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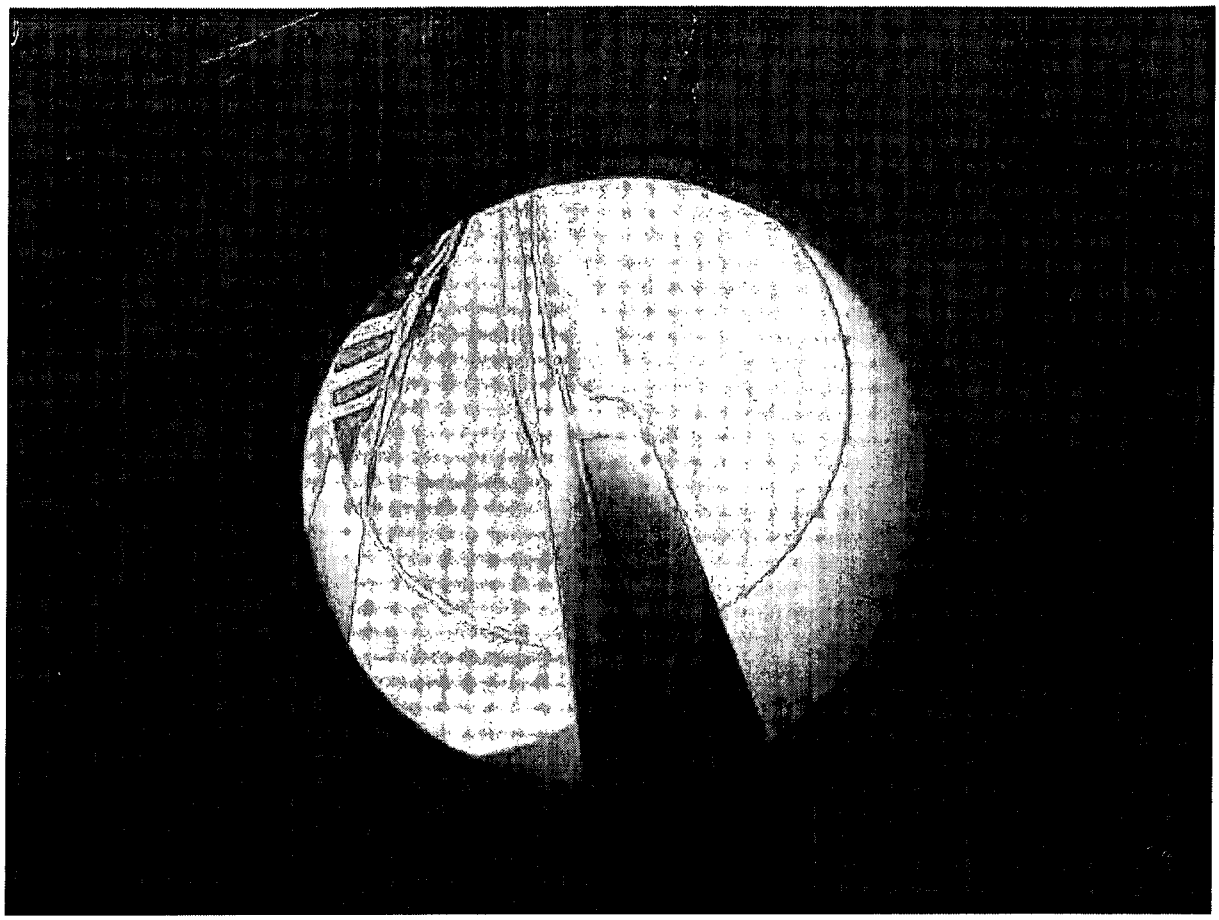
ABSTRACT

This report describes new and innovative approaches to school facilities as they relate to their communities by exploring the trends towards smaller schools, presenting the pros and cons of smaller schools, and examining the solutions and strategies in smart growth planning. The report addresses the following questions: if school leaders, communities and other groups elect to pursue a goal of building smaller schools, what factors should be considered? if small schools are usually more expensive to construct and operate, how can we improve the economics of constructing and operating them? and how and who should be involved in planning them? Concluding sections contain links and references where stakeholders can obtain in-depth material on these subjects. (Contains 60 references.) (GR)



Small Schools
Walkable Schools
Urban Schools

Making Current Trends in School Design Feasible

Smart Growth
Joint Use
Sustainability
Other Design Issues

Published November 2000

Public Schools of North Carolina
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Division of School Support School Planning
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FOREWORD

The design of educational facilities has a profound impact upon how students learn and on how well they serve the communities in which they are located. Facilities that strengthen these relationships are often the most successful. Each district, in concert with the needs of its residents, must make many important decisions regarding how, when and where to build and operate its schools.

The implementation of many new ideas on the growth of communities and its public facilities is currently taking place. These ideas present exciting times and opportunities. Public school facilities must play an important role in the overall life and growth of communities across North Carolina.

This publication describes new and innovative approaches to school facilities, as they relate to their communities. The State Board of Education and the Department of Public Instruction do not necessarily recommend that these approaches should be undertaken. Each local administrative unit should decide what is best for the citizens it serves, as well as the size, location and unique characteristics of the facilities it constructs and operates. This publication is intended as a resource to assist school and design professionals in planning facilities to meet some of these evolving trends. We hope you find it useful.

Phillip J. Kirk, Jr., Chairman
State Board of Education

Michael E. Ward, State Superintendent
N.C. Department of Public Instruction

INTRODUCTION

Why are so many people talking about returning to smaller schools? During the 1960's, we experienced a movement toward consolidation of small schools in an effort to improve construction and operating economies, reduce administrative staff, and offer more comprehensive educational programs. Those reasons for larger, comprehensive schools still exist today; however, now that we have made this transition, some disadvantages of larger schools have become apparent and the potential advantages of the smaller schools are now being revisited.

Specifically, two major trends are receiving national attention:

- There is a widespread belief that small schools may improve student academic performance and enhance school safety, climate and order. "The small schools literature began with the large-scale quantitative studies of the late 1980s and early 1990s that firmly established small schools as more productive and effective than large ones. These studies, involving large numbers of students, schools, and districts, confirmed that students learn more and better in small schools..."[1]

- There is a strong movement and advocacy towards several community planning philosophies called "Smart Growth," "New Urbanism," "Walkable Communities," and other variations. These philosophies promote the use of smaller, community-based and community-shared school facilities. Grassroots activism has begun to influence civic leaders, government entities and other influential bodies in this belief. Such organizations as "The Smart Growth Network," "New Schools/Better Neighborhoods," "Congress for New Urbanism," and others are actively pursuing this philosophy and disseminating information.

We anticipate that these trends will have a significant impact upon the development and use of school facilities in North Carolina and elsewhere. This raises several major questions:

- If school leaders, communities and other groups elect to pursue a goal of building smaller schools, what factors should be considered?
- If small schools are usually more expensive to construct and operate, how can we improve the economics of constructing and operating them?
- How and who should be involved in planning them.

This document has been prepared in an effort to answer these questions, provide suggestions and strategies toward making small schools more economically feasible, and provide links and references where the concerned official can obtain in-depth material on these subjects.

1 Raywid, Mary Anne "Current Literature on Small School" ERIC Digest EDO-RC-98-8 (January 1999)

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UNDERSTANDING THE TRENDS

How Big is Small?

How large is a small school? How small is a large school? Much of the research which focuses on student achievement is somewhat conflicting; however, the preponderance of this literature recommends student populations of no less than 300 and no more than 900[2]. For purposes of this publication, we will define a small school as that indicated by research for effective enhancement of school climate and order which is within the boundaries recommended for enhanced student achievement. On average, this research (Williams, 1990; Howley, 1996) indicates effective [small] school sizes to be:

Elementary: 300-400 students
Middle: 300-600 students
High: 400-800 students

For further reading on the subject of school size as related to climate and order, refer to the School Planning Publication: "Safe Schools Facility Planner." Other related information and research references are included in the appendix.

What is a Walkable School or Walkable Community?

Walkable communities are those in which citizens homes and work, children's school, and customary grocery, drug and other stores or services are all within a walkable distance of about a mile. Historically, many older communities developed this way, primarily because the use and ownership of automobiles was limited. Today, many communities are rediscovering the advantages of being walkable and are promoting such development. In addition, numerous new communities are being planned and constructed with many of these elements.

Walkable schools in themselves, whether part of a total walkable community or not, are perceived as a highly desirable feature. Campaign speeches, real estate sales advertisements, and residents of communities are frequently espousing the desirability of "neighborhood" or "walkable" schools.

Due to walking distance limits and the usual housing density found in most of North Carolina's communities, "walkable" schools are, by their walking distance population, smaller schools. Large schools that can be walkable require an extremely high density of residents with children. This occurrence is typically only found in very densely populated areas of the nation's largest cities.

Diversity must also be considered with regard to walkable schools. In most communities and neighborhoods, housing is mostly homogenous; very little diversity can be found with regard to socio-economic status, race or ethnic origin. This same lack of diversity will be reflected in walkable schools that are established to serve those neighborhoods.

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2 Raywid, Mary Anne "Current Literature on Small School" ERIC Digest EDO-RC-98-8 (January 1999)

What is "Smart Growth?"

Smart Growth Principles, Neighborhood and Walkable Schools

"Smart Growth Network[3]
Principles of Smart Growth

- Mix land uses.
- Take advantage of compact building designs.
- Create housing opportunities and choices.
- Create walkable communities.
- Foster distinctive, attractive communities with a strong sense of place.
- Preserve open space, farmland, natural beauty, and critical environmental areas.
- Strengthen and direct development toward existing communities.
- Provide a variety of transportation choices.
- Make development decisions predictable, fair, and cost-effective.
- Encourage community and stakeholder collaboration in development decisions."

As Hugh L. McColl, Jr., Chairman and CEO of BankAmerica said in his speech March 30, 1999 at the International Council of Shopping Centers:

"Smart Growth is about protecting our environment. Yes, this does mean protecting the environmental quality and biological diversity of our farmlands, wetlands and open spaces. And sometimes that may mean restricting land use. But it also means finding economically sound ways to reuse brownfields. And it means continuing to pursue design innovations that make all our developments easier on the environment.

Smart Growth is about using our resources wisely. It means encouraging densely developed corridors that will make public transit viable — not to force people out of their cars, but to give people who prefer public transit a choice. ...

Smart Growth also is about working together to rebuild our inner cities, where land has already been developed and infrastructure already exists — instead of using our land, a limited natural gift, as a disposable product, to be used once and thrown away.

Smart Growth is about regionalism. As cities grow, and transportation and communications enable communities to interact more and more, the need for regional growth strategies becomes greater than ever. A key element of Smart Growth is that community and business leaders make decisions based on a clear understanding of regional growth needs and projections.

