



NORTH CAROLINA
State Board of Education
Department of Public Instruction

Report to the North Carolina General Assembly

School Connectivity Initiative
Legislative Update - **FY2024**

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DPI Chronological Schedule, 2024-2025

Data Provided for State Fiscal Year 2023-2024

E-Rate Cycle Year 2023

Submitted by the North Carolina Department of Public Instruction in
conjunction with The Friday Institute for Educational Innovation,
North Carolina State University

STATE BOARD OF EDUCATION

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EXECUTIVE SUMMARY

The North Carolina School Connectivity Initiative (SCI) enables sufficient and reliable Internet access to every public school classroom across the state. Through the SCI, the NC Department of Public Instruction (NCDPI) also provides all Public School Units (PSUs) with cooperative purchasing agreements, training, support, network engineering, content filtering, identity management and firewall services. North Carolina has been building this program for 18 years and is recognized as a national leader in providing equitable connectivity to all public schools.

North Carolina utilizes the Federal Communications Commission's (FCC) [E-Rate](#) program to the fullest extent possible and is a leading recipient of FCC funding on a per-student basis. This report details the significant accomplishments achieved over the State Fiscal Year 2024 (SFY24) and calendar years 2023 through 2024 (CY23 to CY24). Due to the schedule in which the FCC allocates funding, multiple calendar years are reported for some data. Included are financial and operational performance data, opportunities for improvement, risks, mitigation strategies, and recommendations for legislative action. Key graphs used in this report are available online and interactively at <https://go.ncsu.edu/SClreport> courtesy of the Friday Institute for Educational Innovation at NC State University.

KEY CHARACTERISTICS OF THE PROGRAM

Schools and NCDPI recover Universal Service Fees paid by North Carolina residents in their telecommunications bills. These fees are distributed to schools through the E-Rate program. Every school has a fiber internet connection, and every classroom has Wi-Fi access, all because of the SCI and the E-Rate program. Over the last decade, the public schools in the state have averaged \$75 million in funding commitments from the FCC E-Rate program. North Carolina is a recognized leader in utilizing the FCC E-Rate program; in 2023 the state [recouped 99% of the fees collected by the FCC](#) from North Carolina residents and businesses. See <https://go.ncsu.edu/USFmap> for more details.

The aggregate K-12 Internet capacity is approximately 620 Gbps (billion bits per second), with the aggregate average peak network utilization at about 70%. Every school has enough bandwidth to support digital teaching and learning, with the capacity to grow, without overpaying for excess network capacity.

Managed firewall, content filtering, endpoint protection and identity management services are provided at no cost to the PSUs, to protect students and school business systems.

E-Rate training programs for pertinent PSU staff are provided. Leadership training is provided through a partnership with the UNC School of Government for PSU Chief Technology Officer/Technology Leaders.

The initiative provides network operations support, on-site technical assessments, and assistance is provided to PSUs to ensure the impact of the investment in infrastructure is maximized.

In Fiscal Year 2024, each dollar of state funding spent on E-Rate eligible goods and services delivers \$4.52 in value to the PSUs.

Through analysis and modeling of E-Rate filing scenarios performed by the Friday Institute, SCI continues to optimize E-Rate Internet access applications to maximize the amount of E-Rate funding the state receives.

Through 2023 and 2024, DPI took significant steps to upgrade the cybersecurity protections for PSU networks. However, a large portion of this upgrade was accomplished with non-recurring funding.

In 2024, the FCC created a three-year E-Rate Cybersecurity Pilot Program. This program will provide a de minimis amount of E-Rate support for cybersecurity in North Carolina. Upon completion of the

three-year program, we expect that the FCC will execute a rulemaking procedure to determine if E-Rate should provide permanent support for cybersecurity. We do not expect significant support from the FCC for cybersecurity in the foreseeable future.

CONSIDERATIONS AND RECOMMENDATIONS

Detailed within this report are several recommendations for legislative actions that are necessary for SCI to remain viable at the current service levels.

1. Since the pandemic, the General Assembly has provided \$14 million in non-recurring SCI funding which was used for cybersecurity efforts. The state has established a nationally recognized K-12 cybersecurity program which provides significant cybersecurity support and mitigations at no charge to the PSUs. No PSU utilizing these new enhanced cybersecurity mitigations provided by this funding experienced a ransomware outbreak during FY2024. However, now that the non-recurring funding has ended, we are at risk of losing the current cybersecurity posture.

While \$5 million of recurring funding for E-mail Threat Detection has been appropriated, the core cybersecurity functions, Advanced Firewall and Advanced Endpoint Protection, remain underfunded. The General Assembly should work with NCDPI and the Friday Institute to evaluate the effectiveness of the various mitigations and provide funding to sustain this program and protect our schools.

The cybersecurity measures currently in place are uniform across the state, ensuring fair and equitable distribution of the resources, while also benefiting from economies of scale and providing drastically reduced pricing that would not be available if each PSU were to procure individually.

2. In late 2025, the FCC will likely adjust the per-student budget for Wi-Fi and Ethernet equipment based on inflation. The state should prepare for an increase in the required recurring appropriations in the following year. For the state to fully utilize every dollar available for Wi-Fi in the classroom from the FCC E-Rate program, the General Assembly would need to commit an additional (approximately) \$2,500,000 of recurring funding to the SCI. Once the FCC sets the new five-year per-student budget, the Friday Institute will calculate the exact state match required to fully maximize the use of this federal program¹.
3. The General Assembly has also appropriated \$600,000 of recurring funding for Cybersecurity Awareness Training. DPI has procured a product which is recognized as a leader in this market; however, there is an opportunity to fully utilize the allocated funding to provide additional training resources within the budget. The General Assembly should acknowledge that training for compliance with privacy laws, such as HIPPA, FERPA, and various other regulations is within scope and can be procured to the extent possible with the appropriated funding level.
4. Several western districts receive stipends for their Wide Area Networks in 2006, because at the beginning of the SCI, the most cost-effective way to connect these counties was through a consortium. These connections were obtained with non-recurring funding and are built on leased fiber known as an infeasible right to use (IRU). As it is approaching time to renew these IRUs, the State should address these stipends and ensure that each district utilizing IRUs is obtaining cost-effective connectivity and has equitable access to funding and support for their connectivity. E-Rate does support fiber build-out through the “special construction” option, but it must be shown to be cost-effective, and the state must provide a match. More analysis and cooperation with the affected PSUs will be required. All districts using these IRUs which are due for renewal were heavily impacted by Hurricane Helene. The state should be prepared to provide funding that ensures these western

¹This assumes the FCC adjusts the per-student budget from \$167 to \$200. Other assumptions include statewide ADM of 1.5 million and average E-Rate discount of 75%.

counties remain connected to NCREN and are able to rebuild their networks with the maximum use of E-Rate funding.

5. In recent months SCI has noticed an appreciable increase in the amount of internet traffic utilizing VPNs. While substantial mitigations are in place to prevent disruptive or inappropriate content from being accessed on the school network, no technology is perfect. Furthermore, many students may access inappropriate content at school while using their cellular connection that is not subject to the schools filtering. It is imperative that the State support teachers in their efforts to maintain control of their classrooms. The State should work with a trusted university partner to analyze the effects of cell phones in classrooms and make policy recommendations. The State should also encourage schools to follow the best practices for filtering as provided and updated by DPI. The use of VPNs, if unchecked, could result in substantial increases in bandwidth consumption which will impact the cost of providing internet to the PSUs, while also distracting students during class time. Furthermore, excessive use of the school network for non-educational purposes could lead to degradation in service for the students who are using it for educational purposes.

Invoicing from NCDIT for statewide internet, managed firewall and content filtering continues to be problematic and error prone. The typical monthly invoice to DPI for these services is often over 50 pages long. Errors, even very small, can cause serious issues with the FCC and the Universal Services Administrative Corporation, which manages the funding for the FCC. The State should require DIT to use DPI PSU identifiers, in addition to the PSU name, for each charge. Many charter schools change names annually, and many other schools have very similar names. These seemingly insignificant differences can become major issues in USAC and FCC reviews and audits. USAC has been known to require extensive restatement or resubmission for errors as small as \$0.06.

PERFORMANCE OVERVIEW

The vision of the SCI is to ensure all NC PSUs have equitable access to secure and reliable high-speed Internet access, sufficient to meet their instructional and professional needs, through efficient use of federal and state funding.

It is our mission to maximize the state and local use of the federal E-Rate program to obtain the greatest discounts or reimbursements possible. This is accomplished with cooperative purchasing agreements (CPAs) and common shared services which enable PSU local control while leveraging economies of scale.

E-RATE UTILIZATION RATE BY NORTH CAROLINA

In SFY2024 or the 2023 E-Rate filing cycle (January 2023 through September 2024):

190 PSUs submitted 498 requests for E-Rate that were funded by the FCC. A total contract value of \$92M was sought with \$69M of that being provided by the FCC E-Rate program.

95% of all funding requests were approved by USAC.

The average E-Rate discount for NC public schools is about 75%. This is not expected to change significantly in the foreseeable future.

These results are directly attributable to the work of SCI's regional E-Rate coordinators providing:

Direct assistance within PSUs for E-Rate planning and filing

Individualized support through multiple levels of FCC reviews, audits and appeals occurring throughout the year

Multiple regional training events open to all E-Rate eligible entities, including public libraries

Planning, filing, and audit support of multiple state Internet consortia applications

Assistance from The Friday Institute in data analytics and the development of algorithms to determine the optimal E-Rate filing strategy to maximize E-Rate discounts.

FINANCIAL SUMMARY

The School Connectivity Initiative resulted in \$114 million in expenditures, supported by \$39 million in state appropriations and \$75 million in FCC E-Rate funding. Table 1 summarizes SFY2024 total SCI expenses, the portion paid by E-Rate, and the portion paid by state funding. The FCC groups E-Rate eligible expenses into two broad categories. Category One includes external connectivity expenses that deliver Internet and interconnect individual schools via fiber, and Category Two consists of internal connectivity expenses that provide the wiring, switches, and wireless access points within each school building.

Table 1

Financial Summary SFY24 (unaudited)

	Total Cost	E-Rate Portion	State Portion
Category 1 Consortium Internet	\$11.63	\$9.04	\$2.95
Category 1 School Fiber Connections (WAN)	\$27.45	\$21.44	\$6.01
Category 2 Classroom Connections (Wi-Fi)	\$57.28	\$44.57	\$12.71
<i>E-Rate Eligible Totals</i>	<i>\$96.36</i>	<i>\$75.05</i>	<i>\$21.31</i>
Identity & Access Management	\$1.82	*	\$1.82
Client Network Engineering	\$1.80	*	\$1.80
Program Administration ERC, FFL, FI, NCDPI	\$1.23	*	\$1.23
Firewall Services	\$2.91	*	\$2.91
Content Filtering Services	\$5.34	*	\$5.34
Endpoint Protection Services	\$3.75	*	\$3.75
Cybersecurity Training	\$0.56	*	\$0.56
NC DIT Administrative Fee	\$0.20	*	\$0.20
<i>E-Rate Ineligible Totals</i>	<i>\$17.61</i>		<i>\$17.61</i>
Grand Totals	\$113.97	\$75.05	\$38.92

Note. All values in millions, rounded.

*Not E-Rate Eligible

Each year approximately 85% of SCI expenditures are eligible for FCC E-Rate discounts. Every E-Rate-eligible purchase goes through multiple reviews by the Universal Services Administrative Company (USAC), a subcontractor to the FCC, to ensure the most cost-effective and technically sufficient solution is selected through an open and competitive bidding process. For most PSUs, SCI's E-Rate Coordinators are involved in filings and at various levels during the review and audit processes. The SCI team is responsible for all filings and work related to NCREN (NC Research and Education Network) which provides internet connectivity from the various PSUs to the public internet. The SCI team works to maximize the use of E-Rate funding wherever possible.

For every \$1 of state funding spent through the School Connectivity Initiative, North Carolina schools received \$2.92 in total value.

