

DOCKET FILE COPY ORIGINAL

BEFORE THE  
Federal Communications Commission  
WASHINGTON, D.C.

MAY 22 1998  
FEDERAL COMMUNICATIONS COMMISSION

In the Matter of Proposed )  
Revision of 1998 Collection )  
Amounts for Schools and Libraries )  
and Rural Health Care Providers )

Public Notice  
CC Dkt. No. 96-45  
DA 98-872

COMMENTS OF WINSTAR COMMUNICATIONS, INC.

**WILLKIE FARR & GALLAGHER**  
Three Lafayette Centre  
1155 21st Street, N.W.  
Washington, D.C. 20036  
(202) 328-8000

ATTORNEYS FOR WINSTAR  
COMMUNICATIONS, INC.

May 22, 1998

No. of Copies rec'd \_\_\_\_\_  
List A B C D E \_\_\_\_\_



TABLE OF CONTENTS

	<u>Page</u>
DISCUSSION .....	1
CONCLUSION .....	6
ATTACHMENT .....	

BEFORE THE  
Federal Communications Commission  
WASHINGTON, D.C.

In the Matter of Proposed	)	
Revision of 1998 Collection	)	Public Notice
Amounts for Schools and Libraries	)	CC Dkt. No. 96-45
and Rural Health Care Providers	)	DA 98-872

**COMMENTS OF WINSTAR COMMUNICATIONS, INC.**

WinStar Communications, Inc. ("WinStar"), by its attorneys, hereby files its comments in the above-captioned proceeding.

**DISCUSSION**

Since Congress passed the 1996 Telecommunications Act, WinStar has remained committed to Congress' vision of connecting children to the information superhighway. The Universal Service schools and libraries program holds great promise for America's schoolchildren as the Internet and other advanced communications services are a central component of the concept of universal service at the end of the 20th century. The Commission has appropriately recognized that schools and libraries must have the greatest flexibility permitted under the Act to tailor their applications for funds to their particular students' needs. Moreover, the Commission has wisely established subsidies for inside wiring without which the subsidies for services would only help those schools that need it least -- schools with advanced networks already in place.

The Commission's May 13, 1998 Public Notice<sup>1</sup> seeks comments on the size and scope of coverage of the schools and libraries fund. In its review of these issues, the Commission must retain vigilant in its commitment to schoolchildren and their future in our growing and changing economy. As Chairman Kennard noted recently:

Skilled labor today requires the ability to use computers and telecommunications. Telecommunications is now 14% of the economy -- and growing. The United States will need 1.3 million new workers in information technology over the next eight years. We're going to need 95,000 new computer scientists, analysts and programmers each year.<sup>2</sup>

These jobs can only be filled through adequate education and training, which starts with early and frequent access to and use of the Internet. The schools and libraries fund fills this very important need that otherwise may go unfilled.

The point is driven home by some startling statistics. Though 78% of schools in affluent communities have Internet access, only 50% in low-income communities have access. See id. In addition, only 5% of minority classrooms are linked to the Internet. See id. at 5. These students would benefit most from the schools and libraries fund. The Commission has rightly focused on these areas in the Public Notice. "We emphasize that

---

<sup>1</sup> FCC Public Notice, Common Carrier Bureau Seeks Comment on Proposed Revision of 1998 Collection Amounts for Schools and Libraries and Rural Health Care Universal Service Support Mechanisms, CC Dkt. No. 96-45 (rel. May 13, 1998) ("Public Notice").

<sup>2</sup> "Bridging the Digital Divide," William E. Kennard, Chairman FCC to NAACP Board of Trustees at 4 (May 15, 1998) ("Kennard Speech").

any adjustments should not impact the level of support available to the most economically disadvantaged schools and libraries . . . " <sup>3</sup>

Commissioner Furchtgott-Roth's statement, <sup>4</sup> accompanying the Public Notice, makes plain his view that inside wiring may not be subsidized by the schools and libraries fund. Chairman Kennard, however, has crystallized the issue on several occasions, stating that the big losers of not supporting internal connections to classrooms are:

poor kids in our most distressed inner city and rural areas. Ironically, if we were to provide universal service support only for telecommunications services, but not for the networks to connect the classrooms within the school, we would end up giving universal service support to more well-to-do areas that already have connections, while denying support to our poorest schools and libraries until they somehow otherwise become wired. Kennard Speech at 5-6.

Moreover, the Joint-Board Recommendation, <sup>5</sup> and the Commission's Universal Service Order, <sup>6</sup> broached this subject and explicitly rejected the notion that internal connections may not be covered by the schools and libraries fund.