Smart Growth is about working together. One of the most fundamental tenets of Smart Growth is that everybody gets a seat at the table. Developers, business people, public officials,

3 The Smart Growth Network: Http://www.smartgrowth.org/information/principles.html

environmental advocates and ordinary citizens all have an opportunity to participate and have their voices heard on decisions affecting land use, transit, road construction or tax incentives...

Smart Growth is about families and communities. It's about thinking and acting to create neighborhoods — whether in the city, in existing suburbs or in newly developed areas — with housing, employment, schools, houses of worship, parks, services and shopping centers located close enough together that our kids can ride their bikes wherever they need to go, without asking us for a ride every ten minutes."

A common misconception about smart growth is a perceived belief that it is a way to stop growth in a community or is a more restrictive method of zoning. Instead, Smart Growth is simply a different outlook on how growth should occur. Rather than provide separation between uses or occupancies of sections of land, Smart Growth recognizes that some multi-use of land is good, that the ability to walk to the neighborhood store or school has positive benefits and that higher density development in core areas may be beneficial -- both economically and as a lifestyle enhancement. "Smart growth does not seek to stop or limit growth, but rather to accommodate it in a way that enhances the economy, protects the environment, and preserves or improves a community's quality of life." [4]

What is Sustainability?

Sustainability, which is often embodied as a principle of "Smart Growth," places an emphasis on respect for the environment and our relation to it. "Green Building Practices" are a major focus of Sustainability

As defined by the Center of Excellence for Sustainable Development, U.S. Department of Energy (http://www.sustainable.doe.gov):

> "Sustainable development is a strategy by which communities seek economic development approaches that also benefit the local environment and quality of life. It has become an important guide to many communities that have discovered that traditional approaches to planning and development are creating, rather than solving, societal and environmental problems. Where traditional approaches can lead to congestion, sprawl, pollution, and resource overconsumption, sustainable development offers real, lasting solutions that will strengthen our future.
>
> Sustainable development provides a framework under which communities can use resources efficiently, create efficient infrastructures, protect and enhance quality of life, and create new businesses to strengthen their economies. It can help create healthy communities that can sustain the present generation, as well as those that follow.
>
> Green building practices offer an opportunity to create environmentally-sound and resource-efficient buildings by using an integrated approach to design. Green buildings

4 O'Neill, David, *Smart Growth: Myth and Fact.* Washington, DC.: ULI-the Urban Land Institute (1999) p5

promote resource conservation, including energy efficiency, renewable energy, and water conservation features; consider environmental impacts and waste minimization; create a healthy and comfortable environment; reduce operation and maintenance costs; and address issues such as historical preservation, access to public transportation and other community infrastructure systems. The entire life-cycle of the building and its components is considered, as well as the economic and environmental impact and performance."

The LEED (Leadership in Energy and Environmental Design) Green Building Rating System provides a benchmark standard in evaluating the effectiveness of Green Building Design Practices. Its emphasis is on conservation of resources, protection of the environment, recycling of materials, waste reduction, optimal energy performance and renewable energy and reduction of indoor air pollutants. The major areas of evaluation include:

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality

Parallels to Urban Schools

Challenges in constructing and operating urban schools have many similarities to those found in Smart Growth and Small Schools. Sites for these schools are usually very compact and require innovative strategies to accommodate bus loading, parent pick-up, staff parking and playfields. Because of the small sites, the schools often need to be smaller as well, because such limited real estate often does not allow for the usual amount of parking, drives and extensive athletic fields. The building footprint is often reduced as well by using two-story schemes where possible.

Urban schools, by their geography, utilize existing urban infrastructure for water, sewer, natural gas, road systems, public transportation and other amenities. This is a major focus of Smart Growth.

Both new and existing urban schools have the built-in unique opportunity to expand upon smart growth principles and utilize them to enhance and expand services to the children they serve, as well as its neighborhood community. Joint use agreements offer many possibilities to offer additional educational opportunities, before/after school day care, transportation, parking and community programs, to name a few.

PROS AND CONS OF SMALL SCHOOLS

Advantages and Disadvantages of Small and Large Schools

If small or walkable schools are so desirable and they are such a key component of Smart Growth, why aren't more of them being built? Economics certainly plays a large part in what type of schools are constructed, especially with the very limited capital improvement budgets that most school systems must face. School systems must build as many seats as possible with very limited funds. The economic picture is only part of the final decision, however, and many other traits of each type of school, as well as its grade organization, must be considered in conjunction with a final decision on its size

Some of the advantages and disadvantages of smaller schools and larger schools can be summarized in the following matrix. Most of these items will be discussed later in this publication.

	Smaller Schools	Larger Schools

Advantages	• School safety/violence prevention
	• Personal touch with students
	• "Neighborhood Schools"
	• "Smart Growth" principles
	• Potential improved learning
	• Less bus distance/time
	• Potential "Walkable Schools"
	• Higher percent of student involvement in activities
		• Enhanced course offerings
		• Less expensive per student
		  • Construction
		  • Operation
		  • Administrative staff
		• More/higher-league athletics and student activities
		• Can achieve diversity with normal bussing
		• Less susceptible to family aging of neighborhoods

Disadvantages	• Basics-only course offerings
	• More expensive per student
	  • Construction
	  • Operation
	  • Administrative staff
	• Fewer/lower-league athletics and student activities
	• Difficult to achieve diversity without bussing
	• Susceptible to family aging of neighborhood
		• School safety/violence problems
		• Impersonal student/staff relationships
		• "Institutional" rather than "community" feel
		• contributes to "sprawl"
		• Potential reduced learning
		• More bus distance/time
		• Less percent of student involvement in activities

Economic Considerations for Smaller vs. Larger Schools

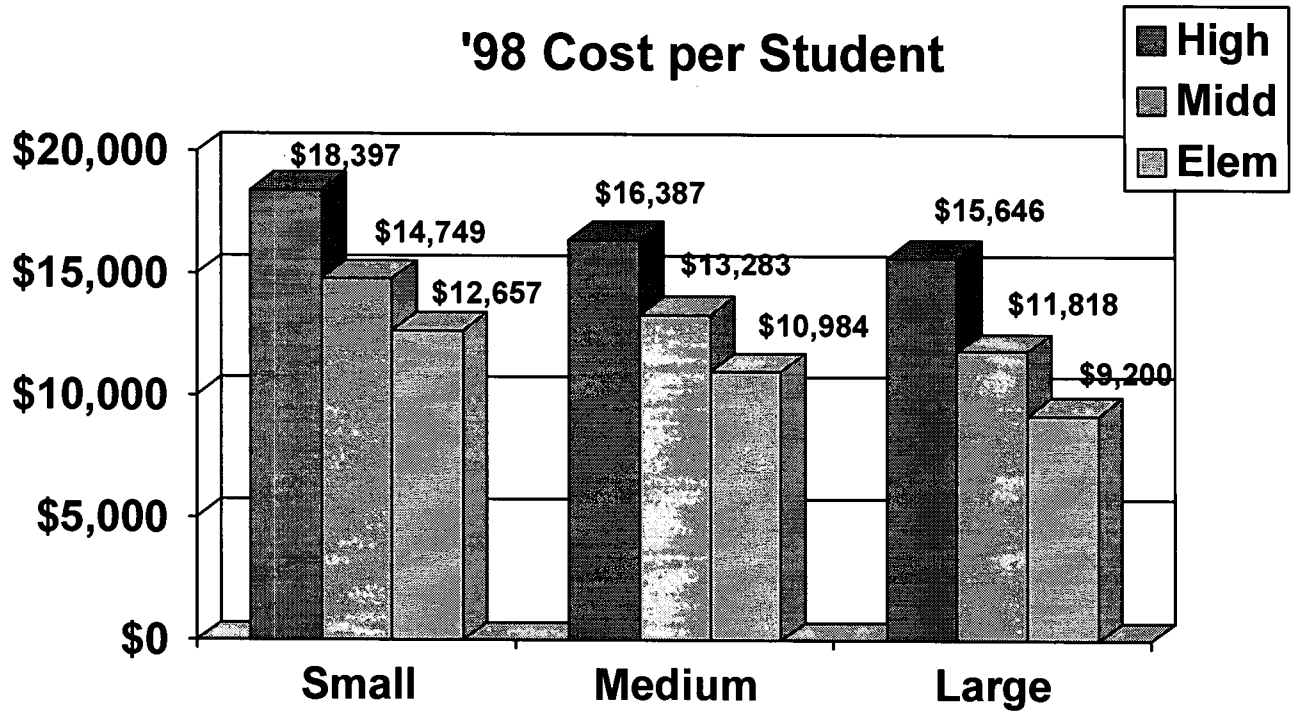
Small schools are more costly build, staff and operate than larger schools, when analyzed on a per-student basis. This is for several reasons:
Each school will typically have a media center, PE space/gym, administrative /guidance suite, media center, cafeteria and miscellaneous other support spaces, regardless of how many students it serves. These support or core spaces may vary in size depending upon the population but begin at a size that is a significant percentage of the overall size of the school. For a small elementary school these spaces are over 50% of the total building area.

- These support spaces must be constructed, which has a significant impact upon the initial cost of the facility. One larger school, rather than two smaller schools, serving the same number of students will only require an incremental increase in building area. Unfortunately, many of these support/core spaces are the most expensive to construct. The gym, dining and media center typically are large-volume spaces with long structural spans and the kitchen has a high concentration of very expensive equipment, finishes, plumbing and electrical work.

- These support/core spaces must be heated and cooled, lighted, cleaned and maintained. This has a significant impact upon the operating costs of the school.

- These spaces must be staffed. *All* schools will have a minimum staffing level of a librarian, principal, secretary, SIMS operator, basic custodial and cafeteria workers. A larger school serving double the number of students does not require double the number of support staff; only an incremental increase.