For every \$1 of state funding spent specifically on E-Rate-eligible goods and services, North Carolina schools received \$4.52 in total value.

CONSORTIUM INTERNET

SCI offers all PSUs fiber-based Internet access to a single centralized location, often the district central office, through the NC Research and Education Network, (NCREN) operated by MCNC. This opt-in service is provided at no cost to all PSUs. For over a decade, all 115 districts have selected to opt-in to this service.

Charter schools may opt-in to this service at no cost or receive an annual \$5,000 allotment for Internet service. 178 charter schools use the state-provided internet service through NCREN.

On behalf of the 293 PSUs that opt-in to the service, SCI establishes NCREN Internet access through a contract with the NC Department of Information Technology (NCDIT). Cost containment is achieved by actively monitoring each PSUs actual internet usage and only procuring the capacity needed, based on industry-standard metrics, and observed bandwidth usage.

For SFY2024, the actual cost of Internet via NCREN was \$11.6 million with an E-Rate funding commitment of \$9.0 million, making the State portion \$2.6 million. Note that in future years, the actual cost to the state could go higher if PSUs increase bandwidth beyond what was predicated at the time of the annual E-Rate filing.

In CY2022, NCDPI bid the consortium internet contract and, while capacity increased, costs decreased on a per-Megabit per second basis. While the SCI team works to leverage the E-Rate program to the maximum level possible, anticipating bandwidth demands in the post-COVID world has become increasingly complex.

SCHOOL FIBER CONNECTIONS (WIDE AREA NETWORK, WAN)

To distribute Internet access from a district central location to each school, districts use private service providers, such as Spectrum, AT&T, Lumen, or Conterra, to provide a fiber-based Wide Area Network (WAN). These WANs aggregate all the district schools to a central location for upstream connection to NCREN and the public Internet. Each of these connections are eligible for E-Rate discounts of up to 90%. Any PSU with multiple campuses is eligible to have a WAN that is funded by SCI.

With over 2,500 school buildings in NC and dozens of service providers in the state, it is not feasible for SCI to provide WAN services in the same manner as Internet service. Therefore, each district is responsible for the procurement, management, and E-Rate filings for their WAN. The SCI E-Rate coordinators provide each PSU guidance and assistance with each step. Upon FCC approval, the service provider bills E-Rate directly for the discounted portion and invoices the PSU for the remaining cost of the service. SCI provides an allotment to the PSU to cover this discounted invoice, resulting in a net-zero cost to the PSU for E-Rate eligible expenses. In SFY2024, PSUs received approximately \$27.5 million in WAN services with E-Rate covering approximately \$21.4 million, leaving just \$6.1 million for SCI to cover. These funds provide fiber connections to approximately 2,500 school buildings. Despite significant increases in bandwidth year after year, the cost to the state went down by several hundred thousand dollars compared to last year. See Appendices A and B for funding details on a per-PSU basis.

CLASSROOM CONNECTIONS (WI-FI)

With Internet service delivered to the individual school building, additional network infrastructure is necessary to distribute access to individual classrooms. Funding inside the school building is considered Category Two in E-Rate terminology and has different rules than the funding used to provide fiber to the school building itself. Unlike Internet and WAN funding, this classroom connection funding is capped by the FCC on a per-student basis of \$167 per student over five years (2021 to 2025).

The procurement process is similar to that of the WAN: PSUs make the purchases, the vendor bills E-Rate and then invoices the PSU for the balance (the non-E-Rate portion), and finally, SCI allots to the PSU an amount equal to the non-E-Rate portion as committed by the FCC.

In July 2014, the FCC issued an E-Rate Modernization Order establishing a five-year per-student "budget" to expand funding for robust classroom Wi-Fi. In response, SCI established Cooperative Purchasing

Agreements providing numerous options for each PSU to select a vendor of their choice. The CPAs provide deep discounts that would not be available to most PSUs if they were to obtain services and equipment on their own. SCI continues to maintain and re-bid these contracts as necessary to meet state procurement laws and E-Rate rules.

SCI has an established and tested methodology to track each PSU's use of E-Rate funds and to budget for each funding year. If every PSU applies for every dollar allowed under the current 5-year E-Rate budget cycle, PSUs could procure \$267 million of classroom connectivity equipment, with E-Rate providing \$200M and SCI providing the remaining \$67 million. Over the next two years, for every \$1 of state funding, the PSUs would receive \$4 of equipment, on average, for Category Two procurements.

As of November 2024, all public schools in aggregate have a remaining Category Two budget of \$54 million. That represents about 20% of the total available Category Two budget for all NC public schools. Given that this is year five of a five-year budget cycle, NC is perfectly on track to consume 95% or more of the available Category Two federal funds in this five-year E-Rate cycle. The SCI program aims to enable schools to refresh their network equipment on about a six-year basis. Rules in the program ensure useful equipment is not replaced before its expected useful life is reached.

Note that the state portion is not evenly split over the five years, since there is no way to centrally manage every PSU's Wi-Fi procurement schedule. This can create challenges as there is no way to predict which districts will file for Category Two each year. Large, low-discount districts can cause a funding shortage if they request a disproportionate amount of Category Two funding in any one single year.

A detailed analysis and tracking tool for Category Two has been developed by the Friday Institute and is available at: <https://go.ncsu.edu/cat2budget>

The following figures provide screen shots of the interactive Category Two Budget Dashboards for 2023 and 2024. The darker green districts have utilized most, if not all, of their Category Two budget. We expect the remaining yellow districts to utilize most, or all, of their Category Two budget in E-Rate cycle 2025, which begins in January 2025 and ends in September 2026.

Figure 1

Screenshot of the Category Two budget tracking tool November 2023

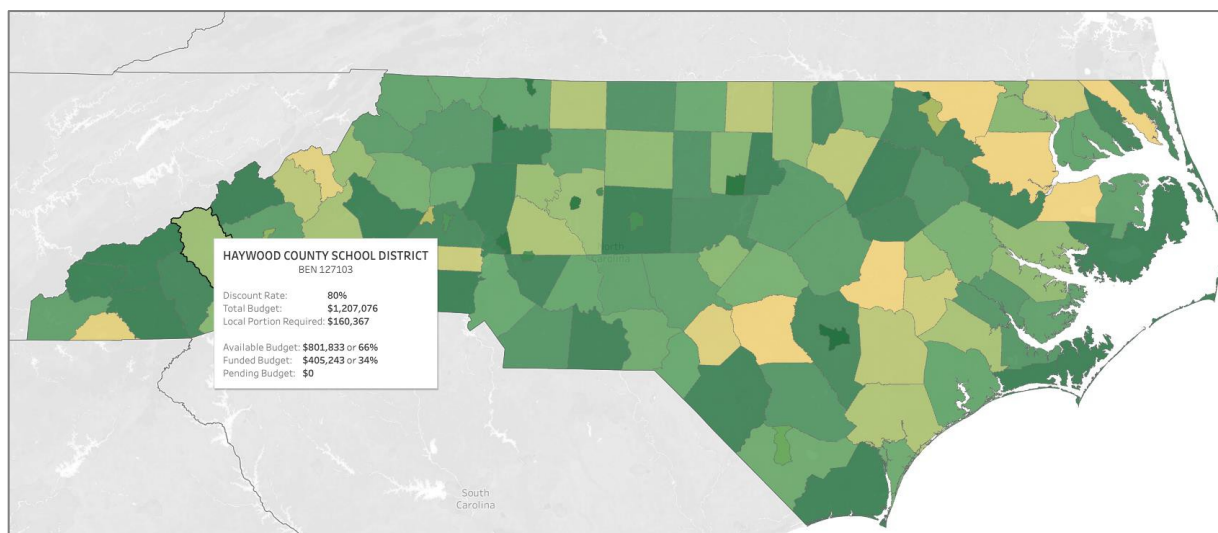
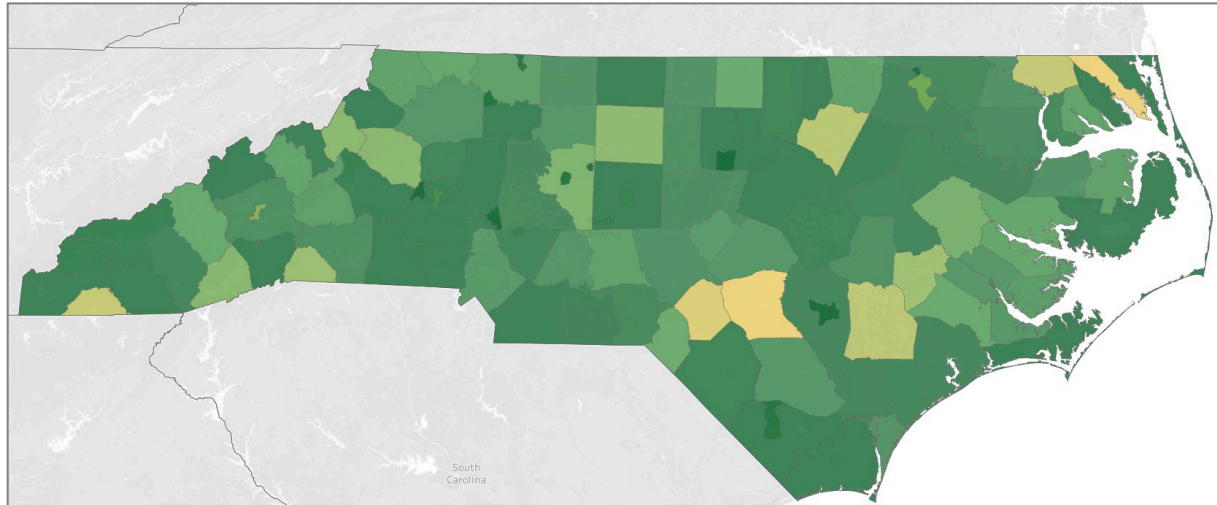


Figure 2

Screenshot of the Category Two budget tracking tool November 2024



A detailed accounting of Category Two funding for E-Rate year 2023 (SFY24), which includes calendar years 2023 and 2024 is provided below. This data is broken out by E-Rate discount, which is based on district rurality and the percentage of students eligible to participate in NSLP (National School Lunch Program). “Pre-discount” is the full contract value of the equipment and services. “Requested” is the portion of the total cost requested from the FCC. “Committed” is the amount that the FCC agrees to provide. “Disbursed” is the actual amount that the PSUs received from the FCC. Sometimes projects require less funding than expected. PSUs can only be reimbursed for actual expenses incurred thus the disbursed amount may be slightly less than what the FCC committed.

