TOM PERRIELLO
5TH DISTRICT, VIRGINIA

COMMITTEE ON TRANSPORTATION
AND INFRASTRUCTURE

COMMITTEE ON VETERANS' AFFAIRS

Congress of the United States
House of Representatives
Washington, DC 20515-4605

1520 LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-4711
(202) 225-5681 FAX

DISTRICT OFFICES:

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(434) 293-9632 FAX

308 CRAGHEAD STREET, SUITE 102
DANVILLE, VA 24541
(434) 791-2596
(434) 791-2598 FAX

August 11, 2009

Administrator
Rural Utilities Service
U.S. Department of Agriculture
Washington, D. C. 20250-1500

Assistant Secretary
National Telecommunications and Information Administration
U. S. Department of Commerce
Washington, D.C. 23230

Re: Nelson County, VA Telecommunications Project

Gentlemen:

I am writing in strong support of the proposal submitted by Nelson County to the Broadband Initiatives Program / Broadband Technology Opportunities Program for the Nelson County, Virginia Telecommunications Project.

As Representative of Virginia's 5th congressional district, I have been working hard to facilitate the deployment of broadband service to my constituents in unserved and underserved areas. One of my major interests in supporting H. R. 1, The American Recovery and Reinvestment Act (ARRA) was its investment in last mile broadband deployment. My office has organized district-wide roundtables to encourage and facilitate sustainable solutions to broadband deployment in the region.

Broadband access is a high priority objective of the Nelson County Board of Supervisors and a key factor in the county's future economic development, public safety, and quality of life for its residents. The county's application is proposes a two-year, three-phase planning project that uses state and local funding for a middle mile project. The requested ARRA funding will allow the county to complete a fiber optic backbone network to which both public and private providers will have open access.

Thank you for your careful consideration of this proposal. If my office can provide any additional information, please do not hesitate to contact me.

Respectfully,

Tom Perriello
Member of Congress

TP: bj

JIM WEBB

VIRGINIA

COMMITTEE ON
ARMED SERVICES

COMMITTEE ON
FOREIGN RELATIONS

COMMITTEE ON
VETERANS' AFFAIRS

JOINT ECONOMIC COMMITTEE

United States Senate

WASHINGTON, DC 20510–4605

WASHINGTON OFFICE:

WASHINGTON, DC 20510
(202) 224–4024

August 13, 2009

Stephen Carter
County Administrator
Nelson County, Virginia
PO Box 336
Lovingston, VA 22949

Dear Mr. Carter:

Thank you for contacting my office to inform me of the proposals that Nelson County is submitting to the Rural Utilities Service (RUS) of the U.S. Department of Agriculture and the National Telecommunications and Information Administration (NTIA) of the U.S. Department of Commerce to secure funding for broadband deployment. I would like to express my support for your efforts as I am firmly committed to expanding technology resources available to underserved rural communities in Virginia.

It is my understanding that county officials recognize that the current limitations on Nelson's broadband infrastructure presents a significant challenge for economic development, public safety, and education activities. Securing funding under the American Recovery and Reinvestment Act (ARRA) would help the county address these pressing needs.

It is my hope that your applications to RUS and NTIA receive every favorable and fair consideration. Please keep me informed of the progress of your grant proposals by notifying Conaway Haskins in my Richmond office at 804-771-8310.

With warm regards, I remain

Sincerely,
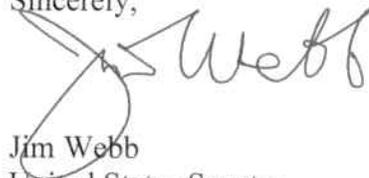
Jim Webb
United States Senator

JW/ch

MARK R. WARNER
VIRGINIA

COMMITTEES:
BANKING, HOUSING, AND
URBAN AFFAIRS

COMMERCE, SCIENCE, AND
TRANSPORTATION

BUDGET

RULES AND ADMINISTRATION

United States Senate

WASHINGTON, DC 20510–4606

August 7, 2009

Lawrence E. Strickling, Assistant Secretary for Communications and Information
Broadband Technology Opportunities Program
National Telecommunications and Information Administration
U.S. Department of Commerce
HCHB, Room 4812
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Secretary Strickling:

As the former Governor of the Commonwealth of Virginia and now as one of its U.S. Senators, I am very committed to bringing affordable broadband to businesses and citizens throughout the Commonwealth. That is why I am so encouraged by the American Recovery and Reinvestment Act's commitment to provide funding for broadband infrastructure deployment, for enhancing broadband capacity at public computer centers, and for encouraging sustainable adoption of broadband service.

I know how communities benefit when they have access to affordable broadband. When I was Governor, I worked to get grants so that homes and businesses in the small southwest Virginia town of Lebanon could get access to broadband. Lebanon created a job training center so residents could develop new job skills. Lebanon's broadband technology, plus its job training program, made it a community much more attractive to outside investment. As a result, Northrop Grumman and the information technology firm CGI opened facilities there, providing high-paying, mid-level IT jobs for about 700 people.

The stimulus broadband initiatives from the National Telecommunications Information Agency will provide similar benefits to other Virginia communities. That's why I am so glad so many Virginians are applying to the Broadband Technology Opportunities Program, and urge you to give their proposals strong consideration.

Thank you very much.

Sincerely,

Mark R. Warner
United States Senator

MARK R. WARNER
VIRGINIA

COMMITTEES:
BANKING, HOUSING, AND
URBAN AFFAIRS

COMMERCE, SCIENCE, AND
TRANSPORTATION

BUDGET

RULES AND ADMINISTRATION
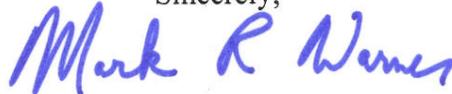
United States Senate

WASHINGTON, DC 20510–4606

August 7, 2009

Jonathan Adelstein, Administrator of United States Department of Agriculture,
Rural Development's Rural Utilities Service
Broadband Initiatives Program
Rural Utilities Service
U.S. Department of Agriculture
1400 Independence Avenue, SW, Stop 1599
Washington, DC 20250

Dear Administrator Adelstein:

As the former Governor of the Commonwealth of Virginia and now as one of its U.S. Senators, I am very committed to bringing affordable broadband to businesses and citizens throughout the Commonwealth. That is why I am so encouraged by the American Recovery and Reinvestment Act's commitment to provide funding for broadband infrastructure deployment to rural communities.

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The stimulus broadband initiatives from the Rural Utilities Service will provide similar benefits to other Virginia communities. That's why I am so glad so many Virginians are applying to the Broadband Initiatives Program, and urge you to give their proposals strong consideration.

Thank you very much.

Sincerely,

Mark R. Warner
United States Senator

Attachment B – Proposed Middle Mile Service Offerings

Please complete the table below describing the service offerings that will be available indicating the bandwidth packages, the distance band (length of the network section) or point-to-point (geographical end points) of the specific package, the minimum peak load bandwidth that is available on the route, and the monthly or yearly pricing for the services. The chart may be adapted to adequately describe the service offerings of the project as long as the information described is included. If different packages will be available based on the area that will be receiving the benefits, then separate charts should be developed indicating which are the services for each area.

Service Offering	Distance Band or Point to Point	Minimum Peak Load Network Bandwidth Capacity (Mbps)	Monthly/Yearly Pricing ($)	Other
Fiber Optic	31 mile distance band consisting of 5 network sections described below	100-1000 Mbps per second between points	$50-$150 per Mbps per Month depending on the cost of purchasing access from a private provider of last mile services.	

The proposed middle mile project consists of the installation of 31 miles of 96 count fiber optic wire line with a minimum peak load network bandwidth capacity of 100-1000 Mbps per second and a monthly cost of $50-$150 per Mbps per month, depending on the cost of purchasing the internet access from a private provider, for all proposed funded service areas of the project.

As described in the Broadband Planning Phase III report (see attached), a main connectivity point (node) shall be located near the Martins Store electric substation and for interconnection of networks with a private provider such as Central Virginia Electric Cooperative (CVEC) or Nelson Cable. This connection point would support Internet or distribution transport for IBEC's broadband over powerline (BPL) deployment and facilitate connections between the two Nelson Cable Headends (Lovingston and Wintergreen). Fiber is proposed to be constructed aerially on utility poles owned by

CVEC wherever possible to avoid higher costs for placing fiber underground. Fiber is proposed to extend from the Martin's Store node as follows:

1. North approximately 2.2 miles along the Rockfish Valley Highway to Rockfish River Elementary School at Chapel Hollow Road (proposed new tower)

2. North from the school approximately 7.9 miles to Afton Mountain (proposed new tower)

3. South approximately 13.4 miles along Route 6 through Woods Mill and continuing Down Highway 29 (Thomas Nelson Highway) into Lovingston and the Emergency Communications Center at the Courthouse (future planned Public Safety tower)

4. From the Courthouse, approximately 1.2 miles of fiber deployed throughout downtown Lovingston and back to Highway 29

5. South approximately 6.2 miles on Highway 29 to the Colleen Business Park and ending at the CVEC property (proposed tower)

In addition to transporting the bandwidth traffic of private providers and the County, businesses and residents located within approximately 500 feet of the fiber could be feasibly served by a direct fiber connection for last mile service delivery. Costs to serve customers meeting this criterion are not included as it will be the responsibility of the private provider offering last mile services. Premises located beyond 500 feet of the network could also be served by using longer fiber service drops or wirelessly. Direct fiber connections will be made available to those users within approximately 500 feet of the fiber, which include:

Many public safety entities, and critical community organizations: 14 Municipal/education facilities; 6 public safety facilities; 3 healthcare providers; 4 community centers and a library; 170 employers; 3 private provider facilities; and 11 communication towers.

Currently, no restrictions on use have been identified and the applicant intends to provide an unrestricted open access network.

Timothy M. Kaine
   Governor

August 10, 2009

Lawrence E. Strickling
Assistant Secretary for Communications and Information
Broadband Technology Opportunities Program
National Telecommunications and Information Administration
U.S. Department of Commerce
HCHB, Room 4812
1401 Constitution Avenue, NW
Washington, D.C. 20230

Dear Secretary Strickling:

One of the most important challenges I face, as Governor of Virginia, is ensuring that all businesses and citizens of the Commonwealth have access to affordable and reliable broadband infrastructure. I am very encouraged to see that the American Recovery and Reinvestment Act has committed to providing funding for the expansion and development of broadband infrastructure to rural areas.

The broadband initiatives proposed by the National Telecommunications Information Agency though stimulus dollars are a prime example of how investment in technology can make huge gains in rural communities. With financial help from the American Recovery and Reinvestment Act, the National Telecommunications Information Agency can work towards achieving their goals of creating jobs, closing the gap in broadband access, generating increased investment and demand for broadband, and spreading high-speed access to community centers, schools, universities, libraries, job training centers, hospitals and public safety personnel. In these difficult economic times, achieving these goals will greatly improve the quality of life for all Virginians, but especially those in underserved rural areas.

I urge you to give strong consideration to the many applications from Virginians being submitted to the Broadband Technology Opportunities Program.

Sincerely,

Timothy M. Kaine

COMMONWEALTH OF VIRGINIA
Office of the Governor

Timothy M. Kaine
    Governor

August 10, 2009

Jonathan Adelstein
Administrator of the United States Department of Agriculture
Rural Development's Rural Utilities Service
Broadband Initiatives Program
U.S. Department of Agriculture
1400 Independence Avenue, SW, Stop 1599
Washington, D.C. 20250

Dear Administrator Adelstein:

One of the most important challenges I face, as Governor of Virginia, is ensuring that all businesses and citizens of the Commonwealth have access to affordable and reliable broadband infrastructure. I am very encouraged to see that the American Recovery and Reinvestment Act has committed to providing funding for the expansion and development of broadband infrastructure to rural areas.

The broadband initiatives proposed by the Rural Utilities Service though stimulus dollars are a prime example of how investments in technology can serve as a catalyst to spur huge economic gains in rural communities. With financial help from the American Recovery and Reinvestment Act, the Rural Utilities Service can work towards achieving their goal to "provide and improve broadband service to the highest proportion of rural residents who do not have adequate access to broadband services." In these difficult economic times, achieving these goals will greatly improve the quality of life for all Virginians, but especially those in unserved rural areas.

I urge you to give strong consideration to the many applications from Virginians being submitted to the Broadband Initiatives Program.

Sincerely,

Timothy M. Kaine

ATTACHMENT C – COMPETITOR TABLE – LAST MILE

 Existing Last Mile Broadband Service Providers and Services Offered: Please complete a table describing the competing last mile providers' broadband service offerings being advertised in each proposed funded service area (BIP applicants should complete this table for each census designated community within the proposed funded service area) . For each competitor, explain the following: a) technology; b) service tiers; c) advertised speeds for residential and business; d) pricing. Include any other comments to explain your findings, if necessary.

	<Applicant Service Area Name>							
Service Area	Last Mile Services Provider	Technology Platform	Service Tier	Advertised Residential Offering		Advertised Business Offering		Other Comments
				Downstream Speed (Mbps)	Price	Downstream Speed (Mbps)	Price	
Service Area 1/ Census community 1 Lovingston, VA	**Provider A Verizon**	DSL	Entry Level Plan	768 kbps	$15/mo	768 kbps	$15/mo	
			Highest Speed Plan	5.0 mbps	$45/mo	5.0 mbps	$45/mo	
			Other Plans (e.g., Mid-Tier Plan)					
	Provider B		Entry Level Plan					
			Highest Speed Plan					
			Other Plans (e.g., Mid-Tier Plan)					
Service Area 2/ Census community 2 Colleen	**Provider A Stewart Computers**	wireless	Entry Level Plan	256 kbps	$50/mo	256 kbps	$50/mo	
			Highest Speed Plan	1.5 mbps	$70/mo	1.5 mbps	$70/mo	
			Other Plans (e.g., Mid-Tier Plan)	512 kbps	$60/mo	512 kbps	$60/mo	
	Provider B IBEC	Broadband over power lines	Entry Level Plan	256 kbps	$30/mo	256 kbps	$30/mo	
			Highest Speed Plan	3.0 mbps	$90/mo	3.0 mbps	$90/mo	
			Other Plans (e.g., Mid-Tier Plan)					

ATTACHMENT C – COMPETITOR TABLE – LAST MILE

 Existing Last Mile Broadband Service Providers and Services Offered: Please complete a table describing the competing last mile providers' broadband service offerings being advertised in each proposed funded service area (BIP applicants should complete this table for each census designated community within the proposed funded service area) . For each competitor, explain the following: a) technology; b) service tiers; c) advertised speeds for residential and business; d) pricing. Include any other comments to explain your findings, if necessary.

	<Applicant Service Area Name>							
Service Area	Last Mile Services Provider	Technology Platform	Service Tier	Advertised Residential Offering		Advertised Business Offering		Other Comments
				Downstream Speed (Mbps)	Price	Downstream Speed (Mbps)	Price	
Service Area 1/ Census community 1 Afton	**Provider A NONE**		Entry Level Plan					
			Highest Speed Plan					
			Other Plans (e.g., Mid-Tier Plan)					
	Provider B NONE		Entry Level Plan					
			Highest Speed Plan					
			Other Plans (e.g., Mid-Tier Plan)					
Service Area 2/ Census community 2 AVON	**Provider A IBEC**	broadband over power lines	Entry Level Plan	256 kbps	$30/mo	256 kbps	$30/mo	
			Highest Speed Plan	3.0 mbps	$90/mo	3.0 mbps	$90/mo	
			Other Plans (e.g., Mid-Tier Plan)					
	Provider B NONE		Entry Level Plan					
			Highest Speed Plan					
			Other Plans (e.g., Mid-Tier Plan)					

ATTACHMENT C – COMPETITOR TABLE – LAST MILE

 Existing Last Mile Broadband Service Providers and Services Offered: Please complete a table describing the competing last mile providers' broadband service offerings being advertised in each proposed funded service area (BIP applicants should complete this table for each census designated community within the proposed funded service area) . For each competitor, explain the following: a) technology; b) service tiers; c) advertised speeds for residential and business; d) pricing. Include any other comments to explain your findings, if necessary.

Service Area	Last Mile Services Provider	Technology Platform	Service Tier	Advertised Residential Offering Downstream Speed (Mbps)	Advertised Residential Offering Price	Advertised Business Offering Downstream Speed (Mbps)	Advertised Business Offering Price	Other Comments
			\<Applicant Service Area Name\>					
Service Area 1/ Census community 1 Tyro/Massies Mill	**Provider A NONE**		Entry Level Plan					
			Highest Speed Plan					
			Other Plans (e.g., Mid-Tier Plan)					
	Provider B NONE		Entry Level Plan					
			Highest Speed Plan					
			Other Plans (e.g., Mid-Tier Plan)					
Service Area 2/ Census community 2	**Provider A**		Entry Level Plan					
			Highest Speed Plan					
			Other Plans (e.g., Mid-Tier Plan)					
	Provider B		Entry Level Plan					
			Highest Speed Plan					
			Other Plans (e.g., Mid-Tier Plan)					

ATTACHMENT C – COMPETITOR TABLE – MIDDLE MILE

Existing Middle Mile Broadband Service Providers and Services Offered: Please complete a table describing the competing middle mile providers' broadband service offerings being advertised in the last mile service areas associated with the proposed middle mile project. **For BIP**, please provide this information for each census designated community within each last mile service area. For each competitor, explain the following: a) technology; b) service tiers; c) point-to-point of the competitor's service offering; d) speed; and e) pricing. Include any other comments to explain your findings if necessary.