WinStar agrees with Chairman Kennard's view that internal connections are important in general, and critically important to

---

<sup>3</sup> Public Notice at 3.

<sup>4</sup> See Statement of Commissioner Harold Furchtgott-Roth, attached to Public Notice.

<sup>5</sup> See Federal-State Joint Board on Universal Service, CC Dkt. No. 96-45, *Recommended Decision* at ¶ 473 (rel. Nov. 8, 1996).

<sup>6</sup> Federal-State Joint Board on Universal Service, CC Dkt. No. 96-45, *Report and Order* at ¶ 242 (rel. May 8, 1997).

schools in low-income areas. As we transition schools and libraries into the 21st century, funding for inside wiring is part and parcel of funding for "Internet access" generally -- indeed, it is a prerequisite. Though some schools are already wired to the Internet, many are not. The Commission must remain committed to the idea of permitting schools and libraries maximum flexibility to obtain whatever package most effectively and efficiently meets their needs -- including, to the extent necessary, inside wiring for Internet access.

WinStar's telecommunications and information services, including high-speed wireless Internet access, represent precisely the type of service to satisfy the needs of inner-city schools and libraries, in particular. Because WinStar's wireless service is generally cheaper than its wireline counterparts, WinStar is able to provide more service for the school or library's money. WinStar has prepared several proposals thus far, including a proposal for the District of Columbia Public Schools ("DCPS"). These proposals include not only high-speed Internet access, but a package of related services including free training, video content, and other related enhancements to the basic Internet service. For example, WinStar's "Proposal for District of Columbia Public Schools: Beyond 1997...Children First" (attached at Appendix A) outlines such a wireless, high speed Internet service and package of related services, featuring a 45 Mbps Internet connection to the DCPS through WinStar Goodnet, a wholly owned subsidiary of WinStar Communications, Inc. WinStar also intends to provide two services free of charge

to DCPS: a suite of educational applications and content programs, and basic and advanced training for DCPS employees. WinStar is working and will continue to work hand in hand with schools and libraries to provide services efficiently tailored to their children's' needs. The full realization of the benefits from this collaboration, however, cannot be realized without continued Commission commitment to the schools and libraries program.

**CONCLUSION**

The schools and libraries program holds tremendous promise for the future of our schoolchildren. WinStar intends to continue to work with schools and libraries, and the Commission, in order to speed the provision of Internet and related telecommunications and information services -- including vital internal connections -- to schools and libraries. WinStar respectfully requests the Commission to consider the foregoing comments.\*

Respectfully submitted,

WINSTAR COMMUNICATIONS, INC.



Michael F. Finn  
Jay Angelo

**WILLKIE FARR & GALLAGHER**  
Three Lafayette Centre  
1155 21st Street, N.W.  
Washington, D.C. 20036  
(202) 328-8000

ATTORNEYS FOR WINSTAR  
COMMUNICATIONS CORPORATION

May 22, 1998

\* Electronic filing submitted via 3.5" diskette to Sheryl Todd, Accounting Policy Division.

WinStar Communications, Inc.  
May 22, 1998

# **ATTACHMENT**



# Proposal for District of Columbia Public Schools

## Beyond 1997 ... Children First

April 6, 1998

Prepared by the WinStar Team

Contact: Gary Markovits, VP WinStar for Education  
888-229-6934 or [gmarkovits@winstar.com](mailto:gmarkovits@winstar.com)

## Table of Contents

Executive Summary .....	5
Goals and Objectives.....	6
Children First.....	6
E-rate Independent.....	6
Scalable .....	6
Flexibility in Defining Core.....	6
Reliability.....	6
Equity of Access .....	7
Complete Solution Team.....	7
Statewide Network for 21 <sup>st</sup> Century .....	7
Scope of Proposal.....	8
ATM Wide-Area-Network.....	8
Phase 1 Network .....	8
Phase 2 Network .....	10
Phase 3 Integration of Current Frame Network .....	10
Network Architecture Details .....	10
Network Overview .....	10
Network Architecture .....	11
Phase 1 - The Pilot Network .....	11
Phase 2 - The Expanded Network.....	16
Hub Location Methodology .....	17
Network Management .....	20
ITFS Expansion.....	20

