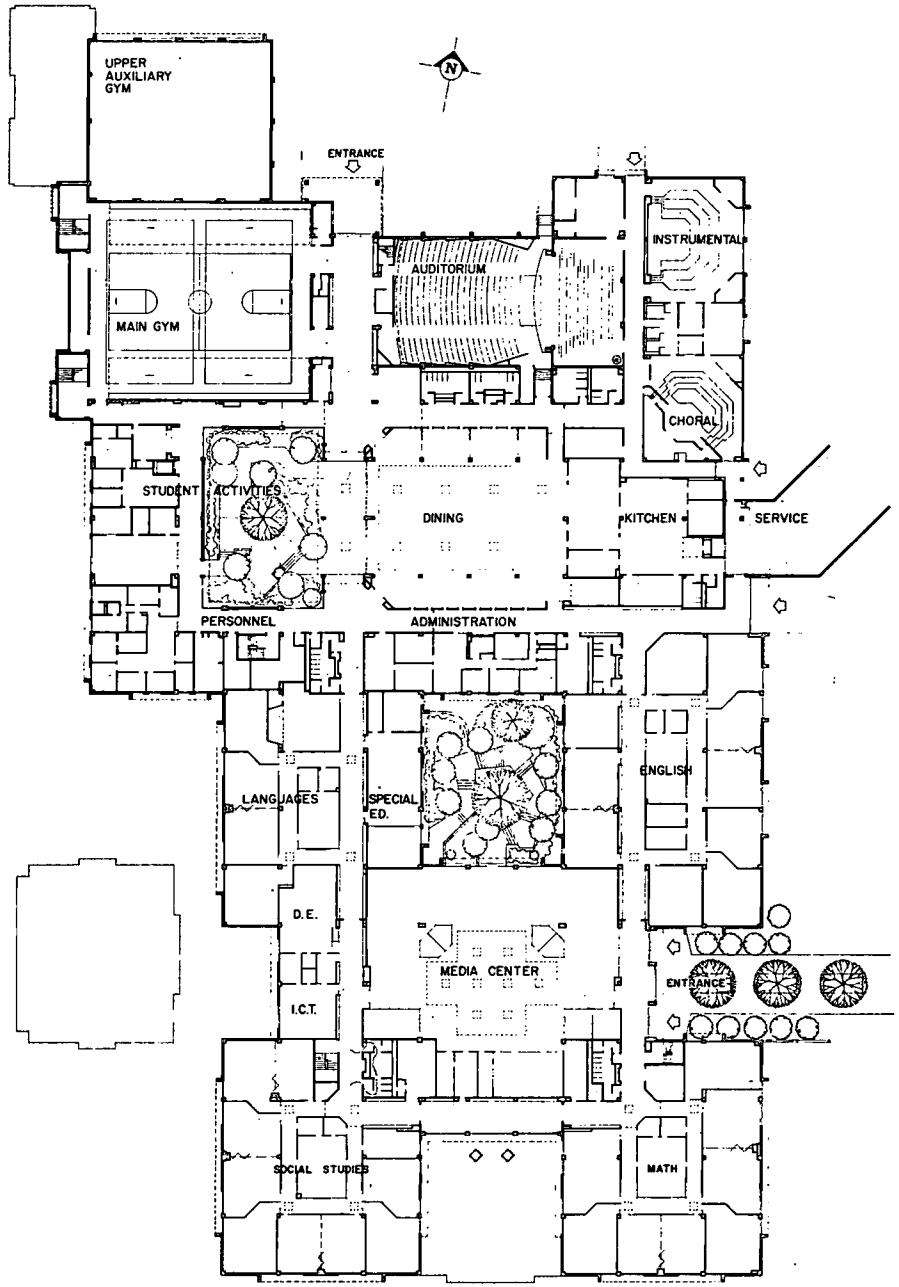
When does a junior high become a middle school? Frequently the difference is only the name. For purposes of facility design, this project could be a model for both types of schools. A hilltop location is dramatized by massive hip-roofs which define two large, square classroom clusters. The hip-roofs shelter and articulate general studies classrooms in one cluster and exploratory and support facilities in the other cluster. The entrance arcades are particularly inviting. Exterior proportions and scale are distinguished by the absence of the frequently-used heavy fascia treatment which has become commonplace in school building design.



ATHENS DRIVE HIGH

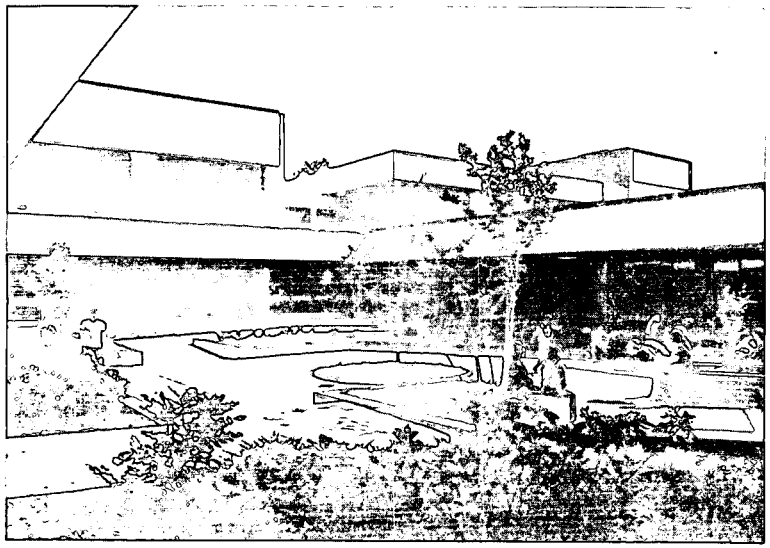


FLOOR PLAN - LOWER LEVEL

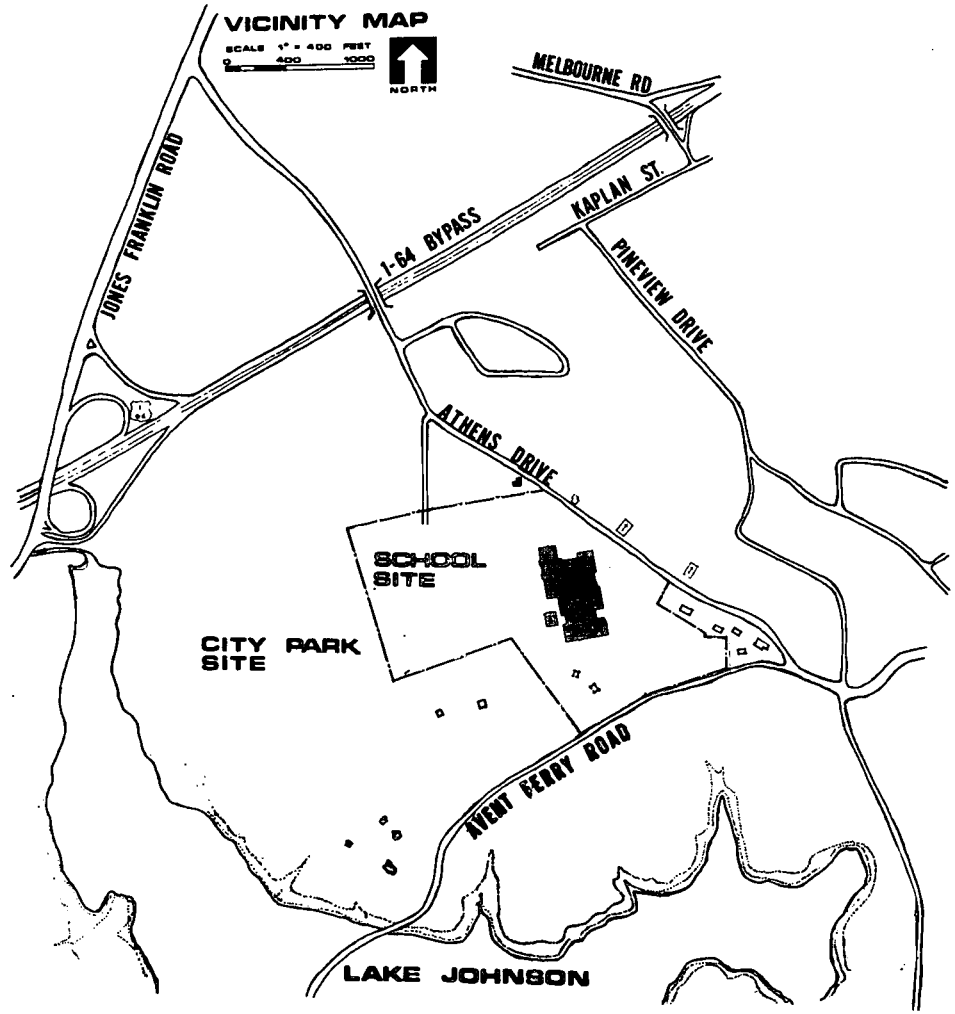


FLOOR PLAN - MAIN LEVEL

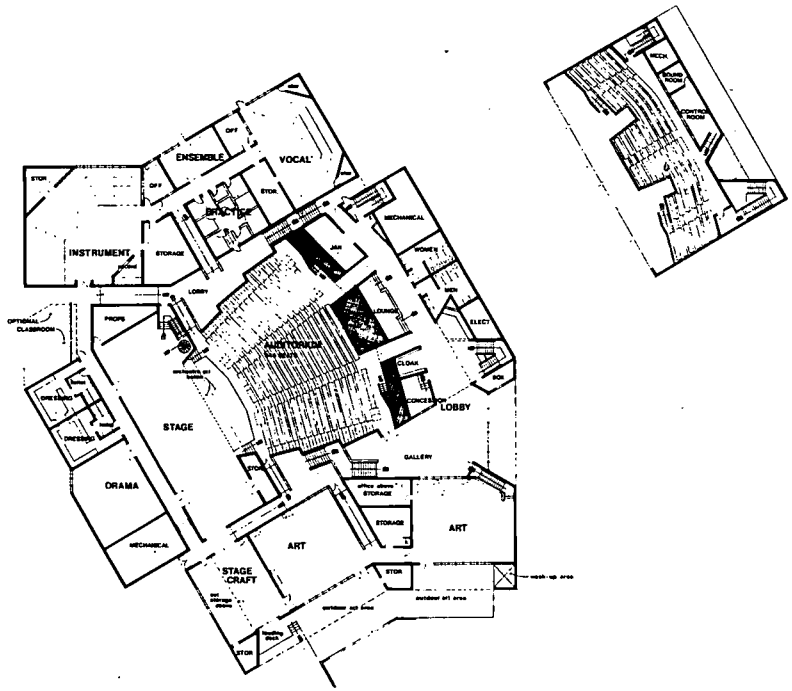
Year round community use of this school building, outdoor facilities, and adjacent Lake Johnson public areas were major planning considerations. The Raleigh City Parks and Recreation Department cooperated to help produce an outstanding example of a community school. There are activities here day and night throughout the year open to the public, including the library. When the school was planned it had the largest per pupil square footage ratio in North Carolina. The extra spaciousness has reinforced its value due to subsequent pupil attendance zone realignments. Visitors interested in construction details can see standard building materials and finishes used for best appearance and easy maintenance to produce a quality school building.