Construction (Only) Costs



High	600	1,000	1,600	($100.52/sf)
Middle	400	650	950	($91.61/sf)
Elementary	300	600	870	($90.44/sf)

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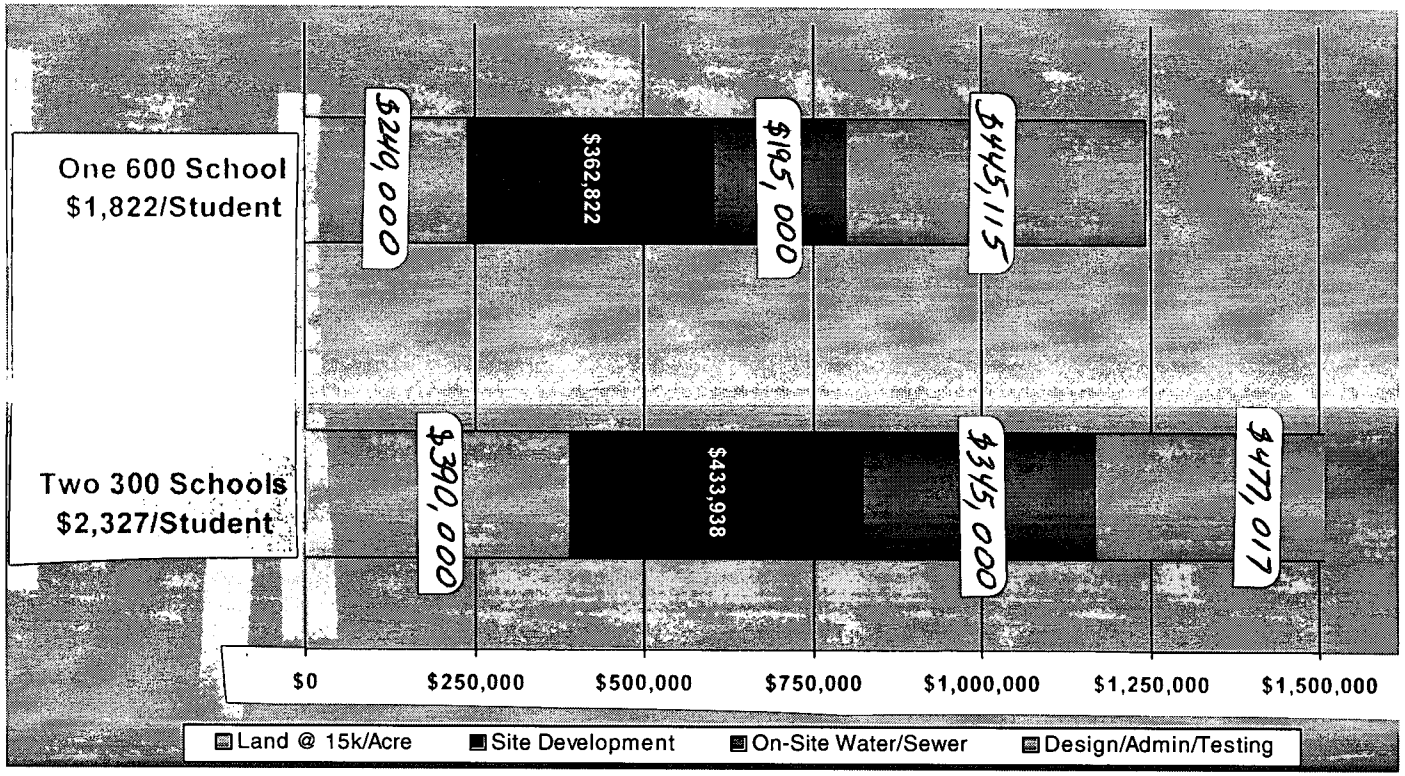
Site and Soft Costs - One School vs. Two



Assumes:
1. Normal site work - rural site
2. Design of 2nd school at 2/3 fee

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Initial Facility Costs:
Two 300-Student Elementaries vs. One 600-Student Elementary

	Two 300-Student Schools (2 x 42,750 sf=85500 sf)	One 600-Student School (71,500 sf)
Initial Construction Cost	$7,594,200	$6,568,800
Initial Site Development and Soft Costs	$1,645,955	$1,026,937
Total Initial Facilites Cost	$9,240,155	$7,595,737
Total Facilities Cost per Student Capacity	$15,400	$12,660
Percentage Additional Cost for Smaller Schools	22%	

Life Cycle Costs:
Two 300-Student Elementaries vs. One 600-Student Elementary
(no inflation)

	Two 300-Student Schools (2 x 42,750 sf=85500 sf)	One 600-Student School (71,500 sf)
Total Initial Facilites Cost (from above)	$9,240,155	$7,595,737
Life Cycle Maintenance & Repairs (2% of Const Cost per yr x 50 yr)	$7,594,200	$6,568,800
Life Cycle Energy Costs (Lights, HVAC, Misc) x 50 yrs ($1.00/sf)	$4,275,000	$3,575,000
Total Life Cycle Facilities Cost	$21,109,355	$17,739,537
Total Facilities Cost per Student Capacity	$35,182	$29,566
Percentage Additional Cost per Student Capacity	19%	

FINDING SOLUTIONS AND APPLYING STRATEGIES

Overcoming the Economic Picture

As the charts and graphs clearly indicate, both initial and life cycle facility costs are considerably higher for typical small schools than for larger schools serving an equivalent number of students. This is a very significant factor for boards of education facing extremely limited funds, especially when the mood of the citizenry may be to reduce costs of education and their accompanying taxes.

How, then, can small schools be made more economically feasible? Several approaches to this dilemma include:

- Partner with other agencies or groups to contribute to or share in the additional cost
  - Joint-use agreements (with joint funding) with other governmental or private agencies
  - Increase community use of school to increase desire of citizenry to fund facilities

- Find innovative ways to maximize the use of all spaces, so that less building area is required
  - Strive to schedule a class or program in every space every period (reduce/eliminate "teacher-owned" classrooms used only by teacher during planning period)
  - Make more use of "multi-purpose" classrooms
  - Year-round or double-shift scheduling of the school building
  - Use off-site facilities where possible (kitchen, special programs, athletics, etc.)

The interesting thing about many of these approaches is that they share or are the same as many of the tenets of "Smart Growth," "Walkable Communities," and "New Urbanism." An informed and concerned board of education can accomplish multiple goals by attempting to find ways to make small schools economically feasible. They can improve their relationship with the community, serve a larger portion of its citizens, save money on facilities, reduce sprawl, place less stress on utility/road infrastructure, improve student safety/reduce violence, and most importantly, potentially boost student academic performance. This multitude of positive benefits are the very reasons that so many people are promoting these philosophies.

Careful thought must be given to any new strategy; each has its own limitations, as well as positive features. Unless very well thought out and implemented fully, a particular strategy may not achieve the desired result and could, in fact, result in unexpected outcomes.

Small and Walkable Middle and High Schools: The Dilemma

Small and walkable elementary (K-5) schools are relatively easy to achieve in many of North Carolina's cities, especially if they are located in a relatively densely populated area with predominately young families. Even with this assumption, however, as the families in the neighborhood which the school serves begins to age, it is likely to become more and more difficult to fill the school with a surrounding walkable population. Typically, over time, it may take two generations (or more) for a neighborhood to transition from young families with small children through middle/high school aged children, through grown children, through retirees and back to young families again. This poses significant challenges to a school facility that is designed to be both small and walkable.

Establishing small and walkable middle and high schools based upon feeder schools from small and walkable elementary facilities is much more difficult:

- Assume an elementary with two classes (50 children) per grade. This translates to a 300-student K-5 school. This is probably the upper limit of what size school can be walkable for most of the higher-density communities across North Carolina.

- A walkable middle school serving the same youth density/geographical area of 50 children per grade could then be no larger than 150 students and a high school would only serve 200 students. Such a small size middle or high school would be very difficult to operate, even with innovative community joint-use and multi-purpose shared classrooms. Because of this, it may be necessary to consider a different grade organization. Although not considered generally the most desirable, perhaps an organization such as K-8/9-12 or K-6/7-12 would provide sufficient population to make the school facility economically feasible. If so, some sort of physical separation within the facility for the different age groups during the majority of the day should probably be considered as well. It should be noted that these unusual grade organizations are usually only established in remote geographical locations.

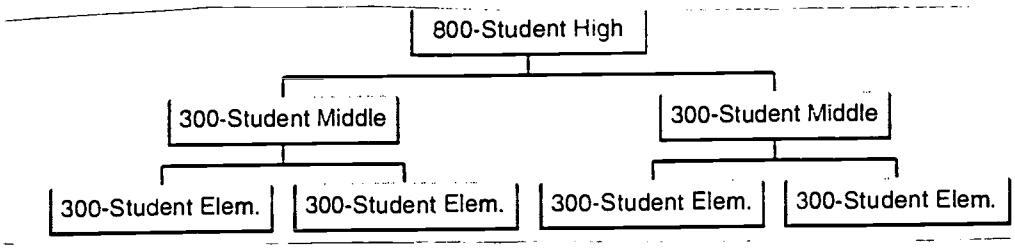
A more achievable arrangement may be to provide small, walkable elementary schools and small but non-walkable middle and high schools:

- A non-walkable but still small middle school could be fed from two, three or four 300-student walkable elementaries for a middle school size of 300, 450 or 600 students respectively.

- A small but non-walkable high school could be fed from a number of small walkable elementaries and two small (or one medium sized) middle schools.

Using the latter approach, it may be possible to provide small schools throughout the district. Further, walkable elementary schools could serve those neighborhoods with sufficient population density to support them. Sample feeder plans follow.

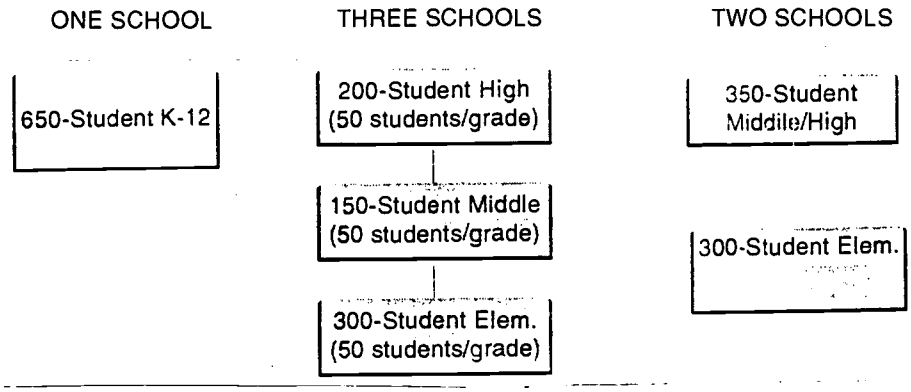
Four Elementary Feeders



Note: Only the elementary schools are likely to have sufficient walkable population.

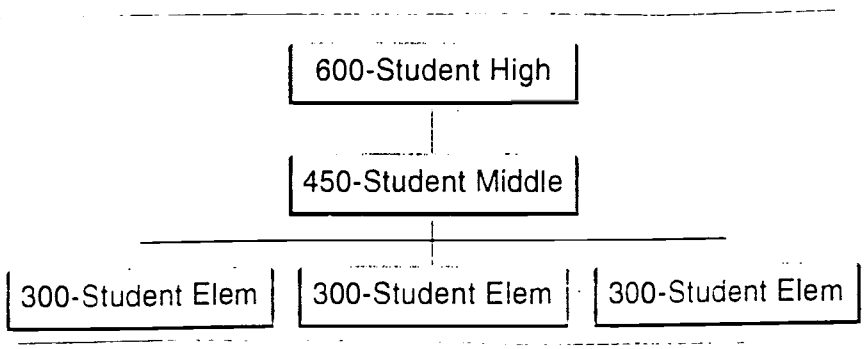
The Diversity – Walkable School Dilemma

Single-Feeder Walkable Systems



Note: Middle and High schools of such small size as shown herein are likely to be too inefficient to construct or operate unless geographically remote.