Proposed ITFS Expansion .....	20
Premise Equipment and Wiring Upgrade .....	23
Internet Access .....	23
Why ATM? .....	24
High-speed Access.....	25
ATM Network .....	25
24-hour Monitoring .....	25
How does Wireless Fiber Work: .....	26
Educational Software and Content.....	28
LivingPage™ .....	28
NewsNow™ .....	28
WebBoard™ .....	29
MindsEye Monster Exchange™ .....	29
Insect Ecology Exchange™ .....	30
Fish-n-Chips Exchange™ .....	30
The Journey Exchange™ .....	30
Tidal Passages™ .....	31
Future Developments.....	31
Staff Development.....	32
Critical Element.....	32
Internet Boot Camp .....	32
Advanced Tool Training .....	32
Training the Trainers .....	33
Copies of Materials.....	33
Statewide Network for 21 <sup>st</sup> Century.....	33

Telephony.....	34
Cost Estimates .....	34
Affordability if E-rate Evaporates.....	35
WinStar Profile .....	35
How is WinStar different?.....	35
Who is WinStar – “The New Phone Company”?.....	35
WinStar Communications, Inc.....	36
WinStar Telecommunications, Inc. ....	36
WinStar Wireless Inc. ....	36
WinStar New Media.....	36
WinStar Broadband Services.....	36
WinStar for Education .....	37
WinStar Executives .....	37
My WinStar Team .....	38
WinStar Customers.....	39
Who is using WinStar today?.....	39
What do they think so far? .....	40

## **Executive Summary**

This proposal is in response to the District of Columbia Public Schools' Universal Service E-rate application, information contained in the DCPS Website, and "Beyond 1997 ... Children First" the District's technology plan. WinStar's proposal addresses the following fundamental goals:

- Children First,
- Scalability,
- Reliability,
- Equity of access,
- Flexibility in defining Core and Access sites,
- Complete solution team,
- Cost effectiveness and E-rate independence, and
- Foundation for the Network for the 21<sup>st</sup> Century.

WinStar's response combines leading edge telecommunications technology with staff development, award winning software, and educational content that will enable the district to effectively integrate the proposed telecommunications and Internet technology into the curriculum, and help our children to compete successfully in tomorrow's world.

The combination of an ATM bi-directional optical fiber backbone ring connecting two Server sites and four wireless hubs, with 38 GHz Wireless Fibers<sup>SM</sup> services connecting Core and Access sites to the hubs, gives DCPS a reliable, and scalable solution. It also gives DCPS the flexibility to define Core sites at will, today and tomorrow. In addition, WinStar's proposed architecture combined with its data replication strategy, provides the District the ability to grant any school, whether Core or Access, equal access to all critical District information.

WinStar has also initiated discussions with IBM Global Services. These discussions have identified the fact that IBM's proposal and WinStar's are complementary, and in total provide a more complete solution for DCPS. WinStar and IBM are willing to work together for the benefit of DCPS.

Once educational technology is given to our children it should never be taken away. Unfortunately, the future of E-rate is not certain. WinStar's proposal is not only cost effective, it also includes an analysis of DCPS' local telephone services indicating that the potential cost savings by using WinStar telephone services could pay for a significant percentage of the ATM wide area network. This would help to move the District toward E-rate independence.

Finally, putting "Children First" implies making an effort to reach them wherever and whenever possible. Extending the school into the community for life-long learning. WinStar's proposal lays the foundation for the "Network for the 21<sup>st</sup> Century" envisioned in the District's strategic plan. This is an incredible opportunity for DCPS and the children of Washington, DC.

## **Goals and Objectives**

### **Children First**

While the District of Columbia Public School's Universal Service E-rate request is couched in terms of technology, the goals and objectives lie with the children. "Beyond 1997 --- Children First", the District's educational technology plan, is dedicated to ensuring its "students' successful competition in tomorrow's world." WinStar's proposal will help the District accomplish this with both leading edge telecommunications technology, and unique educational software, content and staff development provided by WinStar for Education.

### **E-rate Independent**

DCPS must be certain that critical educational technology, once given to the children, will never be taken away. Any viable plan must present a cost option that will remain viable even if E-rate ceases to exist. The combination of WinStar's complete line of services makes this more probable.

### **Scalable**

No one today can predict the bandwidth that will be required by tomorrow's educational applications. WinStar's 38 GigHz Wireless Fiber™ services will provide DCPS with the ability to scale the entire network, or any portion of the network, as requirements dictate.

### **Flexibility in Defining Core**

The DCPS proposal defines "core locations" as locations that have the ability to support a core competency, or culture, such as engineering, multimedia course development, language arts, etc. Any viable proposal should allow DCPS to define new Core locations, at any point in the future, based upon those characteristics and not based upon the service provider's capabilities. As the composition of a school's staff and student body change, so do its core competencies and culture. WinStar's network design will enable any school that develops a unique core competency or culture to be defined as core -- today or tomorrow.