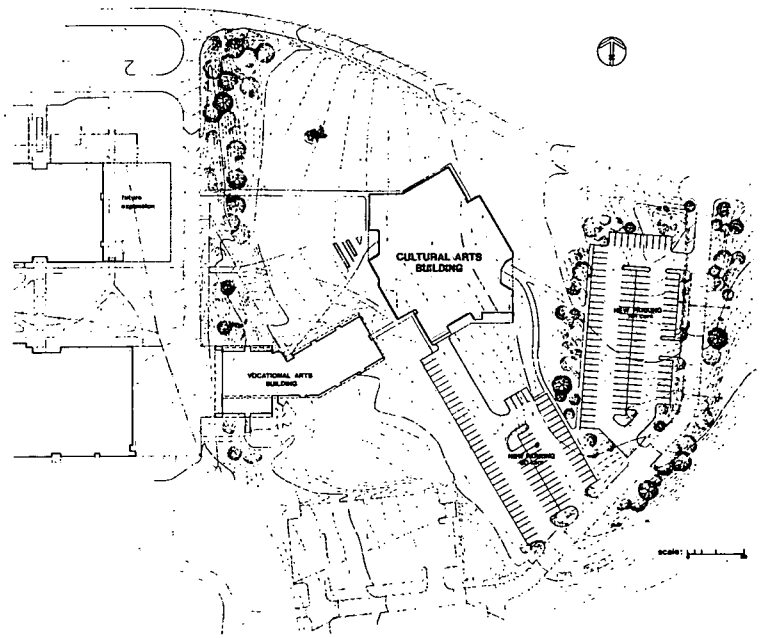
Administrative Unit	Wake County
Superintendent	John Murphy
Grade Organization	10-12
Approximate Capacity	1,620
Square Footage	240,140 sq. ft.
Opening Date	Fall, 1978
Architects	F. Carter Williams
Structural Engineers	Lasater-Hopkins
Mechanical and Electrical Engineers	Buffaloe, Morgan & Associates
Landscape Architect	Lewis Clarke Associates



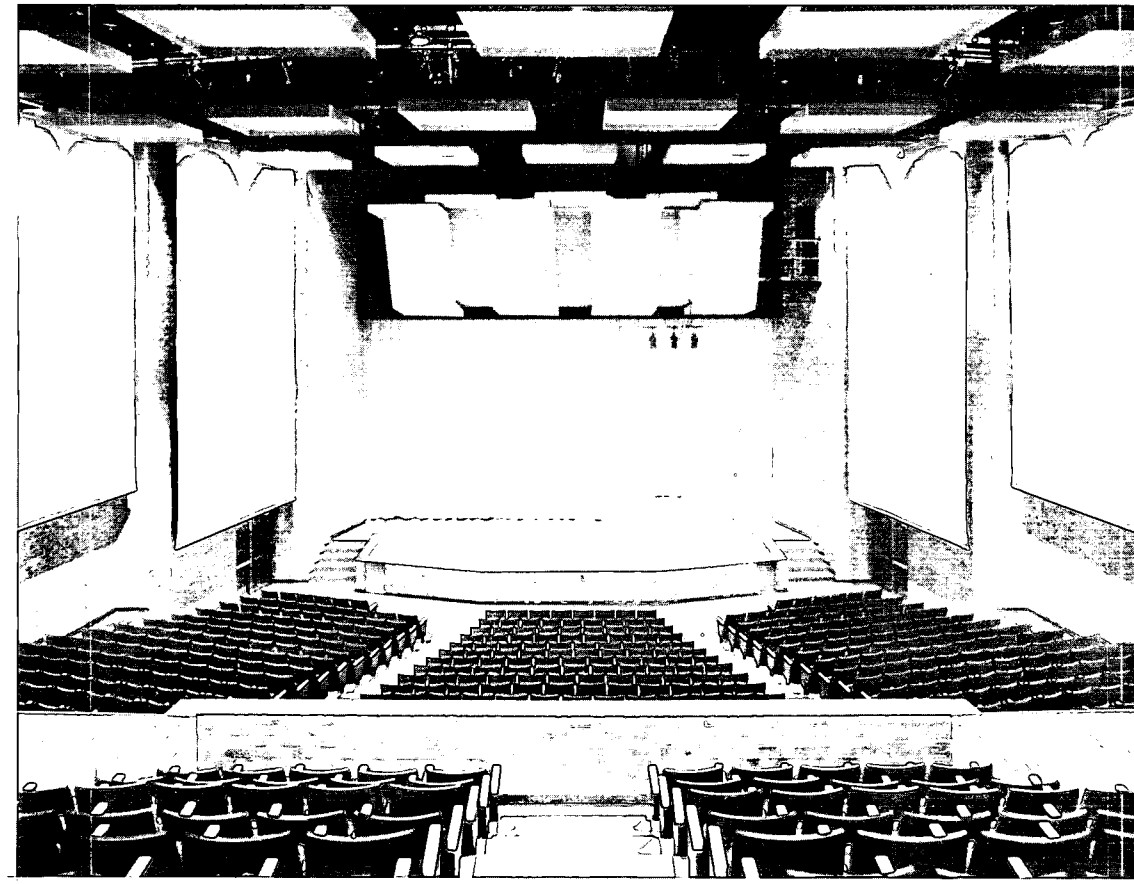
Administrative Unit ..... Chapel Hill/Carrboro City
Superintendent ..... Pamela Mayer
Grade Organization ..... 10-12 and Community Programs
Approximate Capacity 770-1,500
Square Footage ..... 37,400, sq. ft.
Opening Date ..... July, 1977
Architects ..... Ferebee, Walters and Associates
Structural Engineers ..... Ferebee, Walters and Associates
Mechanical and Electrical Engineers ..... Ferebee, Walters and Associates
Special Acoustical Consultants ..... Bolt, Baranek and Newman



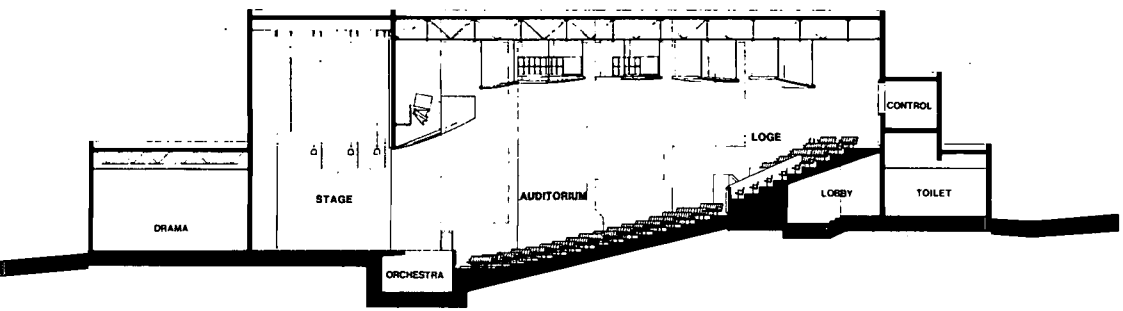
FLOOR PLAN scale:
32,400 sq. feet



At a time when community use of schools is growing, a high school arts center becomes especially important. If the arts are to be adequately provided for, facilities must be planned with a minimum of budget compromise. The individual demands of instrumental music, vocal music, graphic arts, craft arts, dance, and drama can be mutually enriched if they are housed in facilities which encourage cooperation among varying talents. The planners of this complex recognized the possibilities and built accordingly. The rest is up to the teachers, students, and community members who use the facility on a regular basis.



RICK L. ALEXANDER
PHOTOGRAPHY, INC.
WAXHAW, N.C.



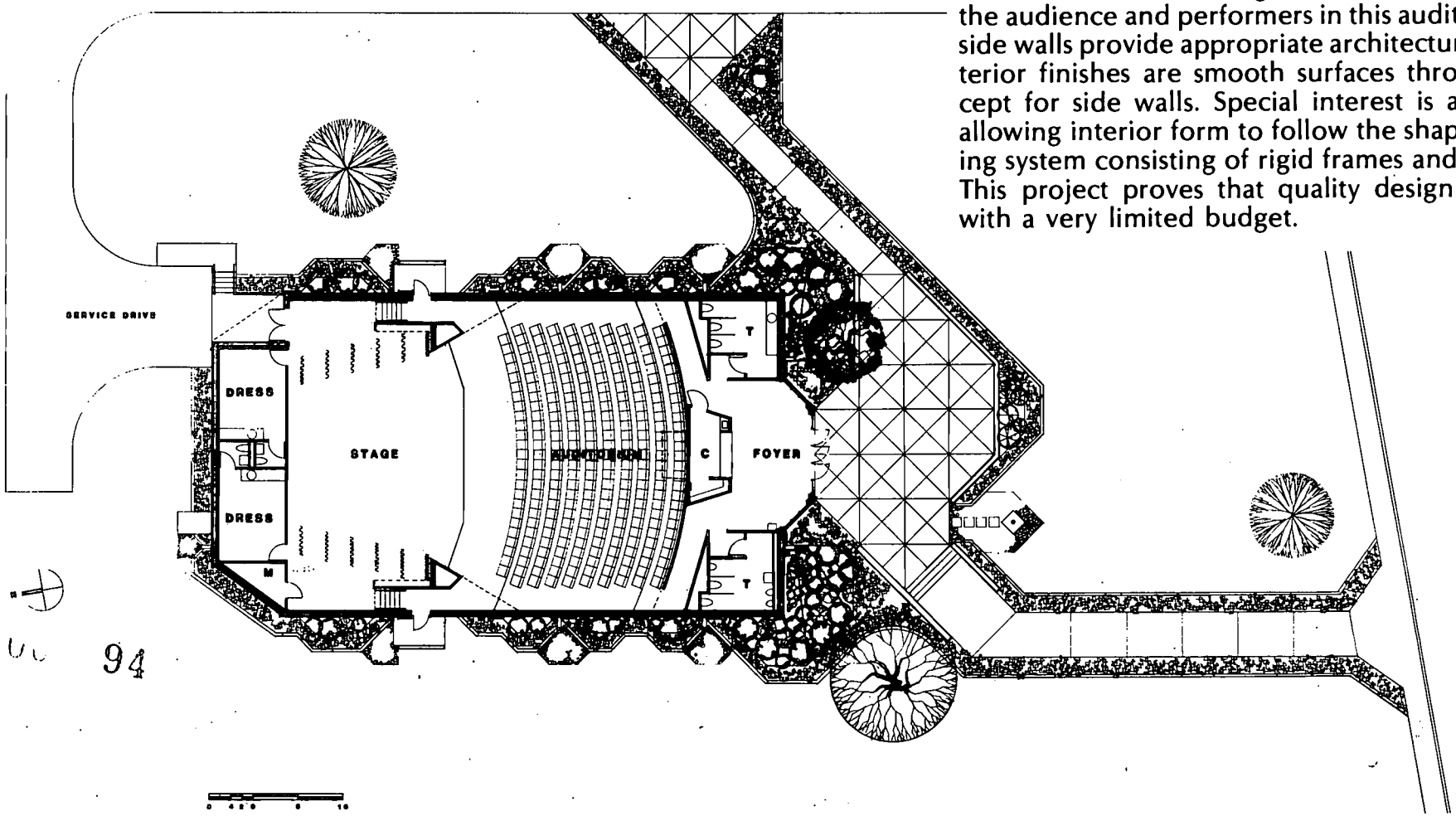
92

SECTION

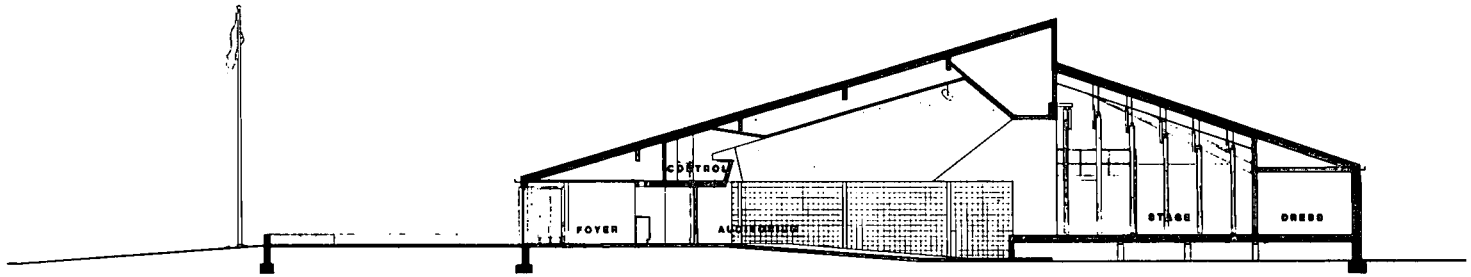
93

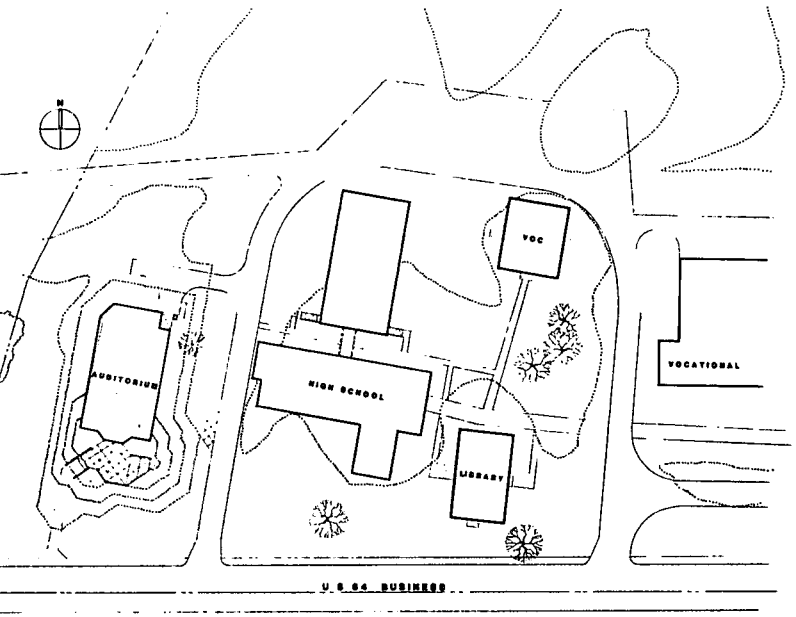
Administrative Unit ..... Tyrrell County
Superintendent ..... David E. Davis
Grade Organization 7-12
Approximate Capacity ..... 270 permanent seats/30 portable
Square Footage ..... 5,900 sq. ft.
Opening Date ..... October 5, 1980
Architects ..... Stephens & Cardelli
Structural Engineers ..... George K. Coffin & Associates
Mechanical and Electrical Engineers ..... Buffaloe, Morgan & Associates

Persistence was the key to the successful design and completion of Columbia High School Auditorium. Sometimes the combination of a low construction budget and high expectations requires a reduced seating capacity and a different seating configuration. Continental seating creates intimacy between the audience and performers in this auditorium. Low side walls provide appropriate architectural scale. Interior finishes are smooth surfaces throughout except for side walls. Special interest is achieved by allowing interior form to follow the shape of a roofing system consisting of rigid frames and steel joists. This project proves that quality design is possible with a very limited budget.