Table 2

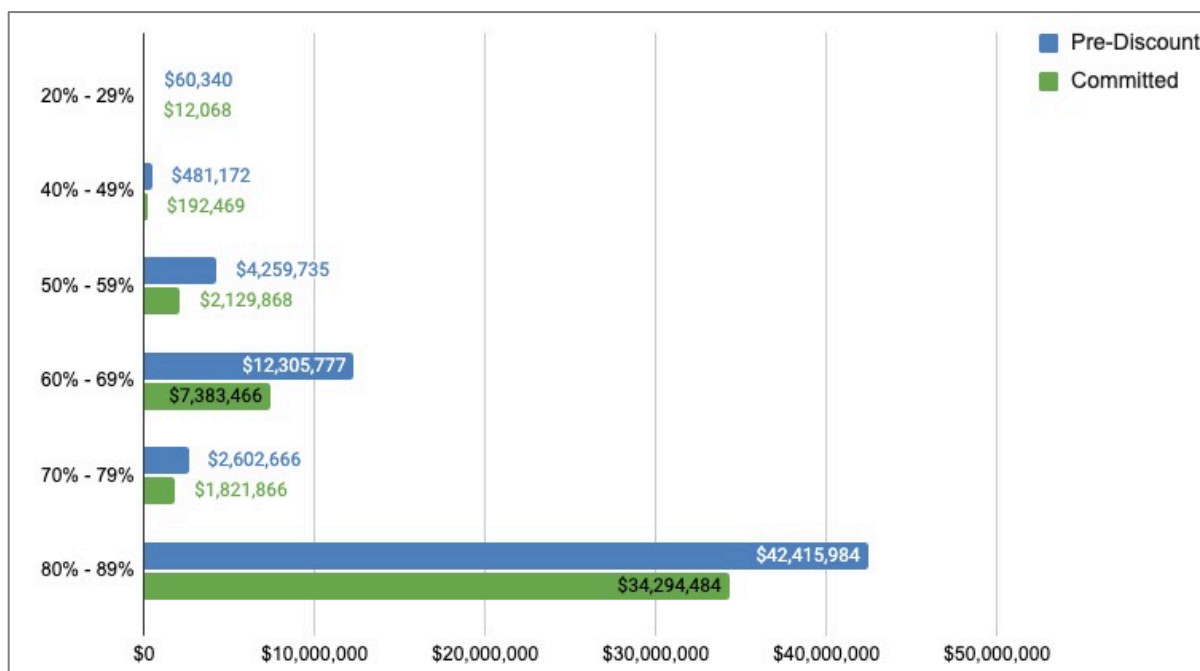
E-Rate Year 2023, State Fiscal Year 2024 Category Two by discount rate

Discount Percentage	Requests	Pre-Discount	Requested	Committed	Disbursed	Utilization Percentage
20% - 29%	3	\$60,340	\$12,068	\$12,068	\$12,068	100%
40% - 49%	18	\$481,172	\$192,469	\$192,469	\$140,129	73%
50% - 59%	27	\$4,259,735	\$2,129,868	\$2,129,868	\$2,059,232	97%
60% - 69%	40	\$12,305,777	\$7,383,466	\$7,383,466	\$7,108,875	96%
70% - 79%	18	\$2,602,666	\$1,821,866	\$1,821,866	\$1,670,081	92%
80% - 89%	226	\$42,415,984	\$34,294,484	\$34,294,484	\$33,596,793	98%
	332	\$62,125,674	\$45,834,221	\$45,834,221	\$44,587,178	

The E-Rate discount has a profound, and non-linear effect, on the schools with higher NSLP participation. The difference between a 75% discount and an 80% discount is not simply 5%. Consider that at 75% E-Rate discount, each state dollar results in \$3 of E-Rate. However, at 80% E-Rate discount, each state dollar results in \$4 (or 33% more) funding from the FCC. This profound increase in FCC funding, with just small changes in discount rate, is the reason the SCI team works diligently to ensure the accuracy of student nutrition data that is provided to the FCC, as well as to optimize the way DPI files the consortia internet application.

Figure 3

E-Rate Year 2023, Category Two by discount rate



Several of the western counties affected by Hurricane Helene have substantial Category Two funding available for use in calendar year 2025. Those counties with budgets remaining are enumerated in the following table.

Table 3

Hurricane Helene-affected PSUs, Category Two budgets for 2025

PSU	Available Category Two Budget
Buncombe County Schools	\$624,090
Asheville City Schools	\$528,246
Haywood County Schools	\$498,834
McDowell County Schools	\$351,916
Transylvania County Schools	\$337,502
Polk County Schools	\$260,155
Rutherford County Schools	\$229,809
Avery County Schools	\$198,824
Ashe County Schools	\$157,545
Yancey County Schools	\$132,184
Total	\$3,319,105

NCDPI must ensure that state funds are allotted based on actual expenses, not committed. Some for-profit E-Rate consultants charge their clients based on the amount committed, and thus may request more funds than necessary. While the FCC will not pay for expenses that have not been invoiced, this is a potential issue for the SCI program. Excessive requests of Category Two results in reversion of SCI funds which could otherwise be used by other districts. NCDPI has been working diligently this year to ensure that allotted SCI funds only match actual invoiced expenses. This ensures that equitable funding is available to all PSUs and that no school receives a disproportionate amount of Category Two funding.

The FCC will reevaluate the Category Two program and reset the budgets in 2026. The original budget in 2015 was \$150 per student. In 2021 the budget was adjusted to \$167 per student, over a 5-year period, based on inflation. On average, the Category Two E-Rate discount is 74% across the state.

The Friday Institute closely monitors the usage and produces the dashboard mentioned above annually. As seen in the table above and compared to last year's Legislative Report, the total contract value for Category Two decreased by \$14.9 million or 27% year over year.

Preliminary data for E-Rate Year 2024 (State Fiscal Year 2025), which is the current cycle, shows \$50 million in total contract value with SCI expected to provide \$12 million of that amount. Fiscal Year 2026 Category Two expenditures (which will be filed for in January 2025) are on target completely consume the states total Category Two budget. Very few states can claim this level of utilization of the FCC E-Rate program while maintaining tight controls to prevent abuse and waste.

Table 4

Category Two E-Rate utilization in the current 5-year budget cycle (as of December 1, 2024)

Year	Requests	Pre-Discount	Requested	Committed	Disbursed	Utilization Percentage
2021	400	\$53,656,494	\$39,228,315	\$39,158,667	\$28,593,487	99%
2022	224	\$38,747,898	\$29,086,047	\$29,086,047	\$27,334,478	94%
2023	336	\$62,165,799	\$45,866,320	\$45,866,320	\$44,619,223	97%
2024	420	\$49,823,921	\$37,262,355	\$37,262,355	\$10,866,966	29%
	6,820	\$424,065,024	\$313,897,629	\$313,617,430	\$280,557,608	89%

See Appendix C for more data regarding historic E-Rate utilization and trends.

E-RATE INELIGIBLE EXPENSES DETAIL

While most SCI expenses are leveraged against E-Rate, there are several items that are not E-Rate eligible:

Firewall Services: PSUs may opt-in to the SCI firewall service offered at no charge to the PSUs through a contract with NCDIT. This firewall service enforces network policies designed to protect school networks. In SFY24, 87 districts, 138 charters and the deaf and blind schools utilized this service at a cost of \$2.91 million in state funding.

Content Filtering Services: PSUs may opt-in to the SCI Content Filtering Service offered at no charge to the PSU through a contract with NCDIT. Each PSU's acceptable use policy is enforced on school-issued student devices regardless of the device's location, on or off campus. This type of filtering is required by E-Rate and the Children's Internet Protection Act but is not E-Rate eligible. Currently, NCDIT is billing NCDPI for 87 districts, 137 charters and the deaf and blind schools for this service at a cost of \$5.34 million in state funding.

Identity and Access Management (IAM): The 2015 appropriations act expanded the SCI budget by \$12M annually effective SFY2017 and included IAM services. Processing logins for every student and staff member daily, IAM automates the provisioning and management of accounts for every student and school employee, over 1.8 million accounts. Integration of those accounts with cloud-based applications and services allows for more consistent security across applications and across PSUs. NCDPI manages the NCEdCloud IAM service through a contract with an identity services provider at an annual cost of \$1.8M. Note that this contract was bid in 2023 for the first time in ten years, but was canceled. The increasing need for an enhanced and more modern identity management will likely lead to higher costs going forward.

Client Network Engineering (CNE): Network infrastructure requires knowledge and skill to deliver reliable and secure access. PSUs are responsible for technology planning and the daily operation and

maintenance of their infrastructure, but they need assistance at times. SCI contracts with MCNC to assist PSUs with high-level troubleshooting, network design consultation, and related training events through its CNE team. For SFY24, CNE directly supported 141 PSUs with 350 specific engagements. SCI is invoiced quarterly for services provided by MCNC and the actual expenses incurred for each PSU engagement at a cost not-to-exceed \$1.8M annually.

- Program Administration: Program administration includes SCI staff salaries and operational costs, licenses, NCDIT program management fees and contracts with E-Rate consulting firms and the Friday Institute. For most of SFY24, four, regionally based NCDPI staff members and a manager provided technical consulting, E-Rate training, and related support at a combined compensation and benefit expense of approximately \$900,000. Additional consulting and data analysis were provided by the Friday Institute, E-Rate Central and Funds for Learning at a cost of approximately \$300,000. Total Program Administration costs are 1.1% of the total value delivered to PSUs or 3.2% of State appropriations for the program.

K12 INTERNET UTILIZATION AND CAPACITY ANALYSIS

NCREN provides for bulk purchase of Internet for all K-12 schools. NCREN peers with several major commercial carriers as well as Internet2. North Carolina schools all receive excellent Internet access, no matter how remote. By combining the purchasing power of the entire state, the cost is spread out among all the schools, enabling even the most remote or economically disadvantaged schools to have the same quality Internet access as the most urban or wealthy schools.

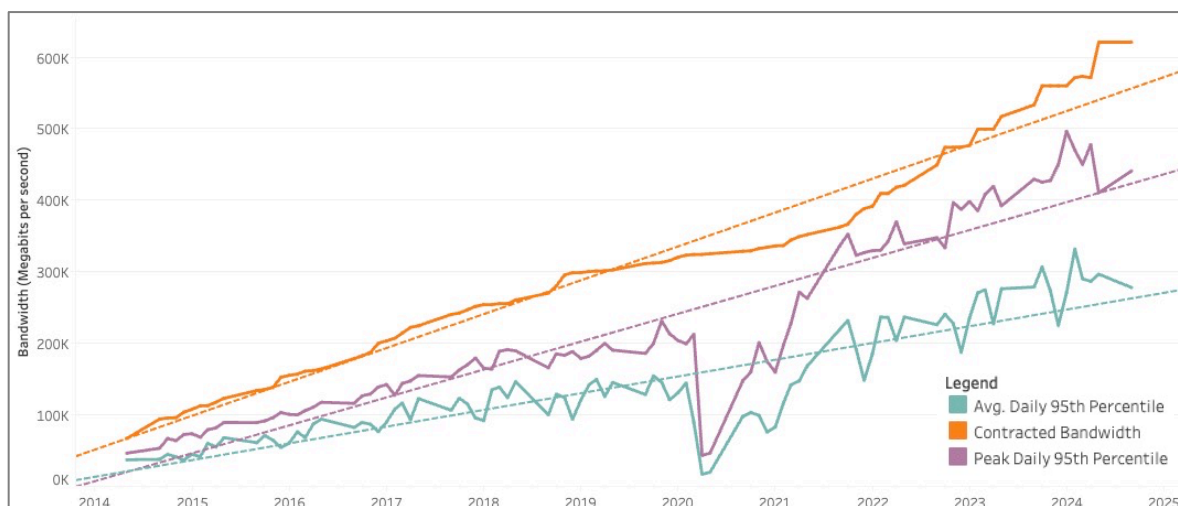
BANDWIDTH UTILIZATION

Between May 2023 and May 2024, contracted bandwidth increased from 515 Gbps to 560 Gbps. As of September 2024, the total contracted bandwidth is over 620 Gbps. Contracted bandwidth represents the maximum sustainable transmission rate between all K-12 schools, in aggregate, and the public Internet. The average daily usage is significantly below the peak. This is because the network must be prepared to handle high utilization spikes, such as may be seen during end-of-grade testing. By aggregating the access across all PSUs, the amount of capacity required per student is lowered as compared to a network design in which each PSU connects to the Internet separately. This is because the likelihood that all PSUs will be at peak capacity on the same day is extremely low. This allows SCI to procure reasonable, and sufficient bandwidth, while giving each PSU the appearance of having unlimited capacity.

Note that the data represented in Figure 4 is only downstream, from the Internet to the school; a similar graph for upstream traffic also exists. Per common industry practice, the highest 5% of usage readings have been discarded and are not used in the billing calculation. This ensures that MCNC is not aggressively billing based on transient spikes but rather the long-term average based on the lower 95% of the usage readings, taken only during weekdays from 7 AM to 5 PM. Figure 4 clearly shows the impact of the return from COVID. Summers are excluded from this data.