### **Reliability**

A teaching moment lost can never be regained. The network that delivers the educational content and tools of DCPS must be reliable and available. WinStar's proposed network design is a true ring structure ensuring the highest possible reliability and availability.

## **Equity of Access**

A viable proposal will serve all eight wards, and all grade levels, in all phases of the technology plan. WinStar's proposed network architecture accomplishes this.

## **Complete Solution Team**

DCPS has encouraged vendors to team in order to provide the District a complete solution. WinStar initiated discussions with IBM to accomplish this. The combination of IBM and WinStar will provide a complete solution.

## **Statewide Network for 21<sup>st</sup> Century**

DCPS has the goal of establishing a DC statewide network for the 21<sup>st</sup> Century. A network capable of supporting voice, video and data. The initial data and Internet network proposed here will in fact lay the foundation to accomplish that objective.

In addition, ideally, any network built today should lay the foundation for increasing the connectedness between the school system and its community. It should lay the foundation that places the school system at the center of life-long learning. WinStar's proposed network architecture and 38 GHz Wireless Fiber<sup>SM</sup> services positions DCPS to connect to the community, to reach students and their families where they live and work. It positions DCPS to adopt and implement the strategies highlighted by Vice President Gore in the recent "Connecting All Americans for the 21<sup>st</sup> Century" conference held in Washington DC.

## **Scope of Proposal**

WinStar realizes the DCPS desires a complete solution. WinStar also realizes that it is important for any vendor dealing with DCPS to understand how to provide those pieces of the solution that it excels at, and how to team with other world-class vendors to provide the complete solution. With this objective in mind, WinStar initiated discussions with IBM Global Services to provide DCPS with a team that is capable of delivering the complete solution. A solution that leverages IBM's strengths in overall project management, LAN, server and ATM hardware, software, and network management services, while simultaneously leveraging WinStar's strengths in providing the broadband ATM WAN, ITFS, Internet access, telephony and educational content. Our intent is to work collaboratively with IBM Global Services to provide DCPS with a complete solution.

## **ATM Wide-Area-Network**

### **Phase 1 Network**

#### ***Network Design***

The DCPS technology plan calls for an ATM OC3 ring, connecting Server sites with Core sites. Each Core site in turn serving multiple Access sites in a three level hierarchy. WinStar is proposing a bi-directional ATM OC3 ring connecting Server sites with Hub sites. Each Hub site in turn connecting Core sites and Access sites using 38 GigHz Wireless Fiber™ in a two level hierarchy.

For phase one the bi-directional ring consists of six sites. Two are Server sites, one each at 415 12<sup>th</sup> Street, NW, and 1709 3<sup>rd</sup> Street NE. The four remaining sites are Hubs from which line-of-sight is available to twenty-seven DCPS schools, spanning all eight wards.

This bi-directional ring is comprised of six fiber optic OC3 links, which, if required, could be upgraded in the future to OC12 or beyond. The network design is a true ring with an outage tolerance of one for Core and Access sites and a tolerance of two for mirrored Server sites.

Each connection to a Core or Access site is scalable from a single DS3 to multiple DS3's or single/multiple OC3 Wireless Fiber™ connections, thus flexibly ensuring both bandwidth and redundancy where and when required.

#### ***Core and Access Sites***

Core locations can be designed for the required level of bandwidth and redundancy independently. For example, for "mission critical" sites requiring both high bandwidth and high availability, two high-bandwidth Wireless Fiber™ lines could be used. For sites requiring high bandwidth, but that could live with temporary degradations in performance, one high-bandwidth plus one lower-

bandwidth line could be used. Finally, for sites requiring high availability but with lower bandwidth requirements, two lower-bandwidth lines could be used.

Similarly, each Access site can be connected with Wireless Fiber<sup>SM</sup> services that can be scaled in bandwidth. Further, should an Access site today develop a critical core competency tomorrow, it can easily be upgraded to multiple Wireless Fiber<sup>SM</sup> lines and become a Core site.

This technical flexibility also translates into financial flexibility. Both bandwidth and redundancy are scalable, up or down, should Universal Service E-rate funds cease to exist. Only a microwave-based technology such as WinStar's Wireless Fiber<sup>SM</sup> will allow such flexibility.

### ***Server Replication Strategy***

WinStar is recommending that DCPS adopt a server replication strategy in which the Server sites periodically mirror each other. This strategy, accomplished over the high-speed bi-directional ring, ensures that if any disaster befalls a single Server site, the other Server site can continue to serve the entire network.