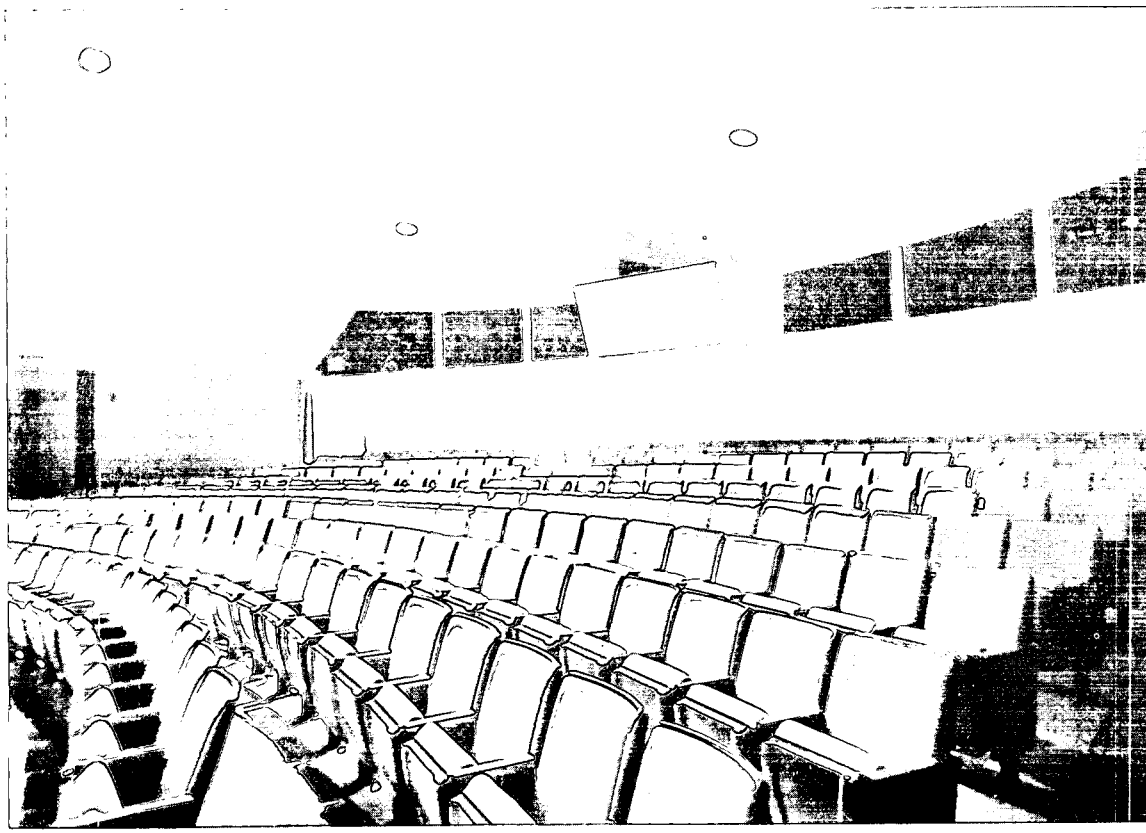


94

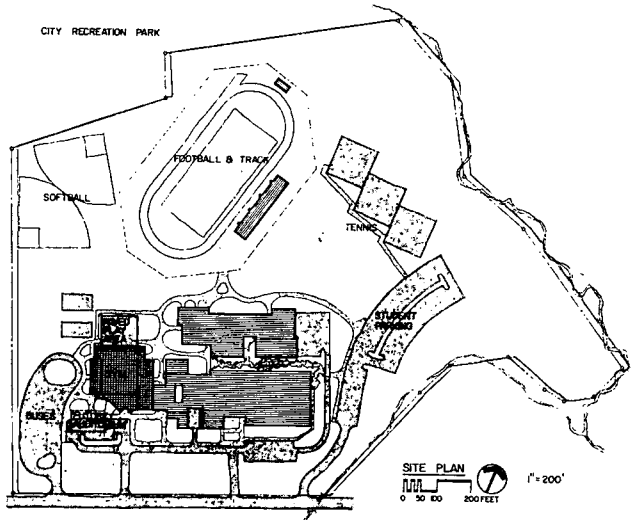

CONTROL
FOYER
AUDITORIUM
STAGE
DRESS

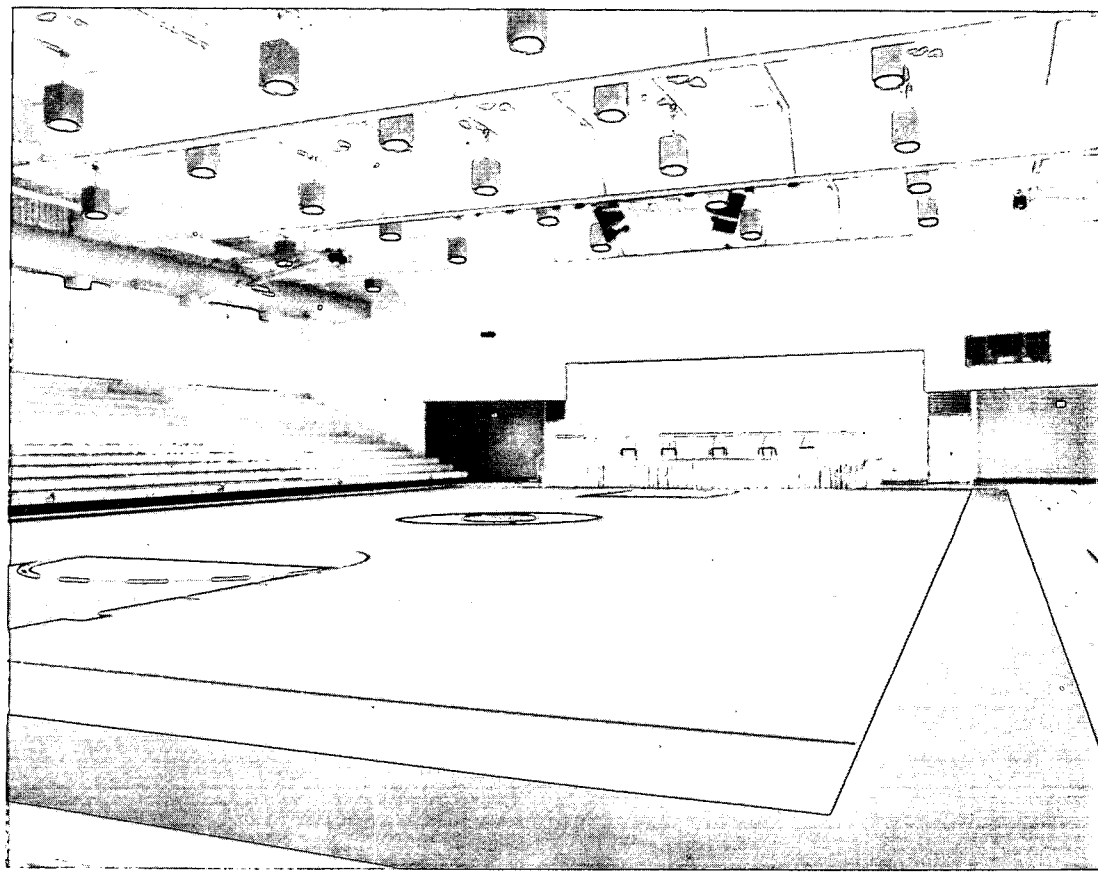

N
AUDITORIUM
HIGH SCHOOL
VOC
LIBRARY
VOCATIONAL
U.S. 64 BUSINESS

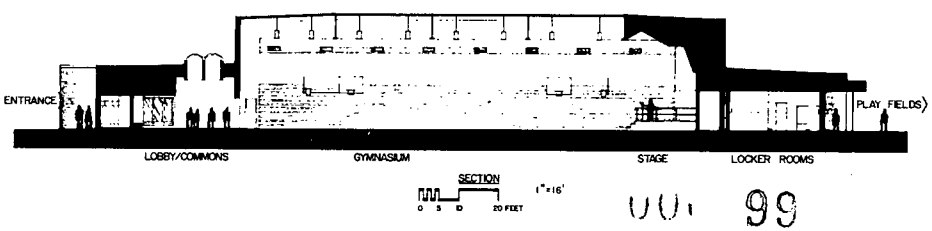
96

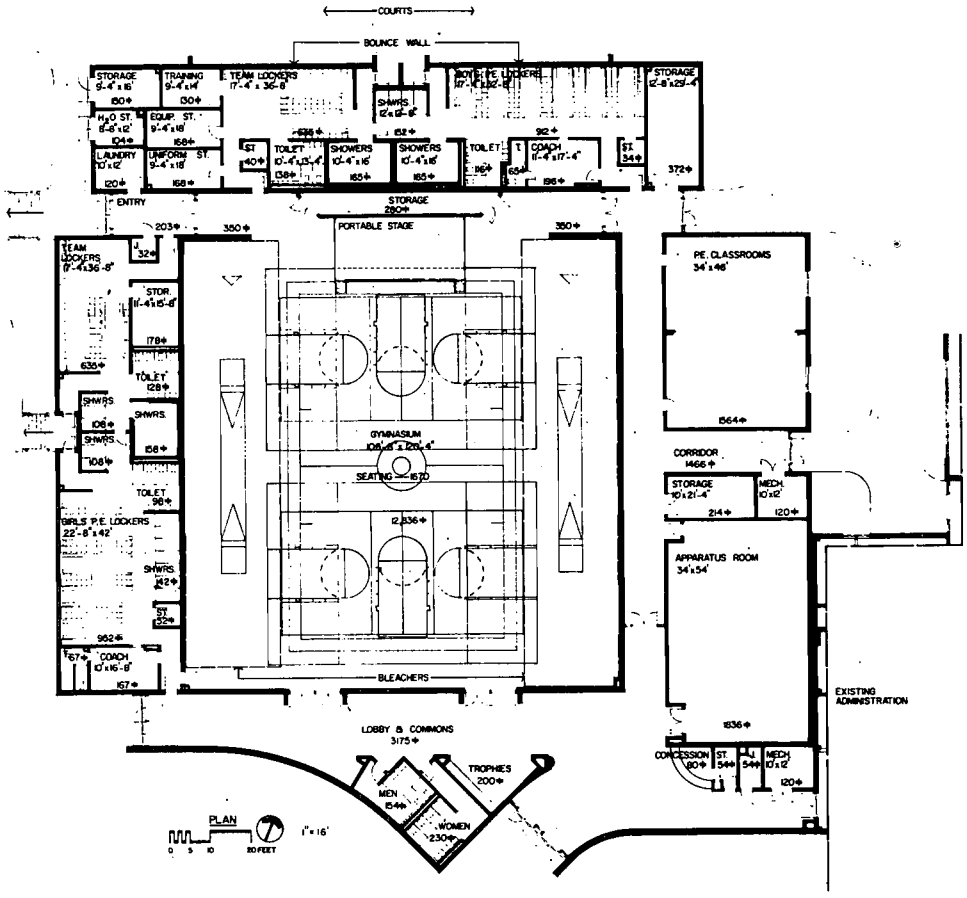


97


CITY RECREATION PARK
FOOTBALL & TRACK
SOFTBALL
TENNIS
STUDENT PARKING
SITE PLAN
0 50 100 200 FEET
1"=200'