Service Area	Middle Mile Services Provider	Technology Platform	Service Tier	Point-to-Point	Minimum Peak Load Network Bandwidth Capacity	Pricing	Other Comments
NELSON COUNTY, VIRGINIA – APPLIES TO ENTIRE SERVICE AREA							
Service Area 1/ Census community 1 NELSON COUNTY VIRGINIA	**Provider A** Verizon	Telephone wire line	Entry Level Plan		1.5 mbps	$800-1100/month	Applies to all Nelson County and service area
		DS3	Highest Speed Plan		45 mbps	$4500-5000	Allies to all Nelson County and service area
			Other Plans (e.g., Mid-Tier Plan)				
	Provider B		Entry Level Plan				
			Highest Speed Plan				
			Other Plans (e.g., Mid-Tier Plan)				
Service Area 2/ Census community 2	**Provider A**		Entry Level Plan				
			Highest Speed Plan				
			Other Plans (e.g., Mid-Tier Plan)				
	Provider B		Entry Level Plan				
			Highest Speed Plan				
			Other Plans (e.g., Mid-Tier Plan)				

ATTACHMENT E – PROJECT PLAN (KEY PHASES AND MILESTONES TO DEMONSTRATE DEGREE OF COMPLETION)

- Use the following table to list the major network build-out phases and milestones that can demonstrate that your entire project will be substantially complete by the end of Year 2 and fully complete by the end of Year 3.   This is to be done at the aggregate level (combining all proposed funded service areas.)

- Indicate how the milestones listed below will demonstrate these completion objectives. The applicant should consider such project areas as: a) network design; b) securing all relevant licenses and agreements; c) site preparation; d) equipment procurement; e) inside plant deployment; f) outside plant deployment; g) equipment deployment; h) network testing; i) network complete and operational. The applicant may provide any other milestones that it believes showcase progress.

- Project inception (Year 0) starts at the date when the applicant receives notice that the project has been approved for funding.

- In the table, provide any information (e.g., facts, analysis) to: a) demonstrate the reasonableness of these milestones; b) substantiate the ability to reach the milestones by the quarters indicated.

- On a separate sheet, describe the key challenges, if any, to a timely completion of the project, including any applicable mitigation plans.

Time Period	Quarter	List All Relevant Milestones	Support for Reasonableness/Data Points
Year 0	-	Nelson County administrative/legal staff will complete the obligations required for acceptance and use of ARRA funding. Issue request for proposal, following Virginia and funding source procurement requirements to solicit formal agreements with qualified parties to respond with the terms and utilization of the network they may wish to utilize. Negotiate with respondents as well as those who have previously expressed interest (RFI) to develop agreements. Agreements with wholesale Internet providers may extend well beyond this period.	• Nelson County is ready to begin the RFP process immediately once funding is secured for the project. Private provider interest has already been determined through the preliminary request for interest surveys as well as meetings with interested providers.
Year 1	Qtr. 1	County staff will execute contract addendum with the incumbent professional firm presently under contract with the locality or retain a qualified firm through the issuance in conformance with public procurement requirements of a Request for Proposals to secure the services of a professional consultant with expertise, including engineering, in the disciplines required for the network's design and construction, inclusive of construction drawings, specifications and contract documents. Contract with utility providers for pole attachment agreements and make-ready along a finalized fiber optic route. The utility providers may accept make-ready engineering provided by design team or they may insist on doing the work in-house. Based on those decisions and the amount of make-ready indicated, changes to the route may be	• County staff is experienced in preparing and issuing RFPs and is prepared to expedite the preparation as necessary to secure an engineering firm to complete the project design. Additionally, the County has informal pole attachment agreements and full support from the electric utility for this project which will enable these agreements to be formalized quickly.

		necessary. The time-frame for repairs will be determined by the utility. County staff will begin securing utility easements.	
	Qtr. 2	Secured engineering firm will develop detailed design, bid specifications and network requirements. Design team will develop a detailed set of plans for use by the selected contractors. Permitting, licensing and other technical issues will also be handled during this time period. County staff will continue finalizing required utility easements.	• The engineering firm engaged that recently completed a broadband planning study and implementation plan for Nelson County has estimated the time necessary for design completion to be 8-12 weeks.
	Qtr. 3	Engineering firm will finalize detailed design specifications and prepare complete construction bidding documents following Virginia and funding source procurement requirements. Plans and specifications will be distributed to bidders. A pre-bid meeting will be held. Once all the bids are received, bids will be tabulated, bid compliance will be confirmed, and references will be checked. The engineering consultant will make recommendation to the County for award of contract.	•
	Qtr. 4	County staff will make award, negotiate construction contract and issue Notice to Proceed. Network construction begins with project mobilization, set up of project staging area, and procurement of material and equipment. County staff will administer compliance with the Federal Davis-Bacon Act (on-going through completion of construction phase).	• County staff has experience with management of construction projects including water/sewer, public facilities, recreational trails, and schools. Many of these projects also included administration of Federal Davis-Bacon Act compliance.
Year 2	Qtr. 1	Network construction continues inclusive of tower erection. The prefabricated building will need to be delivered, set into a prepared area and provided with power and utilities. County inspector will serve as on-site representative to ensure quality control.	• Per timeline provided in engineering implementation plan included as a supplemental attachment. Estimated construction time including installation of electronics is 6-9 months.
	Qtr. 2	Network construction continues.	•
	Qtr. 3	Network electronics will need to be installed and tested. Interconnections with other providers will have to be made and tested. ONTs and drops will need to be made to all County facilities.	• Per timeline provided in engineering implementation plan included as a supplemental attachment.
	Qtr. 4	After the infrastructure is built, testing will be performed and a punch list created for correction of items prior to issuing the final completion notice and release of bond. Upon completion of the project and satisfaction of the punch list, retainage will need to be released, warranties collected, operations and maintenance manuals distributed and contractor demobilization reviewed for acceptable site condition. Network completed and operational.	• Per timeline provided in engineering implementation plan included as a supplemental attachment.

Year 3	Qtr. 1	Contingency to provide for milestones that take longer than anticipated.	•
	Qtr. 2	•	•
	Qtr. 3	•	•
	Qtr. 4	•	•

ATTACHMENT E (CONTINUED) – BUILD-OUT TIMELINE

Complete the following schedule for each proposed funded service area (or, if a middle mile project, for each last mile service area) to indicate the planned build-out in terms of: 1) the requested infrastructure funds; and 2) the entities passed. Entities passed include households, businesses, and "strategic institutions" comprised of critical community facilities, community anchor institutions, and public safety entities. In addition, please complete a separate schedule that aggregates all projected broadband subscribers within the proposed funded service area (or if a middle mile project, for each last mile service area). For BIP only, please include this information for the non-funded service areas as well.

Service Area A	[Afton]																				
	YEAR 0	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
		Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4
Infrastructure Funds																					
Infrastructure Funds Advanced (estimate)		10000	40000	40000	122934	60932	60932	60932	60932												
Percentage of Total Funds		.4%	1.75%	1.75%	5.3%	2.7%	2.7%	2.7%	2.7%												
Entities Passed & %																					
Households							299														
Percentage of Total Households							100%														
Businesses							30														
Percentage of Total Businesses							100%														
Strategic Institutions (Comm. Anchor, Public Safety, etc)							1														
Percentage of Total Institutions							100%														

Service Area B	[Avon]																					
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
	YEAR 0	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4
Infrastructure Funds																					
Infrastructure Funds Advanced (estimate)		10000	40000	40000	122934	60932	60932	60932	60932												
Percentage of Total Funds		.4%	1.75%	1.75%	5.3%	2.7%	2.7%	2.7%	2.7%												
Entities Passed & %																					
Households						322															
Percentage of Total Households						100%															
Businesses						38															
Percentage of Total Businesses						100%															
Strategic Institutions (Comm. Anchor, Public Safety, etc)						2															
Percentage of Total Institutions						100%															

Service Area C	[Lovingston]																					
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
	YEAR 0	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4
Infrastructure Funds																					
Infrastructure Funds Advanced (estimate)		10000	40000	40000	122934	60932	60932	60932	60932												
Percentage of Total Funds		.4%	1.75%	1.75%	5.3%	2.7%	2.7%	2.7%	2.7%												
Entities Passed & %																					
Households					105	105															
Percentage of Total Households					50%	50%															
Businesses					55	55															
Percentage of Total Businesses					50%	50%															
Strategic Institutions (Comm. Anchor, Public Safety, etc)					3	4															
Percentage of Total Institutions					50%	50%															

Service Area D	[Colleen]																				
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
	YEAR 0	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4
Infrastructure Funds																					
Infrastructure Funds Advanced (estimate)		10000	40000	40000	122934	60932	60932	60932	60932												
Percentage of Total Funds		.4%	1.75%	1.75%	5.3%	2.7%	2.7%	2.7%	2.7%												
Entities Passed & %																					
Households					210	209															
Percentage of Total Households					50%	50%															
Businesses					30	30															
Percentage of Total Businesses					50%	50%															
Strategic Institutions (Comm. Anchor, Public Safety, etc)					5	5															
Percentage of Total Institutions					50%	50%															

Service Area E	[Tyro-Massies Mill]																				
		YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
	YEAR 0	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4
Infrastructure Funds																					
Infrastructure Funds Advanced (estimate)		10000	40000	40000	122934	60932	60932	60932	60930												
Percentage of Total Funds		.4%	1.75%	1.75%	5.3%	2.7%	2.7%	2.7%	2.7%												
Entities Passed & %																					
Households								152	153												
Percentage of Total Households								50%	50%												
Businesses								12	12												
Percentage of Total Businesses								50%	50%												
Strategic Institutions (Comm. Anchor, Public Safety, etc)									1												
Percentage of Total Institutions									100%												

Combined Last Mile Areas	[Afton, Avon, Lovingston, Colleen,Tyro-Massies Mill]																				
	YEAR 0	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
		Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4
Infrastructure Funds																					
Infrastructure Funds Advanced (estimate)		50000	200000	200000	614671	304659	304659	304659	304660												
Percentage of Total Funds		3%	9%	9%	27%	13%	13%	13%	13%												
Entities Passed & %																					
Households					315	636	299	152	153												
Percentage of Total Households					20%	41%	19%	10%	10%												
Businesses					85	123	30	12	12												
Percentage of Total Businesses					32%	47%	11%	5%	5%												
Strategic Institutions (Comm. Anchor, Public Safety, etc)					8	11	1		1												
Percentage of Total Institutions					38%	52%	5%		5%												

Key Challenges:

Nelson County has tried to mitigate unanticipated problems by an extensive planning phase for this project. For example, the County has already met with utility companies to provide pole attachment agreements and also met with private providers who have agreed in principle to participate in this project. Nelson County has extensive experience with managing multi-million dollar projects and has done its due diligence in the planning process to prepare for project implementation.

ATTACHMENT H – Broadband Subscriber Estimates

 Instructions: Using the table below, please estimate the number of subscribers for each distinct type of service offering on a quarterly basis over the five year forecast period. Combine all service pricing tiers of broadband data services into a single service offering. The subscriber projections must be described separately by the type of services offered, and by type of entity (households, businesses, "strategic institutions" i.e., critical community facilities, community anchor institutions, and public safety entities) to which services are offered. For last mile subscribers, please also provide, on a separate sheet, your estimated take rate (the percentage of total customers passed who will subscribe to your service), along with a brief description of the methodology used to forecast these subscribers/take rates. Middle mile applicants should indicate their subscriber forecasts in terms of the entities served via the last mile service providers, community anchor institutions, or public safety entities that are connected to their middle mile network. Middle mile applicants should also provide a reasoned basis for these subscriber forecasts (e.g., agreements in principle with existing or planned last mile service providers, market studies, etc).

Household Subscribers	YEAR 0	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
Service Type #1 Wireless		Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4
Net add-ons		58	77	38	19	60	36	18	6	38	24	19	14	12	12	12	12	10	5	5	5
Cumulative subscribers		58	135	173	192	252	288	306	312	350	374	393	407	419	431	443	455	465	470	475	480
Service Type #2																					
Net add-ons																					
Cumulative subscribers																					
Service Type #3																					
Net add-ons																					
Cumulative subscribers																					

Business Customers	YEAR 0	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
Service Type #1 Wireless		Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4
Net add-ons		10	15	7	1	12	6	3	1	3	3	2	3	1	1	1	1	1	1	1	1
Cumulative subscribers		10	25	32	33	45	51	54	55	58	61	63	66	67	68	69	70	71	72	73	74
Service Type #2																					
Net add-ons																					
Cumulative subscribers																					
Service Type #3																					
Net add-ons																					
Cumulative subscribers																					

Strategic Institution	YEAR 0	YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5			
Service Type #1 Fiber Optic		Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4
Net add-ons		6	2	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Cumulative subscribers		6	8	8	8	11	11	11	11	12	12	12	12	12	12	12	12	12	12	12	12
Service Type #2																					
Net add-ons																					
Cumulative subscribers																					
Service Type #3																					
Net add-ons																					
Cumulative subscribers																					

48. Broadband Subscriber Estimates: The estimate of broadband subscribers contained in Attachment H herein is supported by the locality's initial planning study entitled "Community Broadband Planning Study, Nelson County, Virginia; Phase I Report – Needs Assessment and Broadband Education, November 26, 2007" (attached).

Census Block and Tract data was utilized to identify the total number of Households (1,555), Businesses (262) and Critical Community Facilities, Anchor Institutions and Public Safety Entities (21) located within the middle mile project's service area. Underserved totals included 951 households, 208 businesses and 19 CCF, AI & PSEs. Un-served totals are 604 households, 54 businesses and 2 CCF, AI & PSEs.

Based upon survey results contained in the locality's Phase I Report, subscriber estimates for last mile and middle mile connectivity were conservatively established at 25% for underserved areas (all entities) and 40% for un-served locations (all entities). Using these assumptions, total projected underserved subscribers are 238 households and 52 businesses, which will connect by last mile, wireless service, and, 10 CCF, AI & PSEs which will have direct, fiber optic, connection to the middle mile network. Un-served subscribers include, 242 households and 22 businesses via last mile, wireless connection and, 2 CCF, AI & PSEs by middle mile, fiber optic service.

Attachment H was completed using the 25% (underserved) and 40% (un-served) subscriber estimates. The Service Type for households and business subscribers (last mile) is wireless only. For CCF, AI and PSEs the Service Type is fiber optic via the middle mile network.

The Phase I Report survey results indicated the potential for subscriber levels to meet or exceed the conservative subscription rates contained in Attachment H. Of the total households (2,500) and businesses (500) surveyed, the response rate was, respectively, 24% (600) for households and 20% (103) for businesses. Of these responses, 89% of households indicated they were likely (74%) or somewhat likely (15%) to subscribe and 67% of businesses responded they were dissatisfied with their current service. Based upon these results, it is reasonable to assume that the subscriber rates denoted in Attachment H are conservative and not over projected (i.e. Household subscribers at 89% equates to 1,381 possible connections versus Attachment H's 480 and Business connections at 67% result in 176 subscribers versus 74 in Attachment H).

The 5 year subscriber rates delineated in Attachment H anticipate higher subscription rates in years 1 – 3 than in years 4 and 5, which is derived from the indicators contained in the Phase I report. The 12 CCF, AI & PSEs connections represent only 57% of the total (21) of such entities projected to be connected directly to the middle mile network. It is also considered a reasonable assumption that all CCF, AI and PSEs will be subscribers, again reflecting the conservative estimates listed in Attachment H.

Lastly, the locality (applicant) has undertaken a three phase planning study on which its application is based. These initiatives point to and support the inadequacy of broadband services and the need for greater bandwidth. The locality (County/applicant) is committed to addressing this need, including a commitment to use the fiber for direct (100meg) connectivity from the middle mile, fiber optic, network.

March 27, 2009

Stephen A. Carter, County Administrator
County of Nelson
PO Box 636
Lovingston, VA 22949

RE: Nelson County, Virginia Community Broadband Implementation Plan

Mr. Carter:

Icon Broadband Technologies (IBT) and Consulting Gateway Corporation (CGC) are pleased to provide this final implementation plan for the proposed Nelson County, VA Community Broadband Project. This plan provides guidance to meet the established project milestones and expectations of the County. As stated in the Phase II Community Broadband Study report presented to the study management team, the "overall objective of this implementation plan is to provide enough detail to ensure that local leaders have sufficient information to make an informed decision as to what model is appropriate, how much local investment and support will be required, and why such an initiative is crucial for their community".