Figure 4

Statewide Contracted Bandwidth, Peak, and Average Utilization for all PSUs using NCREN



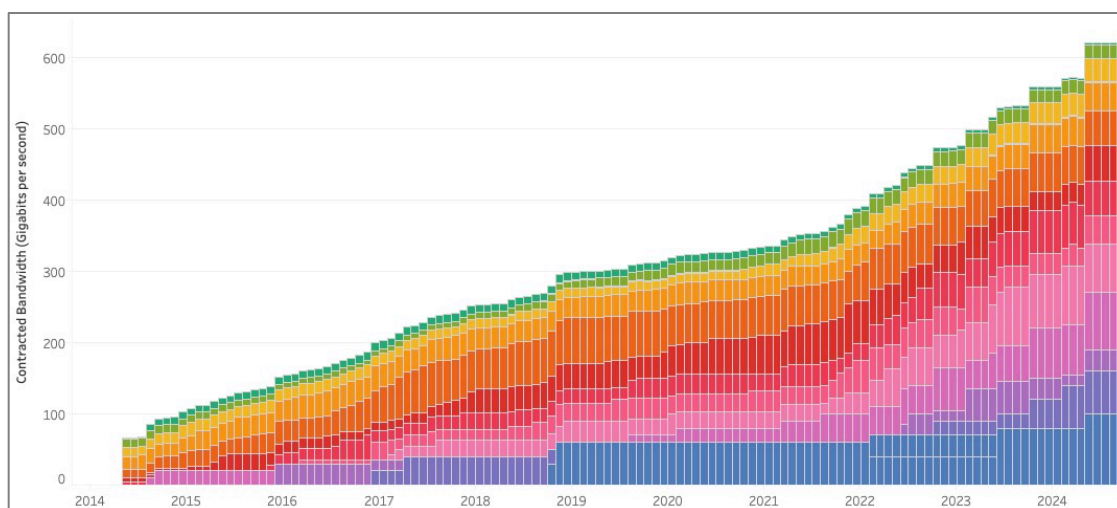
Source: Interactive dashboard at <https://go.ncsu.edu/SClreport>

One key point of distinction is that the aggregated Internet cost of NCREN includes not only peering with the public Internet providers, but also the cost of circuits (fibers) from the various PSUs to the NCREN backbone. When comparing North Carolina's K-12 internet costs to other states, it is important to include the circuit costs in the analysis.

The following diagram shows the growth of PSU contracted bandwidth, color-coded by circuit speed. The green portions of the bars represent the circuits at 100 and 250 Mbps, while the blue bars represent the 30 and 40 Gbps circuits. There are over 20 unique capacity levels in use across LEAs on NCREN. This granular billing ensures that schools are only being charged for their actual need however it can make mid-school-year adjustments more difficult. NCDPI is investigating ways to reduce the number of circuit speeds under 1 Gbps, to allow charter schools and smaller districts to more readily utilize bandwidth when needed. The need for flexibility will be balanced with cost effectiveness goals and the need for equitable use the resources.

Figure 5

Aggregate Contracted Bandwidth 2015 through 2024



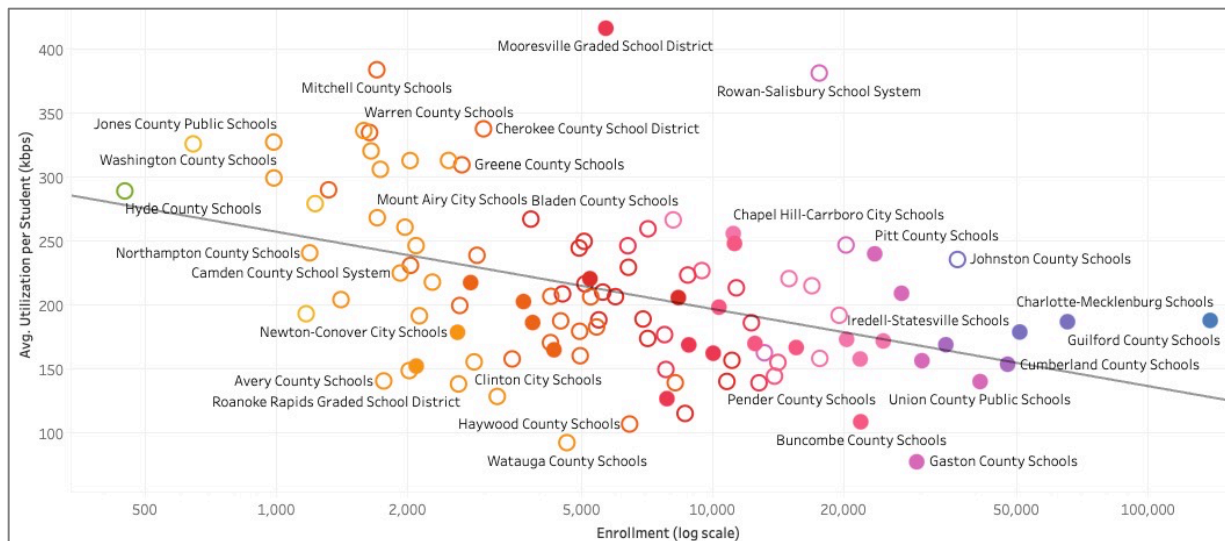
Source: Interactive dashboard at <https://go.ncsu.edu/SClreport>

The following diagram shows the relationship between district size and average Internet utilization. The size of the LEA, along the x-axis, is logarithmic in scale to spread out the data for better readability. This graph shows that the larger the LEA, the lower the average utilization. Larger districts typically have more variety in activities that may or may not require the internet at the same time. Larger districts also typically have staggered school schedules. Contrasted with smaller districts, where there is a higher likelihood that all students are in class at the same time, the utilization is spread across a smaller number of hours in the school day.

The graph is color-coded by circuit speed. Rural districts are represented with open circles while urban districts are represented with filled circles. While rural districts tend to be smaller, the graph shows there is not a particular bias for rural districts to have slower connections than urban ones. In fact, most districts with the highest usage are rural. This is probably because students at these schools are most likely to not have internet access at home, thus they rely on the school internet connection more than their urban counterparts. The gradient of color shows that the contracted bandwidth increases with the number of students in the district.

Figure 6

Average Per-Student Utilization versus enrollment, color-coded by contracted bandwidth, September 2024



Note. Only contains LEA. Open circles are rural districts, while filled circles are urban.

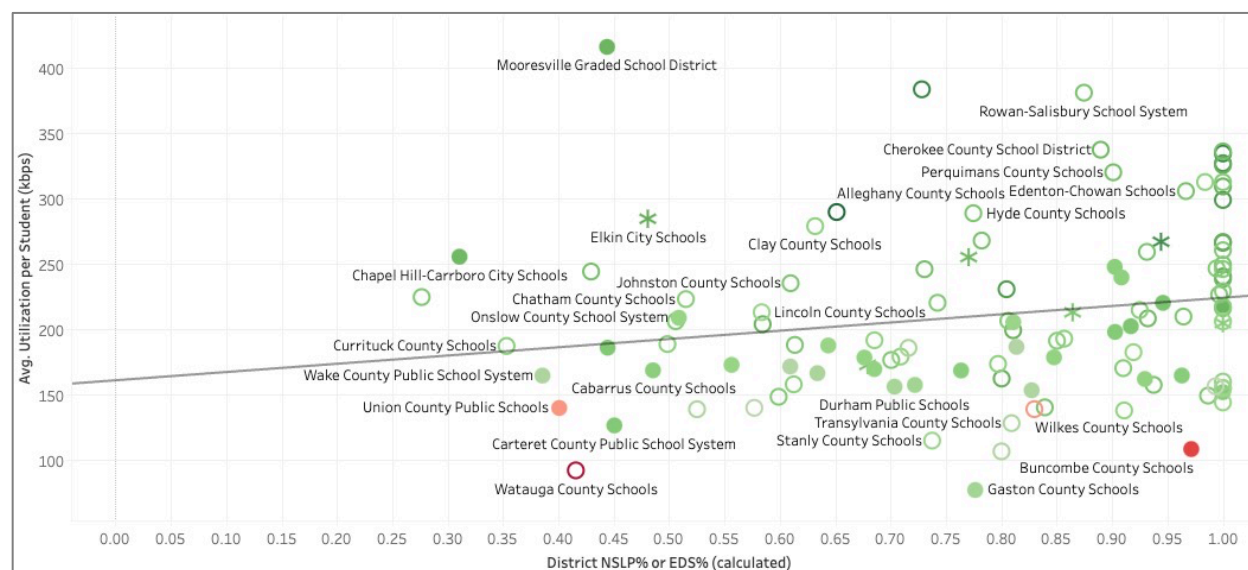
Source: Interactive dashboard at <https://go.ncsu.edu/SClreport>

EQUITY IN ACCESS

The final graph related to utilization and capacity is a high point for North Carolina and speaks to the success of the School Connectivity Initiative. The x-axis shows the percentage of students eligible to participate in the National School Lunch Program and the y-axis shows the average utilization per student. The graph is color-coded by contracted bandwidth per student.

Figure 7

Average Per-Student Utilization versus NSLP% by District, color-coded by bandwidth per student, September 2024



Source: Interactive dashboard at <https://go.ncsu.edu/SCIreport>

The y-axis is measured in kilobits per second, per student. One megabit is 1,000 kilobits. This graph visualizes the average usage on a per-student basis allowing for a more accurate comparison between PSUs.

There is no correlation between district wealth level (as measured by NSLP percentage) and utilization. This implies there is no bias in the way Internet access is provided to the PSUs by the SCI program. The wide variation of usage per student is likely a function of the teaching methodologies used in the school, school schedules, and the student's likelihood to have home internet access.

Also apparent is the value of procuring Internet access centrally by NCDPI. The cost per Mbps varies widely in the state, because of geography, topology, and service provider used for the circuits from the PSU to the NCREN backbone. By aggregating the purchasing power and procuring Internet centrally, at the state level, districts located in difficult-to-service areas are not disadvantaged compared to those in locations with multiple service providers and competition.

Readers are encouraged to visit <https://go.ncsu.edu/SCIReport> to view the interactive version of the previous figures. All PSUs, including charter schools, are shown in the interactive dashboard on the website.

COST CONTAINMENT

A per-student capacity goal of 1 Mbps per student has been proposed by various national coalitions and the FCC. On the contrary, SCI employs a capacity management process based upon data-driven predictions and demonstrated need through continuous utilization monitoring. This has proven to be a much more efficient and cost-effective approach than simply using an arbitrary Mbps per student target. We estimate that to blindly provide every student with 1 Mbps of internet access, despite data showing no justification for this, the

state would expend an additional \$20 million of which at least \$5 million of that would not be covered by E-Rate.

CONSIDERATIONS AND RECOMMENDATIONS FOR 2025

FUND CYBERSECURITY FOR SHARED RESOURCES ALREADY IN PLACE AND UTILIZED

Issue

The 2024 Biennium Budget provided additional funding for e-mail security through the SCI program. Unfortunately, there is currently no statewide program for e-mail security, and it is unlikely that e-mail security will be E-Rate eligible. The NC K-12 Cybersecurity Program was funded mostly by one-time COVID- related funding that has expired. Current K-12 statewide cybersecurity shared resources that may be impacted include managed firewall, managed endpoint security, network enumeration and asset discover services, web content filtering, and identity and access management.

Recommendation

SCI recommends that the shared resources already in place, used by most PSUs, and at risk of being turned off or greatly diminished in their capacity in 2025, be funded on a recurring basis.

The FCC began a Cybersecurity Pilot Program in 2024 however, the amount of funding North Carolina will receive from this program is de minimis.

Without additional funding, many schools may resort to reduced function cybersecurity solutions which may leave them vulnerable to attack and increase cybersecurity insurance premiums.

MINOR POLICY ADJUSTMENTS AND EFFICIENCY IMPROVEMENTS FOR SCI

Issue

No matter how well-planned, a nationwide program like FCC E-Rate results in some corner cases and unintended consequences which may create loopholes or inefficiency. SCI does an outstanding job ensuring efficient use of funds, still there is always room for improvement.

Recommendation

Additional rules should be established by the State Board after careful review and input from the various stakeholders. All schools seek the best outcomes possible for their students, but some practices may inadvertently result in inequitable distribution of SCI funds, with no ill intent. NCDPI should empower the SCI team to work with the Friday Institute to create a concrete list of actionable policy changes which will ensure equity in the program, regardless of future changes the FCC may make to the E-Rate program. NCDPI should perform a detailed analysis of the cost and quality of district WANs and help districts ensure their internal networks are not bottlenecks.