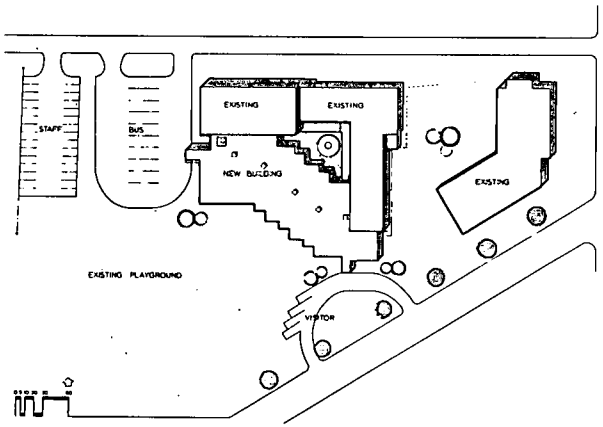


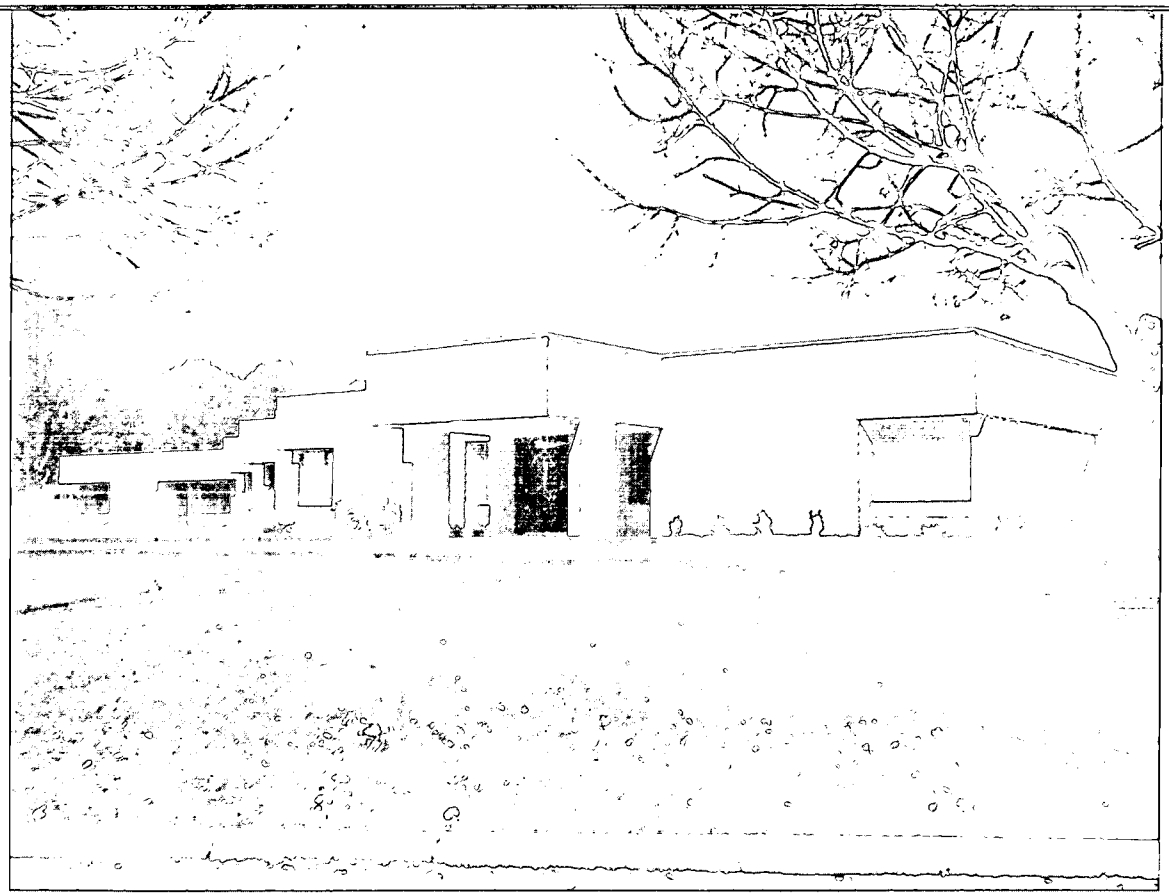

ENTRANCE
PLAY FIELDS
LOBBY/COMMONS
GYMNASIUM
STAGE
LOCKER ROOMS
SECTION
0 5 10 20 FEET
1"=16'

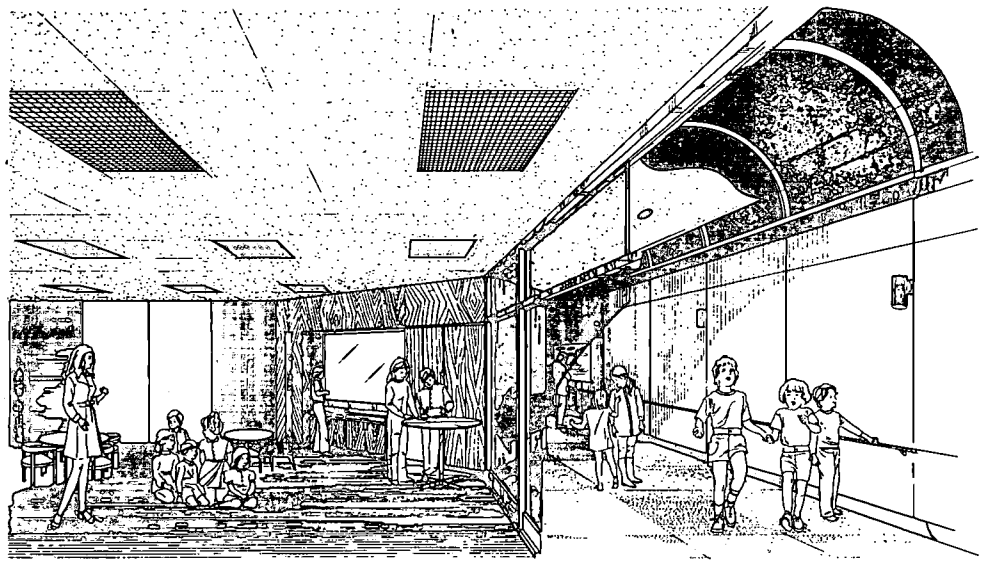


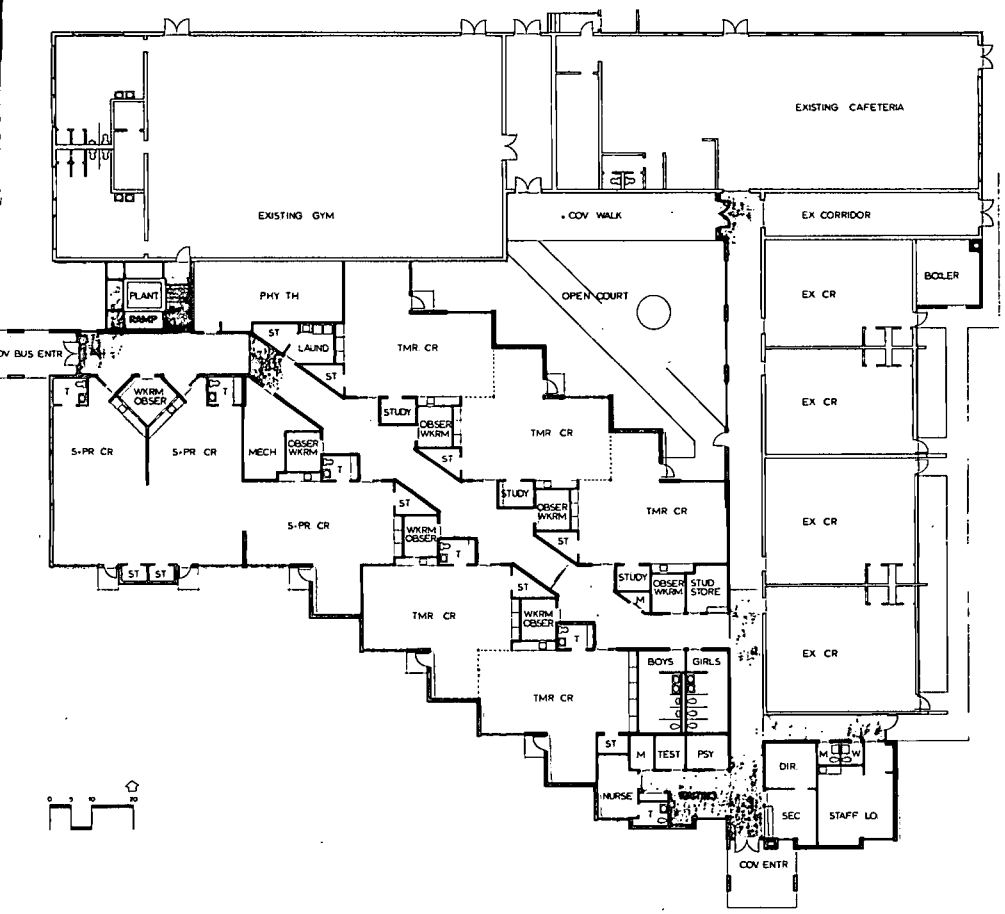
Administrative Unit	**Tarboro City**
Superintendent	**Philip L. Beaman**
Grade Organization	**9-12**
Approximate Capacity	**1,670 seats (950 pupils)**
Square Footage	**31,647 sq. ft.**
Opening Date	**July 18, 1979**
Architects	**Polier, Ballard, Associates**
Structural Engineers	**Bigger & Agnew, Inc.**
Mechanical and Electrical Engineers	**Buffaloe, Morgan & Associates, Inc.**

The photograph indicates that large spaces such as gymnasiums are enhanced by direct expression of a simple structural concept. In this large room, plate girders and steel beams result in an uncluttered interior. The major design problem of gymnasium sound attenuation is solved by means of an exposed sound absorbent roof deck and slotted concrete block side walls. High intensity discharge lighting contributes to the simple design. Seamless synthetic flooring makes maintenance easier. Well-organized dressing rooms and auxilliary facilities augment a carefully designed athletic arena.


EXISTING
EXISTING
STAFF
BUS
NEW BUILDING
EXISTING
EXISTING PLAYGROUND
VISITOR





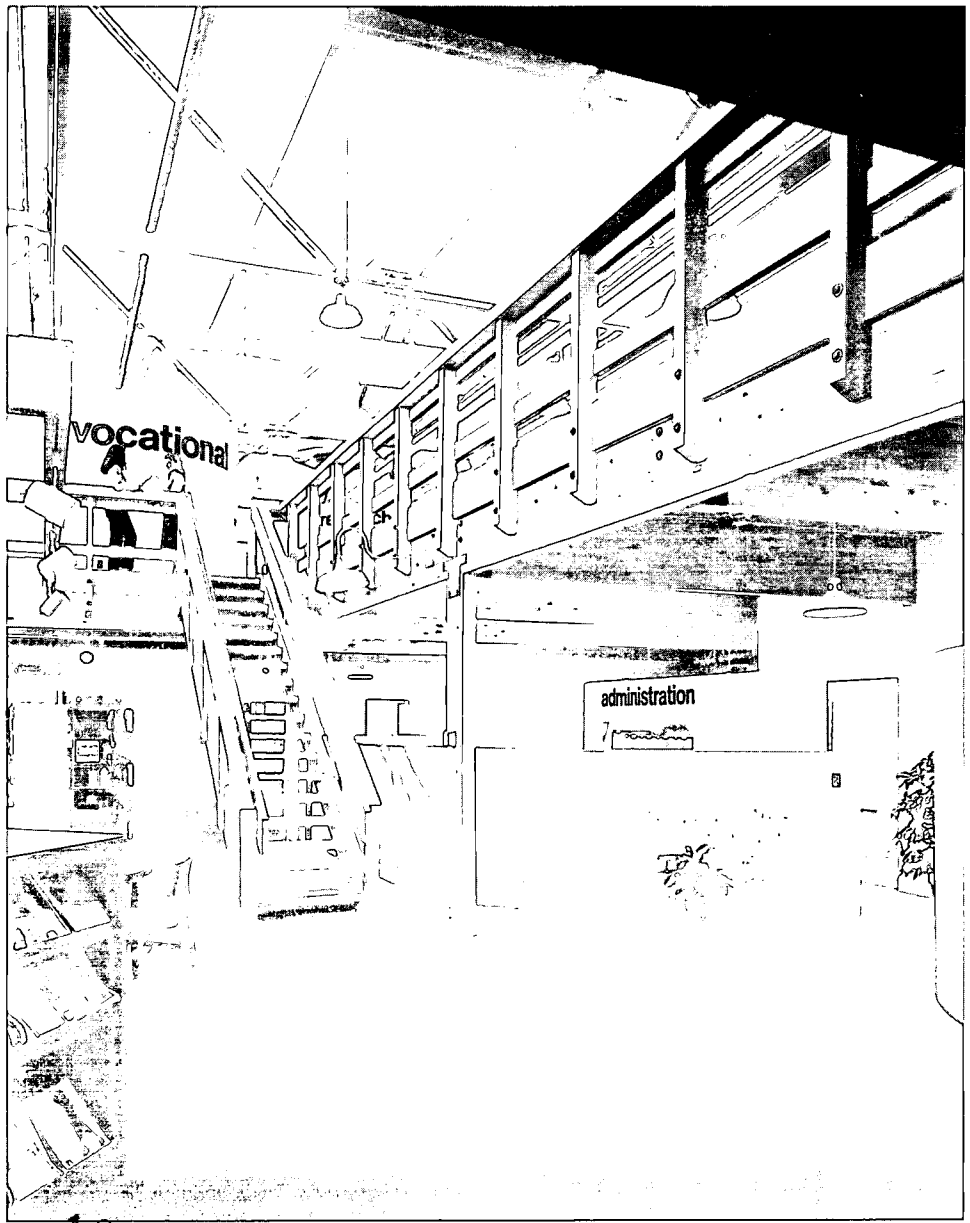


104

Administrative Unit ..... Newton-Conover City
Superintendent ..... N. S. Cranford
Grade Organization ..... Upgraded Special Education
Approximate Capacity 125
Square Footage ..... 15,000 sq. ft.
Opening Date ..... April, 1980
Architects ..... Wm. P. Reinhardt/Robert L. Smith
Structural Engineers ..... Wm. P. Reinhardt/Robert L. Smith
Mechanical and
Electrical Engineers ..... McDermott, Canaday, & Little