The County's administrative staff has communicated the Board's objectives to seek solutions that do not increase current workloads, mitigate financial risk and avoid long-term debt obligations. After examining all options and roles for the County to consider, it is our recommendation that the County can best meet their stated goal of bringing high bandwidth infrastructure into the County by working with private providers. The Commonwealth of Virginia encourages rural municipalities to establish partnerships with private providers to encourage and enable broadband service delivery to the citizenry. Local providers have a vested interest in the communities in which they live and serve, and have been active stakeholders participating in the project planning. Local companies including the cable provider and wired and wireless Internet providers have indicated their desire to work with the County to implement infrastructure that would allow each to expand their current service areas. Additionally, each of these providers has expressed their willingness to work together to meet mutual goals and objectives. While this is clearly an example of the Commonwealth's expected outcome of the rural broadband planning initiative, it is unusual in practicality and highlights new thinking on the part of typically competitive providers. By partnering with the private sector the County minimizes the investment, the risk and the demands on County staff while connecting government facilities in a high bandwidth network, reducing communication expenditures, and expanding broadband services to the citizenry.

This plan advocates capitalizing on the synergy between the public safety radio upgrade, emergency communications interoperability planning, and the community broadband project. Portions of each projects' objectives can be achieved simultaneously with the installation of fiber and communication towers in areas where the projects overlap.

The American Reinvestment and Recovery Act of 2009 allocated over $7 billion for broadband infrastructure implementation assistance, disbursed through the National Telecommunication and Infrastructure Agency (NTIA) and the Rural Utilities Service (RUS). At the time of this writing, specific funding announcements and application guidelines have not been announced. Nelson County was

proactive in submitting requests to the Governor's office in December 2008 and March 2009 for funding assistance to complete both the Radio and Broadband projects, but grants will be awarded on a competitive basis. This implementation plan is intended to use funds in a fiscally responsible manner, balancing need with long term sustainability and taking advantage of cost efficiencies.

IBT and CGC appreciate being allowed to be part of this ground-breaking initiative and look forward to continuing to assist Nelson County in bringing this important infrastructure to the County.

Sincerely,

Icon Broadband Technologies

Judy Bentley
Vice President
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Consulting Gateway Corporation

Keith A. Hill, P.E.
President
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PLAN SUMMARY

Per 2000 census data, Nelson County, VA has a total population of approximately 14,445 occupying 5,887 housing units. The US Census Bureau estimates the current number of housing units to be approximately 6,300. The Virginia Quarterly Census of Employment indicates that there are approximately 489 businesses are located within the County[1] . This number does not include a significant number of small businesses not counted in their analysis. In addition, public input received during the needs assessment survey process revealed strong support for broadband services to support telecommuting by Nelson residents.

The implementation planning recommendations are a result of discussions with the broadband study stakeholders with direction from County staff. While the County is committed to pursuing all avenues for increasing broadband service availability, it seeks to do so in a limited role so as not to increase current County staff workload and to mitigate risk to Nelson County taxpayers by avoiding long-term debt constraints. Accordingly, the County is advised to work with broadband service providers through public/private partnerships to meet mutual objectives.

Additional communication initiatives in Nelson County include enhancements to the Public Safety Radio and Interoperable Communications Systems. The consultants and the Nelson County Broadband Management Team have identified synergies between the three communication projects. The alignment of project objectives provides an opportunity to leverage each of the networks and achieve overall increased benefits to the County that otherwise might not have been considered. The following demonstrates considerations in combining planning and implementation activities:

- Weakness of Public Safety Radio and Interoperable Communications Systems: There is no wire-line redundant path. In the event microwave towers are disabled (storms, earthquake, tornado, plane crash, etc.), portions of the County may be isolated from communicating with each other and outside the County via the radio system. Within the County the mountainous terrain makes it difficult to achieve strong radio signal coverage in all areas.

- Community Broadband Network Benefits to Public Safety: Consider the creation of a fiber optic cable connection between the Devils Knob Tower Site and the Emergency Operations Center in Lovingston. This not only provides a wire-line communication path between these two (2) locations, but future efforts can include establishing an alternative route out of the county from the Wintergreen 911 Gatehouse/Devils Knob Tower Site in the event communication out of the county from Lovingston becomes disabled. An investment in communication towers provides opportunities for wireless services to be used for filling gaps in Public Safety radio coverage and deploying future mobile services.

The recommended solution to enhance telecommunications services in Nelson County is a combination of wired and wireless networks and new communication towers which can be addressed simultaneously if funding and commitments are secured. Investment in a fiber optic distribution network for cost-effective bandwidth transport and Internet access is a necessary component for enabling both wireless and wireline service area expansion. The additional investment in communication towers or monopoles connected to the fiber transport network allows the County to leverage these communication assets to enable private

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[1] Source: Virginia Employment Commission, Quarterly Census of Employment and Wages (QCEW), 3rd Quarter (July, August, September) 2008.

provider participation to benefit the citizenry. A wireless network addresses most residential and a majority of small business broadband needs today, but in anticipation of continued growth of other bandwidth intensive services such as video, large volume off site data storage, VoIP (Voice over Internet Protocol) and other enterprise business applications (triple play voice, video and data), any investment in communications infrastructure today should incorporate such future growth.

FIBER NETWORK

The Community Broadband Study (Phase II) identified several routes for potential fiber deployment. Those routes have been refined based on input from County staff, community stakeholders and public safety representatives. For example, fiber to High Top Mountain has been removed from the implementation plan as has the fiber extension from Route 6 south along Rockfish Valley Highway into Nellysford.

Private providers and other community stakeholders indicate a fiber distribution network is needed to connect the northwestern communities (Nellysford/Afton) with the south-central communities (Lovingston/Colleen) and passing through the Woods Mill community. Such a high capacity communications network will enable transport within the county and connectivity to wholesale access providers outside of the county.

A main connectivity point (node) shall be located near the Martins Store electric substation and for interconnection of networks with a private provider such as Central Virginia Electric Cooperative (CVEC) or Nelson Cable. This connection point would support Internet or distribution transport for IBEC's broadband over powerline (BPL) deployment and facilitate connections between the two Nelson Cable Headends (Lovingston and Wintergreen). Fiber is proposed to be constructed aerially on utility poles owned by CVEC wherever possible to avoid higher costs for placing fiber underground.

Fiber is proposed to extend from the Martin's Store node as follows:

1. North approximately 2.2 miles along the Rockfish Valley Highway to Rockfish River Elementary School at Chapel Hollow Road (proposed new tower)
2. North from the school approximately 7.9 miles to Afton Mountain (proposed new tower)
3. South approximately 13.4 miles along Route 6 through Woods Mill and continuing down Highway 29 (Thomas Nelson Highway) into Lovingston and the Emergency Communications Center at the Courthouse (future planned Public Safety tower)
4. From the Courthouse, approximately 1.2 miles of fiber deployed throughout downtown Lovingston and back to Highway 29
5. South approximately 6.2 miles on Highway 29 to the Colleen Business Park and ending at the CVEC property (proposed tower)

A total of 31 miles of 96 count fiber is assumed. In addition to transporting the bandwidth traffic of private providers and the County, businesses and residents located within approximately 500 feet of the fiber could be feasibly served by a direct fiber connection for last mile service delivery. Costs to serve customers meeting this criterion are not included in county planning as it will be the responsibility of the private provider offering last mile services. Premises located beyond 500 feet of the network could also be served by using longer fiber service drops or wirelessly.

One of the major decisions in installing a fiber optic cable network is whether to deploy aerially or underground. Both have advantages and disadvantages which will make one method more or less

favorable under various conditions. For this network a recommendation has been made to deploy predominantly aerially except in Lovingston or where conditions will make it impractical.

Aerial fiber is usually less expensive to deploy. Fiber deployed in the communications zone[2] will require less attaching hardware (messenger cable, lashing and mounting hardware) and lower labor costs for installation. There are, however, costs associated with preparing the poles to allow fiber to be attached in a safe manner called make-ready. Usually make-ready consists of making sure that mandated (National Electric Safety Code) separations between the power lines and the fiber optic cable are maintained as well as clearances above grade. Those changes can be as little as adding non-conductive risers to move power cables to a different elevation, to as much as complete change-outs of utility poles to create additional room (taller pole required).

Underground fiber installation is generally more costly. The hardware (vaults and conduit) are more expensive than that used with aerial fiber. The cost of trenching or boring is more expensive than hanging aerial fiber and is variable depending on soil conditions. Care has to be taken to identify and locate underground utilities before digging. Under extreme conditions, it can cost well in excess of $100 per foot to directional bore for the installation of fiber. There may be some areas where it is impractical to using aerial installation (no pole line or inadequate pole capacity over long distances) or underground installation (extreme levels of rock). Most projects include at least some of both methods. In the table below, a comparison is made of aerial versus trenched or bored fiber installation and the effect on applicable costs. This example assumes a condition of moderate make-ready ($10,000/mile) requirements.

Comparison of Costs Aerial vs Underground Deployment (typical)*		
	Cost per mile Aerial	Cost per mile Underground
Make-Ready	$10,000	
Fiber Optic Cable (96 count)	$ 4,500	$ 4,500
Mounting Hardware/Vaults	$ 2,600	$10,600
Hang Fiber or Pull Fiber in Conduit	$ 7,200	$ 2,700
Trench Fiber (90%)		$19,000
Directional Bore (10%)		$ 8,000
Splice and Quality Control Checks	$ 1,700	$ 1,700
Totals	$26,000	$46,500

*Installation numbers are typical and are for running fiber along extended distances with no drops and no splicing other than at the ends of storage reels. Both aerial and underground can change dramatically under adverse conditions. Design and management fees not included but should be the same for both cases. Some of the numbers are specific to the fiber count used (96).

COMMUNICATION TOWERS

The goal of a County investment in infrastructure is to enable private provider delivery of services into areas that are currently unserved, and to enable higher bandwidth services in areas that may be underserved. While the fiber distribution network will provide transport across the county, wireless service providers need access to vertical assets. Currently the tall structures owned by the County are limited primarily to water towers. Fiber has been included in the network terminating at four proposed communication towers or monopoles located in the following areas:

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[2] The communications zone is an area of utility poles where non-utility attachments such as telephone and cable television cables are placed.

1) Rockfish River Elementary School
2) Afton Mountain
3) Colleen Business Park
4) Lovingston Emergency Communications Center (included in current courthouse project)

Additionally, construction of one microwave tower in the Tyro/Massie's Mill area of the county is recommended and included in the implementation costs to support serving wirelessly in this hard to reach section. There is no fiber proposed to reach this site, but microwave equipment (transmitter/receiver) is included in the County's costs. This microwave point could potentially serve public safety radio communication needs as well.

NETWORK DESIGN COMPONENTS

Summary of Proposed Network

➢ Include Point-of-Presence (POP) space in a prefabricated hut located near the courthouse in Lovingston. The POP will house the broadband network equipment for the County as well as providing space designated for private provider collocation of equipment and access (including network operator).[3]

➢ Fiber will extend from the County-owned public safety tower to the POP as well as to the Emergency Communication Center in Lovingston in the new Courthouse. It will provide additional communications capabilities for emergency communications without impacting operations of that network. In addition to hosting the microwave connection to High Top Mountain for the public safety network, this tower and fiber would additionally be used for hosting private provider wireless equipment and providing data transport. This creates two potential access points for Internet access, via microwave or fiber, providing network redundancy. Potentially these connections will reduce costs for Public Safety/Community connectivity.

➢ Extend fiber from Lovingston along Highway 29 to the Colleen Business Park. The middle/high school complex will have access to high bandwidth services from eRate providers while potentially reducing expenses by eliminating local loop access charges from the current provider or through access to lower Internet costs.

➢ The Blue Ridge Medical Center will have access to high bandwidth services to support additional use of technology to serve rural citizens. (Meets CDBG objectives)

➢ Fiber through the Colleen Business Park for marketing by economic development officials to attract new businesses that depend on high speed access. The network will pass the Nelson Service Authority allowing replacement of current dial-up services. Fiber to the CVEC substation would provide an alternative data transport option for IBEC broadband over powerline Internet traffic.

➢ A tower located at the Colleen Business Park and connected to the fiber distribution network will provide access for private provider to offer wireless services to the southern end and west side of the county where there are concentrations of low-to-moderate income households. (Meets CDBG

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[3] Collocation space is where equipment from one provider's network can interconnect with equipment from the County network allowing each to have access for repairs and maintenance.

objectives) This location could serve as an interoperability point for any future regional broadband or public safety initiatives with neighboring communities south of Nelson County (i.e. Amherst).

➢ Fiber through Woods Mill from the Lovingston courthouse to Martin's Store and the Rockfish Valley Highway connects networks and communities on both sides of the county. The fiber provides a pathway for future interoperability connections between 911 PSAPs (public safety answering points) in Lovingston and Wintergreen. Allows redundant connections to Internet access points out of Nellysford and Lovingston. Alternative transport option for IBEC broadband over powerline Internet traffic. Point of connection with private provider networks to the north enabling service expansion to Lovingston and south to Arrington and Colleen.

➢ Fiber extended up Rockfish Valley Highway to the Rockfish River Elementary School at Chapel Hollow Road would allow the elementary school to receive high bandwidth services from the middle/high school complex in Lovingston across fiber, eliminating provider local loop access charges for current services. A tower located at this property (and connected to fiber) will provide access for wireless private providers to reach areas north of the elementary school (Afton and Rockfish Valley).

➢ Fiber extended along Rockfish Valley Highway to Afton Mountain. Construction of a tower or monopole located on Afton Mountain and connected to fiber. Would allow a wireless private provider to serve the Afton and Rockfish Valley areas currently unserved. This location could serve as an interoperability point for any future regional broadband or public safety initiatives with neighboring communities north of Nelson County (i.e. Albemarle).

➢ Fiber would be deployed aerially on CVEC utility poles wherever possible to defray higher underground construction costs.

Local communications providers were active stakeholders participating in the Community Broadband Planning process and have provided input on how a fiber distribution network would allow them to expand their operations to benefit Nelson County citizens and businesses. In addition, service providers in neighboring locales provided their interest in using an open-access fiber network to expand services into Nelson County through a Request for Interest process. Two distinct partnering opportunities resulted from discussions with these providers, each with a focus on different last mile service delivery technologies that ultimately depend on access to a fiber distribution network in the County. Some of the benefits the proposed network would offer to private providers include:

• The option of purchasing wholesale bandwidth at competitive prices from Comcast or other providers using fiber near Lovingston. Currently Internet connectivity is purchased in Lovingston and Nellysford from near-monopoly providers. Comcast has indicated interest in providing wholesale Internet.

• Provides the local cable provider the opportunity to offer expanded digital TV programming to Nelson County residents.

• Allows the local cable provider to connect their headend located at the Wintergreen resort to their Lovingston headend to offer expanded services currently available only in Wintergreen.

- Gaining access to communication towers with fiber backhaul offsets high recurring costs for the local wireless provider, allowing the firm to expand services to reach unserved areas of the county.

- Provides the broadband over powerline provider with alternative options for Internet backhaul at potentially lower transport rates.

- Offers the opportunity for providers in neighboring counties to serve Nelson County by any last mile service delivery method. Services not limited to Internet access, could potentially include security, video, and telephone.

All County facilities passed would be connected using fiber on a secure County network. Facilities that are not within reach of the fiber would continue to use current methods of access. The County would still retain the option of using their choice of Internet service providers, but would eliminate leased T1[4] lines to connect facilities along the fiber route. The wireless system used to connect the Registrar's office, Tourism and Recreation could be replaced with secure fiber access. This will also allow the library to maintain Internet access for patron's separate from the County's network. Fiber currently connecting the Courthouse and Sheriff's office building would continue to securely connect those facilities. The current system of leasing PRI lines for phone and 911 trunks for Dispatch would remain unchanged.

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[4] T1 lines provided by the local incumbent deliver 1.5 Mbps of data at a cost of approximately $700/month. The County network will be capable of providing 100-1000 Megabits per second between locations. The monthly expense to the County for Internet access (data connections outside of the County or inside the County but not on the network) will be determined by the cost of purchasing the Internet access from a private provider. Depending on the provider, this cost will likely be between $50 and $150 per Mbps per month.

FIGURE 1 – PROPOSED FIBER NETWORK

Community Broadband Planning
Nelson County, Virginia

Proposed Fiber Routes

Prepared by:

ICON BROADBAND TECHNOLOGIES
A Division of Icon Engineering, Inc.
6745 Bells Ferry Road
Woodstock, Georgia 30189

Nelson_Proposed_Fiber_11x17_20090327

Public Facilities

✳	County
◄	Fire Department
●	Law Enforcement
▣	Library
▦	Medical Facility
●	Public Safety
◄	Public School
●	Rescue Squad

Proposed Fiber Routes
Rockfish Elementary to Lovingston
Lovingston Distribution Fiber
Rockfish Elementary to Afton
Lovingston to Colleen

NETWORK OWNERSHIP AND ORGANIZATION STRUCTURE

The Virginia Water and Waste Authorities Act (VA. CODE §§ 15.2-5100 - 5158) allows counties, cities, and towns to form authorities for a variety of purposes. The Act provides that an Authority may: "Install, own and lease pipe or conduit for the purpose of carrying fiber optic cable, provided that such pipe or conduit and the rights-of-way in which they are contained are made available on a nondiscriminatory, first-come, first-served basis to retail providers of broadband and other telecommunications services unless the facilities have insufficient capacity for such access and additional capacity cannot reasonably be added to the facilities." (Va. Code § 15.2-5114(15)). An Authority may borrow funds, issue revenue bonds, and collect fees for its services, and may contract with parties to accomplish its purposes.