### ***Server-Core Backup Strategy***

Further, WinStar is recommending that DCPS adopt a Server-Core replication strategy in which each Core site's critical information and/or programs are copied to a Server site, which in turn would be replicated to the other Server via the server replications strategy. This Server-Core backup strategy protects the network from losing access to critical information and/or programs if a Core site should go down.

### ***Equity of Path Length***

The proposed network architecture ensures equity of path length for all schools to the entire knowledge base residing on the DCPS network. Whether Core or Access, all schools are two hops to a Server site. This eliminates the possibility of technology creating a two-class system of schools based upon access to Server sites.

### ***Equity of Core Site Opportunity***

The WinStar network design also creates equity of opportunity for schools to excel and become Core sites. The individual school's competencies and motivation will determine if DCPS connects that school up as a Core site, not the service provider's technology limitations. The opportunity for Core site status could motivate schools to excel and provide additional value to the DCPS network, self-actualization at a school level, building esprit de corp.

## **Phase 2 Network**

### ***Scalable Network Characteristics***

The WinStar network design scales for phases two and three while maintaining all of the desirable properties of the phase one network. This is accomplished by using the same Server-Hub architecture with parallel layers of Hub sites to reach additional schools.

Figure two, "DC Public Schools – Phase 2", depicts how additional parallel Hub site arms will be added to the network. As new Hub segments are added they are connected by fiber optic links in exactly the same configuration as the original hubs. The Core and Access schools connected to the new Hub sites have equitable access, reliability, services, etc., that the original phase one sites enjoyed.

Further, this architecture allows DCPS to leverage its investment in the two Server sites. No matter how many hub segments are added, all sites become connected in exactly the same fashion as in phase one, thus, any investment made in the Server sites will be equally available to all Core and Access sites.

As requested the entire ATM network will be a single IP address space.

## **Phase 3 Integration of Current Frame Network**

### ***Seamless Migration from SMDS***

Currently, DCPS schools are connected via a T-1 SMDS frame network. As Core and Access sites are connected to the new network they can be removed from the SMDS network. In making this transition, the SMDS connections of key buildings such as the Server sites would be maintained to provide the connectivity between the new network and the old SMDS network. This will provide a seamless transition that will allow existing sites on the SMDS network to continue communicating with the sites on the new network. As sites are connected, and the SMDS connections terminated, the savings can be used to offset costs of the final network.

## **Network Architecture Details**

### **Network Overview**

This section articulates WinStar's engineering approach to provide the DC Public School System with a broadband communication network. The proposed network will interconnect school facilities throughout the city with major server locations, offering internet access and video transmission at speeds well in excess of current capacity.

WinStar's infrastructure is straight forward and simple, combining high bandwidth with reliable performance. It is readily available in instances where traditional LEC capacity has been exhausted and augmentation is problematic or expensive. Our technology is state-of-the-art and enables us to guarantee circuit performance far superior to that offered by older infrastructures. The WinStar network is protocol insensitive, supporting a wide variety of user application: voice, data, multimedia or video, thus providing the school system with a transparent agent for end users that are adding new facilities or rolling over existing services, to take advantage of our superior performance.

## **Network Architecture**

WinStar has selected a two level network architecture that minimizes the path length between any two sites, optimizes network performance and enhances system reliability.

The network backbone, or core, consists of a bi-directional optical fiber ring offering wide bandwidth, redundant connections, and a high tolerance to circuit outages. DC School System server sites will be positioned on this ring as will carefully selected WinStar hub sites.

Access by schools to the core network will be provided by WinStar "Wireless Fiber" between each individual school and an appropriate hub site or sites. "Wireless Fiber" is a trade name for our ultra reliable microwave service. WinStar typically designs this service to provide availability in excess of 99.999%, significantly greater than today's generation of optical fiber. For specific locations, where even "Wireless Fiber" reliability is insufficient, dual connections can be provided.

To enable as precise and complete an analysis as possible, the proposed WinStar network is described in two parts, coinciding with the two phases of network implementation requested by the DC School System. Phase 1 addresses a pilot network that can be quickly implemented enabling the School System to prove out concepts, provide immediate service and implement a test bed for existing and planned school system applications.

Phase 2 describes two methods of expanding the pilot network with additional schools and facilities. The preferred version enables a gradual or incremental expansion without disruption of existing facilities.