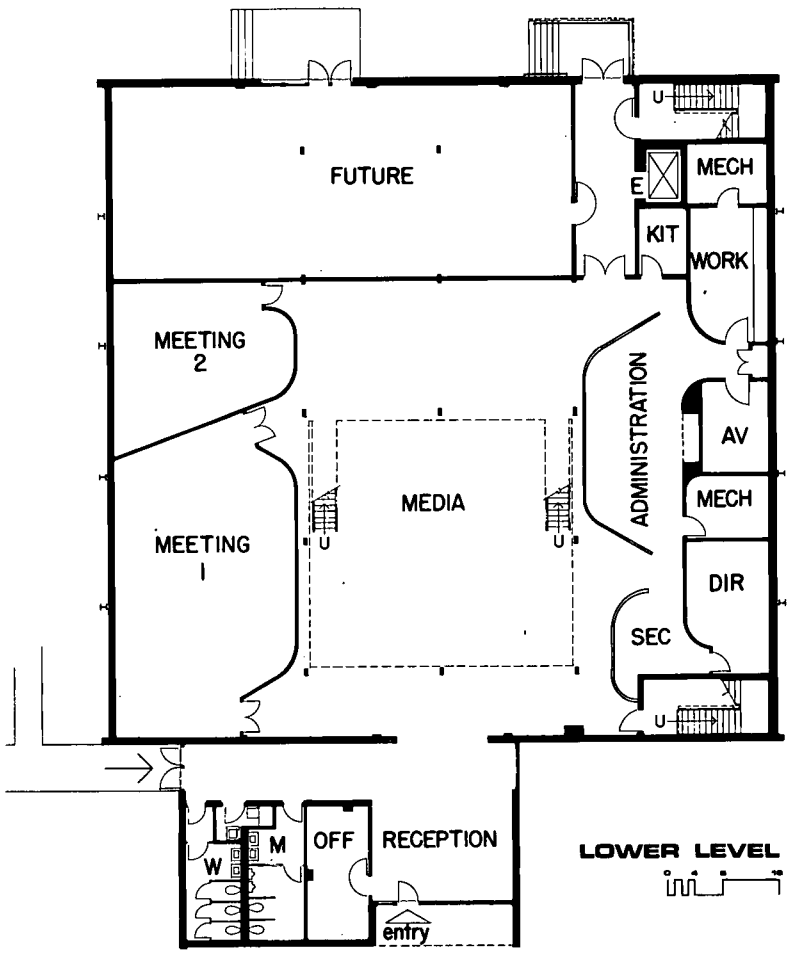
This is an ungraded special education center for Catawba County. The architect's research revealed the need for handrails in the corridor, lever-action door handles, radiused corners at masonry walls, and recessed cabinets and cabinet hardware in order to minimize injury. Classroom entrances are pocketed so that retarded children will be spatially cued. Classrooms are divided into learning activity areas. Teacher work rooms have one-way glass for parent and teacher observation of pupils. Color graphics are used throughout as part of the special identification system.

105

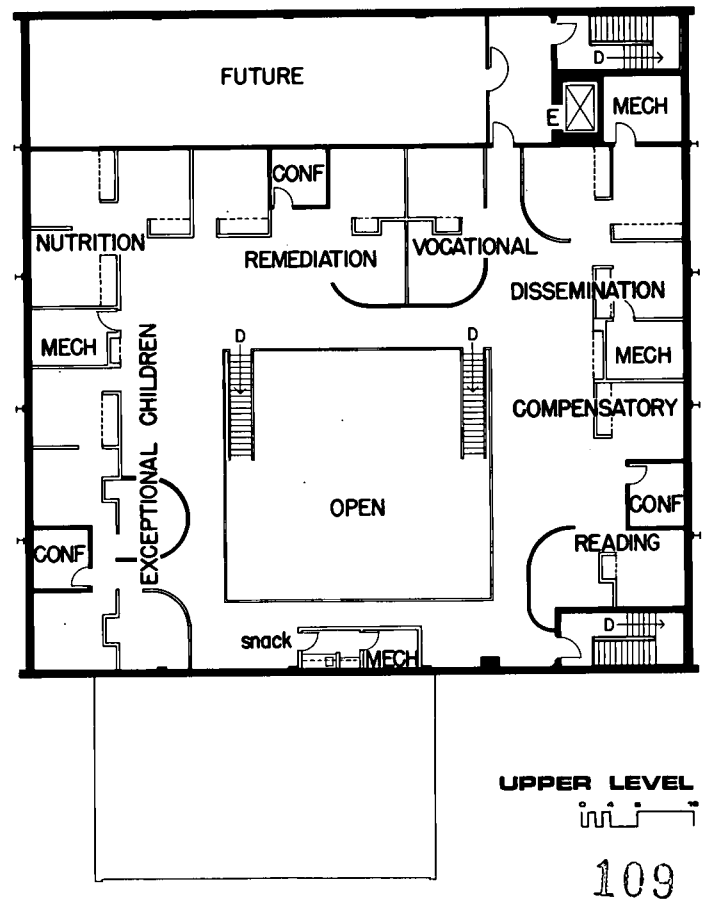


Administrative Unit ..... **Moore County**
Director ..... **Gladys Britt**
Square Footage ..... **15,500 sq. ft.**
Opening Date ..... **December, 1979**
Architects ..... **Austin Associates**
Structural Engineers ..... **W. H. Gardner, Jr. & Associates**
Mechanical Engineers ..... **McKnight-Smith Engineers, Inc.**
Electrical Engineers ..... **K. M. Armstrong Associates**

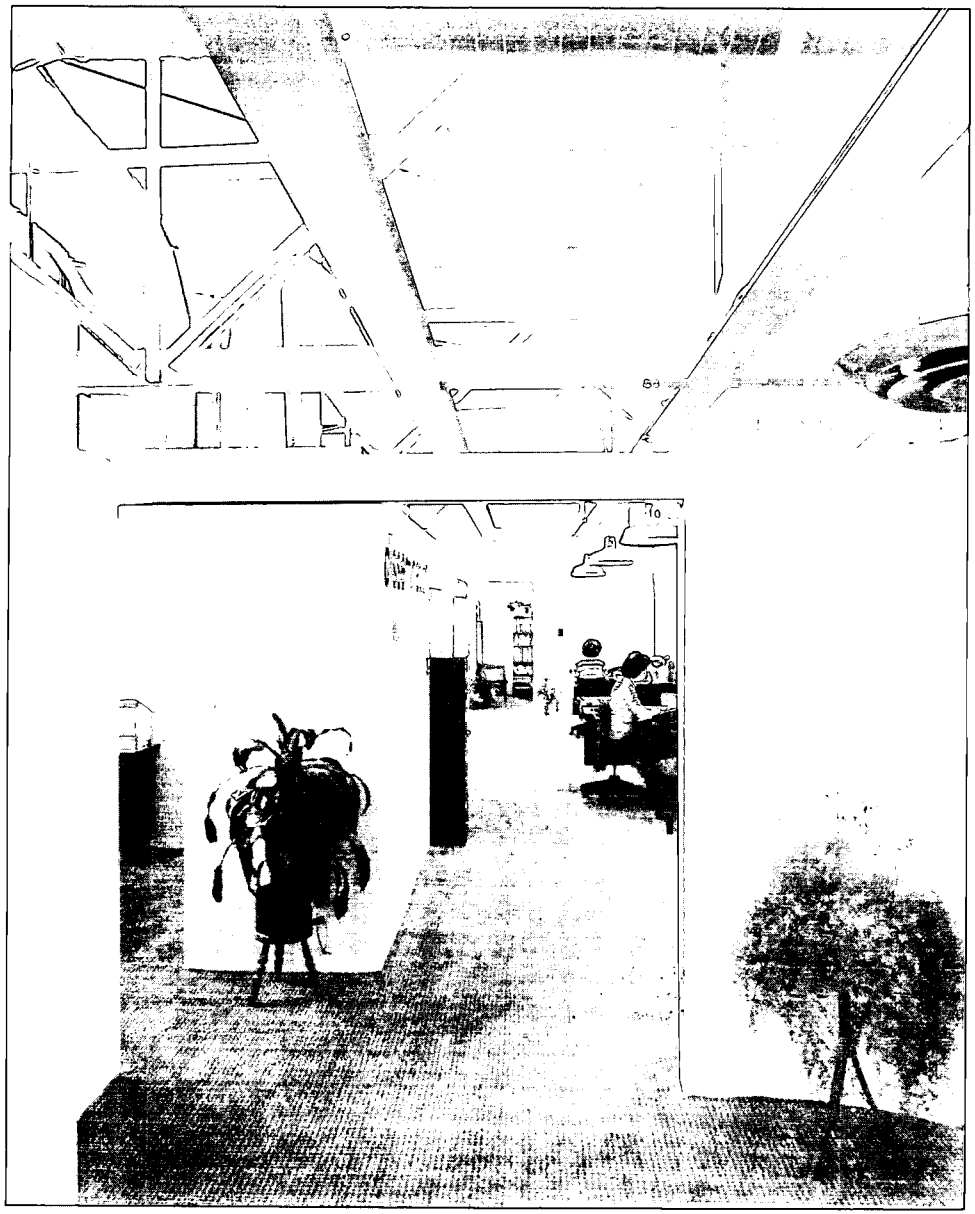
The South Central Regional Education Center is an unusually sophisticated approach to a design which required adapted use of an existing school facility. The former gymnasium, with its high volume and clear spans, is used as an envelope in which walls and floors are arranged without the structural restraint of supporting the roof. All elements of the building are honestly expressed. More school renovations and remodeling should reflect similar bold approaches to adaptive design. The Moore County School system was instrumental in providing support for this project.

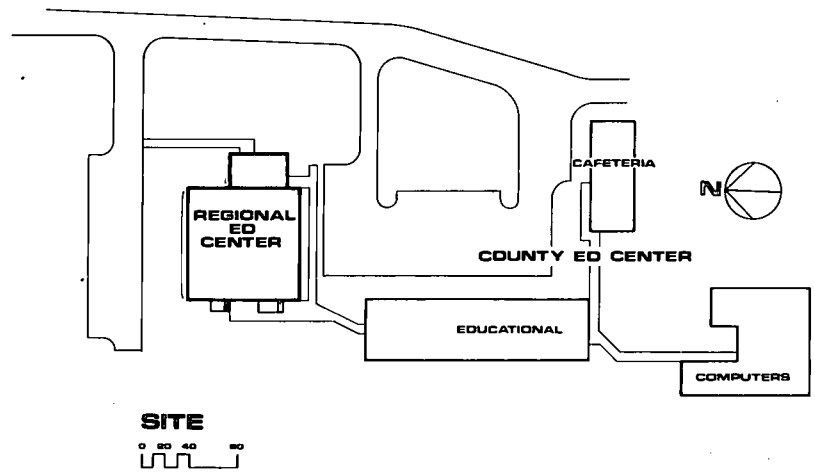

FUTURE
MECH
KIT
WORK
MEETING 2
MEETING 1
MEDIA
ADMINISTRATION
AV
MECH
DIR
SEC
M
OFF
RECEPTION
W
entry
LOWER LEVEL

108

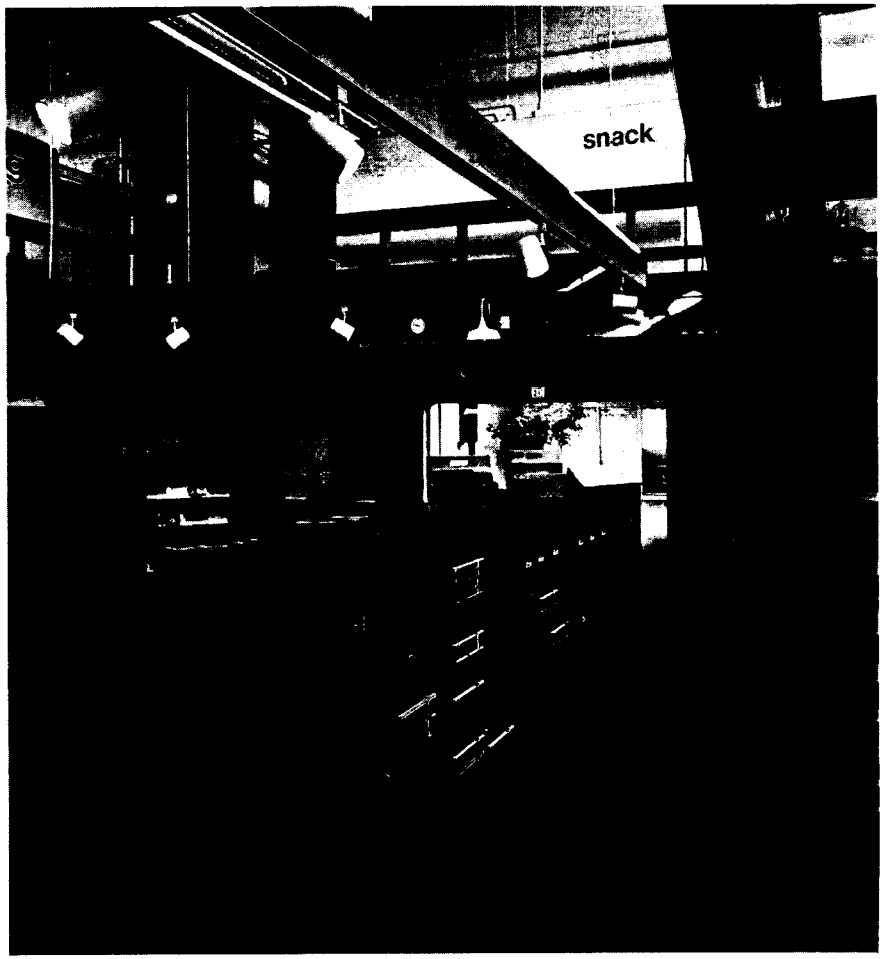

FUTURE
MECH
CONF
NUTRITION
REMEDIATION
VOCATIONAL
DISSEMINATION
MECH
MECH
COMPENSATORY
EXCEPTIONAL CHILDREN
OPEN
CONF
READING
CONF
snack
MECH
UPPER LEVEL