It is recommended Nelson County establish a Broadband Authority as authorized by Code of Virginia, §15.2-5431.1 et seq. (Wireless Service Authorities Act). The Authority can acquire, construct, improve, enlarge, operate or extend any project providing qualifying communications services under the provisions of the Act. The Authority can also borrow money and issue revenue bonds to finance the project that do not constitute debt of the local governing body.

The County can elect to retain ownership of the network assets and lease operation to the Broadband Authority, or transfer ownership to the Broadband Authority entirely. Some of the benefits to the County of separating ownership of facilities from the Authority include:

County Owns & Leases Operation to Authority	Broadband Authority Owns
Can borrow against assets	Can borrow against assets
County maintains control to ensure County objectives are met	No debt service obligation on the County
Advance economic development initiatives of the County	County shielded somewhat from operations risk
Ability to transfer monetary payments between entities	

The County has clearly stated its preference to leave last mile service delivery to private providers; therefore the primary role of the Authority will be overseeing the operations and governance of the network. The County and/or Authority are authorized to form public/private partnerships under the Virginia Public-Private Education and Facilities Act of 2002, amended in 2008 to include communications infrastructure projects. Projects may be initiated one of two ways: the County may solicit proposals from private entities (§ 56-575.4(B)), or private entities may request approval for an unsolicited proposal (§ 56-575.4(A)).

The public/private partnership approach is recommended because of the following County objectives:

1. County seeks to avoid considerable long term debt
2. County prefers outsourcing operation to experienced firm
3. County seeks to mitigate risk of revenue shortfalls
4. County concerned with increasing current staff workload
5. County prefers services provided by the private sector

Experienced private providers responding to the Request for Interest during network study indicated their willingness to operate any county-owned network, as well as their support for providing services over an open access network that is also available to competing providers. 'Open access' refers to a network that is made available to more than one entity for use on a level playing field basis. Such entities could include cable providers, Internet providers, phone providers, security companies and utility companies. In addition to firms providing services to homes or businesses, fiber may be leased by private firms to link facilities for private network use.

In a public-private partnership approach, one or more private companies agree to work in tandem and share resources to meet individual needs. For private providers, the greatest impediment to deploying new services is access to capital and the need to generate a return on their investment on a near-term basis. The County has access to capital with more attractive loan terms, can withstand longer payback periods, and may also be eligible for grants to offset infrastructure costs. The County does not have the expertise nor the staff to operate and maintain the network; private providers are best suited to assume those responsibilities, while ensuring County operations continue uninterrupted. Additionally, private providers are well-positioned to aggregate the bandwidth needs of both the public and private sector to negotiate cost-effective Internet connectivity and support.

Going forward, the County would be best served by issuing a Request for Proposal to allow interested service providers to propose a competitively priced solution for operating and/or using the network. The formation of a Broadband Authority should commence as well to allow Authority members to participate in the project planning as early as possible.

COSTS AND FUNDING

The largest part of the project cost is associated with the construction of the outside plant fiber. While the fiber could be buried in conduit along VDOT right of way, it is usually more cost effective to attach the fiber to existing poles owned by either incumbent electric utility, CVEC or Appalachian Power. Before either of these entities will allow a Broadband Authority to attach to their poles, they will conduct a physical assessment which identifies the costs associated with modifying the existing poles to allow for additional attachments (fiber optic cable) in a manner which does not jeopardize safety, is in compliance with the National Electric Safety Code requirements, and does not impede their primary purpose, the delivery of power. Those upgrades will be borne by this project, but the modifications will actually be assessed and implemented by the pole owners. Estimates of these costs are included in the table following based on field surveys, but the final decisions, often the subject of differing interpretations, are ultimately mandated by the incumbents.

The new fiber infrastructure costs are more straightforward:

- Outside Plant Labor – the costs to install the new fiber and associated hardware and splice fibers together where necessary
- Permitting – the costs to prepare documents and obtain permission to cross railroads and use road rights of way
- Outside Plant Hardware – costs of fiber optic cable, splice closures, pole attaching hardware, conduit, and vaults
- Final Design and Construction Management – Layout of the fiber, locations for closures, fiber splicing details, bid management, construction management, development of specifications, bid evaluation and review

- Install Fiber Drops and ONTs – A connection made to each County facility or customer, adding an Optical Network Terminal (ONT) (network gear). These costs will vary with the number of customers taking service and will extend from year to year as new customers or facilities are added.

The majority of fiber proposed is to be deployed aerially on utility poles along CVEC service routes. CVEC has indicated their willingness to work with the County to accommodate attachments to their poles where feasible. Appalachian Power owns the poles in downtown Lovingston and at the time of this writing, had not provided communication regarding allowing access to their poles or at what recurring fees. As such, underground deployment in the downtown Lovingston area is assumed for implementation. The initial construction costs are higher than aerial construction when the fiber is put underground, but the fiber is less prone to damage by weather and other external events and there are no annual pole attachment fees for the buried fiber.

Fiber and Tower Project Costs	
Outside Plant Labor	$ 499,806
Make Ready and Permitting	$ 258,813
Outside Plant Materials	$ 366,035
Network Gear	$ 249,000
Design, Bid Preparation and Evaluation, Construction Management	$ 409,858
ONTs, drops, splicing and installation **	$ 20,120
Contingency	$ 186,801
POP Building/Building Modifications	$ 83,000
Wireless Towers/Poles	$ 180,000
Legal—Establish Authority/Contracts for Construction/Agreements	$ 30,000
Total Distribution Fiber Network and Towers	**$2,289,068**

*dollars rounded to nearest thousand
** Covers nine connections. Figure does not include any interior building wiring. Installation will vary from location to location depending on outside conditions (e.g. asphalt parking lots vs. landscaped terrain)

The above costs are for infrastructure materials, labor and equipment required to prepare for and implement the network. Additional funds of approximately $31,000 will be required in the first year to cover any shortfall in the operating budget. While ideally the projected shortfall would be included in the total funding requested from grant sources, it is unclear at this time if the grants will fund operating expenses. If they are excluded, this amount would be in addition to the County's local dollar match.

County staff has indicated their intention to seek federal grant assistance announced as part of the American Recovery and Reinvestment Act of 2009 (ARRA). Local governments are eligible for funding under the two Federal departments, the NTIA and RUS, authorized to award grants for broadband infrastructure construction. Although the precise rules and application processes have not been released as of this writing, it is clear that the County is not restricted from applying for funding from both programs. Grants will be awarded at 80 percent of project costs with a local match of 20 percent required from the County. The local match can include other grant funding that is not from a Federal source. It is unknown at this time if the value of 'in kind' services could be used as part of the match.

The Virginia Department of Housing and Community Development (DHCD) has financially supported the County's broadband planning. Based on their position that communications infrastructure is critical for a community's economic growth, the DHCD offers grants through the Local Innovation Program to assist in network implementation. A maximum of $200,000 is available to local governments for infrastructure improvements that meet the following Community Development Block Grant objectives:

1) Create or retain jobs
2) Enable services to serve communities with high percentage (greater than 51%) low to moderate income households

This is a non-competitive grant, and applications are accepted as long as funding is available. The County is encouraged to apply for $200,000 in funding to assist with the project's local matching fund requirement for the Federal grant application. There is no one-time award restriction; funding from the Local Innovation Program can again be sought for additional phases of the broadband network project so long as the program's objectives are met.

Excluding the first year's projected operation shortfall (worst case scenario), the County intends to seek $1,831,254 in Federal grant assistance. The County's required local match of $457,814 is anticipated to be offset by DHCD Local Innovation Program grant dollars of $200,000 resulting in $257,814 in funding obligated by the County to build the proposed broadband network. Should the $31,000 in first year operating expenses be excluded from the Federal grant funding, the County is advised to budget additional funds to meet any projected shortfall.

The network anticipates private provider use generating revenue to cover operating expenses at a minimum. The County's goal of enabling broadband service expansion for economic development growth can be feasibly achieved by providing access to infrastructure with low recurring fees to mitigate financial barriers for private providers. These measures however, must be balanced with sufficient revenue to cover operating costs (revenue neutral) accompanied by a gradual repayment of the County's initial investment. Internal sources of revenue include redirected current County spending for a portion of T1 access and Internet fees.

While the County's legal counsel should be consulted for assurance of compliance with Virginia public procurement requirements, typically there are two (2) approaches used by Authorities to solicit service provider use of the network. In the first approach, the Authority adopts set fees and rate tariffs that will subsequently apply to any and all service providers that want to use the network. Essentially all anticipated scenarios (voice, video, data applications) could be addressed. The network could be available for dark fiber lease (for transport) and/or lit fiber (for customer access). The service providers may use wireless or wireline technologies. This approach makes sense when multiple service providers have expressed interest in utilizing the network.

A second approach is to issue a Request for Proposal (RFP) to find a provider(s). This approach allows more flexibility in offering what terms and services providers may wish to offer. It also provides an additional opportunity for responses from otherwise, unknown providers. If no responsive proposals are presented, the Authority could become a service provider acting as a "provider-of-last-resort" without the perception that there was no open and transparent solicitation for competition. The County's position is currently that they will refrain from providing services if at all possible. In this study there is some private provider interest, but no definitive agreements. Both approaches (negotiations leading to fixed tariffs and an RFP) have been recommended.

All County departments and local government entities should be encouraged to use the network for services if it is within reach of their facilities. Other community stakeholders that have been involved in the broadband network study and implementation process are still free to use their current providers for services, but are encouraged to support the community investment by mandating private provider service delivery be made via the new fiber network. Only with this level of community support will large private providers located outside of Nelson County be forced to use the open access network.

LAST MILE SOLUTIONS

The fiber distribution network as proposed can feasibly serve subscribers located within 500 feet of the fiber by a drop connection from the fiber network. Large bandwidth customers located farther from the fiber network may make sense on a case-by-case assessment, depending on their bandwidth requirements. The proposed network route from Lovingston to Colleen was developed to pass key facilities requiring high bandwidth connectivity that would serve as anchor customers on the network and attract service providers to the County. Included in the network capital costs are the premise installation and equipment requirements to serve County facilities as anchor customers.

The following table details the key facilities located within reach of the fiber deployment. Facilities located significant distances from main thoroughfares are not feasible to serve from fiber (except for very high bandwidth customers) and should be included in wireless last mile network planning or future network expansion.

KEY CUSTOMER FACILITIES WITH ASTERISKS TO BE SERVED[5]	ADDRESS
Nelson County	
County Offices/Courthouse*	84 Courthouse Square
Planning and Zoning*	80 Front Street
Health Department*	63 Courthouse Square
Magistrate's Office*	58 Courthouse Square
Parks & Recreation*	8445 Thomas Nelson Highway
Public Works*	8395 Thomas Nelson Highway
County Service Authority*	Cooperative Way
Social Services*	203 Front Street
Nelson Memorial Library*	8521 Thomas Nelson Highway
Virginia Cooperative Extension	8445 Thomas Nelson Highway
Nelson County Public Schools	
Nelson Co. Public Schools Admin.	84 Courthouse Square
Nelson Co. Middle & High School	6919/6925 Thomas Nelson Highway
Tye River Elementary School	5198 Thomas Nelson Highway
Rockfish River Elementary School	200 Chapel Hollow Road
Nelson County Public Safety	
Rockfish Valley Vol Fire Department	11100 Rockfish Valley Highway
Lovingston Vol Fire Department	53 Baker Lane
Nelson County Sheriff's Office	94 Courthouse Square
Rockfish Valley Rescue Squad	11100 Rockfish Valley Highway
Nelson Rescue Squad (Lovingston)	8047 Thomas Nelson Highway
Healthcare	
Blue Ridge Medical Center	4038 Thomas Nelson Highway
Afton Family Medicine	7849 Rockfish Valley Highway

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[5] All facilities are close enough to be served by fiber. The asterisk indicates that they will be served in the network and network equipment is included at the facility to connect them into the network.

KEY CUSTOMER LOCATIONS WITH ASTERISKS TO BE SERVED[5]	ADDRESS
Non-Profit Service Organizations	
Region 10	69 Tan Bark Plaza
ARC of the Piedmont	1 Court Street
JABA	8445 Thomas Nelson Highway
Nelson Co Community Dev Foundation	8445 Thomas Nelson Highway
Horizon Clubhouse Day Treatment	83 Tan Bark Plaza
Utility	
Central Virginia Electric Cooperative	800 Cooperative Way
Service Providers	
Nelson Cable	400 Front Street

The local cable provider has indicated their desire to connect their Wintergreen and Lovingston cable TV headends to serve the Lovingston cable area with digital programming and high speed Internet. It is anticipated that the Lovingston cable service would be delivered via direct fiber in the future in lieu of upgrading old technology and copper infrastructure.

Additional private providers have expressed interest in working with the County to enable them to begin offering or expand current services. Blue Ridge InternetWorks out of Charlottesville is currently operating a DSL network in the Wintergreen Resort, and would like to expand services to serve multi-tenant facilities. Virginia Broadband offers wireless services in close proximity to Nelson and sees a natural extension into the county.

Last mile services that can be delivered via fiber extend beyond simple Internet access. IBEC has indicated their interest in exploring the possibility of using a fiber network to incorporate applications that are related to their broadband over poweline technology, most notably those applications that contribute to a SmartGrid – automated meter reading and substation control and monitoring.

WIRELESS PLANNING

Nelson County's mountainous terrain provides a challenge for reaching all homes and businesses within the County. Communities that are not feasible to be served by wireline technology in the near term include:

- Montebello
- Massie's Mill
- Tyro
- Afton
- Faber
- Arrington
- Shipman
- Piney River
- Wingina
- Schuyler
- Gladstone

Needs assessment research indicates clusters of strong demand for broadband services from households located in the Massie's Mill, Piney River, Tyro, and Afton areas. These areas are good candidates for wireless service deployment in the near term. Through the Request for Interest process, several wireless providers – including the local provider – expressed interest in serving in Nelson County with financial assistance to remove some of the high recurring costs of providing services. In particular, the local loop

charges by the incumbent provider for T1 (1.5 Mbps) data transport make offering higher speeds of service cost prohibitive. High recurring fees for access to vertical assets such as communication towers and water towers, and the approval and permitting process itself are impediments to cost-effective and timely deployment of services.

To enable the provision of wireless broadband services to a greater number of Nelson citizens and mitigate the financial barriers to entry for private providers, the fiber network is augmented by the construction of four (4) communication towers or monopoles strategically placed at four points in the county listed below. A fifth tower included in the Lovingston courthouse renovation and emergency communications center relocation project would be able to accommodate attachments of wireless broadband equipment. Proposed tower locations include:

1) Rockfish River Elementary School – Rt. 151 and Chapel Hollow Road
2) Afton Mountain
3) Colleen Business Park
4) Tyro/Massie's Mill area

The recommended business model proposes that the County provide locations for wireless providers (towers), backhaul for Internet traffic and other incentives as agreed upon. In return the provider has access to at least 2,144 customers within a serviceable area from these towers (approximate 3 mile radius). Over the County network, data would be transported between locations such as the towers and a facility owned by a wireless provider. In return the provider would pay a fee per customer or per unit of bandwidth to be negotiated.

Wireless providers must gain access to vertical assets to locate wireless serving equipment. Impediments include a complicated and protracted permitting process and high recurring fees for access. Nelson County currently requires a special exception to construct a pole taller than 80 feet, which private providers report is difficult to obtain. The County's current vertical asset inventory includes water towers and at least one tall tower for public safety. Other tower owners in the County demand high recurring fees for collocating equipment. Coupled with the equipment's useful lifetime of four to seven years and customer premise equipment and installation costs averaging $400 per customer, it is difficult for wireless providers to realize a return on investment that would allow them to expand services to additional areas.

The County can leverage their investment in strategically placed communication towers and a fiber network for data backhaul to incentivize private providers to deploy services in hard to reach, currently unserved areas such as Afton, Massie's Mill and communities south and east of Lovingston and Colleen. There are several opportunities for cooperation benefiting both the County and the provider. For example, a wireless network could accommodate additional applications such as laptops in police vehicles, free Internet in fire houses and public works utility monitoring (SCADA Systems) in lieu of fees.

Through ownership of additional vertical assets and streamlining the permitting process, the County can remove many of the impediments for wireless providers to grow their business and serve a greater portion of Nelson County.

IMPLEMENTATION PROCESS

STEPS AND TIMELINE

Board Decision to Proceed and Request Funding (Four Weeks)

The Nelson County Board of Supervisors would accept the plan which will consist of applying to DHCD for $200,000 in funding and for Federal Funding administered by the Department of Commerce ($1,800,000). Board agrees to provide the twenty percent matching funds required under the Federal Grants. Board of Supervisors would pass a resolution authorizing the County legal counsel to prepare an ordinance authorizing the formation of a County Wireless Broadband Authority;

Four Weeks to Twelve Weeks from receipt of grant awards: Negotiate Agreements for Initial Users of Network

Authorize consultants to provide assistance in developing documents and formal design. Issue an RFP requesting qualified parties to respond with the terms and utilization of the network they may wish to utilize. Negotiate with respondents as well as those who have previously expressed interest (RFI) to develop agreements advancing broadband goals while generating sufficient revenue to make the network self-sufficient. Agreements with wholesale Internet providers may extend well beyond this period.