FCC CATEGORY TWO BUDGET WILL BE ADJUSTED FOR INFLATION IN 2025

Issue

It is expected that the FCC will issue a Notice of Proposed Rulemaking in 2025 to renew the Category Two program for another five years. When this occurred in 2020, the FCC adjusted the Category Two budget from \$150 per student to \$167 to compensate for inflation. We suspect a similar increase will occur in 2025 for the 2026 E-Rate cycle.

Recommendation

Increase the recurring funding for Category Two in the SCI appropriation by \$2.5 million beginning in FY2026. By increasing the funding, the state will ensure that every possible E-Rate dollar available is consumed by the PSUs. For every dollar added in this appropriation, the state will receive about \$4 of total expenditures for classroom Wi-Fi and in-the-school-building wired networking.

Once the FCC issues the NPRM and makes the final rule, the Friday Institute will calculate the exact state appropriation required and report it to NCDPI and Fiscal Research. However, the Friday Institute agrees that \$2.5 million is a conservative, but safe expansion to cover this increase, beginning in 2026.

SUPPORTING DOCUMENTATION

An interactive dashboard that illustrates PSU Internet utilization, as well as statistics about the costs of E-Rate-related services, may be found at:

<http://go.ncsu.edu/SCIReport>

An interactive map showing Internet utilization may be found at:

https://portal.mcnc.org/reporting/ncnen_utilization_map

An interactive data dashboard of for NC Category Two budgets, as well as an analysis of Universal Service Fee utilization may be found at:

<https://go.ncsu.edu/cat2budgets>

<https://go.ncsu.edu/2022usf>

Table 5

Appendices within this report

Appendix	Data
A	Fiscal Year 2024 LEA PRC 073 allotments and shared services distributions
B	Fiscal Year 2024 Charter School PRC 036 allotments and shared services distributions
C	North Carolina E-Rate Funding History Report
D	History of the School Connectivity Initiative

APPENDIX A: FISCAL YEAR 2024 LEA ALLOTMENTS AND SHARED SERVICES

Presented below are details of the direct funding received by districts from SCI through PRC 073 allocations and the direct costs paid by SCI for each shared service (Content Filtering, Firewall, and Internet services) for SFY24. Districts request E-Rate funds for WAN and Wi-Fi during spring for service delivery within the funding year between July 1 and June 30. SCI issues allotments during each fiscal year to cover the costs for eligible expenses that E-Rate does not.

Table A1

SCI Funding to LEAs through PRC 073 and for shared services, FY23

PSU	PSU Name	District WAN	Category 2 Wi-Fi	Content Filtering	Firewall	Internet	Total
10	Alamance-Burlington Schools	\$50,960	\$339,346	\$116,484	\$48,408	\$23,834	\$579,032
20	Alexander County Schools	\$21,876	\$86,465	\$33,360	\$12,495	\$10,509	\$164,705
30	Alleghany County Schools	\$17,280				\$6,568	\$23,848
40	Anson County Schools	\$17,381		\$32,100	\$11,454	\$6,344	\$67,279
50	Ashe County Schools	\$22,080	\$59,897	\$33,360	\$12,495	\$10,509	\$138,341
60	Avery County Schools	\$14,760		\$18,240	\$12,072	\$11,626	\$56,698
70	Beaufort County Schools	\$13,987	\$7,086	\$40,914		\$15,058	\$77,045
80	Bertie County Schools	\$17,322		\$18,240	\$11,873	\$3,875	\$51,310
90	Bladen County Schools	\$37,261		\$33,360	\$12,495	\$7,794	\$90,910
100	Brunswick County Schools	\$84,550	\$195,403			\$41,026	\$320,979
110	Buncombe County Schools	\$105,019	\$213,121	\$78,696		\$16,983	\$413,819
111	Asheville City Schools	\$42,288	\$67,514	\$33,360	\$11,698	\$10,509	\$165,369
120	Burke County Schools	\$71,088	\$178,151	\$78,696	\$46,425	\$13,160	\$387,520
130	Cabarrus County Schools	\$154,560	\$1,048,554	\$154,260		\$36,294	\$1,393,668
132	Kannapolis City Schools	\$13,477	\$14,104	\$48,468	\$25,575	\$9,115	\$110,739
140	Caldwell County Schools	\$55,908	\$37,971		\$28,328	\$12,108	\$134,315
150	Camden County Schools	\$19,200		\$18,240	\$12,072	\$11,626	\$61,138
160	Carteret County Public Schools	\$34,932	\$1,414	\$53,504	\$25,669	\$9,804	\$125,323
170	Caswell County Schools	\$10,036		\$18,240	\$12,270	\$3,875	\$44,421
180	Catawba County Schools	\$96,441			\$27,418	\$11,182	\$135,041
181	Hickory City Schools					\$6,793	\$6,793
182	Newton Conover City Schools	\$7,300	\$27,751	\$18,240	\$12,270	\$6,201	\$71,762
190	Chatham County Schools	\$32,423	\$121,516	\$31,788	\$25,688	\$20,844	\$232,259
200	Cherokee County Schools			\$18,240		\$6,170	\$24,410
210	Edenton-Chowan Schools	\$12,840		\$15,724	\$11,171	\$5,514	\$45,249
220	Clay County Schools	\$10,800		\$10,692		\$6,863	\$28,355
230	Cleveland County Schools	\$24,486		\$63,576	\$26,609	\$11,182	\$125,853
240	Columbus County Schools	\$12,394	\$58,013	\$34,619	\$13,585	\$7,983	\$126,594
241	Whiteville City Schools	\$3,000	\$24,391	\$18,240	\$11,248	\$3,875	\$60,754
250	Craven County Schools	\$10,000	\$166,986	\$63,576	\$26,609	\$11,182	\$278,353
260	Cumberland County Schools	\$111,959		\$223,538	\$72,840	\$31,716	\$440,053
270	Currituck County Schools	\$36,683	\$28,838	\$33,360	\$13,681	\$10,509	\$123,071
280	Dare County Schools	\$38,753	\$219,651	\$33,360	\$14,866	\$10,509	\$317,139

290	Davidson County Schools	\$44,448	\$81,736	\$126,191	\$46,875	\$18,219	\$317,469
291	Lexington City Schools	\$5,425		\$33,360	\$12,495	\$6,862	\$58,142
292	Thomasville City Schools	\$5,187		\$18,240	\$12,270	\$4,019	\$39,716
296	Eastern NC School for the Deaf			\$4,644	\$7,920	\$2,016	\$14,580
297	Deaf and Blind Schools West Governor Moorhead School for the Blind		\$4,013	\$6,912	\$7,450	\$4,092	\$18,454
298					\$7,980	\$3,064	\$21,969
300	Davie County Schools	\$1,940			\$12,495	\$10,979	\$25,414
310	Duplin County Schools	\$17,334		\$68,616	\$34,293	\$15,954	\$136,197
320	Durham Public Schools	\$105,251	\$712,638	\$154,260	\$48,917	\$22,903	\$1,043,969
330	Edgecombe County Public Schools	\$15,857		\$48,468	\$25,575	\$9,115	\$99,015
340	Winston Salem/Forsyth County Schools	\$94,284	\$246,557			\$39,358	\$380,199
350	Franklin County Schools	\$38,642	\$45,804	\$50,986	\$25,613	\$11,786	\$172,831
360	Gaston County Schools	\$91,903	\$443,617			\$18,106	\$553,626
370	Gates County Schools	\$10,850	\$2,635	\$7,548	\$2,869	(\$524)	\$23,378
380	Graham County Schools	\$3,000		\$10,692	\$7,784	\$4,141	\$25,617
390	Granville County Schools	\$31,120	\$3,503	\$62,317	\$24,691	\$11,009	\$132,640
400	Greene County Schools	\$12,336	\$17,989	\$33,360	\$12,495	\$6,568	\$82,748
410	Guilford County Schools		\$333,958	\$305,400		\$40,912	\$680,270
420	Halifax County Schools	\$10,112	\$5,008	\$18,240	\$7,158	\$4,172	\$44,690
421	Roanoke Rapids City Schools	\$6,240	\$59,315	\$15,724	\$10,865	\$5,514	\$97,658
422	Weldon City Schools	\$5,700	\$3,274	\$10,692	\$8,208	\$2,588	\$30,462
430	Harnett County Schools	\$109,020	\$63,754	\$116,484	\$46,875	\$18,106	\$354,239
440	Haywood County Schools	\$29,716	\$81,049			\$10,509	\$121,274
450	Henderson County Schools	\$43,707				\$12,995	\$56,702
460	Hertford County Schools	\$5,618		\$18,240	\$12,072	\$3,875	\$39,805
470	Hoke County Schools	\$14,732		\$48,468	\$25,575	\$11,254	\$100,029
480	Hyde County Schools	\$2,359		\$6,912	\$7,980	\$1,915	\$19,166
490	Iredell-Statesville Schools	\$444,531	\$59,945		\$48,408	\$28,970	\$581,854
491	Mooreville Graded School District	\$11,616		\$63,576	\$25,800	\$17,891	\$118,883
500	Jackson County Schools	\$17,700	\$73,475			\$10,509	\$101,684
510	Johnston County Schools	\$227,827	\$637,551		\$66,077	\$33,933	\$965,388
520	Jones County Schools	\$6,998			\$12,270	\$4,172	\$23,440
530	Lee County Schools	\$65,304	\$53,437	\$63,576	\$25,800	\$11,182	\$219,299
540	Lenoir County Public Schools	\$20,364	\$30,077	\$88,143	\$34,931	\$19,914	\$193,429
550	Lincoln County Schools	\$70,108				\$17,615	\$87,723
560	Macon County Schools	\$64,500	\$141,574			\$11,833	\$217,907
570	Madison County Schools	\$8,760		\$18,240	\$12,072	\$7,713	\$46,785
580	Martin County Schools	\$10,221	\$27,443	\$18,240	\$12,072	\$3,875	\$71,851
590	McDowell County Schools	\$30,343	\$33,282		\$13,088	\$6,793	\$83,506
600	Charlotte-Mecklenburg Schools	\$269,499	\$1,145,104	\$683,628		\$84,898	\$2,183,129
610	Mitchell County Schools	\$20,112	\$3,389	\$23,280	\$12,345	\$18,913	\$78,039