### **Phase 1 - The Pilot Network**

#### *Backbone Network*

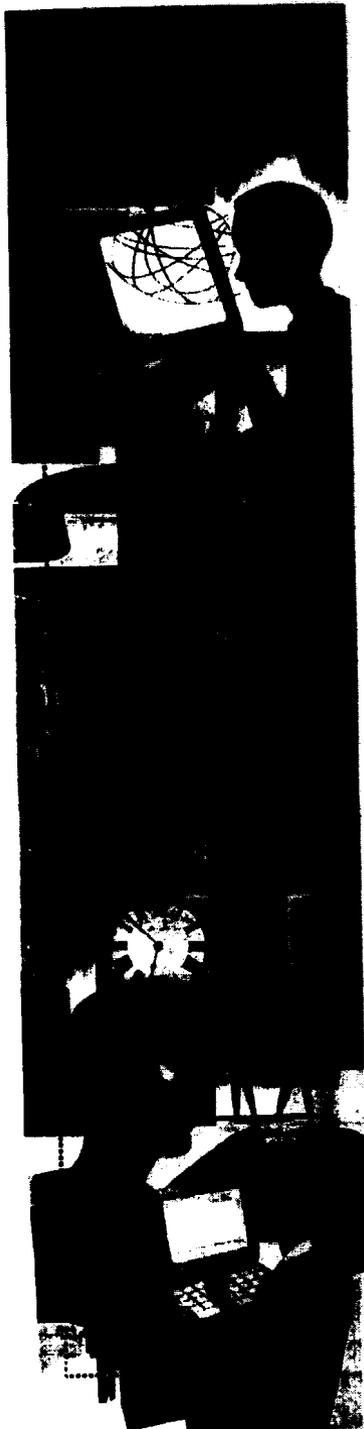
The pilot backbone network will interconnect two School System server sites and four carefully selected WinStar hub sites in an OC3 bi-directional optical fiber ring. Figure 1 identifies those sites and illustrates their interconnection. Since all server sites and WinStar hubs are on a fully redundant fiber ring, the proposed network can tolerate the loss of an individual link anywhere in the backbone, without losing contact with any site in the network. The ring configuration further enhances both reliability and cost by reducing the number of required links when compared with an

equivalent star, or hub and spoke network. Note, this is subject to the availability of reasonable terms and conditions for roof rights on the Hub sites.