Eight Weeks to Twenty Weeks: Contract with utility providers for pole attachment agreements and make-ready along a finalized fiber optic route.

The utility providers may accept make-ready engineering provided by design team or they may insist on doing the work in-house. Based on those decisions and the amount of make-ready indicated, changes to the route may be necessary. The time-frame for repairs will be determined by the utility.

Twelve Weeks to Twenty Weeks: Develop detailed design, bid specifications and network requirements.

Design team will develop a detailed set of plans for use by the selected contractors. Permitting and other technical issues will also be handled during this time period.

Eighteen Weeks to Twenty-Six Weeks: Solicit Bids, Interview Firms, Award Contract

Standard public procurement policies should be followed for the solicitation of bids and award of contract. A list of bidding documents and process are outlined as follows:

Bidding/Contract Award

- Bidding Documents
  - A complete set of bidding documents will need to be developed that typically would include:
    - Advertisement
    - Plans and Construction Specifications
    - Terms and Conditions
    - Pricing Sheets
    - Performance, Maintenance Bonds and Insurance Requirements

- o Addressing Materials/Equipment Quality Standards and Warranties (Electronics are not part of the scope of this RFP for construction)
  - o Change Order Process
  - o Testing Requirements
  - o As-Built Requirements
  - o Payment Request Drawdown Schedules
  - o Construction/Implementation Contracts

- Plans and Specifications
  - The duplication and distribution of plans and specifications to bidders.

- Pre-bid Meeting
  - A pre-bid meeting is strongly suggested to address questions and concerns of potential bidders and to establish the process for notification of addendums.

- Bid Receipt, Tabulation, Bond Compliance and Award Recommendation
  - Once all the bids are received, bids are tabulated, bid compliance is confirmed, references are checked, and a recommendation for award is provided to the County.

Twenty-four to Thirty-four Weeks: Material Procurement and Project/Construction Management Services

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While waiting for materials to be delivered on-site, there are a number of project issues that can be addressed such as completing make-ready work, set-up of a project staging area, and establishing project administration procedures such as the handling of payroll and expense reimbursements, inspection and other quality control measures, required deliverables such as as-built plans, warranties, and material shipping documentation for quantity verification. The following addresses these issues in greater detail.

Construction Management

- Project Mobilization / Staging Area
  - One of the first steps upon signing the contract and authorizing the Notice to Proceed is to have a secured staging area for the contractor so as to mobilize equipment, park vehicles, trailers, etc.

- Material and Equipment Ordering / Purchase Order Compliance
  - The earliest date feasible to order material and equipment needs to be identified early in the process because procurement of some equipment and materials require a considerable lead time. From a quality and cost control measure, as materials and equipment are received, specification compliance and quantity verification should be performed.

- Payroll and Expense Reimbursement Processing
  - Virginia is a Right-to-Work state. Through-out the project payroll and expense reimbursement requests will need to be reviewed for compliance with the bid, confirmation of work completed or materials received, and disbursement of payments. Funds dispersed under the ARRA must comply with the Federal Davis-Bacon Act.

Thirty four to Forty Six weeks: Network Construction

Throughout the project, it is recommended the County have an owner's representative present for on-site construction/installation observation to ensure quality controls are met.

It is not unusual that some adjustments are required during construction/installation and therefore the project representatives would want to ensure accurate as-built plans are prepared and that final quantities are confirmed for verification prior to final payment. Depending upon the season, an additional two weeks may be needed to allow for holiday breaks in construction activity.

Towers will need to be erected. The prefabricated building will need to be delivered, set into a prepared area and provided with power and other utilities.

Thirty-eight to Fifty weeks: Install Electronics

Network Electronics will need to be installed and tested. Interconnections with other providers will have to be made and tested. ONTs and drops will need to be made to all County facilities.

Fifty to Fifty-two weeks: Testing, Punch List, Corrections and Project Close-out

After the infrastructure is built, testing will be performed and a punch list created for correction of items prior to issuing the final completion notice and release of bond. Upon completion of the project and satisfaction of the punch list, retainage will need to be released, warranties collected, operations and maintenance manuals distributed and contractor demobilization reviewed for acceptable site condition.

ORGANIZATION STRUCTURE & GOVERNANCE

OWNERSHIP

The County is explicitly authorized to construct and own communications infrastructure, and to borrow funds and lease access to other municipalities and private companies. The Governor's office and the Virginia Legislature has clearly communicated their position that communication infrastructure is considered a *utility* as critical for a community's growth as water and wastewater systems. The County has access to low-cost loans and potential grant funding to assist with expanding communications infrastructure. By retaining ownership of those assets after construction, the County will own valuable assets that can be leveraged for future economic development initiatives and incentives. Additionally, the County will retain control of these assets to continue to support future phases of expansion in accordance with residential and business growth in the County.

While Virginia law clearly authorizes municipalities to own and operate communication networks, it is important to establish a clear separation of responsibilities between operation and service delivery, and maintenance of the physical infrastructure (County asset). An additional separation is recommended to place all aspects of the communication business venture under a Broadband Authority for accountability. The Broadband Authority would be tasked with managing the County-owned infrastructure.

Should the County qualify for grant funding to implement all or portions of the project, these dollars would be allocated for management and disbursement by the Authority. This provides a clear separation of funds and accountability between normal government operations and the broadband network business. As an alternative, the County could transfer ownership of the network assets to the Broadband Authority. The Authority is also authorized under Virginia law to acquire, construct, improve, enlarge, operate or extend any project providing qualifying communications services under the provisions of the Wireless Services Authority Act. The Authority can also borrow money and issue revenue bonds to finance the project that do not constitute debt of the local governing body.

The County or the Authority would own all fiber strands either purchased and installed directly or funded for use through an IRU with the private provider. The Broadband Authority would manage the IRU agreements and connectivity to County facilities.

OPERATION

Operation of the networks consists of these primary functions:

Function	Tasks	Recommended Responsible Party
Infrastructure Administration and Management	Administrative tasks relative to maintaining all agreements and inventorying of physical assets; overseeing processes and procedures for network operation and third party contracts; accounting for all Authority activities	Broadband Authority

Function	Tasks	Recommended Responsible Party
Physical Infrastructure Maintenance	Perform repairs to fiber optic cable as needed, run drop fiber to facilities for new service, oversee construction of extensions of distribution network during future phases	Broadband Authority – Contract to outside firm
Equipment Maintenance	Repair or replace networking equipment at all municipal facilities (including schools) and the network operation center (Lovingston)	Broadband Authority – Provide service using County IT personnel or contract to outside firm
Network Operation	Oversee bandwidth management; Maintain Internet access, service provider and customer connectivity	Third Party Operator Partner

DEVELOPMENT OF AGREEMENTS

Constructing and operating the community network will require a number of agreements be developed. The following highlights these agreements and touches on some of the items to be addressed within each agreement.

NETWORK OPERATIONS MANAGEMENT AGREEMENT

The Broadband Authority will contract with a third party operator with experience to manage the network. Should the County enter into partnership with a private provider for mutual fiber access, this provider could contract to manage the day to day operation of the network. Other parties may also be interested in providing these services and may respond to the County's RFP for operation and management. The following are some of the issues to be addressed within the Network Operations Management Agreement:

- Bandwidth responsibilities which includes managing and allocating subscribed bandwidth to customers and across the network
- Billing and collections
- Operations budget preparation and monitoring
- Customer and provider technical support/Back-office support
- Enforcing Quality of Service (QOS) agreements
- Oversee maintenance and emergency repair of the network

NETWORK MAINTENANCE AND EMERGENCY REPAIR AGREEMENT

The network manager may not be the party to do the actual maintenance and emergency repair in the event the network goes down. Typically such responsibilities are contracted with a local contractor or service provider that has technical field crews and equipment who will respond within a contracted period of time. Examples of issues typically included within this agreement are as follows:

- Stocking of equipment and infrastructure parts and materials critical to bring the network back up within a short period of time that cannot wait to be ordered and delivered
- Periodic inspection of the outside plant for areas of concern such as loose attachment hardware, low sag of the cable, condition of splice enclosures and handhole vaults, signs of tampering with the network by other utilities or vandals

- Most Quality of Service (QoS) agreements require an emergency repair response within no more than 2 hours of being notified with the intent of bringing the network back up as soon as possible (within 4-8 hours)

NETWORK ACCESS AGREEMENT WITH SERVICE PROVIDERS

Agreements with service providers using the community network to offer last mile services will need to be developed. A variety of issues to be addressed include:

- Clear delineation and understanding of responsibilities
- Maintenance and emergency repair coordination and responsibilities
- Quality of Service Standards
- Fees for use/lease
- Collocation fees and requirements
- Compliance with federal, state and local laws
- Network co-use conduct and notification

POLE ATTACHMENT/TRENCH USE AGREEMENT

Use of other owned facilities such as existing poles, conduit, trenches, etc. is usually handled one of two ways, either through a joint use agreement if the County owns similar facilities that are needed by other owners of such facilities or through annual payments. There are federal guidelines and requirements on establishing fair and reasonable fees through the calculation of developed formulas, as well as when such attachments cannot be denied. Examples of issues addressed in a pole attachment or trench use agreement include:

- Location of cable placement
- Responsibilities for Make-Ready work and repair
- Parameters set as to accessing infrastructure
- Ownership tagging/identification of infrastructure
- Sag allowances and depth placement in trenches with appropriate cover and overall compliance with the National Electric Code requirements

Central Virginia Electric Cooperative (CVEC) has expressed their support for the community broadband project and has indicated they are willing to discuss eliminating or reducing their typical fees for pole attachments that would be required of the County.

INDEFEASIBLE RIGHT OF USE (IRU) AGREEMENT

The proposed business model anticipates the potential for fiber sharing within the community network between the County and a private provider. Such sharing is stipulated in IRU agreements for long periods of time (e.g. 20 years). Dictating how the fiber is used is at the direction of the IRU holder. In effect, the holder will 'own' their allotted fiber strands for a period of 20 years, after which several renewal periods are typically established. The County will need to develop IRU agreements for any fiber strands they allocate to a private provider. Should the opportunity to 'swap' fiber with another provider's network be proposed to extend the County's network in the future, IRU agreements would be developed for both parties.

WIRELESS BROADBAND AUTHORITY ORDINANCE

An ordinance will need to prepared and approved by the County governing board to establish a Wireless Service Authority (Broadband Authority). The word 'wireless' is not required to be part of the Authority name; for example, the Nelson County Broadband Authority. This one Authority can then oversee management and operation of both the wireless network and County's fiber network. Steps and issues that will need to be addressed include:

- Develop resolution, Authority membership, bylaws
- Advertise and conduct a public hearing
- Board adoption of resolution
- Incorporation filing with the State Corporation Commission (SCC)
- SCC approves Broadband Authority charter
- Establish asset inventory and budget
- Hire or allocate employee(s) to the Authority

GOVERNANCE PLAN

A Governance Doctrine will need to be developed to guide the network management in getting started and continuing with on-going development and expansion of the government owned network. The communication open access network should be thought of as much more of a comprehensive government owned network that might include applications associated in serving the constituency's interest such as transportation, telemedicine, utility SCADA systems, wireless PDA support / video streaming, and public health inspection.

TYPICAL STEPS FOR PLANNING NETWORK GOVERNANCE

- Establish key relationships and funding commitments from individual entities
- Create network plan and roadmap
- Identify roles and responsibilities Identify needs of individual entities, including service provider(s)
- Set goals and begin preparations for strategic planning
- Develop network communications interoperability strategic plan
- Develop a network operational hierarchy management organization

RECOMMENDED GOVERNANCE STRUCTURE

Within the governance structure, individuals will need to be identified and aligned utilizing their strengths to meet the needs. In other words, leaders will need to be identified in different disciplines. Examples would include:
- ➢ Policy Setting Leaders
- ➢ Policy Implementation Leaders
- ➢ Funding Control Leaders
- ➢ Technical Application Leaders

Based on the evaluation of governance models used in several different localities and states, many successful governance models employ three groups and have provisions for administrative support. This three-tiered governance model encourages partnerships with other relevant organizations. A brief

explanation of each of these groups is provided below (adapted from SAFECOM General Guidance and Recommendations for Interoperability – Related Governance).

1.   An oversight body or executive committee, composed of higher-level administrators with funding authority, should be vested with final decision-making authority. It is recommended at least one appointed representative and one alternate from each participating jurisdiction or agency. The charter should specify how often the executive committee meets; meeting quarterly is the recommended minimum.

2.   Leadership will benefit from an advisory group that includes representatives from various sectors of the public body such as administration, public safety, economic development, public schools, etc. Representatives may also include an advisory panel consisting of other community stakeholders representing healthcare, non-profits, and major employers. The advisory group should meet regularly. The group can assist the executive committee with prioritizing implementation tasks and developing a roadmap for the future or a project plan.

3.   Temporary, narrowly chartered working groups should be formed for specific tasks, such as conducting research and collecting data. These working groups would have no voting powers and would disband upon the completion of the chartered tasks.

In addition, it is recommended that the Authority board identify the entity that will provide staff support, such as assisting with coordination among members and disseminating information to stakeholders, public officials, and the general public.

CHARACTERISTICS OF SOUND BYLAWS

Written bylaws guide work processes, establish accountability and promote transparency. Both accountability and transparency are essential to establishing credibility with private provider partners and the general public. Credibility is essential to the success of an open access network.

Written bylaws need not be complex. Such documents typically define the Vision, Mission and Values of the Authority, as well as how the governance structure will operate. Defining common values of the group in a formal document brings members into early agreement. Those values will guide the decision making process in a consensus based approach focused on what is best for the county rather than individual agendas.

The bylaws should outline how the governance structure will operate. Some of the key topics that should be addressed for operations are:

Elections. The method of election for the leadership of the executive committee and advisory group should be determined and specifically described.

Roles and responsibilities. Each component of the governance body (for example, executive leadership, advisory committees, and working groups) should have a clearly defined role and a specific set of responsibilities. Descriptions should include the extent of authority, frequency of meetings, reporting requirements, membership duties, terms, and limitations.

Rules of engagement. The way that the governance body and its components will conduct business should be clearly described, including, for example, defining what constitutes a quorum for meetings, the

chain of command between the layers of the governance structure, authority for calling and chairing meetings, and other similar procedural issues.

Voting procedures. Clear voting procedures are necessary for conflict resolution. Discussion should include topics such as voting versus non-voting participation, issues requiring different levels of agreement (for example, simple majority, super-majority, unanimity, or consensus), and a procedure for breaking a tie vote.

RATE ORDINANCE AND RESOLUTIONS

An ordinance establishing the legal authority to charge rates will need to be developed and passed by the Authority board. Typically rates are established through resolutions because of periodic updating. Steps to establish the ordinance and resolutions typically include:

- Advertisement for public hearing and of the ordinance
- Conduct a public hearing
- Some justification basis for the rates such as cost of service or market driven rates
- Nondiscriminatory rate application and structure
- Collection practices and policies
- Connect and disconnect practices and policies

MARKETING/PUBLIC RELATIONS PROGRAM

Virginia law prohibits local government network owners from endorsing and promoting the services of private service providers using the network. As a publicly owned network owner however, the community still needs to be conscientious of public relations. Just like use of other public facilities and infrastructure, the governing board should discuss and establish how the network will be perceived by the general public, as well as service providers using the network. Desired perceptions typically include:

- Professionalism
- Legal decency of content
- Fair and equitable/Non-discriminate
- Benefiting public-owners of the network
- Community asset
- Economic development marketing tool

Many different business models were considered during the preliminary portions of this project ultimately settling on one which best met the following objectives:

- Provide an infrastructure over which multiple providers could offer voice, data and video services
- Minimize the involvement of the County government in the day to day operations of a community network
- Increase the pace of economic development within the county
- Minimize the demands on the County for staffing of a newly developed fiber optic network
- Create a self-sustaining network not requiring continuous support from the County tax base to continue operations
- Avoid any long term debt

The final choice selected is one in which the County (through a Broadband Authority) builds a fiber optic infrastructure capable of connecting the County from the northern section to Colleen, facilitating the delivery of services by both wired and wireless providers. The county involvement would be to build and operate (using a private provider operator) a network. Possible uses of that network would be:

- To transport Internet or cable content from one area of the County to another for a private provider that would be actually delivering the service to the end user (examples of potential clients would be Nelson Cable, IBEC or providers not currently serving in Nelson County)
- Connecting wireless providers' Internet traffic to towers where it can be distributed to wireless users that would otherwise not receive service (e.g. Stewart Wireless or other wireless provider not currently serving Nelson County).
- Improve communications between emergency services where wireless (radio) services are inadequate or not available.
- Connect County facilities together over a fiber network to improve internal communications and reduce access costs.
- Connecting a private provider's network to individual customers over a fiber optic network.

The business model selected identifies the costs and minimum revenues necessary to develop a sustainable network (no additional funds required from the County). The potential number of customers were determined from a GIS analysis which counted all of the businesses and homes within 500 feet of the projected fiber path; the potential number of wireless customers was estimated as the number of housing units within three miles (2000 census) of monopoles or towers (Colleen, Rockfish Elementary School, Afton Mountain, Colleen) which the study recommends be constructed. That information will be helpful to potential providers, although no revenue is attributed to directly serving end users.