Three Elementary Feeders



Note: Only the elementary schools are likely to have sufficient walkable population.

Achieving diversity in schools, in many cases, appears to be mutually exclusive with

walkable schools. Small walkable schools, by definition, can only serve a single geographically compact community due to walking distance limits. If this community is not diverse, then how can the school, which reflects the community, be diverse?

There is no simple solution to this dilemma. A careful population analysis of a district may reveal areas where diverse populations are adjacent to each other. In that case, it may be possible to locate a walkable school on the border between such neighborhoods and achieve some measure of walkablilty for the majority of a diverse student population.

Another consideration, especially in more rural areas, is to accept that it may not be possible to establish a 100% walkable school. A reasonable goal may be to strive toward a sizable walkable population percentage and provide transportation for the remainder. The difficult choice for this approach is deciding which group will be bussed and which can walk.

Planning for Smart Growth

What does this mean for schools?

- Involve community stakeholders early and continuously in the planning process for new schools, additions and renovations to improve relations, enhance facility improvements and potentially improve funding.
- Locate schools with and within the urban or community fabric. Avoid developing larger sites with their own self-contained parking lots, drives and extensive, stand-alone playfields. These features contribute to urban sprawl. Make use of existing infrastructure: water, sewer, pedestrian ways, transit systems, parking as well as nearby businesses (food service, office support, etc.) That can provide outside or contracted services & support normally a part of the school. Note that this can be a substantial construction savings also. On-site water and sewer (wells and septic systems) costs have escalated dramatically.
- Design buildings that relate to the existing neighborhood fabric: as close to the street as adjacent buildings for friendliness/urban context.
- Use two or three-story where possible to promote density and reduce sprawl, develop facades/aesthetics that relate to its surroundings yet still say "school",
- Share/make use of other joint amenities: parks, libraries, restaurants, civic facilities, etc. rather than constructing duplicate ones.
- Open the school for other community uses, work out joint use arrangements (including funding) to promote the school as a community center rather than "just a school."

Examples of older small schools in a community setting:

Travel across North Carolina, stop in almost any small town or community, and one can find a good example of older, small school which serves a local, mostly walking community. Historically, this is the way towns and schools developed. The schools were built prior to the two (or more) cars in every household phenomenon and prior to the consolidation movement and widespread bussing. Many of these schools were originally "union" schools and housed the local population all of the way from 1st to 12th grade. With the advent of consolidation, most of these small schools have now been converted to elementary and usually serve a slightly more widespread population. They remain, however, a vital part of community life. Town meetings, social and recreational events are often held at the school with a substantial proportion of the community's adult population making use of the facilities.

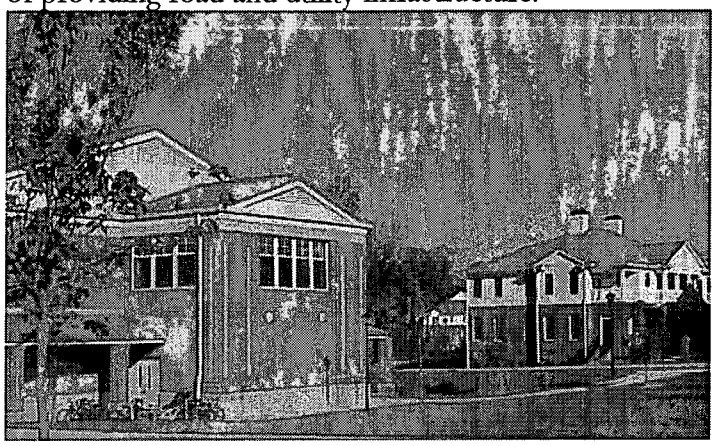
New examples of schools with "Smart Growth" principles

Southern Village (Marie Scroggs) Elementary, Chapel Hill

Southern Village is a "New Town Development" located adjacent to Chapel Hill, NC in which many "Smart Growth" principles were incorporated. It is a planned community with a mix of housing styles/prices (single family, apartments, condos, etc), retail stores, churches, movie theater and other support facilities all located within walking distance in the community itself. A part of this development is a new elementary school. Although not a "small school" (about 600 students), the school does draw from the new community and has a large number of walking/bike riding pupils. As one can see from the photos, the school is located very close to the street and community housing. Several, well-used bike lots are provided for the students. In addition, a privately run day care center is located just next door and the school also operates an after-school program for many of its students. This arrangement is very convenient for care of younger siblings of the school's students.

The site is small (originally six acres) by traditional standards. This was made possible by

reducing the number of busses (more walking students), sharing playfields (an additional six acres) with an adjacent city park, using a partial two-story building and minimal yard setbacks or buffers. The two-story building, coupled with being located very close to the street, increased the apparent density of the community and reduces the impact and cost of providing road and utility infrastructure.



This district is also experimenting with other "Smart Growth" and "Green Building" principles. Under construction is the new Smith Middle School which utilizes natural daylighting, a rainwater collection system and "greywater" for irrigation of the landscaping and playfields. In addition, photovoltaics are being used for demonstration purposes.

Vermillion, near Charlotte, NC., is another "New Town" using "Smart Growth" principles. The pre-existing, Huntersville Elementary is located about ¾ of a mile away, within walking distance for many of the new town's residents. The community has also approached the local school district to plan for a new school to serve the community. The new town comprises about 400 acres, directly adjacent to the town of Huntersville and an old mill, which is planned for adaptive reuse. Shopping, business, recreational and office services are incorporated within the new town development.

Incorporating Sustainability and Green Building Practices into Schools

Most sustainability and green building practices achieve high value because of their benefit to citizens and environment. Appropriate management of stormwater runoff, waste reduction, utilization of renewable resources, pollution reduction, and good air quality make sense, they just have not always been incorporated into traditional design and construction techniques. Now that this movement is receiving national attention, it is fostering widespread development of new and emerging technologies and materials. Those materials and technologies which have yet to establish a track record of long life, durability and ease of maintenance should be used with caution. School buildings, unlike many other building

types, must provide a life of fifty or more years, often with little maintenance and very little funding to correct unforeseen problems.

Many practices are easy to incorporate, are not costly, and add substantial value to our buildings through environmental protection, improvement of the air we breathe, reduction of maintenance, and energy savings (and its accompanying high cost). Refer to the LEED Green Building Rating System, US Green Building Council for a detailed list of potential practices. Some of these principles that are routinely or often incorporated into school design include:

- Stormwater management to reduce/eliminate runoff and/or erosion
- Use of fresh air in the heating and cooling system to reduce indoor pollutants to healthy levels. Install CO2 monitoring devices for performance.
- Select sites and develop within higher-density areas to promote walkable communities and/or take advantage of existing transit systems. Provide/promote biking to school by the use of secured bike lots and safe bikeways.
- Encourage the use of car/van pools by providing more convenient and shorter-wait loading areas separate from the normal drop-off loop.
- Install as much native vegetation as possible. Reduce the need for irrigation through the careful selection of plant material. Investigate the economic feasibility of utilizing stored runoff/greywater for irrigation.
- Do not disturb natural vegetation in critical areas, such as adjacent to streams and wetlands.
- Be sensitive to the use of outdoor lighting to reduce bleed-over on adjacent areas.
- Specify water-saving devices throughout the plumbing system for the building.
- Utilize high-efficiency heating/cooling systems with energy management controls.
- Utilize recycling for reduction of waste. Carry out recycling/waste reduction programs for all portions of the building and all of its users. If cafeteria disposables are used, ensure that they are recyclable.
- Specify salvaged and/or refurbished materials wherever possible. Commonly used examples include carpet, auditorium seating, acoustical ceiling tiles, etc.
- Specify materials that are manufactured locally (to the greatest extent possible and feasible) for the reduction of fuel for shipping.
- Provide more operable and daylight windows for connection to the outdoor environment, air quality improvement and ventilation during comfortable weather
- Investigate and incorporate, where feasible, renewable resources for energy conservation and quality of life, including daylighting, photovoltaics, geothermal heating/cooling systems and the like.

JOINT-USE ARRANGEMENTS

Maximizing school facilities and making them true centers of the community seems to make a lot of sense. It avoids costly duplication of facilities and structures; it allows underused schools to be used many more hours per day and year. Ultimately this has the potential to allow each user to have more and better-equipped facilities. It increases awareness, interest and willingness to fund schools because many, many more citizens will be visiting and using the buildings for their own self-interests. Finally, and perhaps most importantly, true community schools (which also provide other community services) can save local taxpayers significant sums of money, reduce depletion of limited natural resources, and limit sprawl.

This approach to schools and community facilities is not, however, without pitfalls. It is imperative that all of the details for joint/shared use of the facilities be anticipated and carefully resolved. In addition, all of the potential users should take an active role in the planning of the facility and come to the table willing to share in all the costs for design, construction, operation and staffing. Most, but not all of the disadvantages to community/shared use can be overcome by careful planning and invoking a sense of cooperation by the using agencies. When conflicts arise (and they will) each agency must be willing to work together, for the betterment of the entire community, to solve conflicts or problems as they arise.

By far, the most common community use of school facilities by other groups is the use of outdoor athletic facilities. This use is followed closely by the gym and thirdly the auditorium. Potential joint-use agreements include school partnering agencies such as:

- Parks & Recreation: gym and playfields; potentially arts, vocational and multi-purpose rooms
- Public Library: combine with school media center, computer labs, etc.
- Community College: adult education, GED, vocational courses, special interest courses, technology and computer courses
- Parking lots: shared with non-conflicting nearby business or agencies, such as churches, or other after-school-hours businesses.
- Transportation: municipal bus service for student transportation
- Performing Arts Council: auditorium and support spaces
- Health Dept: small clinic
- YMCA: youth athletic programs, summer camp, after/before school programs
- Church Groups: church education, worship
- Eldercare: use of kitchen, certain classrooms, art/activity spaces
- Meals-on-wheels: use of kitchen, loading dock
- Daycare Providers: before/after school, holiday & summer programs

Some Key Considerations:

- Ensure that the type of facility desired by the other agency does not conflict with the needs of the school. Education of students is, by far, the highest priority. Coordination of all aspects of joint-use and their potential conflicts should be resolved in advance. Examples of problems and concerns in this respect include:
    - Construction of only baseball fields at elementary/middle schools: Elementary/middle students need an open, grassy, soccer-sized field for a multitude of different activities; skinned infields and fenced backstops cause problems.
    - Construction of an overly large and elaborate auditorium: Flylofts (with their heavy weights), orchestra pits, etc. are not only hazardous for children but in many cases reduce the effectiveness of the theater and music program for K-12 children. Too many seats in an auditorium result in most school performances being played to a "half-empty house," not a confidence-building event as it should be. Orchestra pits can be hazardous and do not allow children performing there to be seen by their parents and friends.