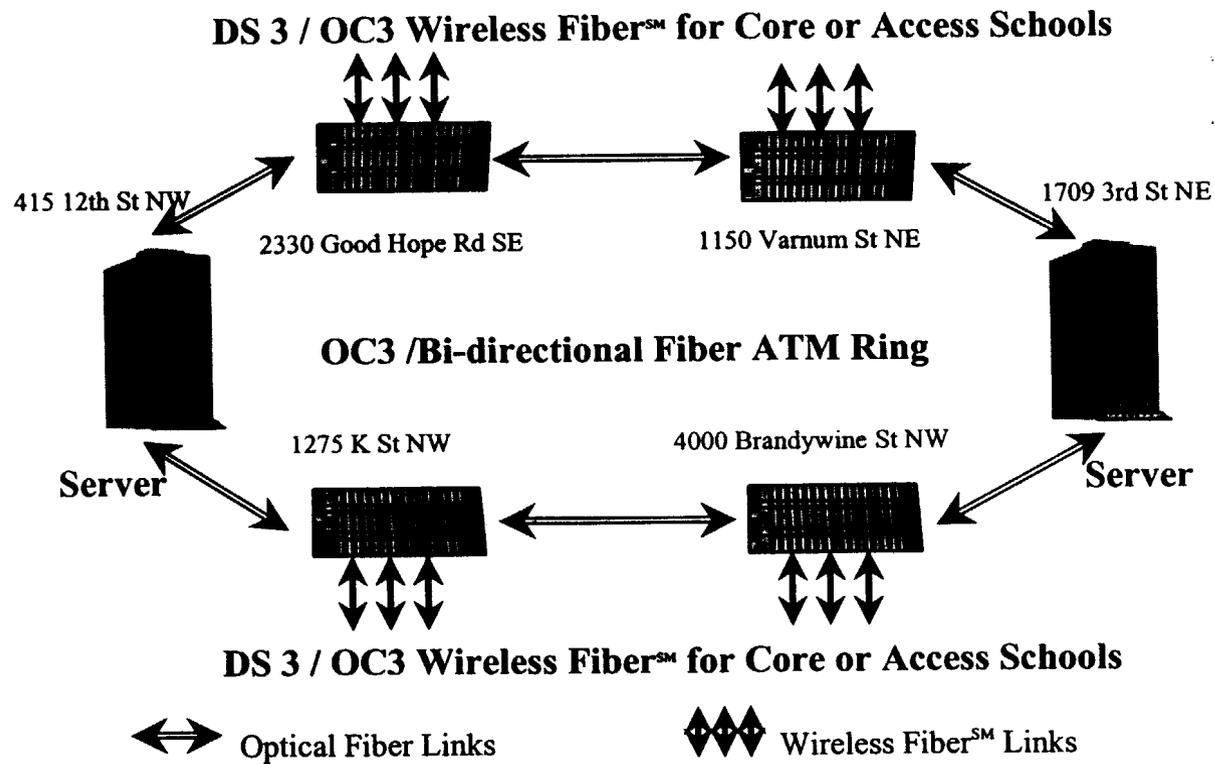
### ***Access Network***

Access to the pilot backbone network is provided by WinStar "Wireless Fiber". Individual schools will be connected to the appropriate hub via point to point DS3 microwave links. Since each site has dedicated DS3 bandwidth, any site can be a cluster or magnet school, not only for it's immediate neighbors, but also for any other location in the network. Redundant access links should not be required, but for specific locations, where even "Wireless Fiber" reliability is insufficient, dual connections can be provided.

A total of 27 School System sites have been selected as candidates for the pilot system. These sites all have suitable "Line Of Sight" (LOS) to one or more of the selected WinStar hubs. Figures 2 through 5 identify these sites and show their connections to the preferred hub.



# Phase 1 - ATM WAN



*Backbone Links Required = 6      Outage Tolerance = 1*

4/6/98

**WINSTAR<sup>®</sup>**  
**for EDUCATION**

**WinStar Hub - 1275 K St NW**

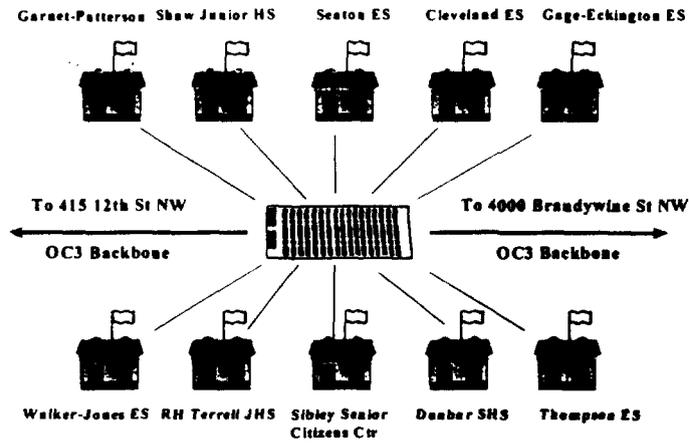


Figure 2

**Marbury Place - 2330 Good Hope Rd SE**

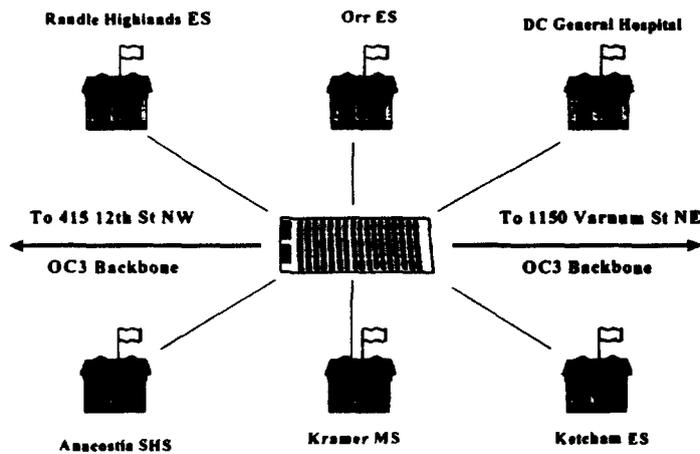
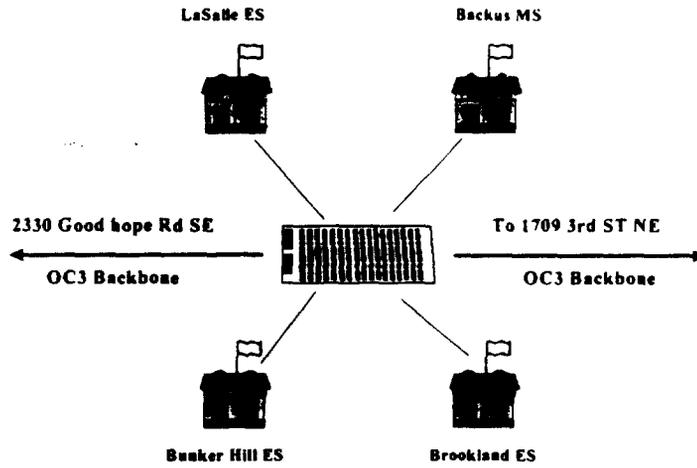