The model proposes that the County provide locations for wireless providers (towers), backhaul for Internet traffic and other incentives as agreed upon. In return the provider has access to at least 2,144 customers. Over the County network, data would be transported between locations such as the towers and a facility owned by a wireless provider. In return the provider would pay a fee per customer or per unit of bandwidth to be negotiated (Leased Network Revenue).

Additional revenues other than from a wireless provider would likely be needed for sustainability of the network. From the various possible network users, revenue could be obtained for the transport of data from one area of the county to another in support of an existing network (e.g. IBEC or Nelson Cable). Revenue currently spent for Internet access by the County could also be redirected to support the network (County facilities - offset against current expense).

Other significant annual fees are network licensing fees—fees paid to the manufacturer of network equipment for continued support—and network operations—fees paid by the county to a private provider for operations of the network.

A prominent objective of the County is to minimize risk by assuming no long term debt for the project. To accomplish this objective three sources of funding have been assumed. The Virginia Department of Housing and Community Development (DHCD) will make awards up to a maximum of $200,000 for fiber projects creating new jobs. This money can be used as part of the 20 percent match required for Federal Grant monies ($1,831,254) which will soon become available under the recently passed American Recovery and Reinvestment Act of 2009 (ARRA). Finally, County investment will be required to make up the remainder of the matching funds ($257,814). While this approach has been used as a mechanism for paying for the capital equipment required for this project, neither the DHCD nor ARRA funds would necessarily be provided to the County. The grant application process for all of these monies is competitive in nature.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Capital Expenditures							
Design, RFP, Evaluation, Management, Oversight	$409,858	$0	$0	$0	$0	$0	$0
Outside Plant Labor exc. Make-ready	$499,806	$0	$0	$0	$0	$0	$0
Make Ready and Permitting	$258,813	$0	$0	$0	$0	$0	$0
Outside Plant Materials	$366,035	$0	$0	$0	$0	$0	$0
Network Gear with OSS	$249,000	$0	$0	$0	$0	$0	$0
Legal-Establish Authority/Contracts/Agreements	$30,000	$0	$0	$0	$0	$0	$0
Wireless Towers	$180,000	$0	$0	$0	$0	$0	$0
POP, Buildings/Building Modifications	$83,000	$0	$0	$0	$0	$0	$0
Equipment Replacements	$0	$9,700	$18,818	$27,380	$26,559	$25,762	$24,989
Fiber Splicing per new customer	$450	$0	$0	$0	$0	$0	$0
Install Fiber Drop and ONT	$12,600	$0	$0	$0	$0	$0	$0
2 Fiber All Dielectric Drop Fiber	$675	$0	$0	$0	$0	$0	$0
FTTH ONT (Outdoor)	$4,950	$0	$0	$0	$0	$0	$0
Contingency @ 10% Outside plant and network gear	$193,881	$0	$0	$0	$0	$0	$0
Total Capital Expenditures	**$2,289,068**	**$9,700**	**$18,818**	**$27,380**	**$26,559**	**$25,762**	**$24,989**
Capital Cost Paid by Grants, State & Federal	**$2,031,254**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Direct County Investment	**$257,814**						

The Capital expenditures recommended would construct a fiber optic network between Afton and Colleen passing homes and businesses from Afton to Martins Store, Woods Mill and Colleen (Afton Mountain Road, Rockfish Highway, River Road and Thomas Nelson Highway) as well as the homes and businesses within Lovingston. The capital costs include approximately 31 miles of fiber optic cable, four wireless towers, a manufactured building (called a POP) to hold electronics, network electronics, and electronics to make the final connections (called ONTs or Optical Network Terminals) to eight (8) County sites passed. Additional capital equipment would be paid for out of network revenues to replace equipment on a periodic basis, typically around seven years.

The net result of Federal, State and local funding will be a completed infrastructure requiring no recurring local funding for debt service. Funds will be necessary in the first year to cover any shortfall in the operating budget (Short Term Financing). It is not clear at this time whether ARRA funds may be used for this purpose. If ARRA terms allow grant monies to support operations, the short term borrowing could be reduced or eliminated. Based on the business model some typical network expenses such as billing will be minimal (County will have only wholesale customers), but there will be still be some recurring expenses to maintain operations. Pole attachment fees are paid on an annual basis to the owner of the utility poles for attaching fiber optic cable. There are three utility operators, (CVEC, AEP and Dominion Virginia). The pole attachment fees could be waved or otherwise traded for service from the utility pole owners, but will otherwise require payments ranging from $18 to $30 per pole per year. The estimated annual operating expenses are:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Network Charges							
Pole Charges	$8,205	$8,205	$8,205	$8,205	$8,205	$8,205	$8,205
Business Operations	$12,000	$12,485	$12,734	$12,989	$13,249	$13,514	$13,784
Central Office Utilities	$765	$780	$796	$812	$828	$845	$862
Misc.--supplies	$750	$750	$750	$750	$750	$750	$750
CPE repairs/replacements	$2,090	$2,132	$2,174	$2,218	$2,262	$2,308	$2,354
Network Licensing	$6,804	$6,804	$6,804	$6,804	$6,804	$6,804	$6,804
Network Operations	$20,675	$21,089	$21,511	$21,941	$22,380	$22,827	$23,284
Total Network	**$51,289**	**$52,245**	**$52,974**	**$53,719**	**$54,478**	**$55,252**	**$56,042**

Some of these expenses can be readily quantified—e.g. network licensing is an approximately fixed percentage of the total equipment purchased. Other items, e.g. network operations, will vary based on the needs of the wholesale purchasers and will need to be adjusted in accordance with the network's customer requirements. As an example, if a wholesale provider wishes to provide round the clock support to a client such with downtime of no more than minutes a year, the level of support will be higher than for a typical cable television service with Internet. Such a level of support would demand higher revenue as well. The level of support estimated is at the lower level.

Summarizing the proposed business model and integrating the steps required for a successful deployment.

- Form an Authority capable of providing Broadband Services under Virginia Law (discussed elsewhere in the document)
- Apply for DHCD and ARRA funds indicating the County's intention of building the proposed network
- Issue RFPs or otherwise hold discussions with wireless and other providers to develop agreements which will generate the revenue necessary for sustainability
- Build and implement the network

Total capital project costs for the broadband network investment are approximately $2,289,068. County staff intends to apply for Federal funding assistance recently allocated in the American Recovery and Reinvestment Act of 2009. At the time of this writing, formal notice of funding availability has not been issued by either the National Telecommunications Infrastructure Agency (NTIA) or the Rural Utilities Service (RUS), the agencies authorized by the Act to award funding assistance. The County is eligible to apply to both agencies for funding all or parts of the project, so long as funding does not overlap (no double-dipping).

The RUS eligibility requirements and application process is unknown at this time. NTIA will fund 80 percent of project costs; the 20 percent local match required from the County can include non-Federal grant funding. It is not known if the value of 'in kind' services could be applied towards the local match. The amount of Federal grant funding the County would seek is $1,831,254. The required local match to accept this funding is $457,814 is anticipated to be offset by DHCD Local Innovation Program grant dollars of $200,000 resulting in $257,814 in funding obligated by the County to build the proposed broadband network. A projected first year operating expense shortfall of $31,000 is anticipated; it is unknown if operating expenses will be excluded from the funding program. Should those expenses be excluded from the Federal grant funding, the County is advised to budget additional funds to meet any projected shortfall.

FUNDING PLAN FORMULA

Approximately $2,031,254 of potential grants or contributions has been identified. In December 2008, the County submitted a funding request in the amount of $3,061,000 to the Governor's office in anticipation of potential infrastructure funding allocated for rural broadband deployment in a proposed federal government stimulus plan. This expedited estimate included costs for deploying an expanded fiber network throughout the county (no public/private partnership revenue detailed) and serving the residents and businesses within 500 feet of fiber. After the stimulus plan was officially enacted, a second expedited funding request was submitted to DHCD in March 2009 in the amount of $2,407,700 for a fiber network only (no communication towers).

Additional local funds would be required to support the first year's operations.

Commonly used utility funding assignments include:

Capital Cost Funding

"Capital Costs" as used within this funding plan is defined as those upfront tangible costs that have a capital asset value that will depreciate over the life of service plus the associated costs of designing and implementing the project. Capital Cost items include:
- Network construction materials and equipment such as fiber, towers, cabinets, enclosures, Network Interface Devises (NID), etc.
- Network design consulting, bidding, constructing and funding expense

Operational Costs Funding

"Operational Costs" as used within this funding plan is defined as costs necessary to operate, maintain, repair and collect revenues of the network. Operational Cost items include:
- Network staffing personnel
- Office equipment and materials
- Software and billing documents
- Network maintenance personnel
- Contracted services such as network repair

Valuation Method

Telecommunications is often referred to as the communications utility. Like water, wastewater, electric, and gas industries, there are some common schools of thought of what source should be used to fund the expenses associated with the utility.

One of the first accounting principles to understand is that utility companies will want to depreciate the system assets. Depreciation schedules not only plan for replacement of the item, but justify the charges associated with the item. The determination of the value of a utility is used to provide information needed in the structuring of proposed rates, development of depreciation reserve funds, and capital outlay funds.

There are two approaches typically employed in the performance of a valuation study. These are the **asset-based method**, which relies on the capital cost of the facilities, and the **income-based method**, which involves the operating income generated by the rates.

The asset based method considers the original and current day (replacement) costs of the utility in-place. The value is based on the capital costs less depreciation, commonly referred to as the undepreciated costs. The depreciation is intended to quantify in dollars, to the extent possible, the actual deterioration of the facilities or the loss in service that occurs over time due to wear and tear. For purposes of establishing a fair market value for the utility in the event of potential acquisition, the original and replacement costs provide a range for negotiations. However, only the original costs and related depreciation are needed for the rate determination.

If the network is being constructed new, the actual costs are the original costs. If the network includes a component already existing, then the replacement or current costs can be determined by trending the original costs forward to the present using generally accepted construction costs indices. On the other hand, if the original costs can not be ascertained from historical records, then the cost to replace the system can be estimated based on recent costs for the installation of similar facilities in the general area. In turn, replacement costs can be trended backwards with the assistance of the same cost indices to arrive at the original costs.

The income-based method is predicated on the revenues earned and the expenses incurred by the utility operations. This method equates the value of the system to the sum of the estimated cash flows of the net operating income (revenues less expenses) over a period of time (say next 20 years), discounted or restated in terms of today's dollars. It is widely used by companies in the valuation of capital acquisitions.

For the Community Broadband Planning Project, a greater emphasis is placed on the asset-based method because original costs are known as opposed to having known operating income and it provides data that is necessary for the development of rate structures and the depreciation reserve. The income-based

method can be used primarily to check the reasonableness of the value generated by the asset-based approach.

GRANTS

In addition to the anticipated Federal broadband infrastructure funding programs, opportunities for grant funding include the USDA Rural Utilities Service (RUS), the Virginia Department of Housing and Community Development (VDHCD), and the U.S. Economic Development Administration (EDA). There are no private foundations making grants for rural communications infrastructure development at the present time. Matching funds requirements at the Federal level are such that funds received from other sources (non-Federal) as well as in-kind contributions can generally be used to meet matching thresholds.

The most likely source for grant funding assistance for the fiber network and communication towers is the DHCD as outlined previously. Specific details of the Local Innovation Program follow in this section.

Should the County elect to leverage the fiber and communication towers to attract wireless providers, funding assistance could be available through the DHCD Local Innovation Program and the RUS Community Connect grant program. Specifically, the County would be enabling wireless services to benefit persons in areas with higher than 51% low to moderate income (LMI) averages. This criterion meets one of the national objectives of Housing and Urban Development in awarding Community Development Block Grant monies through local innovation grants at the State level.

The RUS Community Connect Program has been modified to benefit only communities without any high speed services from any provider. Furthermore, each community to be served is required to establish a community center with ten (10) computers for free access and training. The Nelson community centers currently provide Internet access to the public free of charge, some training is available, and as former schools are conveniently located within residential clusters. One or more of these centers could be used to accommodate additional computers and the training mandated in the Program.

USDA – RUS

The stimulus funding allocated to RUS through the ARRA is in addition to and separate from ongoing RUS broadband grant programs. Two grant programs available through RUS may provide funding for various aspects of broadband deployment in the county. The **Community Connect Grant** is intended to provide Internet access and training to residents and businesses in single, underlined unserved communities within the county. The county as a whole cannot be considered a community. The community must be represented in the last US Census or in the Rand McNally 2008 map, and contain 20,000 or fewer inhabitants. Nelson communities currently receiving DSL, cable modem or wireless services are not eligible for funding. At the time of this writing, communities that would be eligible include the unincorporated communities of:

Community	Population
▪ Afton	120
▪ Avon	80
▪ Gladstone	50
▪ Greenfield	50
▪ Piney River	250

▪ Massie's Mill	120	
▪ Montebello	130	
▪ Roseland	100	
▪ Shipman	250	
▪ Lowesville	120	
▪ Norwood	60	
▪ Wingina	80	

The Community Connect Grant requires two years of free Internet access be made available to all community (municipal) facilities including a Community Center with ten (10) computer access points for public use for a period of two (2) years. The Center must be open before, during and after normal working hours and on Saturday or Sunday, and provide training and instruction to encourage Internet and computer use in the community. Funding will cover expenses for establishing the Center, purchasing the access points and salary for community center staff not to exceed $25,000 per year (cannot include benefit packages or transportation subsidies). Additional eligible costs also include:

- Salary for Operations manager, not to exceed $30,000 per year
- Salary for Technical support staff, not to exceed $30,000 per year
- Bandwidth expenses, not to exceed $25,000 per year
- Training courses on the use of the Internet, not to exceed $15,000 per year

Operating expenses to be financed by grant funds and/or used as matching contributions cannot exceed in the aggregate of $250,000 for the first two (2) years of operation. Other operating expenses, such as utilities, are permissible but will not be eligible for grant funding nor considered an acceptable matching contribution.

Broadband service must be made available to all residents and businesses in the community at a minimum speed of 200 Kbps in each direction; this requirement follows the current FCC definition of broadband service transmission that is expected to change in the future, but probably to no more than 768 Kbps. This speed is still below what is typically offered over wireless (minimum 1 Mbps) and far below the capabilities of fiber.

Offering service to all residents and businesses within the Community Connect Grant community dictates wireless as the last mile access medium, as costs to deploy fiber to every home are not feasible at this time. The minimum grant request amount is $50,000 with a maximum of $1,000,000 and priority given for projects that include advanced services over fiber.

Specifically, grant funds may be used to finance:
1. The construction, acquisition, or lease of facilities (including spectrum) to deploy broadband transmission services to all critical community facilities and to offer such service to all residential and business customers located with the proposed service area.
2. The improvement, expansion, construction, acquisition, or leasing of a community center that furnishes free access to broadband Internet service (minimum of ten (1) access points). Grant funds provided for the community center are limited to the greater of $100,000 or 5% of the grant amount requested. The total cost of the center may exceed the maximum limit, but it will be the responsibility of the County to finance those expenditures which exceed $100,000, and the additional costs cannot be used to satisfy matching funds requirements. Costs for the computer access points, their installation or connection to the broadband system are not included in this limitation.
3. End-user equipment needed to carry out the project.

4. All operating expenses incurred in providing broadband transmission service to critical community facilities and to provide training and instruction for the first two (2) years of operation shall not exceed $250,000 in grant funds requested plus matching contribution. Salary and administrative expenses subject to review by RUS for reasonableness in relation to project scope.

The County must provide a matching contribution equal to 15% of the grant amount requested. The contribution must be for eligible purposes, and can be a combination of cash, in-kind and the rental value for donated space in a community center for the first two (2) years of operation. In-kind contributions must be new or non-depreciated assets with established monetary values. Cash for eligible purposes may include bandwidth expenses to provide service to the community center and salary expenses for operating the center, for the first two (2) years of operation. Matching funds may be provided by a third party (such as a wireless services operator) and can include future revenues but must be documented.

A Notice of Funding Availability (NOFA) is typically released by USDA in January of each year, with a ninety (90) day window for submitting applications. While there are no changes proposed for the Community Connect Grant program this year, because of the change in the federal administration in 2009 the NOFA will not be released until after the new leadership is in place.

The only other grant program administered by USDA-RUS is the **Distance Learning and Telemedicine** (DLT) program. The purpose of this grant is to provide rural communities with opportunities to obtain educational and medical services from distant locations utilizing communication technologies. This program uses the same rurality definition as the Community Connect Grant, but does allow the grouping of communities as beneficiaries of grant funds. Minimum grant funding is $50,000 with a maximum of $500,000 and a 15% matching contribution is required.

This grant does not provide funding for transmission services but does fund costs for the following eligible purposes:
- Computer hardware and software
- Audio and video equipment
- Interactive video equipment
- Computer network components
- Acquiring instructional programming
- Providing technical assistance and instruction

The benefit to the County of utilizing this grant program is to connect rural healthcare providers and the public schools to a high speed fiber network that will allow them to utilize remote service enhancements. The Blue Ridge Medical Center is in need of higher bandwidth to institute an electronic medical record (EMR) system throughout its network, and to participate in the Commonwealth's Rural Health Network initiative. Nelson County Public Schools would like to expand use of video conferencing technology to provide additional resources to all schools. This grant would also fund connecting home health nurses and ambulances to local clinics and the hospital.