- Divide cost sharing (construction, operating and repair) based upon use, expense of specialized/extra facilities, etc.
- Which group will use it when -- exclusively or shared -- common or separate times
- How to resolve conflicts over attempts to simultaneously schedule the same-place same-time - who has priority?
- Separate office, storage and other specialized spaces are needed for each agency. Lockable storage needs to be provided in shared spaces.
- Responsibility to clean up/put away stuff after use of a shared space. What happens if it's not done?
- Who handles overall control of facility - who opens/locks up, turns lights and HVAC on/off, cleans, mows, repairs, etc.? Who does it if first choice is sick/unavailable?
- Liability, fire and other insurance for each agency.
- Ability to assess each other for major unforeseen repairs/improvements.
- Approval procedure for changes, modifications, improvements to individual and joint-agency portions of the facility.
- Joint contribution to deferred maintenance fund.
- Who actually owns what or do the county/town fathers own the whole shebang
- Who pays which persons salary? Will similar positions from different agencies receive similar salaries? For instance, will the county librarian earn less than the school media specialist will?
- How will security be handled?
- Ability and method to amend agreement should be worked out.
- Advance divorce agreement and division of assets should be resolved in advance.

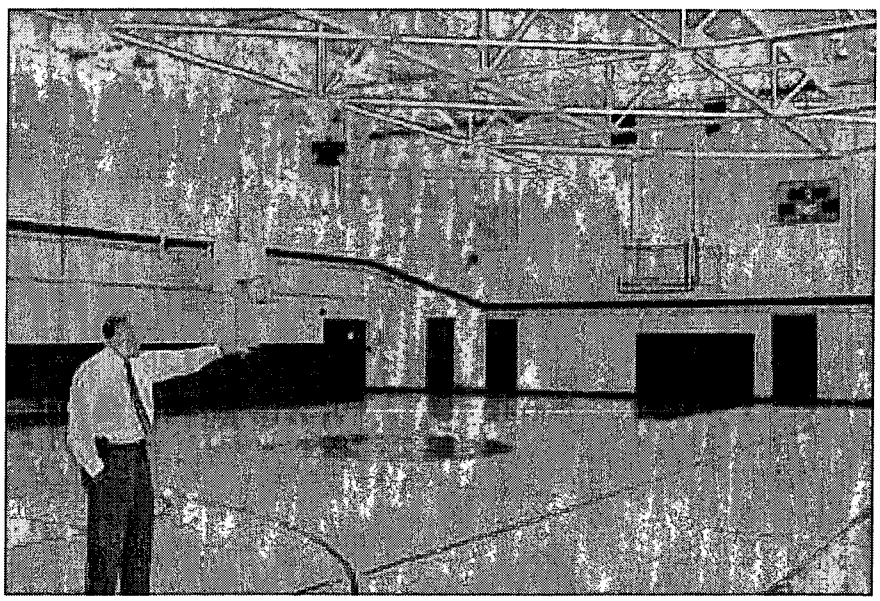
Examples of Joint Use Arrangements:

Cumberland County Parks and Recreation and Schools

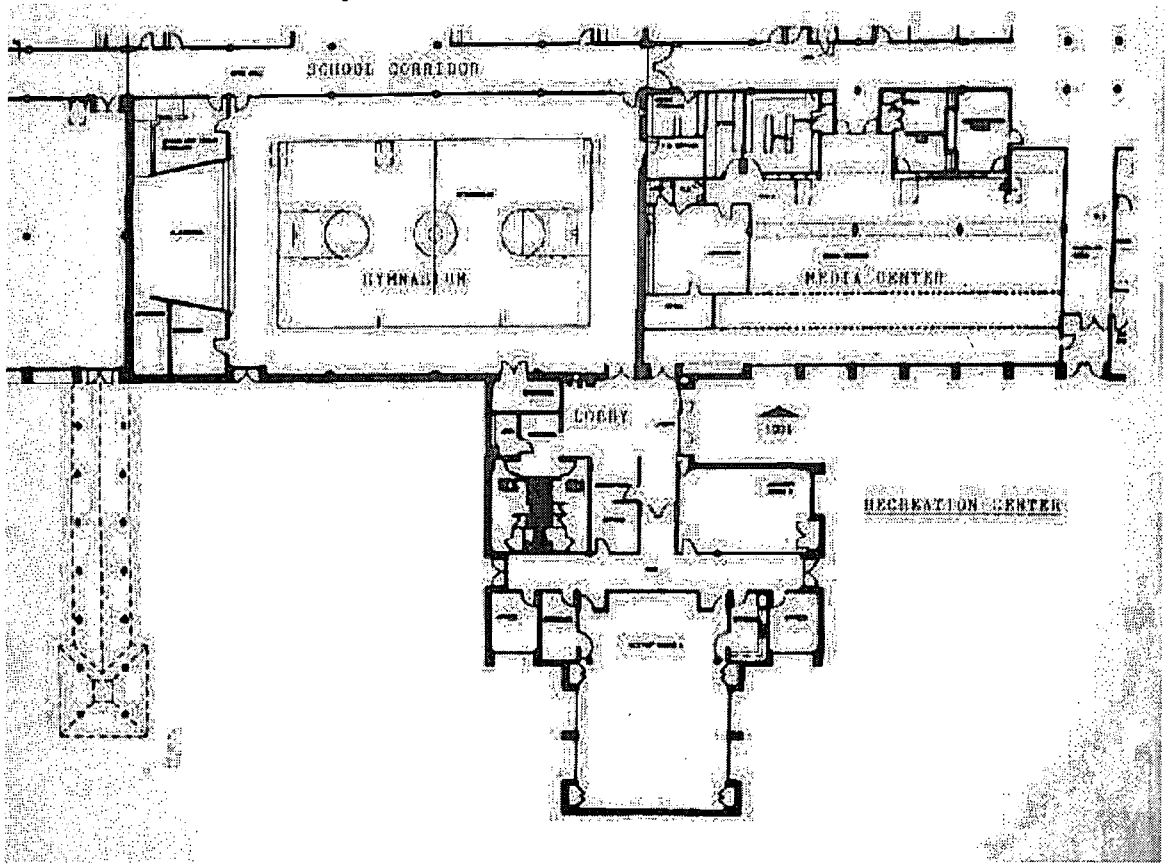
Cumberland County has developed numerous joint-use projects between schools and parks/recreation facilities. In this county the joint-use has progressed much further than the typical park adjacency model found in most areas. At five+ locations, the Parks Department has made substantial investments (several hundred thousand dollars each) at school-owned sites. In addition, the Parks & Recreation Department has developed indoor facilities either directly adjacent to or connected to the school's gymnasium/indoor athletic facilities.

Stedman Elementary School

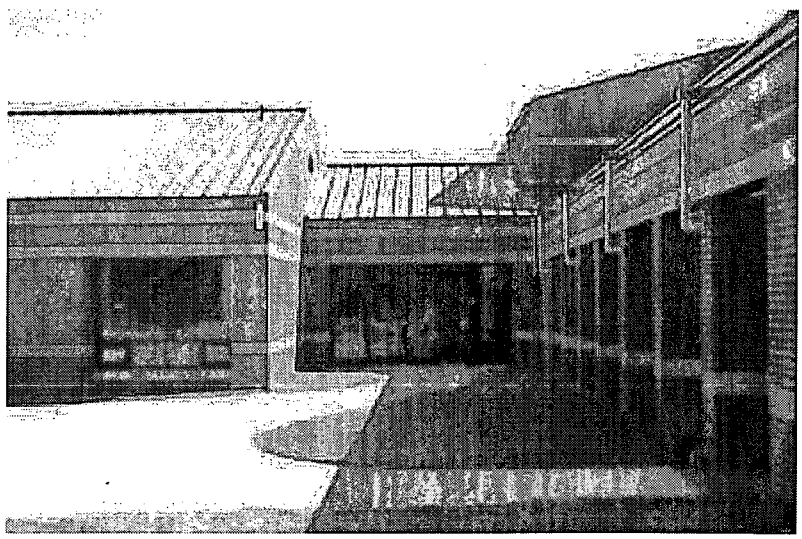
This is an older school, originally built as a high school, serving a small community. Parks and Recreation was given the 1930s vocational shop building, which they completely renovated, as well as constructing a small addition. The building is located immediately adjacent to the gymnasium building, which was also renovated. As a result, the facility offers an extensive recreation program during the evenings, weekends and summer vacation, while the elementary school utilizes the gymnasium during the school day. Another plus, the recreation program offers an after-school program



Lake Rim Elementary School & Recreation Center



This is a new school and recreation center joint venture currently nearing completion (the school opened fall of 2000; the recreation center will open mid year). The facility was designed to support independent operation of either the recreation center or the school. When the recreation center is open after school hours, a separate entrance allows the gymnasium and/or media center to be used with the recreation center, yet restricting visitors from entering the school itself.