109

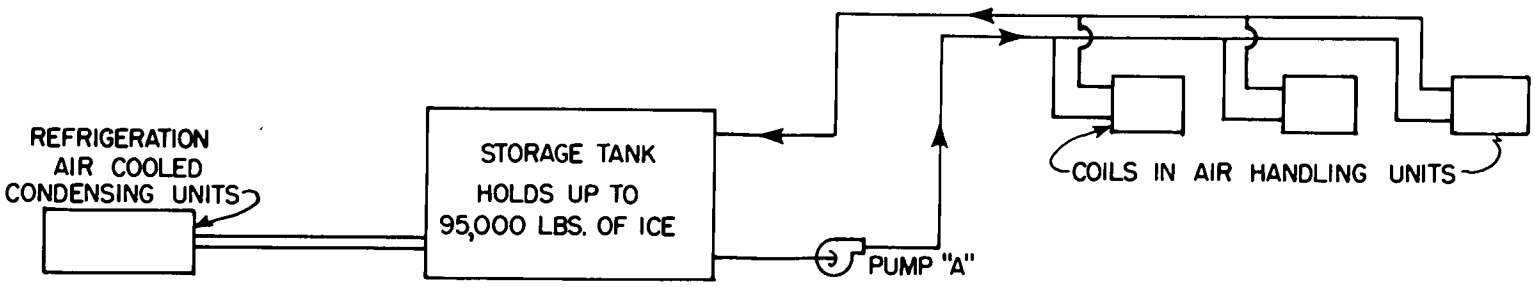



REGIONAL ED CENTER
CAFETERIA
N
COUNTY ED CENTER
EDUCATIONAL
COMPUTERS
SITE
0 20 40 80

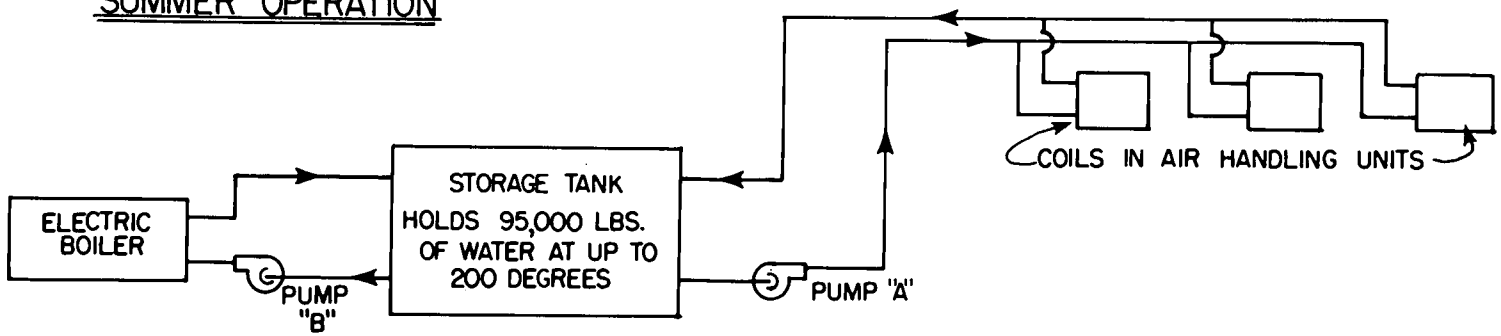
112



113



SUMMER OPERATION



WINTER OPERATION

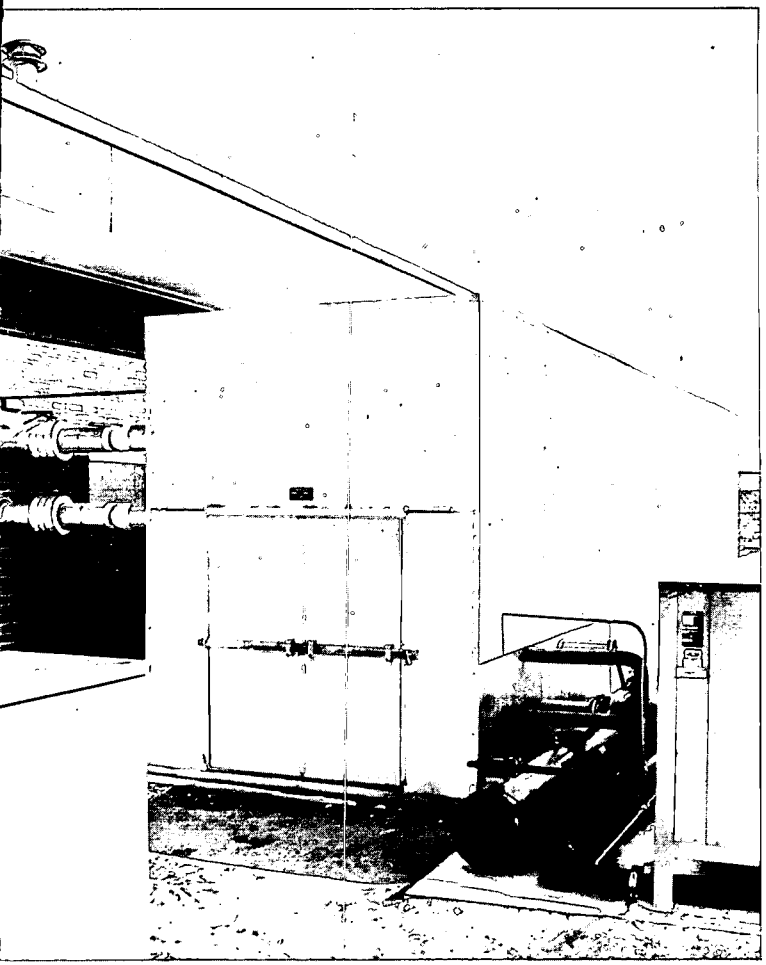
OTHER SCHOOLS THAT HAVE THERMAL STORAGE

Ashe County Career Center, Ashe County; Wilbur, Kendrick, Workman and Warren, Engineer and Architect

South Davie Junior High School, Davie County; Wilbur, Kendrick, Workman and Warren, Engineer and Architect

Nash Central Junior High School, Nash County; Fenner and Proffitt, Engineer; Dove-Knight Associates, Architect

North Nash Junior High School, Nash County; Proposed but not yet under contract; Fenner and Proffitt, Engineer; Dove-Knight Associates, Architect

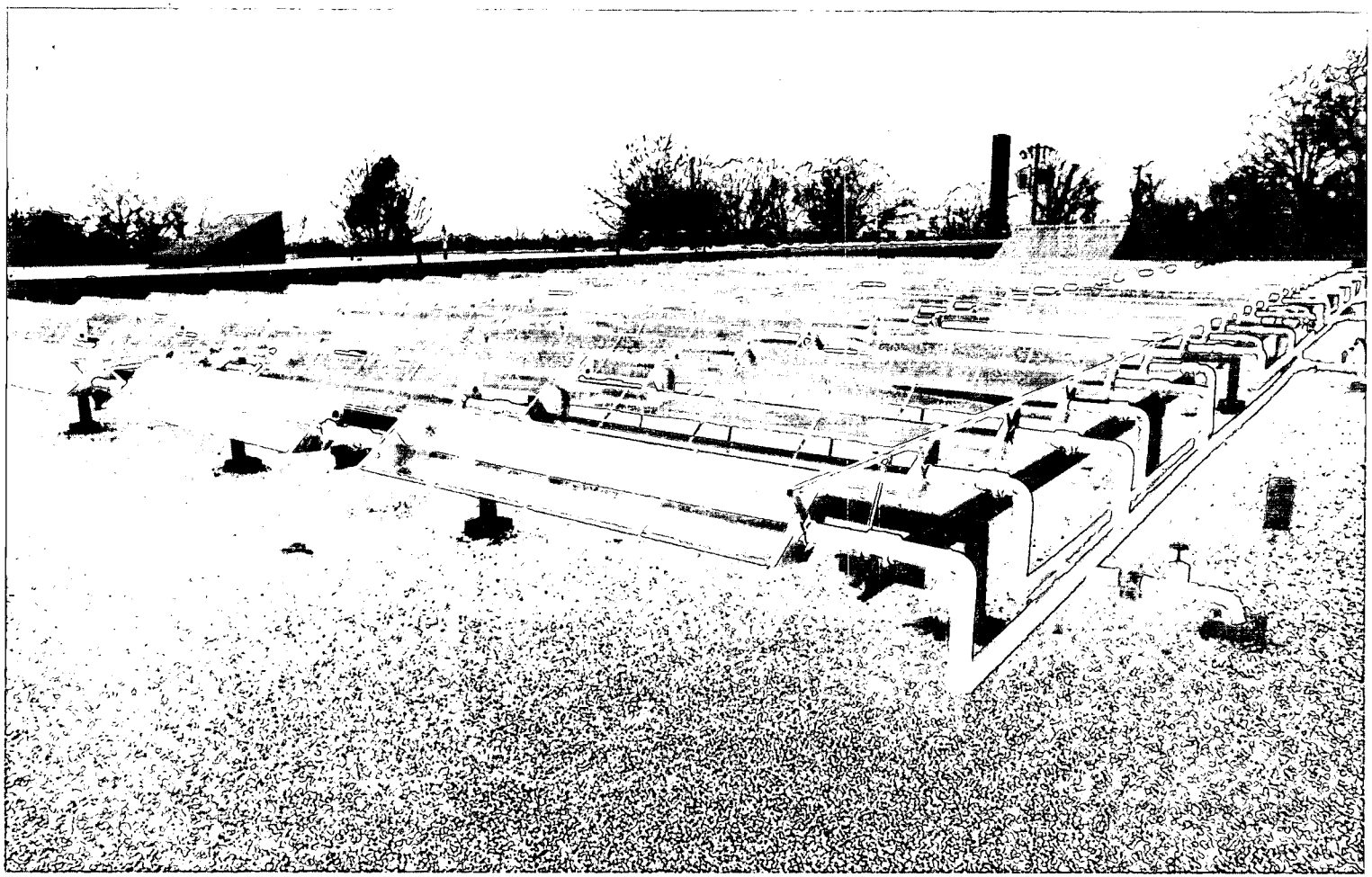


Engineer. . . . . Fenner & Proffitt, Inc.

Architect. . . . Ballard, McKim and Sawyer

Heating and cooling for this school is done by air handling units which are supplied either hot water, for heating, or chilled water, for cooling. The unique feature of this HVAC system is thermal storage. The outdoor storage tank is a manufactured unit that can hold 95,000 pounds of water at 200 degrees or 95,000 pounds of ice. Thermal storage was chosen for the system for the purpose of substantially reducing the demand cost factor in electrical billing. Both heating and cooling (ice making) are done with electrical energy. The thermal storage feature allows equipment and machinery to be operated at off-peak times when other electrical loads are off (unoccupied school hours). For each kilowatt hour of demand reduced, savings are more than $5.00. A 50 kilowatt hour demand reduction saves more than $250.00 on a monthly billing. Since the highest demand rate factor applies for each month of a given 12-month billing period, this storage system has the potential of contributing greatly to the reduction of electrical billing cost.