VIRGINIA DEPT OF HOUSING AND COMMUNITY DEVELOPMENT (DHCD)

The Virginia DHCD has supported community broadband planning for the County with the understanding that the County is proactively investing in economic development to attract and retain businesses and to improve the quality of life for Nelson County citizens. With a communications plan in place and stakeholder support, the County may apply for **infrastructure and planning grants** to move forward

with implementation. Up to $200,000 per project is available from DHCD for telecommunications efforts which may include implementation (e.g., installation of a fiber network) or system development and support (e.g., community business training and education). All projects must demonstrate that they meet a Community Development Block Grant (CDBG) national objective and demonstrate a direct relationship between intended project efforts and measurable, tangible improvements to the health of the community being served. National objectives are as follows:

1. Benefiting low- and moderate-income persons,
2. Preventing or eliminating blight, or
3. Meeting other community development needs having a particular urgency because existing conditions pose a serious and immediate threat to the health or welfare of the community, and other financial resources are not available to meet such needs.

Only implementation projects which target "last mile" installation of broadband applications will be considered for funding (no long-haul backbone systems). Applications for telecommunications projects may combine planning and system development/ technical support or planning and implementation.

U.S. Department of Housing and Urban Development data indicates 6,439 low to moderate income (LMI) individuals located throughout the county and comprising over 45% of total population. Nine census block groups contain population in excess of 51% LMI. The fiber network and communication towers proposed will provide wireless service providers with access to cost-effective backhaul to deploy services to reach these targeted households, thereby meeting a primary CDBG program national objective. Additionally, fiber connectivity to the Blue Ridge Medical Center enables high bandwidth services to be utilized in providing rural healthcare services to low-to-moderate income citizens.

County Population with Greater than 51% LMI
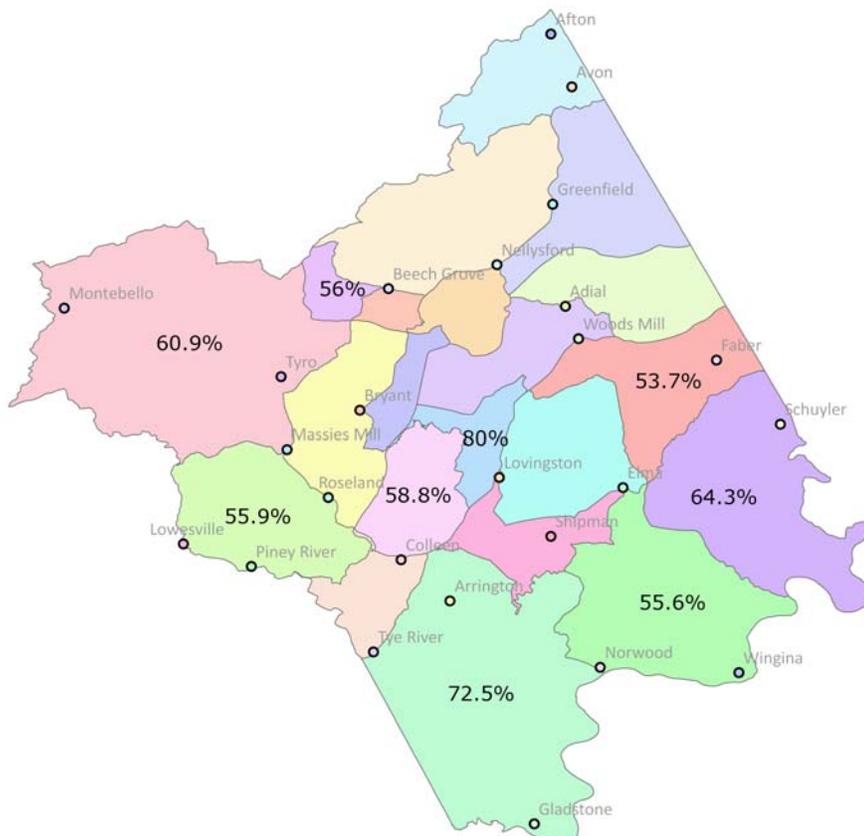
DHCD Office of Community Capacity Building has typically provided **Seed grants** to non-profit and local governments for capacity building and operational support. Seed is a two (2) year program combining an award of $20,000 along with training and technical assistance in strategic planning, board and staff development, financial management, fund development, marketing and communications, and information systems. This program would assist the County by providing resources for effectively implementing organizational and management elements of network ownership and Authority oversight.

U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

The Public Works and Economic Development Program of the Economic Development Administration (EDA) is designed to enhance regional competitiveness and promote long-term economic development in regions experiencing substantial economic distress. Through the program, EDA provides **public works investment assistance** to support the construction or rehabilitation of essential public infrastructure and facilities necessary to generate or retain long-term private sector jobs and investments, attract private sector capital, and promote regional competitiveness. Grants (referred to in CFDA No. 11.300 as investments) may be used for projects such as expanding and upgrading infrastructure to attract new industry, supporting technology-led development, redeveloping brownfield sites, promoting eco-industrial development, and supporting heritage preservation development investments such as those promoted by the Executive Order on Preserve America. Eligible applicants include: State, city, county, or other political subdivision of a State, including a special purpose unit of a State or local government engaged in economic or infrastructure development activities, an institution of higher education or a consortium of institutions of higher education, an Economic Development District organization, a private or public nonprofit organization or association, including a faith-based non-profit organization, acting in cooperation with officials of a political subdivision of a State, or an Indian Tribe, or a consortium of Indian Tribes. Matching funds are required; generally EDA will not provide more than 50% of project funds, though an additional 30% may be authorized based on regional impact and need. Matching funds may be in the form of in-kind contributions, such as contributions of space, equipment, assumptions of debt, and services to provide the required non-federal share of the total project cost. Applications for funding are competitively evaluated on their ability to meet or exceed the following investment policy guidelines, outlined on the Agency's website:

Be market-based and results-driven. An investment will capitalize on a region's competitive strengths and will positively move a regional economic indicator measured on EDA's Balanced Scorecard, such as: an increased number of higher-skill, higher-wage jobs; increased tax revenue; or increased private-sector investment.

Have strong organizational leadership. An investment will have strong leadership, relevant project management experience, and a significant commitment of human-resources talent to ensure a project's successful execution.

Advance productivity, innovation, and entrepreneurship. An investment will embrace the principles of entrepreneurship, enhance regional clusters, and leverage and link technology innovators and local universities to the private sector to create the conditions for greater productivity, innovation, and job creation.

Look beyond the immediate economic horizon, anticipate economic changes, and diversify the local and regional economy. An investment will be part of an overarching, long-term comprehensive economic development strategy that enhances a region's success in achieving a rising standard of living by

supporting existing industry clusters, developing emerging new clusters, or attracting new regional economic drivers.

Demonstrate a high degree of commitment by exhibiting:
• High levels of local-government or nonprofit matching funds and private-sector leverage.
• Clear and unified leadership and support by local elected officials.
• Strong cooperation between the business sector, relevant regional partners, and local, state, and Federal governments.

EDA grants are extremely competitive, requiring strong support and leadership from the region's legislative representatives. The Eastern Shore of Virginia is receiving funding assistance from the EDA for building a fiber network linking communities, a planned research park, and the NASA facility. By focusing on extending fiber to the business park and establishing a wireless service to serve low to moderate income areas, the proposed Nelson County broadband networks meet many of the program's investment policy guidelines.

LOANS

Both the USDA – RUS and Virginia Resources Authority (VRA) offer loans for rural broadband construction projects. While the 2008 Farm Bill dictates changes to the RUS broadband loan program to address numerous roadblocks encountered by applicants historically, the amount of information and document detail required will no doubt remain. Furthermore, the leadtime from application to approval is significant and such that the County may not be able to take advantage of opportunities to leverage deployment with other infrastructure projects. Most importantly, RUS loan applicants need the support of state legislators to bring priority and attention to their funding request in the competitive program. For these reasons, should the County elect to seek long-term debt funding it is recommended to first seek funding through the Virginia Resources Authority.

VIRGINIA RESOURCES AUTHORITY (VRA)

The VRA was created by the Virginia General Assembly in 1984 to support community infrastructure investments by providing cost-effective financial solutions to local governments and other public bodies. In addition to infrastructure projects such as public safety, transportation and water, the VRA is authorized by the Commonwealth to fund wired and wireless broadband projects through revolving fund loans to localities at below-market interest rates and to issue bonds backed by the moral obligation of the Commonwealth. The VRA provides access to three (3) types of financing assistance: Pooled Financing (VRA funds), Term Financing (SunTrust Leasing Corp), and Interim Financing (SunTrust Bank).

Governor's Development Opportunity Fund: The Governor's Development Opportunity Fund is to be used by the Governor to attract economic development prospects and secure the expansion of existing industry in the Commonwealth. Funds may be used for public and private utility extension or capacity development on and off site; public and private installation, extension, or capacity development of high-speed or broadband Internet access, whether on or off site; road, rail, or other transportation access costs beyond the funding capability of existing programs; site acquisition; grading, drainage, paving, and any other activity required to prepare a site for construction; construction or build-out of publicly owned buildings; training; or grants or loans to an industrial development authority, housing and redevelopment authority, or other political subdivision for purposes directly relating to any of the foregoing. Funds shall

be awarded as grants or loans to political subdivisions. Loans shall be approved by the Governor and made in accordance with guidelines established by the Virginia Economic Development Partnership and approved by the Comptroller. Loans shall be interest-free unless otherwise determined by the Governor and shall be repaid to the Fund. The Governor may establish the interest rate to be charged; otherwise, any interest charged shall be at market rates as determined by the State Treasurer and shall be indicative of the duration of the loan. The Virginia Economic Development Partnership shall be responsible for monitoring repayment of such loans and reporting the receivables to the Comptroller as required.

ADDITIONAL FUNDING MECHANISMS

Matching funds can generally be funding received from other sources such as grants or donations, or can often be offered as in-kind services with reasonable dollar values. This provides localities with the opportunity to leverage any funding received, and assets and investments such as community right-of-ways and infrastructure suitable for mounting or housing equipment. Additionally, in-house technology talent can be tapped for system integration, operation and maintenance functions. Cost savings realized by a realignment of services, access to lower-cost bandwidth or interoperability improvements may allow localities to reallocate spending to offset the capital investment of the new facilities or access.

ADVANCED COMMUNICATIONS ASSISTANCE FUND

This Commonwealth fund is intended to assist underserved localities with taking advantage of advanced communication services through loans or grants. Funding assistance can be used for the internal communication needs of localities and in the planning, deployment and maintenance of dark fiber. Funds are appropriated by the General Assembly.

VIRGINIA COMMUNITY CAPITAL

This for-profit bank focuses on providing access to economic development capital, working through partnerships with state/local organizations, city governments and traditional financial institutions. Instead of competing with traditional banks, this organization works with local partners to develop funding packages to meet the needs of Virginia's communities. Projects funded include economic development infrastructure and community facilities.

Respondents to the RFI consist of Wireless Providers, Fiber- or Copper-based providers not currently serving in Nelson County, and the incumbent cable and wired Internet providers within the County. Each of these groups could utilize the new network to provide additional last mile services in the County.

Wireless Providers (Stewart Computer Systems, Virginia Broadband LLC, Alltel): Wireless providers are limited by bandwidth and terrain issues inherent in utilizing radio frequency spectrum for communications, the cost of towers and other equipment, and the cost of wholesale Internet access. The County fiber network will assist these providers by installing new towers strategically placed as well as facilitating connectivity to less expensive wholesale Internet.

The towers provide new locations which can serve as transmitter/receiver points for communications with individual homes and businesses located within about three miles of the tower. They can also provide a site for point to point communications to towers installed by the wireless provider from which additional end users can be reached. Internet traffic can be routed over the County network from a source of wholesale Internet entering the network at the POP location (near the Courthouse) or elsewhere on the network. This frees the provider from using T1 or other high cost, relatively low bandwidth communications paths for transporting Internet traffic from their transmitter to their network operations center. Lower wholesale Internet costs and additional transmitter sites translate to the ability to serve more customers at lower bandwidth and lower cost.

Fiber or Copper based providers not currently serving in Nelson County (Blue Ridge InternetWorks): DSL providers often use fiber to connect high speed digital data transport between remote cabinets and their central office. The fiber installed in the new Nelson network is ideally suited to supporting a range of electronics equipment providing such services. The high cost of fiber infrastructure usually limits the range of providers such as Blue Ridge. By providing the outside plant fiber, additional high speed customers could be accommodated using DSL circuits using existing copper plant for last mile delivery.

Incumbent and wired Internet providers within the County (IBEC, Nelson Cable): IBEC provides Broadband over Power Line Internet services over the existing copper electric plant owned by CVEC currently serving nearly 1000 customers in Nelson County. BPL service is limited in bandwidth and the extent of service territory because of the much higher signal loss when copper outside plant is used to provide Internet services. In Nelson County the generally high wholesale cost of Internet access also drives the price of Internet to levels beyond what would be seen in more urban areas. The new County network would likely not change IBECs end user delivery method (BPL), but could be used to extend the distance which could be served from any substation (because of lower signal loss). Additionally, the availability of lower cost wholesale Internet could assist in providing higher bandwidth to users at lower cost.

Nelson Cable has two head-ends, one in Wintergreen and one in Lovingston. High bandwidth point-to-point data connections over fiber would allow the interconnection of the two headends reducing overhead. The interconnection could also provide benefits by reducing wholesale Internet costs. The fiber insfrastructure in Lovingston could be served directly with a Fiber-to-the-Home (FTTH) solution such as a passive optical network or one of the newer evolutionary solutions which delivery signals to end users over fiber utilizing a traditional cable headend. Either type solution would provide higher quality digital

video cable television signals and higher Internet speeds (there is currently no cable modem service in Lovingston).

RESOURCES

Virginia Wireless Service Authorities Act – Frequently Asked Questions

Wireless Service Authority Resolution Example – Eastern Shore Broadband Authority

Question 50: Financial Assumptions	
General: All assumptions were developed during a one to two year study period by Icon Broadband Technologies and Consulting Gateway Services in conjunction with the local entity. All have been developed using locally applicable rates (e.g. utilities) or industry standards as a basis	
Revenue	
Fiber Leasing Costs:	Based on a fraction of the actual cost to build the fiber optic cable developed during the detailed studies. The build cost was converted to an annual amortized cost per mile at 5 percent interest. Leased mileages were determined based on provider interest in particular segments of planned fiber.
Tower Leases:	Typical tower leases are $500-$3000 per month for wireless providers with three attachments. Estimated revenues were based on a single provider at the low end of expected lease rates
Anchor Customers:	Broadband revenues per customer are based on wholesale loop charges from highly competitive markets ($100/Mb/mo) discounted beyond that rate. Customer numbers are based on an evaluation of actual potential customers
Small Business Customers:	Revenue is attributed as a network access fee only, with ISP partners providing their customer support and internet access. Data rates available over the network could be as high as 1 Gbps (GPON), but would typically be limited to 100 Mbps
Expenses:	
Utilities and Leasing:	Based on local rates for the size building considered
Network Maintenance and Operations:	Based on a data only network (capable of voice and video) with minimum numbers of end use customers. Normal operations could be handled by one person.
Depreciation:	Based on an overall list of items purchased summed into 3, 7, 20 and 39 year lifetimes. Items are depreciated equally per year except in years one and the last year of service in accordance with accepted schedules
Equipment Licensing:	Included at vendor standard rates of 6-8% of installed equipment
Pole Attachment fees:	In accordance with local utility pricing where aerial fiber was used in the proposed design
Borrowing:	Borrowing is used during the first 1-4 years of operation to support operations while network revenues are building. An assumed cost of money of 5% has been utilized. Borrowing is likely available from the Virginia Resource Authority at lower borrowing rates.
Taxes:	No tax burden has been attributed in accordance with Virginia Law under the Broadband Act.