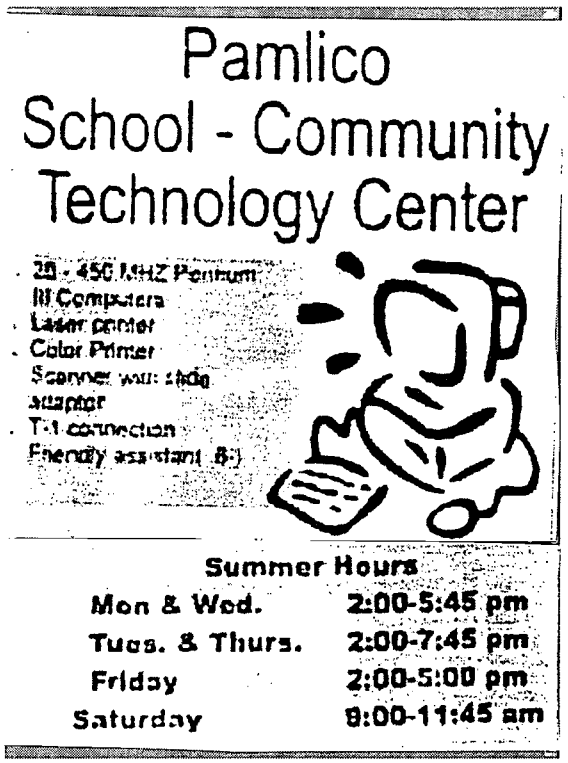
Pamlico County High School:
School Media Center/Public Library/Computer Lab

This example is located in rural eastern North Carolina and has been in operation over 20 years (opened in October of 1978). The facility combines a high school media center with a public county library. In addition, a computer lab was constructed and equipped in March of 2000 for use by students during the school day and by the community after school, on weekends and during the summer. Both facilities are well used by the community and school with very little conflict between the two groups. Numerous factors were observed that may play key roles in the success of this school media center/public library joint-use arrangement. These factors include:

- The library has two main entrances: a direct entrance from the school for students and a separate entrance from the street (with adjacent parking) for public library use.
- The library is staffed by both school media personnel and public library personnel, each with their own budget for purchasing materials and staff salary. Both senior staff members are committed to the success of the joint facility and work together to avoid duplicating material and to ensure that good materials for both groups are available.
- The facility is open for extended hours beyond the school day, including evenings and weekends.
- A formal written agreement was developed and executed prior to the establishment of the facility. A joint board of directors was established whose primary interest is that of the success of the joint facility. The Board meets regularly to oversee the operation.
- The facility is well equipped/supplied with books and media material useable and desirable by both the school and community.

The joint school/community computer lab is a separate operation from that of the public library/school media center. It was constructed and is staffed and funded as a separate entity. During the school day, it is only available for student use. After school hours and weekends it is available for public use. Although only several months old when visited, it is experiencing good use by both the school and community. To date, community use has been primarily in the following areas:

- Basic computer use and operation. An interesting aside: after basic instruction, and when the more affluent adult user appears to have gained confidence, they rarely return. It is presumed that they have purchased and installed their own home computers.
- Internet job search and word processing of resumes.
- Internet access by community users for research, e-commerce, on-line banking and other tasks.
- E-Mail. Users are typically shown how to establish a free e-mail account.
- Basic computer program use: word processing, spreadsheets, etc.



Both of the Pamlico County facilities appear to work very well. Obvious contributing factors to this success are that the community is relatively small and that the sense of cooperation between agencies is very high. Although not necessarily a contributing factor, only one high school and one library exist for the entire county. This is the only choice available to the community for these services without travel to another county.

When planning a joint school/community library, it must be recognized that the collections for each are considerably different (the adult fiction and reference collection is significantly larger). Extra space for the collection and support areas, as well as convenient after-school-hours access, must be included in the initial planning.

Other Examples of Joint-Use Public Libraries/School Media Centers:

Athens Drive High School – Wake County Public Schools
A large high school in an urban area that operates an extensive evening adult/community college program as well
McDougle Elementary/Middle Schools – Chapel Hill-Carrboro Public Schools
Library open two nights per week and weekends
Typical schools located in a very community-conscious community
Ocracoke K-12 School – Hyde County Public Schools
A remote school serving a small community
Princeton K-12 School - Johnston County Public Schools (currently under conversion)
A small school serving a close-knit community
First Flight & Cape Hatteras Elementaries – Dare County Public Schools
Remote schools serving smaller remote communities

Recycling Older Small, Community Based Schools for Continued Educational Use

When evaluating older schools for continued educational use, two major areas of concern must be considered:

1. Function:

Can the building be effectively renovated and modified to function appropriately using current and anticipated educational teaching methods?

- Older classrooms are often only 650-700 square feet and only 20 to 22 feet wide. Can they be economically enlarged and/or widened to present-day 900-1200 square feet for elementary and kindergarten use?
- Will remodeling to new room sizes and configurations result in very few useable classrooms and extraordinary amounts of "leftover spaces," resulting in high operational costs and poor building efficiency?

2. Condition

- Is it economically feasible to renovate the building's major structural, fire safety, waterproofing, envelope, mechanical, electrical and other systems? How good or poor of a condition are they in?
- Does the building's site allow safe expansion of the overall facility? Is there space enough for all the needed playgrounds, parking, drives, bus lots, etc. that we seem to need today?

Many school districts have established standard school capacity sizes (i.e. all elementary schools sized to accommodate 500 students). Many older schools are constructed of load bearing masonry walls. Because of this factor, coupled with the higher construction cost for large open areas, it will often be cost-prohibitive to attempt to enlarge the core spaces (cafeteria, multi-purpose/PE room, media center) . A more cost-effective

approach is usually to accept the school as a "small" school and make improvements as necessary for function, updated infrastructure and life-safety.

Recycling Older Small Schools for New Community Uses.

Sometimes, older schools have simply outlived their usefulness *as a school.* However, it is very important to keep in mind that just because the facility may not be a good candidate for reuse as a school does not mean that it could not be economically renovated for another use. Housing for the elderly, civic centers, governmental office space, retail and myriad other uses are possible.

Most notably this occurs for one or a combination of several reasons that include:

- The estimated cost to remodel the facility to current educational needs and standards approaches or exceeds the cost of a new facility. Many older schools were designed and built to fulfill a completely different educational style and often a different age group than current needs. Many older buildings that now house elementary programs were originally built as small union (first through twelfth grade) schools for a small community.

- The building's condition, design or construction technique makes remodeling costs prohibitive.

- The facility is too small to operate economically and the site is too constrained to allow sufficient expansion or current requirements.

Small and Urban Site Strategies

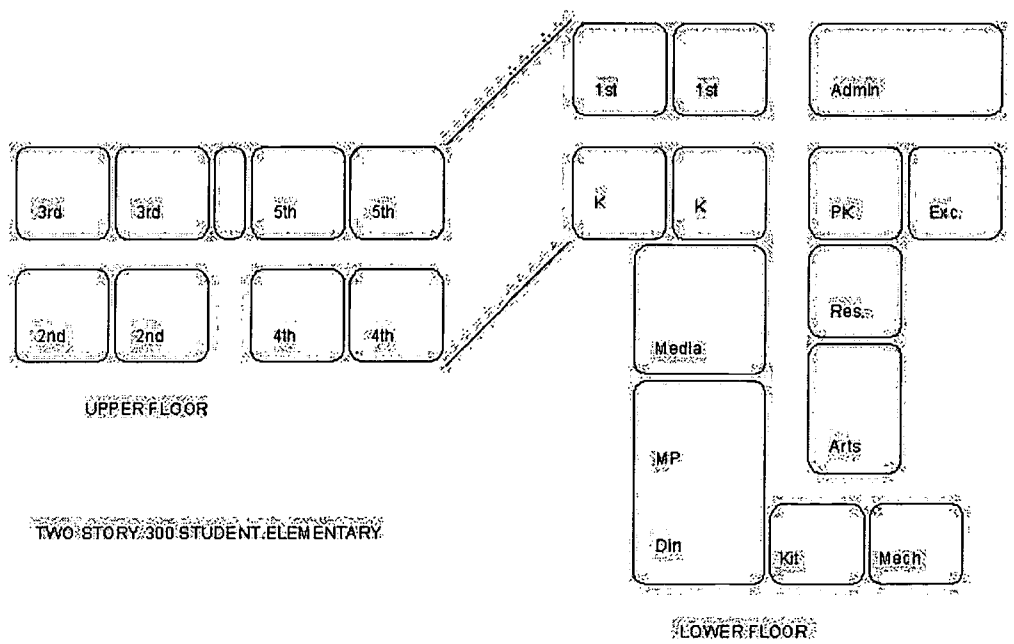
Increase the Density of Development

This strategy involves reducing open space around buildings, drives and other site improvements. Locate buildings closer to the street, provide limited "yard" spaces between buildings and drives and generally push everything closer together. This strategy reduces overall acreage requirements, enhances the urban image of the facility and reduces walking time and distance. Another advantage to this approach is that the building generally feels friendlier because of its proximity to the street and invites interaction between users and passersby.

Design a Compact Building

Compacting the development involves a building approach in which sprawling or campus types of buildings are discouraged. Two and three-story buildings are encouraged, where feasible. Floor plan schemes should avoid long, widely spaced wings, have very efficient circulation systems and locate spaces that don't need outside windows or doors on the interior of the building. Rooms that are or can be rectangular should be located with their short dimension on the corridor so that the building length is reduced.

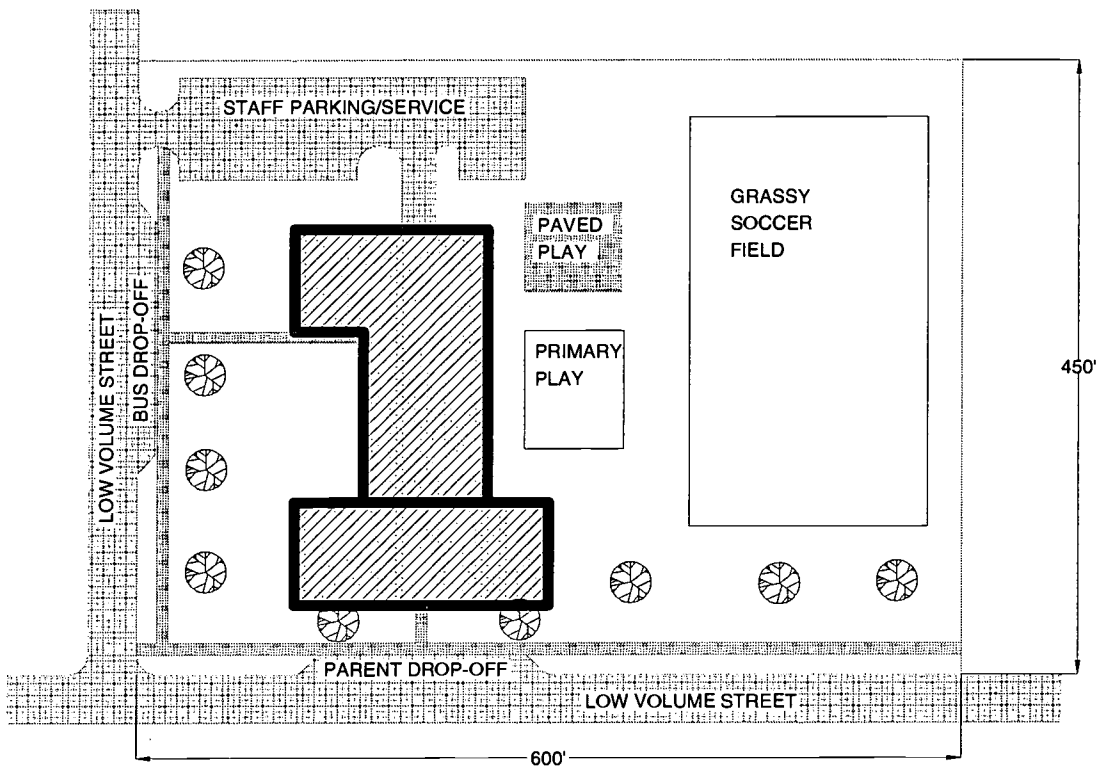
The example below shows a small elementary school for about 300 students. A two-story solution is shown for classroom areas, with kindergarten and first grade located on the first level as required by building code. To improve flexibility, one may also wish to include some or all of the second grade classrooms (for conversion to a lower grade) on the first level so that a larger-than-normal kindergarten or first grade population can be accommodated.