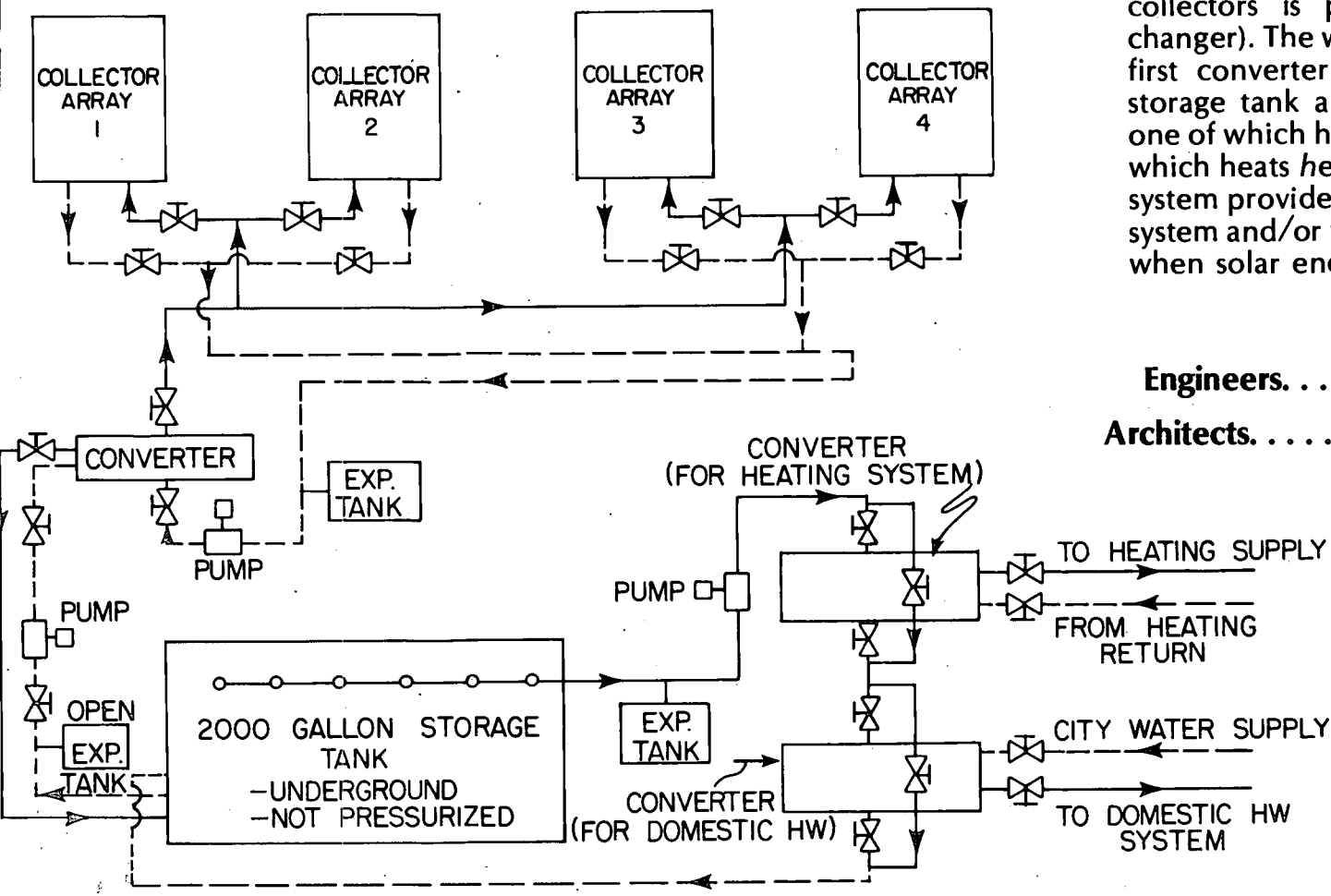
It is interesting to observe that the engineer chose to store ice rather than just chilled water. The reason is that the heat of fusion for ice (changing water to ice) is considerable, and thereby the "cold" stored in the tank is increased in great measure.



OTHERS SCHOOLS THAT HAVE ACTIVE SOLAR SYSTEMS

North Drive Elementary School, Goldsboro; Fenner and Proffitt, Engineer; Griffin-Flynn, Architect

Southwestern Technical Institute, Jackson County; Reece, Noland and McElrath, Engineer; Foy and Lee, Architect

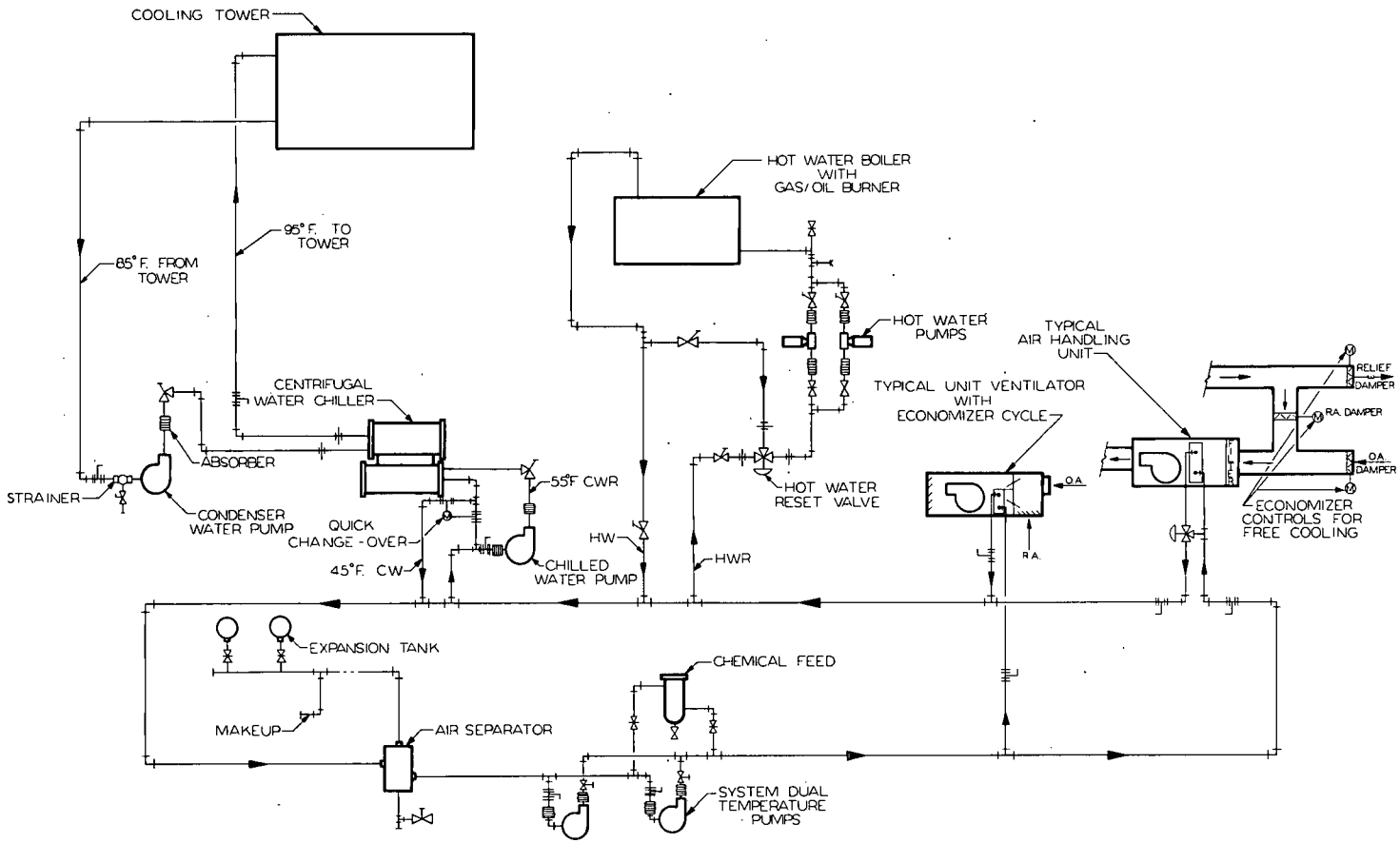


SOLAR HEATING SYSTEM

This solar heating system consists of 120 roof-mounted collectors set in four arrays. These concentrating collectors are the focusing type that effect maximum heat pick-up. Heated water from the collectors is pumped to a converter (heat exchanger). The water heated by collector water in this first converter is then pumped to a 2,000-gallon storage tank and on to two additional converters, one of which heats *domestic hot water* and the other which heats *heating system water*. The solar heating system provides assistance to the domestic hot water system and/or the building hot water heating system when solar energy is available.

Engineers. . . . . McMichael, McCracken

Architects. . . . . Hayes, Howell & Associates



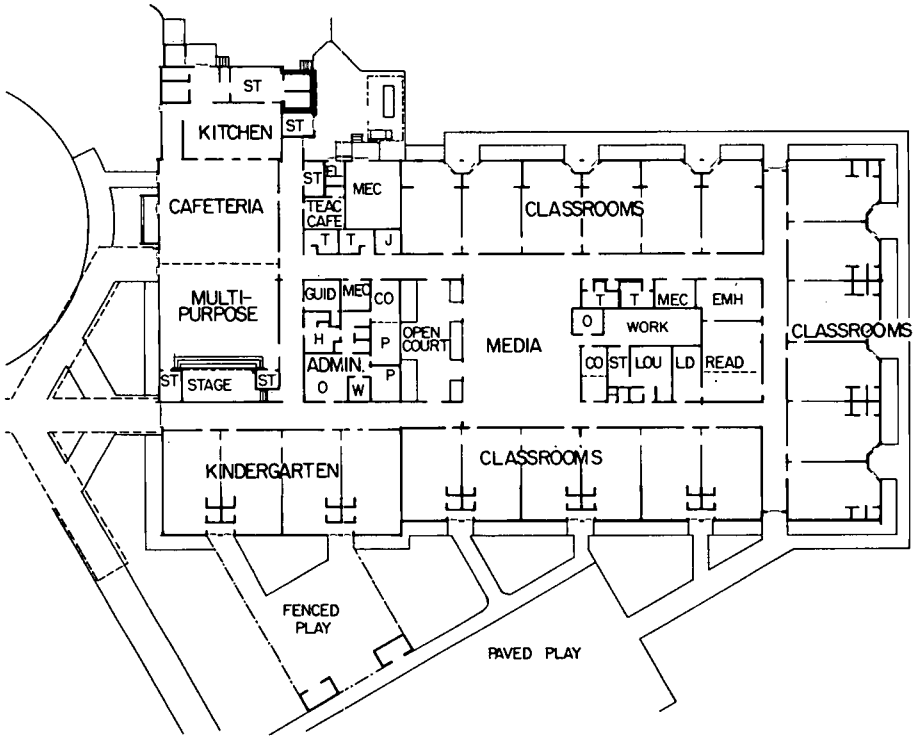
SYSTEM FLOW DIAGRAM

122

Engineers . . . . . Mechanical Engineers, Inc.

Architect. . . . . J. L. Beam

123



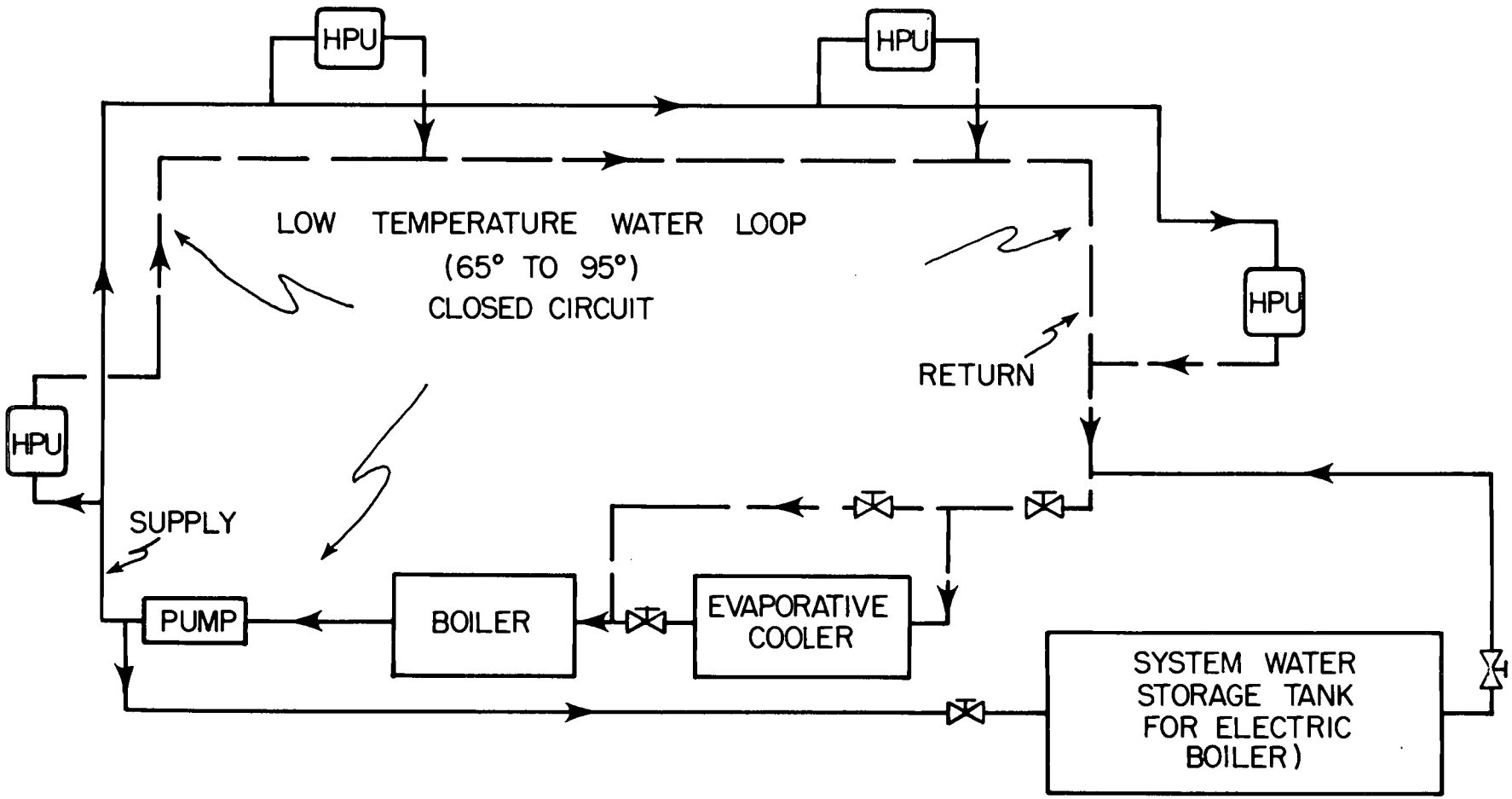
HOT WATER/CHILLED WATER SYSTEM

Input by the school's staff resulting in a clear understanding of the project requirements along with a coordinated evaluation of the life cycle cost factors provided a very efficient, high quality mechanical system.