620	Montgomery County Schools	\$17,950	\$50,404		\$12,420	\$6,587	\$87,361
630	Moore County Schools	\$188,659	\$249,093	\$63,576		\$17,891	\$519,219
640	Nash-Rocky Mount Schools	\$78,971			\$39,550	\$12,500	\$131,021
650	New Hanover County Schools	\$102,592	\$471,353			\$22,692	\$596,637
660	Northampton County Schools	\$11,172		\$10,692	\$8,208	\$2,588	\$32,660
670	Onslow County Schools			\$116,484	\$46,875	\$18,106	\$181,465
680	Orange County Schools	\$26,500		\$33,360	\$12,495	\$10,979	\$83,334
681	Chapel Hill-Carrboro City Schools	\$36,004	\$252,731	\$97,590	\$46,650	\$37,544	\$470,519
690	Pamlico County Schools	\$10,000				\$3,071	\$13,071
700	Elizabeth City-Pasquotank Public Schools	\$15,472		\$48,468	\$25,575	\$9,115	\$98,630
710	Pender County Schools	\$46,070				\$14,589	\$60,659
720	Perquimans County Schools	\$9,172		\$18,240	\$12,072	\$6,201	\$45,685
730	Person County Schools	\$9,454		\$33,360	\$12,495	\$10,509	\$65,818
740	Pitt County Schools	\$287,225	\$396,471	\$151,112	\$47,384	\$20,952	\$903,144
750	Polk County Schools	\$10,598	\$26,973		\$12,072	\$6,201	\$55,844
760	Randolph County Schools	\$52,727	\$173,011	\$116,484	\$48,408	\$18,106	\$408,736
761	Asheboro City Schools	\$9,965	\$60,712	\$18,240	\$12,270	\$3,875	\$105,062
770	Richmond County Schools	\$24,699	\$96,550	\$48,468	\$26,403	\$9,115	\$205,235
780	Public Schools of Robeson County	\$34,688	\$168,729		\$46,437	\$22,684	\$272,538
790	Rockingham County Schools	\$33,885	\$388,067	\$48,468	\$25,575	\$9,364	\$505,359
800	Rowan-Salisbury Schools	\$129,341	\$67,333			\$38,171	\$234,845
810	Rutherford County Schools	\$15,536	\$77,966	\$56,022	\$26,515	\$10,148	\$186,187
820	Sampson County Schools	\$35,567	\$68,690	\$57,281	\$25,706	\$13,323	\$200,567
821	Clinton City Schools	\$4,815	\$46,550	\$18,240	\$12,072	\$4,172	\$85,849
830	Scotland County Schools	\$33,846			\$14,273	\$6,568	\$54,687
840	Stanly County Schools	\$118,598	\$12,618	\$35,878	\$14,675	\$6,993	\$188,762
850	Stokes County Schools	\$23,808		\$33,360	\$12,495	\$6,568	\$76,231
860	Surry County Schools	\$36,401		\$48,468	\$25,575	\$9,115	\$119,559
861	Elkin City Schools	\$7,000	\$1,538			\$9,696	\$18,234
862	Mount Airy City Schools	\$9,223	\$2,878	\$15,724	\$10,865	\$5,514	\$44,204
870	Swain County Schools	\$15,000	\$23,910			\$6,201	\$45,111
880	Transylvania County Schools	\$20,052		\$18,240	\$12,072	\$6,201	\$56,565
890	Tyrrell County Schools	\$3,000			\$7,784	\$2,588	\$13,372
900	Union County Public Schools	\$248,905	\$1,486,470			\$36,294	\$1,771,669
910	Vance County Schools	\$24,265		\$33,360	\$12,495	\$6,568	\$76,688
920	Wake County Schools	\$519,477	\$281,782			\$84,898	\$886,157
930	Warren County Schools	\$12,712		\$18,240	\$12,270	\$3,875	\$47,097
940	Washington County Schools	\$6,141		(\$52)	\$12,072	(\$328)	\$17,833
950	Watauga County Schools	\$29,430	\$162,496	\$18,240	\$12,072	\$6,201	\$228,439
960	Wayne County Public Schools	\$33,240			\$44,981	\$7,552	\$85,773
970	Wilkes County Schools	\$43,932	\$238,816	\$33,360		\$6,568	\$322,676
980	Wilson County Schools	\$11,323		\$63,576	\$25,800	\$11,182	\$111,881

990	Yadkin County Schools	\$16,236		\$33,360	\$12,495	\$10,979	\$73,070
995	Yancey County Schools	\$15,497		\$18,240	\$12,072	\$6,201	\$52,010
997	NC Health and Human Services	\$3,292					\$3,292
Grand Totals		\$5,596,148	\$12,011,440	\$4,811,903	\$1,951,810	\$1,556,775	\$25,928,076

APPENDIX B: FISCAL YEAR 2024 CHARTER SCHOOL ALLOTMENTS AND SHARED SERVICES

Presented below are the details of direct funding received by Charter Schools from SCI through PRC 036 allotments. Also provided are the direct costs paid by SCI to NCDIT for each shared service (Content Filtering, Firewall, and Internet services).

Charter schools may choose to receive a \$5,000 allotment in lieu of connecting to NCREN for Internet service. Charters request E-Rate funds for WAN and Wi-Fi during spring for service/delivery within the funding year between July 1 and June 30. SCI issues allocations during each fiscal year to cover the costs for eligible expenses that E-Rate does not.

Table B1

SCI Funding to Charter, Residential, and Lab Schools for shared services, Fiscal Year 2023

PSU	PSU Name	District WAN	Category 2 Wi-Fi	Content Filtering	Firewall	Internet	Total
00A	North Carolina Cyber Academy	\$965					\$965
00B	NC Virtual Academy						
01B	River Mill Academy			\$6,912	\$7,980	\$5,719	\$20,611
01C	Clover Garden		\$52,474			\$8,757	\$61,231
01D	The Hawbridge School	\$6,088	\$6,765	\$6,912	\$7,980	\$7,673	\$35,418
01F	Alamance Community School		\$26,047		\$7,980	\$7,673	\$41,700
06B	Marjorie Williams Academy			\$6,912	\$7,980	\$2,558	\$17,450
07A	Washington Montessori					\$6,599	\$6,599
09A	Paul R. Brown Leadership Academy		\$4,106	\$6,912	\$7,980	\$5,719	\$24,717
09B	Emereau: Bladen		\$8,172	\$5,292	\$7,340	\$8,535	\$29,339
10A	Classical Charter Schools of Leland			\$10,692	\$8,055	\$10,600	\$29,347
10B	Classical Charter Schools of Southport			\$6,912	\$7,980	\$13,873	\$28,765
11A	Evergreen Community Charter					\$9,038	\$9,038
11B	ArtSpace Charter School			\$2,304	\$4,472	\$7,673	\$14,449
11C	IC Imagine		\$1,486			\$10,600	\$12,086
11D	The Franklin School of Innovation		\$26,422	\$10,692	\$8,055	\$10,600	\$55,769
11F	Asheville PEAK Academy			\$3,839	\$7,920	\$4,397	\$16,156
11K	Francine Delany New School			\$4,644	\$7,920	\$5,336	\$17,900
11L	Mountain City Public Montessori		\$8,926	\$3,870	\$6,600	\$4,195	\$23,591
12A	New Dimensions			\$6,912	\$1,521	\$5,746	\$14,179
13A	Carolina International School					\$7,868	\$7,868
13B	Cabarrus Charter Academy	\$5,000					\$5,000
13C	A.C.E. Academy			\$6,912	\$7,980	\$5,719	\$20,611
13D	Concord Lake STEAM Academy	\$5,000					\$5,000
14B	Oak Hill Charter School			\$1,666	\$7,920	\$4,237	\$13,823
16B	Tiller School		\$18,624	\$3,876	\$7,920	\$4,050	\$34,470
19A	Chatham Charter			\$7,542	\$7,993	\$7,034	\$22,569
19B	Woods Charter			\$6,912	\$7,980	\$5,719	\$20,611
19C	Willow Oak Montessori			\$3,876	\$7,920	\$3,181	\$14,977

19F	School of the Arts for Boys Acad (SABA)			\$858	\$1,980	\$914	\$3,752
23A	Pinnacle Classical Academy	\$5,610				\$9,038	\$14,648
24B	Thomas Academy	\$5,000		\$4,888	\$7,945	\$1,543	\$19,376
24N	Classical Charter Schools of Whiteville			\$7,227	\$7,986	\$2,684	\$17,897
25A	Riverside Leadership Academy						
26B	Alpha Academy			\$10,692	\$8,055	\$7,868	\$26,615
26C	The Capitol Encore Academy	\$2,856		\$8,802	\$8,018	\$5,104	\$24,780
27A	Water's Edge Village School		\$12,500	\$3,276	\$7,920	\$3,528	\$27,224
29A	Davidson Charter Academy			\$6,912	\$7,980	\$5,719	\$20,611
32A	Maureen Joy Charter School		\$5,583	\$10,692	\$2,685	\$2,623	\$21,583
32B	Healthy Start Academy	\$1,884		\$9,747	\$8,036	\$6,632	\$26,299
32C	Community School of Digital & Visual Art			\$5,778	\$4,650	\$2,498	\$12,926
32D	Kestrel Heights School		\$3,308			\$7,311	\$10,619
32H	Research Triangle Charter	\$5,000					\$5,000
32K	Central Park School For Child	\$6,720	\$6,244	\$6,912	\$7,980	\$5,719	\$33,575
32L	Voyager Academy		\$111,462	\$18,240	\$12,270	\$12,058	\$154,030
32M	Global Scholars Academy		\$5,411	\$6,912	\$7,980	\$3,050	\$23,353
32N	Research Triangle High School			\$10,692	\$8,055	\$7,765	\$26,512
32P	The Institute Development Young Leaders		\$7,639	\$6,912	\$7,980	\$3,050	\$25,581
32Q	Reaching All Minds Academy			\$6,912		\$3,050	\$9,962
32R	Excelsior Classical Academy			\$8,172	\$8,011	\$6,435	\$22,618
32S	KIPP Durham College Preparatory		\$658	\$6,912	\$5,985	\$3,050	\$16,605
32T	Discovery Charter		\$6,330	\$6,912	\$7,980	\$6,354	\$27,576
32U	North Oak Academy						
33A	North East Carolina Prep		\$13,752	\$10,692	\$8,055	\$4,913	\$37,412
34B	Quality Education Academy		\$3,944	\$10,692	\$12,083	\$5,653	\$32,372
34D	Carter G. Woodson School		\$617	\$7,227	\$7,986	\$3,100	\$18,930
34F	Forsyth Academy	\$5,000					\$5,000
34G	The Arts Based School	\$5,000					\$5,000
34H	NC Leadership Charter Academy			\$10,692	\$8,055	\$10,600	\$29,347
35A	Crosscreek Charter School	\$8,987					\$8,987
35B	Youngsville Academy	\$5,000					\$5,000
35C	Wake Preparatory Academy					\$9,430	\$9,430
36B	Piedmont Community Charter School	\$18,000		\$10,692	\$8,055	\$7,868	\$44,615
36C	Mountain Island Charter School			\$11,950	\$8,758	\$12,122	\$32,830
36F	Ridgeview Charter School			\$3,876	\$7,920		\$11,796
36G	Community Public Charter			\$6,912	\$7,980	\$9,038	\$23,930
39A	Falls Lake Academy		\$12,007			\$7,868	\$19,875
39B	Oxford Preparatory		\$6,389			\$9,212	\$15,601
41B	Greensboro Academy	\$5,000					\$5,000
41C	Guilford Preparatory Academy	\$5,000		\$8,802	\$8,018	\$5,810	\$27,630