TWO STORY 300 STUDENT ELEMENTARY

Strategies for Reducing School Acreage

- Consider remote (off-site) staff parking
- Bus loading/parent drop-off on low-traffic, one-way or closed street
- Provide minimal outdoor play consisting of a large, soccer-sized grassy field (elementary & middle schools), a primary grades play equipment lot, and a paved play area (use bus loading lot if no day bus parking)
- Possibly share play areas with adjacent park (maybe gym too)
- Share parking lots with an adjacent user whose parking need does not conflict with school use (churches, movie theaters, etc.)
- Contract with municipal/other bus system to provide student transportation where bus routes cover similar territory.



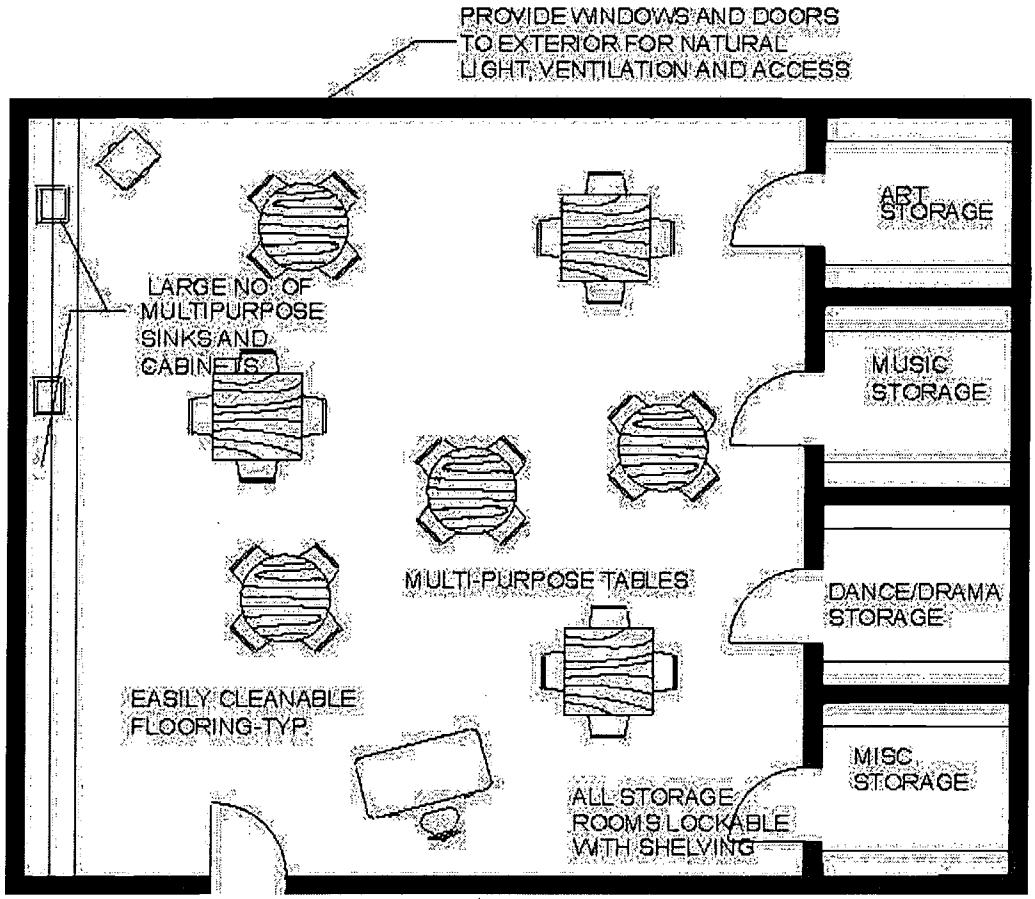
300 STUDENT ELEMENTARY ON A SMALL, 6 ACRE, URBAN SITE
(Assumes that entire site is "buildable" and relatively level)

Small Elementary School Building Strategies

Shared Multi-Purpose Classroom

Rather than construct separate classrooms for programs that aren't used every day, all day long, share a single multi-purpose classroom for art, music, resource, etc. with lockable storage for each program.

A single 1,000 square foot classroom equipped with several sinks and a variety of casework and adjacent 80-120 square foot storage rooms for art, music and any other special programs could suffice for a small student population. Teachers would be itinerant (serving several schools) and may need a remote office for records, paperwork, etc when the classroom is used by another program. Before proceeding with this approach, it will be necessary to calculate the number of each program classes that will be needed to serve the school population and schedule each teacher and program to ensure that the classroom is available .



MULTI-PURPOSE CLASSROOM

Shared PE and Multi-Purpose Programs

This is a similar strategy to the one previously described, except rather than constructing both a PE space and a multi-purpose classroom, this strategy would use the same space for all of these programs. A single 3600-4000 PE and multi-purpose space plus separate storage rooms for each program (art music, drama, PE, etc.) would be required.

Rather than constructing separate classrooms for programs/curricula that are not taught every day, or all day long, construct one large multi-purpose room than can be used by as many of those programs/curricula as can be scheduled into the space. This will require a detailed analysis of each curriculum(such as PE, art, music, drama, etc.), the number of hours it will need to be offered to serve the entire school, and comparison to the number of hours that the space will be available.

Flexibility in Classroom Design

All classrooms 1000 sf (useable for all of K-5)

In small schools, "bubbles" of certain age groups can cause problems. In some years three full-size first grade classes may be needed while only one fourth grade is necessary. This "bubble" of same-age children will advance through the grades each year, sometimes requiring a complete additional class and other times a mixed grades class. Designing each classroom as grade specific puts restrictions/difficulties on using that classroom for other ages. Having all classrooms of similar size, with multi-height countertops, will improve flexibility. Perhaps a larger-than-normal number of primary classrooms could be equipped with self-contained toilets (1/3 to 1/2 of the classrooms, rather than just kindergarten) and be located on the ground level to meet building code egress requirements.

PE/Multi-Purpose/Dining (Cafetorium, Audnausium, etc.)

With a small school, the multi-purpose room has much less demand load for PE activities. Efficient scheduling and the use of rollaway tables can allow quick set-up/take-down of dining seating for morning and afternoon use of space for PE or other activities.

Catered Kitchen

The use of remote cooking (perhaps at the nearest high school or contracted with an adjacent restaurant), delivery trucks equipped with warming racks, and a minimal warming kitchen could save significantly on space and the very high initial cost to build and equip kitchens.

Small Middle School Strategies

Middle schools are usually less efficient than elementary or high schools. "Homeroom" or "core" classrooms (language arts, social studies, math and science) are usually empty of students for two or more periods a day when the students from that team are attending classes in PE, technology, music, art or other electives. In order to improve the building's efficiency (and subsequently reducing building area and construction cost):

Expanded Use of Core Classrooms

Design and equip science rooms for exploratory pre-vocational double use. Provide the storage, casework, and equipment needed for both courses. Design and plan for the other core classrooms to be used for other elective courses. Provide separate teacher planning offices rather than have teachers use a classroom for planning.

Shared Multi-Purpose Classroom

Provide a single multi-purpose classroom for art, music, resource, etc., with separate storage room or casework for each program. This is similar to the elementary school approach.

Grade Reorganization

Consider a different school grade structure by including middle school students within the elementary or high school facility (a K-8 or 6-12 school) so that some or all of the very expensive core spaces can be shared. These spaces include administration, guidance, PE/gym, cafeteria, kitchen, media center, art and general music.

Shared Inter-Scholastic Outdoor Athletic Facilities

Rather than construct competition athletic facilities at each school that are only used a few times a year, construct a single multi-purpose practice field instead than can accommodate all team sports. Construct a single competition complex at a remote site that can be used by the all of the schools of this grade level in an entire school district or conference. By scheduling an early and late game on both Friday and Saturday, a single field with one set of bleachers and one concession/toilet facility could serve up to eight schools (four games per week).

Small High School Building Strategies

Shared Inter-Scholastic Outdoor Athletic Facilities

Similar to, but perhaps more extensive than the approach for middle schools, several high schools, or even an entire district or conference, could share football and baseball stadiums, as well as a competition gymnasium with a large seating capacity. Competition athletic facilities are one of the most expensive and land-hungry facilities associated with high schools. From an economic standpoint, it is difficult to justify a 4,000-seat stadium, complete with concession stands, very large restroom facilities, lighting and other amenities, that is only used for four or five games a year. Likewise, providing seating for 2,000 or more at an indoor gymnasium significantly increases the size and cost of providing a physical education program. Multi-purpose practice fields would still be needed at or adjacent to each school, but these fields can be significantly less elaborate and do not necessarily even need to be full-sized.

Shared Specialty Course Classrooms

For courses that need to be offered, yet receive relatively low enrollment, consider constructing flexible, multi-purpose spaces that can accommodate each of those courses. During the planning phase, the specific spatial and equipment needs for each potential course/program should be identified and noted. The ensuing design for the space should incorporate the amenities needed for each program, as well as separate, lockable storage for each program. Although the ensuing multi-purpose classroom, with its multiple storage rooms, will occupy more space than a "standard" classroom, the overall space constructed will be far less than building three or more separate, stand-alone classrooms. Certain workforce development courses, specialty science or arts courses, and many others may have a potential for sharing of spaces. For instance, earth science and agriculture and perhaps even photography could utilize a single well-equipped classroom.

Career and Enrichment Centers

Several school districts have established central career or enrichment centers serving the entire district, rather than duplicating these spaces and staff at each school. Typically, these central, specialized schools do not serve a base population, but rather serve all of the schools in the district. Basic, core and introductory courses are taught at each school, but for high-level or specialized courses that typical have small enrollments, the spaces and courses are taught at a remote, centralized site. Courses such as Latin IV, calculus, cosmetology or auto body repair can be offered at several times with full enrollment when students are drawn from several schools. These students may attend their home school during the morning, then ride a shuttle bus to the career and enrichment center for specialized courses for a couple of hours in the afternoon.