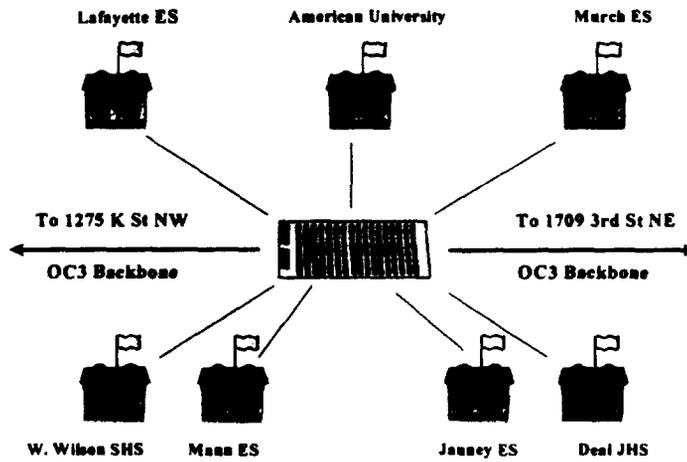
Figure 3

**Providence Hospital - 1150 Varnum St NE**



*Figure 4*

**4000 Brandywine St NW**



*Figure 5*

## Phase 2 - The Expanded Network

Starting with the pilot network, expansion will be by the addition of new hub(s) together with associated school clusters, or by addition of individual schools to existing hubs, where line of sight permits. Where line of sight is not available to a particular school, that site can be connected to the nearest hub using traditional terrestrial facilities.

Figure 6 illustrates the method of hub addition. When adding a hub the original backbone ring remains intact and new hubs are added as additional loops between the server sites. Path links remain short and implementation can be gradual or incremental without disruption of existing facilities.

### DC PUBLIC SCHOOLS - PHASE 2 (Option A)

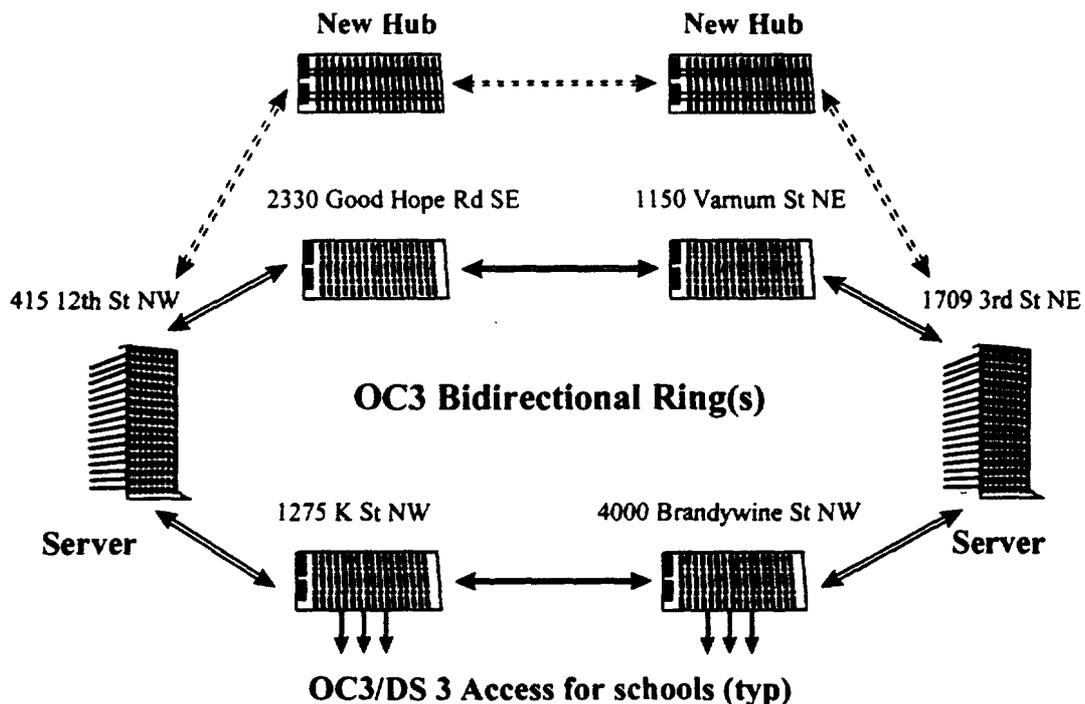


figure 4.6

The effective bandwidth of the backbone network is increased by the addition of each new loop, so backbone links at OC3 rates may prove adequate for years to come. Should increased traffic render the backbone bandwidth inadequate, in the future, an upgrade to OC12 or higher may be feasible.