41D	Phoenix Academy- Primary, Elem. Upper	\$22,967						\$22,967
41F	Triad Math and Science Academy	\$1,109	\$8,003	\$15,724	\$10,865	\$11,741		\$47,442
41G	Cornerstone Charter Academy-CFA			\$6,912	\$7,980	\$9,038		\$23,930
41H	College Prep and Leadership Academy			\$5,211	\$7,935	\$2,223		\$15,369
41J	Summerfield Charter Academy	\$5,000						\$5,000
41K	Piedmont Classical High School		\$227	\$6,912	\$7,980	\$5,719		\$20,838
41L	Gate City Charter	\$5,000						\$5,000
41M	Next Generation Academy			\$5,184	\$7,975	\$2,815		\$15,974
41N	The Experiential School of Greensboro			\$6,912	\$7,980	\$9,038		\$23,930
41Q	Revolution Academy			\$4,129	\$7,925	\$4,293		\$16,347
41R	Summit Creek Academy	\$5,000						\$5,000
42A	KIPP Halifax College Preparatory			\$10,377		\$4,797		\$15,174
42B	Hobgood Charter School			\$6,912	\$7,980	\$6,599		\$21,491
43C	Anderson Creek Academy			\$6,912	\$7,980	\$6,599		\$21,491
43D	Achievement Charter Academy	\$3,524		\$3,876	\$7,920	\$3,181		\$18,501
44A	Shining Rock Classical Academy	\$7,733	\$6,983	\$6,912	\$7,980	\$4,092		\$33,700
45A	The Mountain Community Sch			\$3,876	\$7,920	\$4,428		\$16,224
45B	FernLeaf		\$7,222	\$6,912	\$7,980	\$9,038		\$31,152
49B	American Renaissance School	\$4,519	\$50,326	\$8,802	\$8,018	\$8,107		\$79,772
49D	Success Institute Charter			\$3,876	\$7,920	\$1,328		\$13,124
49E	Pine Lake Preparatory			\$18,240	\$9,888	\$14,710		\$42,838
49F	Langtree Charter Academy	\$5,000						\$5,000
49G	Iredell Charter Academy	\$5,000						\$5,000
50A	Summit Charter					\$5,152		\$5,152
51A	Neuse Charter School			\$10,692	\$8,055	\$7,765		\$26,512
51B	Johnston Charter Academy	\$5,000						\$5,000
51C	American Leadership Academy - Johnston					\$4,913		\$4,913
53B	Ascend Leadership Academy: Lee County					\$10,528		\$10,528
53C	MINA Charter School of Lee County			\$6,912	\$7,980	\$8,484		\$23,376
53D	Central Carolina Academy			\$4,032	\$7,980	\$6,354		\$18,366
54A	Children's Village Academy	\$1,018	\$1,044	\$4,644	\$7,920	\$2,258		\$16,884
55A	Lincoln Charter School	\$4,519	\$38,658	\$18,240	\$12,270	\$14,710		\$88,397
55B	West Lake Preparatory Academy	\$5,000						\$5,000
58B	Bear Grass Charter School			\$6,912	\$7,980	\$6,599		\$21,491
60B	Sugar Creek Charter	\$1,680	\$11,859			\$4,903		\$18,442
60D	Lake Norman Charter			\$18,240		\$11,626		\$29,866
60F	Metrolina Reg Scholars Academy			\$5,211	\$7,935	\$5,907		\$19,053
60G	Queen's Grant Community School			\$10,692	\$8,055	\$10,600		\$29,347
60I	Community School of Davidson	\$19,494	\$12,885	\$10,692	\$8,055	\$10,600		\$61,726
60J	Socrates Academy		\$67,576	\$6,912	\$7,980			\$82,468
60K	Charlotte Secondary		\$748	\$4,833	\$7,925	\$5,645		\$19,151

60L	KIPP Charlotte					\$2,558	\$2,558
60M	Corvian Community School	\$7,485	\$47,722	\$10,692	\$8,055	\$10,600	\$84,554
60N	Aristotle Preparatory Academy			\$3,876	\$7,920	\$1,328	\$13,124
60P	Eastside STREAM Academy					(\$403)	(\$403)
60Q	Invest Collegiate Transform						
60S	Bradford Preparatory School		\$28,096	\$10,692	\$8,055	\$7,868	\$54,711
60U	Commonwealth High					\$3,533	\$3,533
60Y	Pioneer Springs Community School			\$6,912	\$7,980	\$7,673	\$22,565
61J	Lakeside Charter Academy			\$6,912	\$7,980	\$7,673	\$22,565
61K	United Community School			\$4,833		\$4,793	\$9,626
61L	Stewart Creek High					\$2,558	\$2,558
61M	Charlotte Lab School		\$48,810	\$10,692	\$8,055	\$10,600	\$78,157
61N	Queen City STEM School	\$4,934	\$13,616	\$10,692	\$8,055	\$10,600	\$47,897
61P	VERITAS Community School, CFA			\$3,876	\$6,880	\$3,985	\$14,741
61Q	Mallard Creek STEM Academy			\$6,912	\$7,980	\$7,673	\$22,565
61R	Matthews Charter Academy	\$5,000					\$5,000
61S	Unity Classical Charter School		\$16,227	\$6,912	\$7,980	\$7,673	\$38,792
61T	Movement Charter School	\$2,625				\$2,558	\$5,183
61V	Bonnie Cone Classical Academy			\$6,912		\$7,673	\$14,585
61W	East Voyager Academy of Charlotte			\$4,644	\$7,920	\$4,531	\$17,095
61X	Jackson Day School			\$10,692	\$8,055	\$10,600	\$29,347
61Y	Steele Creek Preparatory Academy	\$5,000					\$5,000
62A	Tillery Charter Academy		\$7,980			\$3,645	\$11,625
62J	Southwest Charlotte STEM Academy			\$7,542	\$7,980	\$8,757	\$24,279
62K	Movement School Eastland		\$1,182			\$4,092	\$5,274
62L	Telra Institute		\$16,104	\$6,912	\$7,980	\$6,735	\$37,731
62M	Bonnie Cone Leadership Academy					\$9,815	\$9,815
62N	Aspire Trade High School		\$25,822	\$5,004	\$6,630	\$4,529	\$41,985
62P	Movement School Southwest			\$3,876	\$7,920	\$2,125	\$13,921
62R	Movement School Northwest		\$3,750	\$3,870	\$6,600	\$4,195	\$18,415
62Q	GO BIG Great Opportunities & Boundless Innovati						
63A	The Academy of Moore County			\$5,211	\$7,935	\$4,167	\$17,313
63B	STARS Charter	\$5,000					\$5,000
63C	Moore Montessori Community School			\$3,876	\$7,920	\$1,215	\$13,011
64A	Rocky Mount Preparatory			\$10,692	\$6,970	\$4,913	\$22,575
65A	Cape Fear Center for Inquiry			\$6,912	\$7,980	\$7,673	\$22,565
65B	Wilmington Preparatory Academy	\$5,000					\$5,000
65C	Classical Charter Schools of Wilmington			\$10,692	\$8,055	\$3,533	\$22,280
65D	Island Montessori Charter School		\$9,043	\$3,876	\$7,920	\$4,694	\$25,533
65F	American Leadership Academy-Coastal		\$4,124	\$8,802	\$8,018	\$10,925	\$31,869
65G	Girls Leadership Academy of Wilmington			\$6,912	\$7,980	\$4,092	\$18,984

65H	Wilmington School of the Arts			\$2,261	\$5,940	\$2,125	\$10,326
66A	KIPP Gaston College Preparatory		\$660	\$10,692		\$4,913	\$16,265
	Z.E.C.A. School of Arts and						
67B	Technology			\$3,876	\$7,920	\$1,215	\$13,011
68A	Eno River Academy		\$48,088	\$10,692	\$8,972	\$9,212	\$76,964
68C	The Expedition School					\$6,735	\$6,735
68D	West Triangle High School						
69A	Arapahoe Charter School			\$6,912	\$7,980	\$2,200	\$17,092
70A	Northeast Academy of Aerospace & AdvTech		\$16,621	\$10,692	\$8,055	\$9,212	\$44,580
73A	Bethel Hill Charter			\$5,211	\$7,935	\$4,825	\$17,971
73B	Roxboro Community School		\$18,216	\$10,692	\$8,055	\$9,212	\$46,175
74C	Winterville Charter Academy	\$5,000					\$5,000
74D	Greenville Preparatory Academy						
76A	Uwharrie Charter Academy	\$5,436		\$16,353	\$11,216	\$11,381	\$44,386
78A	CIS Academy			\$3,876	\$7,920	\$2,125	\$13,921
78B	Southeastern Academy			\$4,129	\$7,925	\$3,995	\$16,049
78C	Old Main Stream			\$2,261	\$7,920	\$4,428	\$14,609
79A	Bethany Community School			\$8,802	\$8,018	\$9,137	\$25,957
79C	Legacy Classical		\$2,606	\$3,870	\$6,600	\$4,195	\$17,271
80C	Faith Academy Charter School		\$6,967	\$5,967	\$7,955	\$4,857	\$25,746
81A	Thomas Jefferson Class Academy	\$4,272	\$5,572	\$10,692	\$8,055	\$7,765	\$36,356
81B	Lake Lure Classical Academy		\$20,065	\$10,692	\$8,055	\$10,600	\$49,412
84B	Gray Stone Day	\$5,000	\$872			\$7,868	\$13,740
86T	Millennium Charter Academy						
87A	Mountain Discovery			\$3,876	\$7,920	\$3,231	\$15,027
88A	Brevard Academy			\$6,912	\$7,980	\$7,479	\$22,371
90A	Union Academy		\$74,265	\$18,240	\$12,072	\$12,058	\$116,635
90B	Union Day School		\$4,446			\$6,735	\$11,181
90C	Union Prep Academy at Indian Trail	\$5,000					\$5,000
90D	Monroe Charter Academy					\$2,889	\$2,889
90F	Apprentice Academy High School			\$6,912	\$3,990	\$5,719	\$16,621
90G	American Leadership Academy- Monroe						
91A	Vance Charter School			\$10,692	\$8,055	\$9,212	\$27,959
91B	Henderson Collegiate	\$1,245	\$20,658			\$4,172	\$26,075
92B	The Exploris School	\$6,278		\$6,912	\$7,980	\$5,746	\$26,916
92D	Magellan Charter			\$5,211	\$7,935	\$4,631	\$17,777
92E	Sterling Montessori Academy			\$6,912	\$7,980	\$6,354	\$21,246
92F	Franklin Academy					\$7,689	\$7,689
92G	East Wake Academy		\$48,766	\$18,240	\$12,270	\$12,058	\$91,334
92K	Raleigh Charter High School			\$6,912	\$7,980	\$6,735	\$21,627
92M	PreEminent Charter	\$5,000					\$5,000
92N	Quest Academy					\$4,694	\$4,694
92P	Southern Wake Academy			\$10,692	\$8,055	\$9,212	\$27,959

92R	Casa Esperanza Montessori Charter School				\$7,868	\$7,868	
92S	Endeavor Charter School	\$21,808	\$6,912	\$7,980	\$7,332	\$44,032	
92T	Triangle Math and Science Academy		\$13,208	\$9,811	\$10,972	\$33,991	
92U	Longleaf School of the Arts		\$10,377	\$8,049	\$7,597	\$26,023	
92V	Wake Forest Charter Academy	\$5,000				\$5,000	
92W	Cardinal Charter Academy	\$5,000				\$5,000	
92Y	Envision Science Academy		\$8,172	\$8,011	\$8,535	\$24,718	
93A	Haliwa-Saponi Tribal School		\$6,912	\$7,980	\$3,519	\$18,411	
93J	RISE Southeast Raleigh Charter		\$10,692	\$8,055	\$3,533	\$22,280	
93L	Central Wake High School				\$3,050	\$3,050	
93M	Peak Charter Academy	\$5,000				\$5,000	
93N	Pine Springs Preparatory Academy	\$39,346	\$10,692	\$8,055	\$7,868	\$65,961	
93P	Rolesville Charter Academy						
93Q	Carolina Charter Academy		\$7,857	\$7,999	\$7,929	\$23,785	
93R	Raleigh Oak Charter	\$26,653	\$3,876	\$7,920	\$3,746	\$42,195	
93T	Cardinal Charter Acad at Wendell Falls	\$5,000				\$5,000	
93V	Doral Academy of North Carolina	\$8,596				\$8,596	
93Y	The Math and Science Academy of Apex		\$8,753	\$9,410	\$8,697	\$26,860	
94A	Pocosin Innovative Charter		\$5,211	\$7,935	\$4,825	\$17,971	
94K	Nalanda Charter School						
94Z	Northeast Regional School - Biotech/Agri	\$11,030	\$4,452	\$7,920	\$4,086	\$27,488	
95A	Two Rivers Community School		\$3,876	\$7,920	\$3,985	\$15,781	
96C	Dillard Academy		\$6,912	\$7,980	\$3,050	\$17,942	
96F	Wayne Preparatory Academy		\$10,692	\$8,055	\$7,868	\$26,615	
96G	Wayne STEM Academy	\$7,315	\$3,870	\$6,600	\$3,380	\$21,165	
98A	Sallie B Howard School	\$7,519				\$7,519	
98B	Wilson Preparatory Academy		\$10,692	\$8,055	\$9,212	\$27,959	
Grand Totals		\$306,063	\$1,150,827	\$1,130,026	\$1,133,519	\$1,129,341	\$4,849,776

APPENDIX C: NORTH CAROLINA E-RATE FUNDING HISTORY

Since the inception of the E-Rate program, North Carolina public schools have procured \$2.1 billion in services and equipment. Of that total, \$1.4 has been disbursed to the schools in the form of FCC E-Rate discounts.