Teacher Commons Offices

This is a strategy that increases the efficiency of a high school building and can be used to reduce the number of classrooms required, rather than the usual increase in the number of students the facility can accommodate. The concept is based upon the

college model for assignment of classrooms. In this model, each instructor is assigned an office space consisting of a desk, limited storage and a telephone, along with access to duplicating equipment and other office machines. Usually, large common office areas are established at key locations, either geographically, by department or a combination with individual cubicles for each teacher. General classrooms are assigned for a specific class, rather than a specific teacher. One period may be for English 10, the next for French 1, and the next for algebra. Different teachers use the same classroom each period so that as many classrooms are used for as many periods as possible, rather than have an "empty" classroom during a teacher's planning and lunch periods. By simply maximizing the use of all classrooms, fewer classrooms are required, which substantially offsets the space allocated for the teachers' offices.

Operation Strategies

Year-Round Schools

Year-round, multi-track operation of schools is another way to increase the efficiency of a facility. By increasing the efficiency of a building, the number of students it can accommodate is increased, or conversely, a smaller building can accommodate the same number of students and the building cost per student is more economically feasible. The typical 45/15, four-track calendar of year-round schools increases the buildings enrollment by about 25% over a traditional calendar. Each track's calendar is staggered from the others and is in school 45 days, then off 15 days (see sample calendar from Wake County Public School System). For a truly small school, this approach will require careful design and planning; each classroom must be more flexible than usual because the same classroom may need to serve different grades during different tracks.

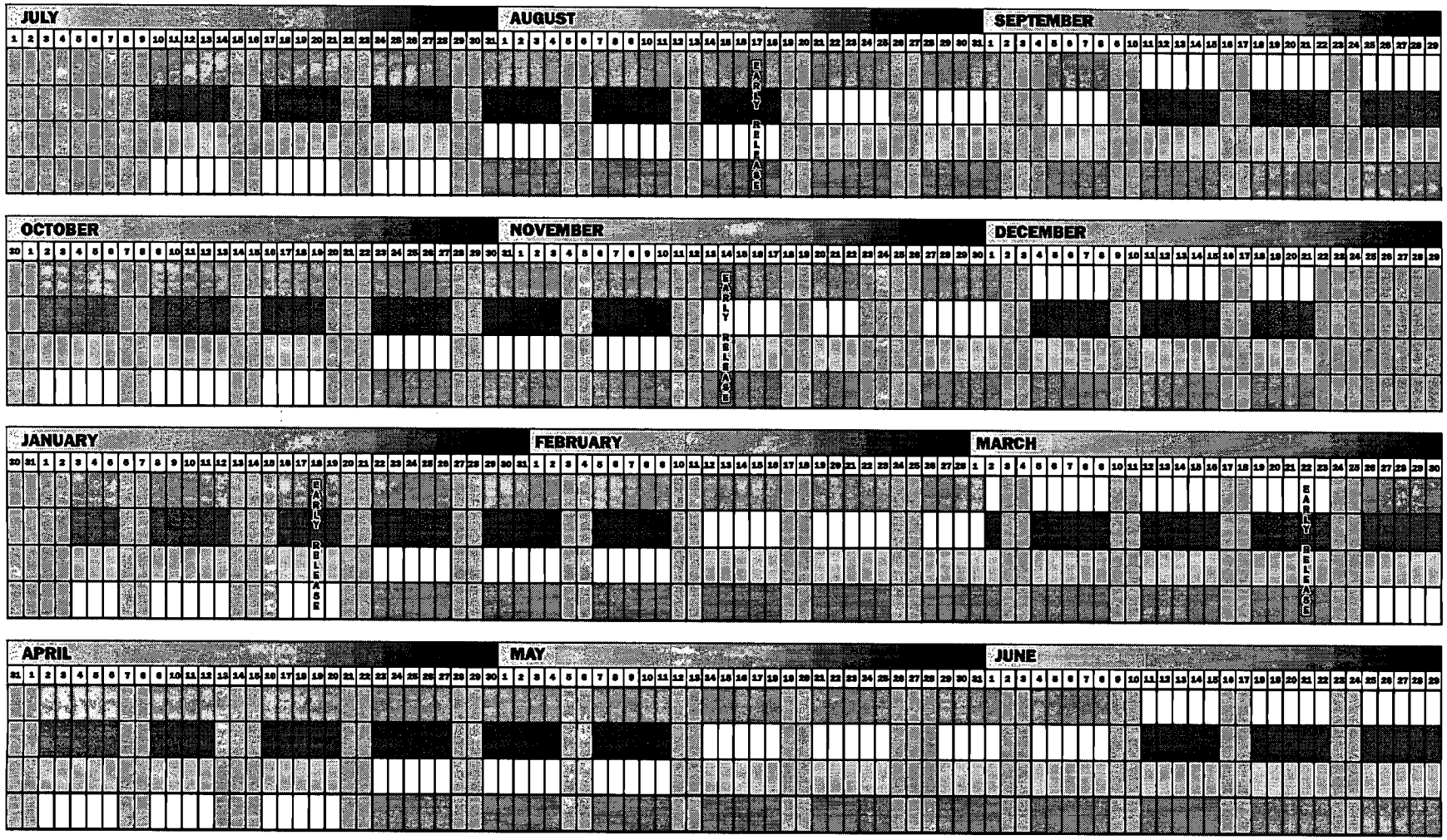
The disadvantages of year round schools should also be considered. The normal summer vacation will no longer be available for major maintenance tasks, and because of the increased number of students, the building will receive harder wear and may experience a shorter life. Another major factor is that some of the personal interaction between students and staff will be reduced due to the overall larger number of students being served by the same principal and administrative staff.

2000-2001 YEAR-ROUND SCHOOL CALENDAR

45/15 MULTI-TRACK SCHEDULE

WAKE COUNTY PUBLIC SCHOOL SYSTEM

TRACK 1 | TRACK 2 | TRACK 3 | TRACK 4 | WEEKEND | STUDENT HOLIDAY



If for any reason the school district must close schools, this adopted 2000-2001 year-round calendar may be amended by the Board of Education to provide additional school days on Saturdays or during vacations to meet legal requirements. Extended learning time will be determined at individual schools. There will be a 2-hour delay on Tuesday, November 7, 2000 (Election Day).

Double Shift/Overlapping Schedule Schools

By operating a school on a double, overlapping shift schedule one can also increase the efficiency of a facility. Once again, with this higher efficiency, a smaller building can accommodate the same number of students and the building cost per student is more economically feasible. This can be accomplished by using a time shift overlap during elementary or middle school electives/non-core classes. In this way, the same group of classrooms can be used by two different tracks of students.

	8	9	10	11	12	1	2	3	4
Track A	**Core/Basics**				**Arts/PE**		Out		
Track B	Out		**Arts/PE**		**Core/Basics**				

Using this oversimplified model, Track A uses the regular academic classrooms during the morning and Track B uses the same classrooms during the afternoon. During the overlap time, one of the two tracks is attending arts, lunch or PE in a different space. A careful analysis of proposed student populations and scheduling for all classes must be performed to ensure that each child will be offered the opportunity to participate in all programs.

Double shifting will have similar disadvantages to year-round school facilities, except the personal interaction between students and administrative staff will be further reduced due to the larger increase in number of students. Maintenance could still occur during summer vacations as with traditional schools.

Staffing Strategies

Itinerant Teachers and Staff

When operating small schools, it is obvious that providing full-time teachers, especially for enrichment and resource programs, is simply not possible. These teachers must serve multiple schools, either by spending a part of each day at each school or by rotating days between different schools (or some combination thereof). This is quite commonplace, especially for such programs as arts, music, PE and various resource programs (Title I, AIG, etc.) in elementary schools and even in middle or high schools where limited enrollment in specialty courses occurs. What is not as common a strategy is to use itinerant administrative staff or itinerant basic/core teachers.

Itinerant teachers need a space to perform planning, make phone calls and store materials, preferably in each school. One possible solution is to provide an "open" office area with cubicles for each (or even shared) itinerant staff member. Teaching can then occur in a shared, multi-purpose classroom.

Opportunities also exist for sharing administrative and guidance staff between several

small schools. Some of these staff members could also be stationed at one school and linked electronically to one or more other schools. This is especially true with SIMS operators, administrative assistants, bookkeepers, secretarial and clerical personnel. Custodial staff can rotate among several smaller schools, as could assistant principals, guidance, media specialists and technology staff.

Other Approaches

School Within a School

A number of school districts have subdivided large schools into several small "schools-within-a-school." An excellent definition of this arrangement follows.

> "A school-within-a-school is a separate and autonomous unit formally authorized by the board of education and/or superintendent. It plans and runs its own program, has its own staff and students, and receives its own separate budget. Although it must negotiate the use of common space (gym, auditorium, playground) with a host school, and defer to the building principal on matters of safety and building operation, the school-within-a-school reports to a district official instead of being responsible to the building principal. Both its teachers and students are affiliated with the school-within-a-school as a matter of choice"[5]

Schools-within-a-school have typically been done in an effort to improve student achievement and/or school climate and order. The concept is that by breaking down a large school into smaller groups, it will foster more interaction and "closeness" between individual students, their teachers and others, similar to that found in a stand-alone small school. Definitive results on the success of this approach are not yet available; however, research from various sources seems to indicate that effectiveness of this solution relies on several key factors:

- Each "sub-school" should be completely autonomous with its own separate principal and administration, its own budget, teachers and staff, interscholastic and extracurricular activities.
- As much separation as possible (physical and social) should be incorporated between each "sub-school"
- Each "sub-school" should have its own physical and perceived identity.
- As few shared spaces between "sub-schools" as possible should be included.
- There is some "upper limit" on how many students can physically be located on one campus and still expect to see positive results.

Similar strategies have been around for some time. "Teaming," "houses" and grade-wing separation are all commonly in use as means of breaking down larger schools into more easily managed components or as an attempt to improve closeness and interaction. With this approach, however, the overall facility usually retains its identity as one large school and non-core programs or courses are usually shared among all groups.

5 Raywid, A A. (1995). The subschools small schools movement--taking stock Madison, WI: Center on Organization and Restructuring of Schools. (ERIC Document Reproduction Service No. ED 397 490)

The concept of "schools within a school" could also be combined with that of a year-round or double-shift school. In this instance, each track could be established as a separate school as an alternative method of subdivision.

Distance Learning/Technology

The use of technology and the concept of distance learning can be an effective method of enhancing and enriching the educational opportunities for a small school. Where enrollment in a specialty or advanced course is too limited in a small school to justify the teaching of that course, distance learning can be used to gather sufficient students from a number of remote sites for instruction. This system uses cameras, microphones and other technology from each site so that the teacher and each participant has the opportunity to see and hear all of the other participants, regardless of where they are located. A technology staff member is usually required to monitor each site and operate the equipment. This staff member can significantly reduce efficiency; however, future improvements in technology such as individual PC-based tools may reduce this need as well.

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