The two-pipe, chilled water/hot water system, incorporating a centrifugal water chiller and combination gas/oil fired boiler to serve classroom unit ventilators, provides a mechanical system that ranks extremely low in total energy use.

A separate direct expansion, multizone system with hot water heating and "economizer cycle" serves the office areas.

The system is adaptable to future active solar energy supplement due to the relatively low hot water design temperature.


HPU
HPU
LOW TEMPERATURE WATER LOOP
(65° TO 95°)
CLOSED CIRCUIT
HPU
RETURN
HPU
SUPPLY
PUMP
BOILER
EVAPORATIVE COOLER
SYSTEM WATER STORAGE TANK FOR ELECTRIC BOILER)

TYPICAL HYDRONIC HEAT PUMP SYSTEM

Each heat pump unit (HPU) takes the delivered system water and either heats or cools with it at any given time.

Water in the pipe loop travels through both the boiler and the cooler constantly, but one of these is on and one is off all the time (or both may be off). The boiler adds heat to the water or the cooler takes it away to maintain the loop water temperature. The cooler can be bypassed for draining to prevent freezing. The tank can store water (and heat), from the electric boiler, to help control the demand rate factor or to use a time-of-day electric rate.

This type of system conserves energy by transferring heat from one part of a building to another, that is, from a warmer area to a colder area. Also, the system can easily utilize solar heating if desired by the addition of appropriate equipment.

PARTIAL LIST OF SCHOOLS THAT HAVE HYDRONIC HEAT PUMP SYSTEMS

Harnett Central High School and Western Harnett High School, Harnett County; Steuer and Cheatham, Engineer; Leslie N. Boney, Architect

Westover Senior High School, Cumberland County; Fenner and Proffitt, Engineer; Mason Hicks, Architect

Clemmons Elementary School and Old Richmond Elementary School, Winston-Salem/Forsyth County; Consultant Engineering Service, Engineer; Fred W. Butner and Associates, Architect

Sedge Garden Elementary School and South Fork Elementary School, Winston-Salem/Forsyth County; Consultant Engineering Service, Engineer; Newman, Calloway, Johnson, VanEtten and Winfree, Architect

North Lenoir High School and South Lenoir High School, Lenoir County; Steuer and Cheatham, Engineer; Leslie N. Boney, Architect

Kinston High School, Kinston; Steuer and Cheatham, Engineer; Leslie N. Boney, Architect

Carrboro Elementary School, Estes Hills Elementary and Glenwood Elementary, Chapel Hill-Carrboro; Douglas Y. Perry and Associates, Engineer

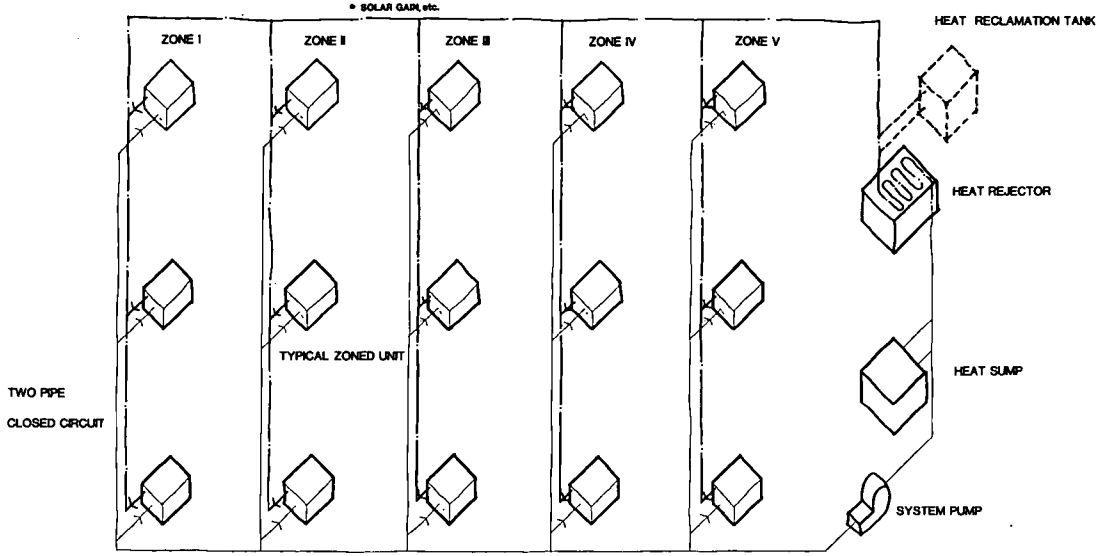
Laney High School, New Hanover County; Steuer and Cheatham, Engineer; Leslie N. Boney, Architect

Reidsville Junior High School, Reidsville; Douglas Y. Perry and Associates, Engineer, Haskins and Rice, Architect

East Wake County High School, Wake County; Douglas Y. Perry and Associates, Engineer; Haskins and Rice, Architect

'HEAT RECOVERY SYSTEM

1. RECLAIMS HEAT FROM:
   - INHABITANTS
   - BUILDING MASS
   - LIGHTS & EQUIPMENT
   - SOLAR GAIN, etc.



2. REDISTRIBUTES EXCESS HEAT FROM ONE ZONE TO ANOTHER ZONE UNIT REQUIRING HEAT.

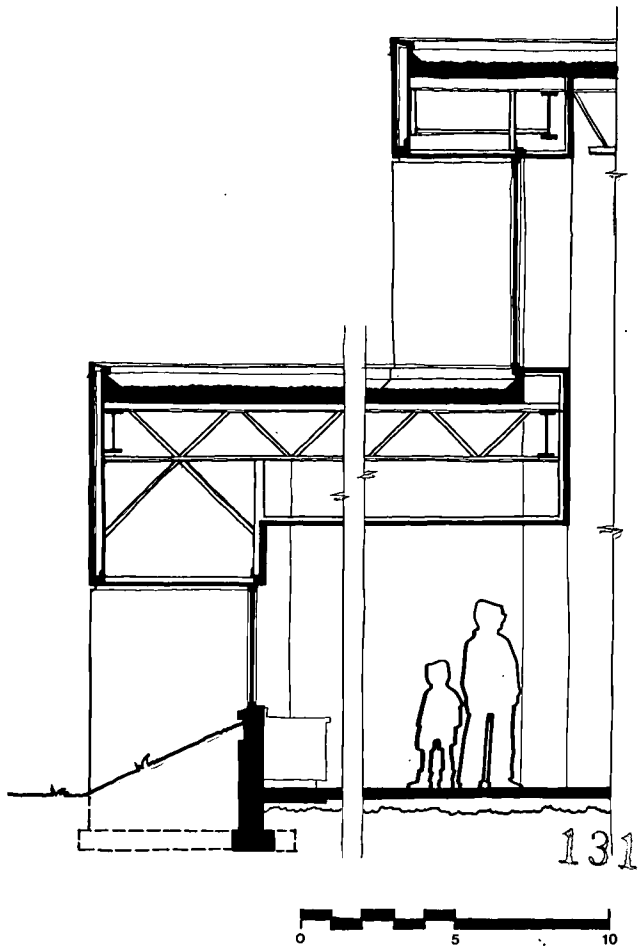
3. DOES NOT REQUIRE HEAT FROM HEAT SUMP UNTIL EXTERIOR TEMPERATURE IS BELOW APPROXIMATELY 45 DEGREES F.

SUPPLEMENTARY HEAT SUMP USING OFF PEAK ELECTRICITY AT LOW ELECTRIC DEMAND RATES TO STORE HEAT.

THIS DIAGRAM IS NOT REPRESENTING THE TOTAL NUMBER OF ZONES NOR THE NUMBER OF UNITS IN EACH ZONE

Architects and Engineers . . . . . Six Associates, Inc.

Mechanical Engineer. . . . . James M. Lorick, P. E.



School boards expect quality design. Generally boards and administrators are proud of an extraordinary design effort. They recognize the value of an artistically conceived building environment. Although it is impossible to prove and difficult to measure, a well-designed school environment contributes a great deal to the positive attitude of children and teachers. Over-designed and thoughtlessly-designed schools can interfere with good educational programs. The job of designers is to create an extraordinary ambience, one in which children and teachers feel comfortable and in which they feel like "somebody." That is their most important task.

Of course, housing the children, staff, and program is the practical purpose of building school facilities. But that is seldom all that is expected of designers, especially for new schools. Attending to the spirit of design is essential because schools are the only other place where young citizens are confined by law. Most adults can modify or escape a mediocre environment at will. School children do not have that option.

More than ever, quality design is needed in this era of public school development. Designers and school people should follow their best impulses. A better time will never come. There will never be funds without limitation for education and schools or a right time for the dream project. Each new school design project is a unique opportunity to transcend the ordinary.

June, 1981

Charles Reed, Jr.

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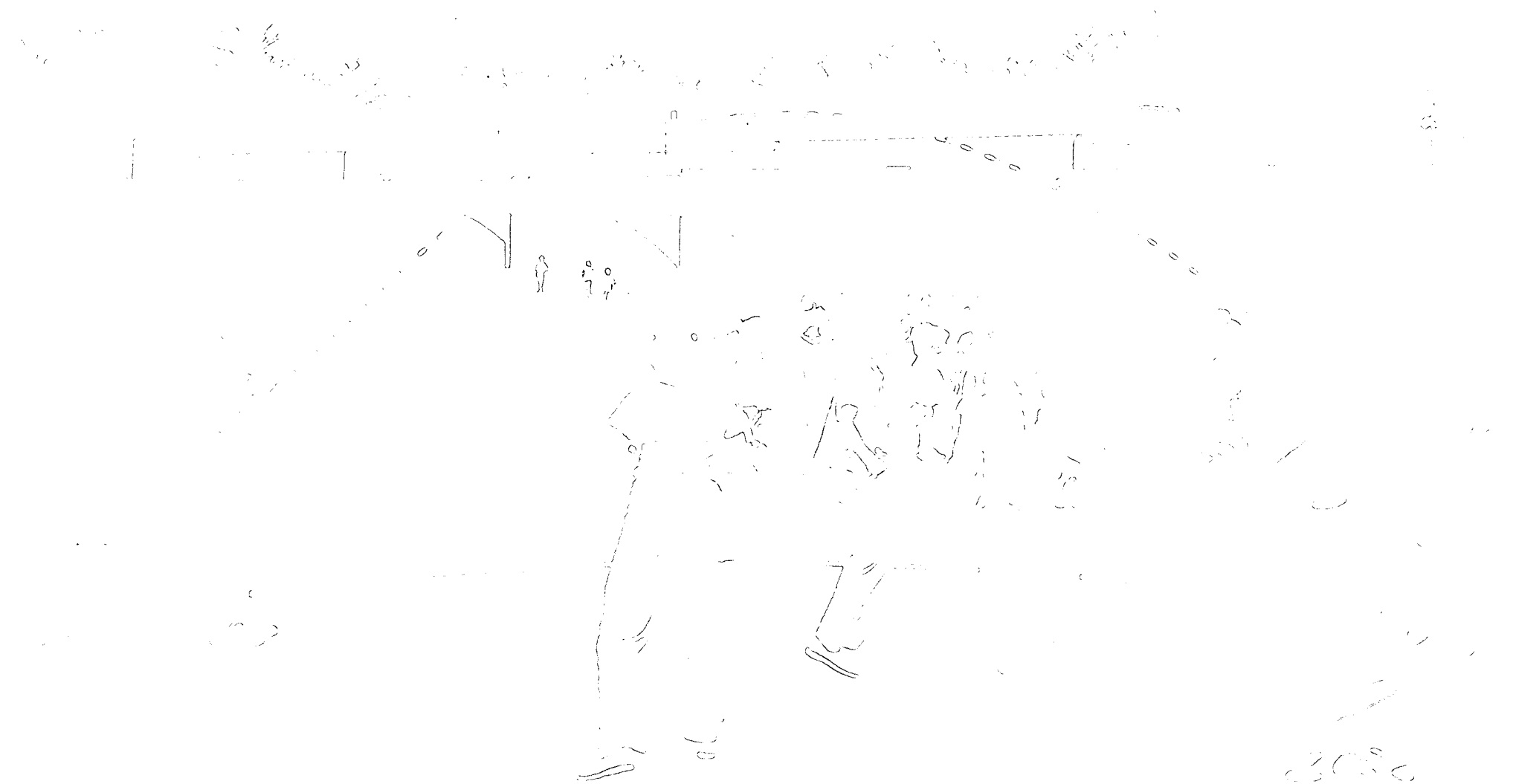

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