Table C1 below, shows North Carolina public school E-Rate funding requests for all 115 districts as well as charter schools that are open, as of November 2024. This represents the entire history of the E-Rate program.

The total pre-discount amount for all requested services, the amount of E-Rate funding requested, the amount of funding committed by the FCC, the amount of funding ultimately disbursed, and the utilization (ratio of disbursed to committed) are provided for each year that E-Rate has been available.

Since the modern E-Rate rules went into effect in 2015, the average total contract value for all E-Rate funding sought by public schools is \$100 million per year. Of that, the FCC covers about \$75 million per year, with state and local funding being responsible for about \$25 million per year, on average. However, as the data shows, the procurement cycle is "lumpy" and it is impossible to predict, or even regulate how schools will seek funding from year to year.

Each year NC schools receive significant increases in capacity, both in the NCREN internet backbone and in each district's WAN. However, due to improved technology and increased competition, prices have remained stable while service levels have increased steadily. With the introduction of Category Two, whereby the FCC funds Wi-Fi networks on a per student budget calculation, we can predict a five-year total contract value by multiplying the number of students by the FCC per student budget. For the 2021 to 2025 E-Rate years, the budget is \$167 per student. With an estimated 1.5 million students, \$250 million in procurement for Wi-Fi, cabling, and other inside-the-school network equipment is expected.

E-Rate funding for fiber connections to schools is not based on a budget, but purely on prevailing rates as discovered by public bidding. So, while Category Two spending is kept in check by the per-student budget, and the fact that all schools may purchase via highly discounted NCDPI cooperative purchasing agreements, the WAN connections are not regulated. Furthermore, the presence, or lack of competition, plays a distinct role in the costs of WANs. This means that WAN costs may vary widely even between districts that are geographically adjacent. This may be an area of focus in the future if it is determined that some schools are seeking more WAN capacity than is warranted based on their actual utilization. The Friday Institute has performed detailed analysis beyond the scope of this report.

Table C1*1998-2024 NC public school E-Rate Utilization*

Year	Requests	Pre-Discount	Requested	Committed	Disbursed	Utilization Percentage
1998	1,889	\$31,248,326	\$21,645,083	\$21,511,196	\$17,384,524	81%
1999	1,596	\$42,380,935	\$29,274,407	\$28,605,610	\$24,662,986	86%
2000	1,006	\$30,508,564	\$21,002,184	\$20,915,884	\$17,740,889	85%
2001	1,199	\$30,523,010	\$20,651,680	\$20,144,577	\$16,038,416	80%
2002	1,645	\$64,699,501	\$50,042,884	\$48,117,223	\$39,627,468	82%
2003	1,733	\$63,794,563	\$48,166,547	\$45,339,691	\$37,042,927	82%
2004	1,751	\$53,530,510	\$38,970,089	\$37,447,335	\$30,304,783	81%
2005	1,476	\$69,384,606	\$52,273,543	\$51,341,395	\$43,909,661	86%
2006	1,040	\$65,879,854	\$48,875,401	\$47,887,208	\$40,370,952	84%
2007	1,415	\$80,754,581	\$60,950,320	\$58,066,576	\$49,808,083	86%
2008	1,056	\$76,124,277	\$57,533,265	\$56,851,364	\$50,485,180	89%
2009	1,053	\$84,184,764	\$63,262,951	\$61,589,853	\$52,917,748	86%
2010	1,183	\$103,018,416	\$80,846,494	\$78,299,979	\$66,362,808	85%
2011	990	\$93,620,204	\$73,180,571	\$71,656,059	\$63,777,521	89%
2012	939	\$102,329,204	\$80,731,162	\$80,126,589	\$71,463,427	89%
2013	815	\$88,382,116	\$67,753,431	\$67,318,765	\$60,425,309	90%
2014	800	\$89,659,311	\$68,839,788	\$68,392,950	\$60,343,541	88%
2015	1,670	\$141,792,220	\$107,180,656	\$107,165,967	\$102,684,442	96%
2016	1,218	\$136,154,930	\$96,614,900	\$96,614,900	\$88,763,211	92%
2017	964	\$89,203,248	\$59,696,080	\$59,498,338	\$55,302,160	93%
2018	1,077	\$87,564,709	\$63,206,749	\$63,206,749	\$55,573,157	88%
2019	1,586	\$90,238,770	\$69,578,076	\$69,565,985	\$65,109,593	94%
2020	2,145	\$88,367,522	\$67,208,977	\$67,208,977	\$63,549,605	95%
2021	562	\$101,376,143	\$76,695,717	\$76,626,069	\$72,394,591	94%
2022	386	\$80,185,662	\$61,249,358	\$61,249,358	\$57,917,862	95%
2023	503	\$104,934,183	\$79,598,296	\$79,598,296	\$74,878,477	94%
2024	586	\$78,827,526	\$61,226,139	\$61,226,139	\$15,447,162	25%
32,283	\$2,168,667,656	\$1,626,254,747	\$1,605,573,033	\$1,394,286,480		

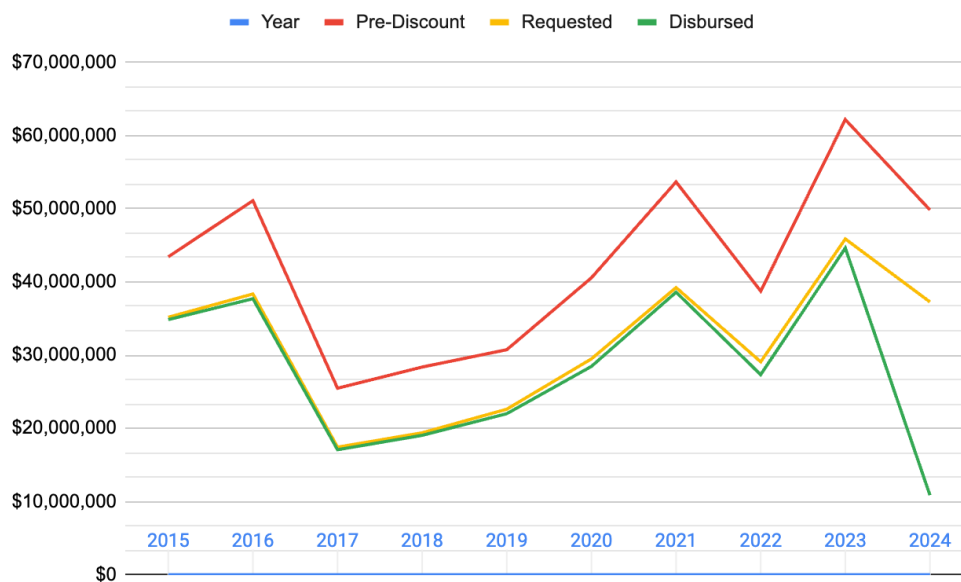
Table C2 shows only Category Two funds associated with the NCDPI Wi-Fi Expansion Program, which began in 2015, funded initially by the State with Race to the Top grant. Under this program, NCDPI developed statewide convenience contracts. The educational discounts offered by the vendors provided significantly lower pricing for even the small districts, enabling all schools to maximize their buying power while allowing choices from multiple vendors. In February 2020, new CPAs, with 23 original equipment vendors and 30 resellers, were established for five years. Assuming the FCC continues the Category Two program, we can expect another five-year budget cycles for 2026 to 2031 and, these contracts will need to be re-bid under FCC and state procurement regulations in 2025.

The utilization for 2024 is low because this funding year is still in progress. Schools have until September 30 of the following year, or 180 days after the FCC commits funding to complete their procurements. This is one of the reasons that reporting E-Rate data is so complex; each E-Rate funding year spans three state fiscal years.

Table C2*NC Category Two E-Rate Utilization Through NCDPI Contracts (2015-2024)*

Year	Requests	Pre-Discount	Requested	Committed	Disbursed	Utilization Percentage
2015	577	\$43,420,879	\$35,170,639	\$35,169,921	\$34,848,226	99%
2016	615	\$51,094,095	\$38,350,865	\$38,350,865	\$37,701,108	98%
2017	492	\$25,482,163	\$17,432,517	\$17,234,775	\$17,081,820	99%
2018	752	\$28,373,120	\$19,394,868	\$19,394,868	\$19,046,346	98%
2019	1,054	\$30,740,604	\$22,617,750	\$22,605,659	\$22,004,160	97%
2020	1,950	\$40,560,051	\$29,487,953	\$29,487,953	\$28,461,794	97%
2021	400	\$53,656,494	\$39,228,315	\$39,158,667	\$38,593,487	99%
2022	224	\$38,747,898	\$29,086,047	\$29,086,047	\$27,334,478	94%
2023	336	\$62,165,799	\$45,866,320	\$45,866,320	\$44,619,223	97%
2024	420	\$49,823,921	\$37,262,355	\$37,262,355	\$10,866,966	29%
	6,820	\$424,065,024	\$313,897,629	\$313,617,430	\$280,557,608	

The following figure show the unpredictability of Category Two funding requests and supports the need for at least a portion of the SCI appropriations not to revert. In an optimized program, the state should expect \$250 million in total E-Rate procurement over the five years, 2021 to 2025. During that time, the cost to the state, in a perfectly optimized SCI program would be about \$62 million. Except during the COVID year, the state has an outstanding record of utilizing Category Two funds that were approved by the FCC; this is depicted by how close the yellow Requested line is to the green Disbursed line. Schools are still in the process of submitting reimbursement request for the 2023 and 2024 years and thus the deviation is expected. The redline which shows total contract value of all procurements under Category Two gyrates wildly and has reached an all-time high in FY 2024.

Figure C1*NC Category Two E-Rate Utilization Through NCDPI Contracts (2015-2024)*

APPENDIX D: HISTORY OF THE SCHOOL CONNECTIVITY INITIATIVE

The School Connectivity Initiative was launched in earnest with the publication of the Developing Regional Education Networks report in May 2006. In the 17 years since the inception of the SCI program, NC public schools have sought \$2.1 billion in network infrastructure and services of which \$1.5 billion was committed by the Federal Communications Commission (FCC) E-Rate² program. During this time, the telecommunications and computing markets have shifted dramatically, and the regulatory environment has been in near-constant flux. The NC legislature has called for and invested in a digital transition in public schools.

Table D1

SCI Milestones

Year	Milestone
2006	Developing Regional Education Networks report published
2007	NC Legislature Funds SCI with \$12M, recurring
2008	NC Legislature adds \$10M for a total of \$22M, recurring
2009	All 115 LEAs connected to NCREN
2010	Inaugural class of 34 CeCTO students graduate
2012	NC Education Cloud Identity and Access Management plan published
2013	MCNC completes final phase of BTOP- GLF fiber expansion
2014	First E-Rate modernization order, paving the way for E-Rate to provide Wi-Fi to all classrooms
2015	NC Digital Learning Plan published. NC legislature adds \$12M recurring to SCI.
2017	NC reaches \$1B in E-Rate disbursements
2018	Modern Wi-Fi is available in every classroom in NC
2021	NCDPI establishes new contracts for Internet, Firewall and Filtering with substantial cost savings and improved service
2022	NC reaches \$300M in E-Rate procurement value for Wi-Fi since modernization (2015 to 2022)
2023	NC reaches \$2B in total E-Rate procurement value with \$1.5B being committed by the FCC

Table D1 illustrates how the SCI program has exhibited extraordinary productivity and adaptability over its history. Within its first year, it connected all 115 districts to the NC Research and Education Network using an opt-in approach. It established the Certified Educational Chief Technology Officer (CeCTO) training program through the UNC School of Government and developed and implemented the NCEdCloud Identity and Access Management (IAM) service. Through MCNC and the Golden Leaf Foundation, the program enabled the delivery of competitive fiber connectivity to rural NC schools and libraries, and adapted to the NC Digital Learning Plan, FCC E-Rate modernization orders, and the growth of student device proliferation. From 2009 to 2024, the K-12 contracted Internet bandwidth grew from approximately 1 Gbps to 620 Gbps.

² <https://www.fcc.gov/consumers/guides/universal-service-program-schools-and-libraries-E-Rate>