ICON BROADBAND TECHNOLOGIES
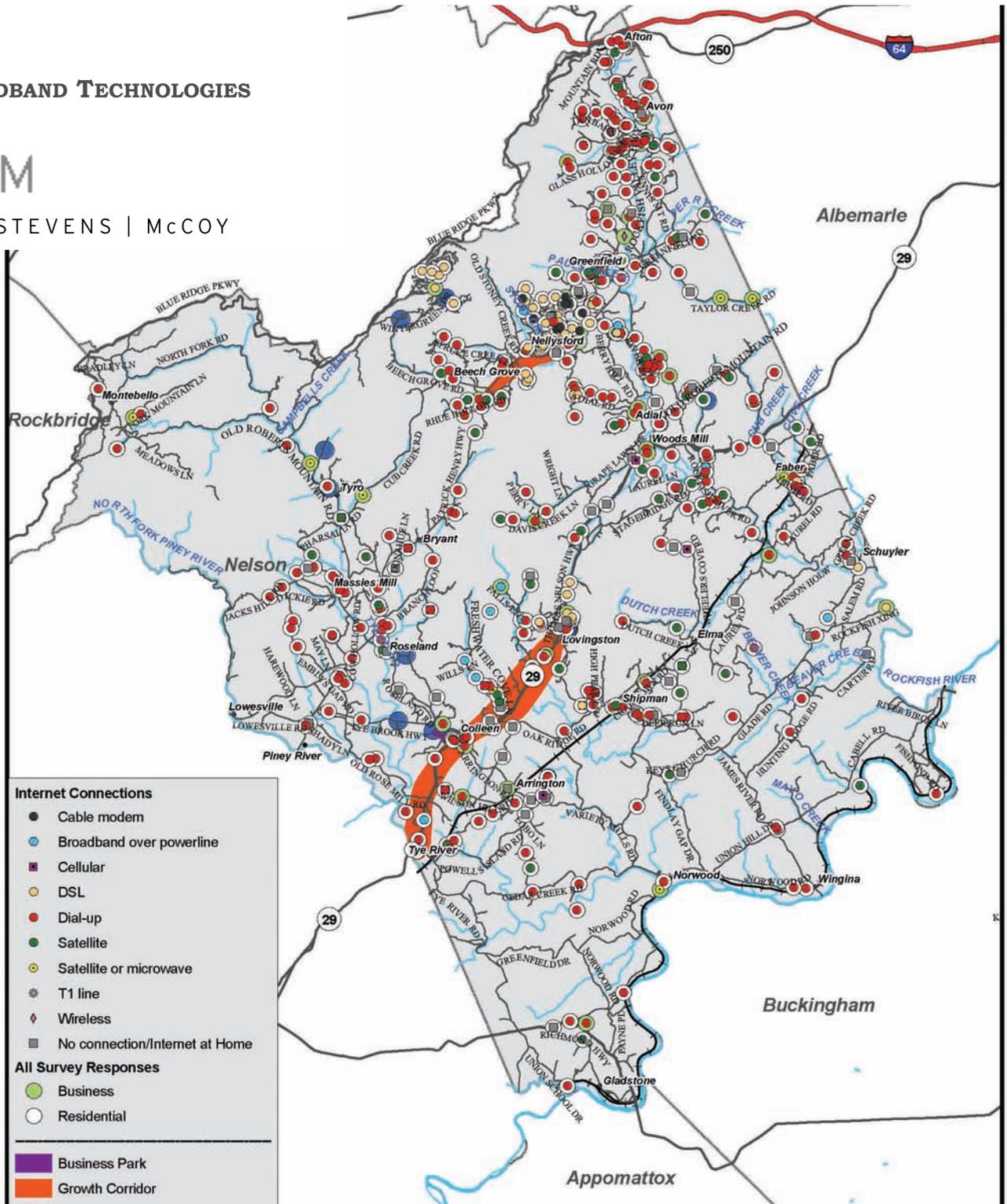
SSM

SPOTTS | STEVENS | McCOY

Internet Connections

- Cable modem
- Broadband over powerline
- Cellular
- DSL
- Dial-up
- Satellite
- Satellite or microwave
- T1 line
- Wireless
- No connection/Internet at Home

All Survey Responses

- Business
- Residential

- Business Park
- Growth Corridor

Community Broadband Planning Study
Nelson County, Virginia

Phase I Report
Needs Assessment and Broadband Education
November 26, 2007

Phase I Telecommunications Planning Study

Community Needs Assessment

Broadband Education and Training

For

Nelson County, Virginia

Transmittal Letter

November 26, 2007

Ms Maureen Corum, Director
Nelson County Economic Development
PO Box 636
Lovingston, VA 22949

Re: Community Broadband Planning Study for Nelson County, VA
        Phase I Report - Needs Assessment and Broadband Education Development Strategies

Dear Ms Corum:

Icon Broadband Technologies (IBT) and Spotts, Stevens and McCoy (SSM) are pleased to submit this report of the Phase I Needs Assessment and Broadband Education Strategies for the Community Broadband Planning Study for Nelson County. This Phase I report will be integrated into the final comprehensive telecommunications plan as the project progresses through Phase II.

Select survey data was mapped that included type and location of survey responses, type of Internet connection, level of satisfaction, inadequate Internet speed, and use of the Internet from home for work, school and job training. The selected points of interest address the scope of work in identifying the gap analysis, level of satisfaction, use, and locations where improvements are needed.

The County representatives and Economic Development department personnel are to be commended in pursuing this regional initiative to research and analyze business, education, health care and residential demand for broadband communications services. Creating a comprehensive telecommunications plan to enhance usage and encourage broadband service expansion is a critical first step to achieving a state-of-the-art communication asset for economic development growth. We look forward to continuing to work with the management team in developing the community broadband plan.

Sincerely,
ICON BROADBAND TECHNOLOGIES

Judy Bentley
Vice President
Icon Broadband Technologies

Executive Summary

With the assistance of the Virginia General Assembly and the Virginia Department of Housing and Community Development (DHCD), Nelson County has undertaken a comprehensive telecommunications planning effort to identify and develop all elements of a successful community broadband network. Undertaken as part of the Virginia Rural Broadband Planning Initiative (VRBPI), the project is designed to create competitive communities and ensure community sustainability by building and utilizing telecommunications infrastructure.

The VRBPI has laid out a series of tasks which are designed to reach the project goals, consisting of:
1. Needs Assessment and Asset Inventory
2. Broadband Education Development Strategies and End User Application Identification
3. Last Mile Connectivity Options
4. Preliminary Design and Cost Estimates
5. Organization and Network Operation Options, and
6. Funding Strategies for Future Implementation Projects

The DHCD grants are very specific, emphasizing infrastructure investment for businesses, education and healthcare providers. Residential inclusion in the study is primarily focused on determining the availability of infrastructure as it relates to education and job training use, and opportunities for small, home based business creation.

Partial or complete funding for the projects from DHCD grants divided the tasks into Phase I and Phase II with the first Phase consisting of the first two tasks. Phase I is primarily a documentation phase which consisted of research and discussions with interested parties and community stakeholders, a mailed survey to 2,500 residents and 500 businesses, and GIS mapping of results. Phase I has now been completed. Primary findings from the first phase are:

- While a vast majority of residents and businesses have computers and Internet access, Nelson County lags far behind the nation in the numbers who have higher than dial-up Internet speeds
- Schools and health care facilities are aware of the benefits that broadband communications bring to their tasks, but both segments are limited in their approach because of the high costs of fully utilizing broadband services

- Most residents and businesses are aware of the value of higher speed access to the Internet, but a lack of high speed access hampers use of applications that provide social and economic benefits

- The higher cost of broadband services as compared to dial-up is a significant deterrent to broadband adoption

- A lack of technology dependent businesses within the County has resulted in the local technology-skilled workforce seeking work outside the County, and young adults not returning after earning technology degrees

- High-speed, affordable bandwidth would enable training facilities, government, businesses and residents to more effectively work in the global environment

- There is no higher education facility located in the County supporting the transition from high school to college, or for adult continuing education

- The Community Centers are ideally located to be convenient training facilities, but lack financial resources to implement on their own

Looking individually at the phase I tasks, the Needs Assessment and Asset Inventory task looked at the communications technologies currently available in the study area and the extent of demand for broadband by all users. On the residential side broadband availability other than satellite consists of DSL and cable modem service in limited areas at pricing in the $20 to $60 range per month. Wireless is available in limited areas but at higher costs. Few business users have T1 access (1.5 Mbps) available at approximately $1,000 per month; wireless and DSL are available at somewhat higher prices than for residential service and in the same areas.

While broadband service availability is limited, the majority of homes (92%) have computers and some form of Internet service (88%). Based on their experience a majority find their level of Internet speed inadequate (68%). A significant percent of residents are using the Internet to work from home (45%) and the vast majority of families with children at home depend on the Internet to complete school work (73%). Teleworking is hampered by the limited availability of high-speed access options that enable secure connections to employers utilizing virtual private networks (VPNs) for remote access. Residential use covers a wide range of purposes with majorities of residents using the Internet to obtain news, plan travel, seeking medical information and to make purchases.

Although a majority of businesses use the Internet (96%), many are dissatisfied with too little bandwidth (66%) but only a few are deterred from broadband adoption because of excessive price (20%). The primary business uses are e-mail, purchasing, communication between offices, research and customer

service. Significant numbers of businesses anticipate future use of the Internet to expand their business presence through advertising and hosting a web site, and increasing productivity with access to training, distance learning, and video conferencing.

The school system has made significant investments in technology, and uses high bandwidth services in a combination of wired and wireless communications between schools to assist in presentation and instruction. Similarly medical facilities utilize higher bandwidth with T1 connections to outside hospitals (to UVA) and DSL service where available. Overall, information from outside of the area could be better utilized if higher bandwidth connections were economically available.

Summarizing the bandwidth needs of the various market segments, education and health care facilities have the greatest unmet bandwidth needs. External learning resources are not being fully utilized because of limited budgets to purchase higher bandwidth connections. The library has limited bandwidth to expand access wirelessly to additional patrons and insufficient facilities to provide training. Access to library computers for free Internet access is critical for a number of citizens that do not have access at home, or for displaced workers using the Internet for job search. The County government offices have minimal connectivity limiting the ability to offer e-government services or to communicate optimally between all public safety locations and personnel.

A previous survey on broadband use conducted by James Madison University over a year ago included Nelson County residents and businesses. Those results have not been combined with the current survey results, as the information is more than a year old, responses were not separated between residents and businesses, and included responses from citizens in the Town of Elkton, Virginia. At that time, results indicated a strong desire for broadband access within Nelson County. Demand has continued to grow but the options for high-speed access remain limited, validating the earlier assessment results.

The second task within Phase I examined Broadband education within the county. The State of Virginia has made computer technology a core portion of public education including early training into the use of computers and distance learning opportunities for older students. The Piedmont Virginia Community College partners with the high school to provide access to higher education opportunities, but there is no higher education facility within the County. Students must either commute the distance to Charlottesville or Lynchburg for classes or leave the County entirely to attend college fulltime. A satellite One-Stop workforce development center located in Lovingston provides limited assistance with job search. Resources for small and medium businesses to seek assistance with managing operations and access to

financing are primarily located in Charlottesville. Similarly, entrepreneurs seeking information on new business planning are limited in the local resources available to them.

For reasons due primarily to availability, virtually no segment of the community is using broadband communications to a high degree. The county government does not provide any portal to view meetings, make payments or access documents. Residents and businesses are limited in the applications that are feasible using dial-up or satellite access. Given the majority of residents and businesses that are using the Internet, higher speed access would encourage additional uses that influence social and economical change. Broadband education includes making residents aware of the benefits and convenience of online learning and job search. Businesses should be educated on the value of using the Internet for voice calling, secure network access, and marketing their business online. Education on potential uses for the Internet and the currently available services is equally as important as purchasing more bandwidth. As the education level of users increases, increasing usage and demand will follow.

There is strong demand among both residents and businesses within Nelson County for higher speed access. Over 60% of both segments of the community provided comments during the market assessment that encourage the County to continue to pursue options to expand high-speed availability on their behalf. Businesses report responses from Verizon regarding requests for expanding DSL access indicating this provider is focusing financial resources on fiber deployments to areas outside of Nelson County, with no future plans for increasing access locally. The second phase of study will look more specifically at how to improve bandwidth availability and examine the interest of service providers in expanding services to unserved areas. Priority areas will be defined and options for deploying fiber optics to enable new providers to offer services will be explored. Costs will be developed and the feasibility of a County investment examined to determine options for enabling broadband deployment in Nelson County.

1.0   Community Needs Assessment and Asset Inventory

1.1   Background

One objective of the Community Broadband Planning Study is to document the availability of communication technologies throughout the study area and to assess the amount of demand by residential and business end-users. Communication technologies include any form of Internet access, pay TV, and telephone delivered by any medium.

The use of a mailed survey allowed for a greater percentage of the population to be polled, including those that would potentially be reluctant to respond to telephone solicitations for surveying. The overwhelming popularity of the national Do Not Call list and the increasing use of caller ID to screen out unwanted calls substantiate use of a written survey as the preferred means to obtain community input from the largest number of respondents.

In addition to validating service availability by geographic area, end users provided valuable input to calculate demand for advanced technologies such as higher speed and wireless Internet access and phone service that uses the Internet as a transmission medium. This information is valuable to service providers contemplating the deployment of new services or to areas not presently served. Government leaders can use this knowledge as a tool for measuring how their community compares to others in relation to technology adoption by citizens, and for developing broadband education strategies.

Comments were solicited as to what changes or improvements to the current communication technology in Nelson County would best meet citizens' needs. Local leaders can use this knowledge to expand the reach of government services and prioritize implementation efforts. Through the survey process, citizens have been recruited as stakeholders in their community's future.

1.2   Area Assets

In preparation for a market survey to assess needs, base maps were developed for use throughout the study. Economic development personnel provided input on future growth areas. Local provider input and independent research was used to develop a telecommunication infrastructure map, and census data was applied to display population density throughout the County. Maps are displayed on the following pages.

**Figure 1: Economic Development Features**

*Broadband Study;
Community Telecommunications Plans
Nelson County, Virginia*

Figure 1

Economic and Public Facilities
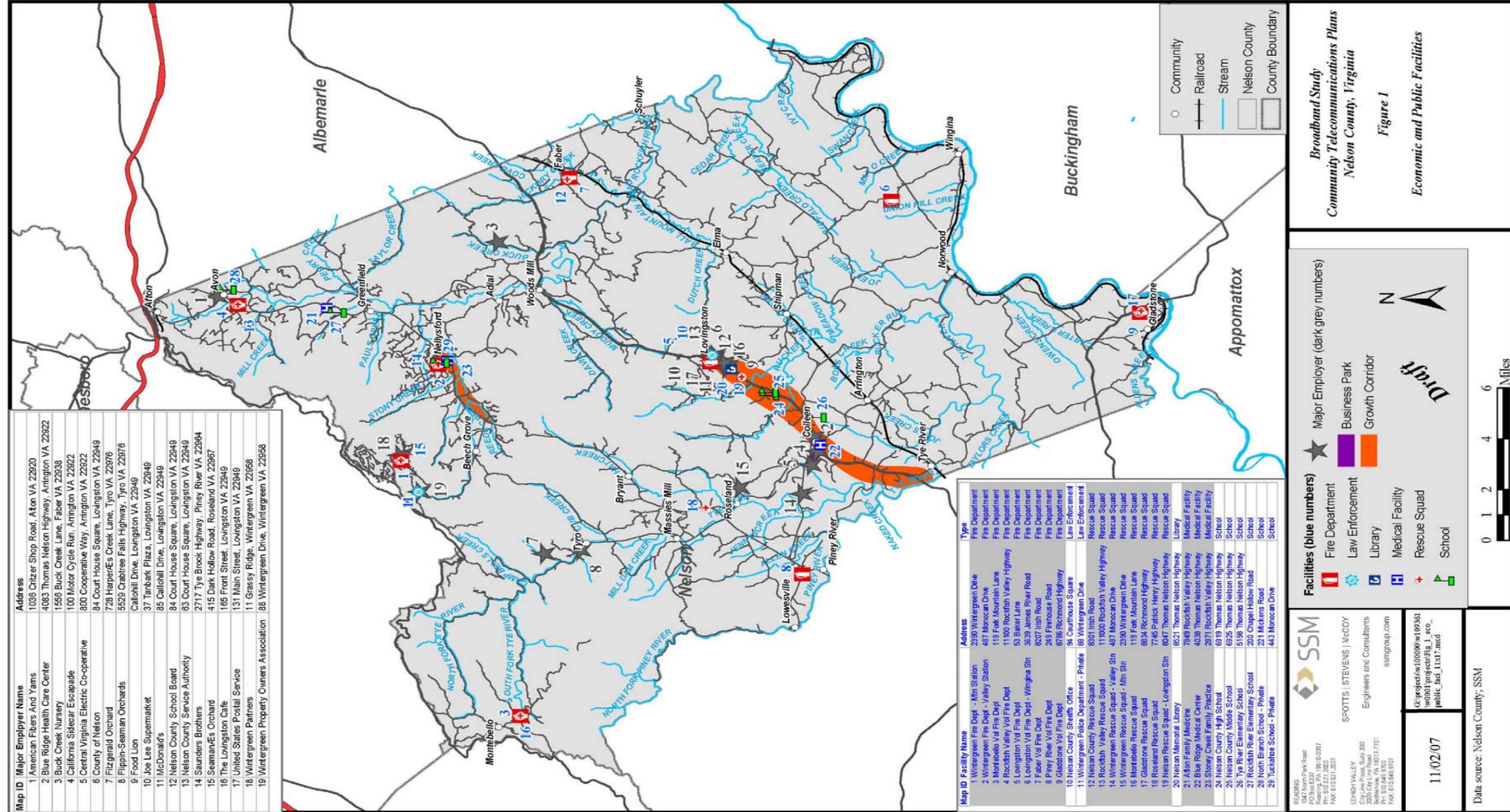
Figure 2: Current Telecommunication Infrastructure

Broadband Study
Community Telecommunications Plans
Nelson County, Virginia

Figure 2

Broadband Facilities

Figure 3: Population Density

Broadband Study
Community Telecommunications Plans
Nelson County, Virginia
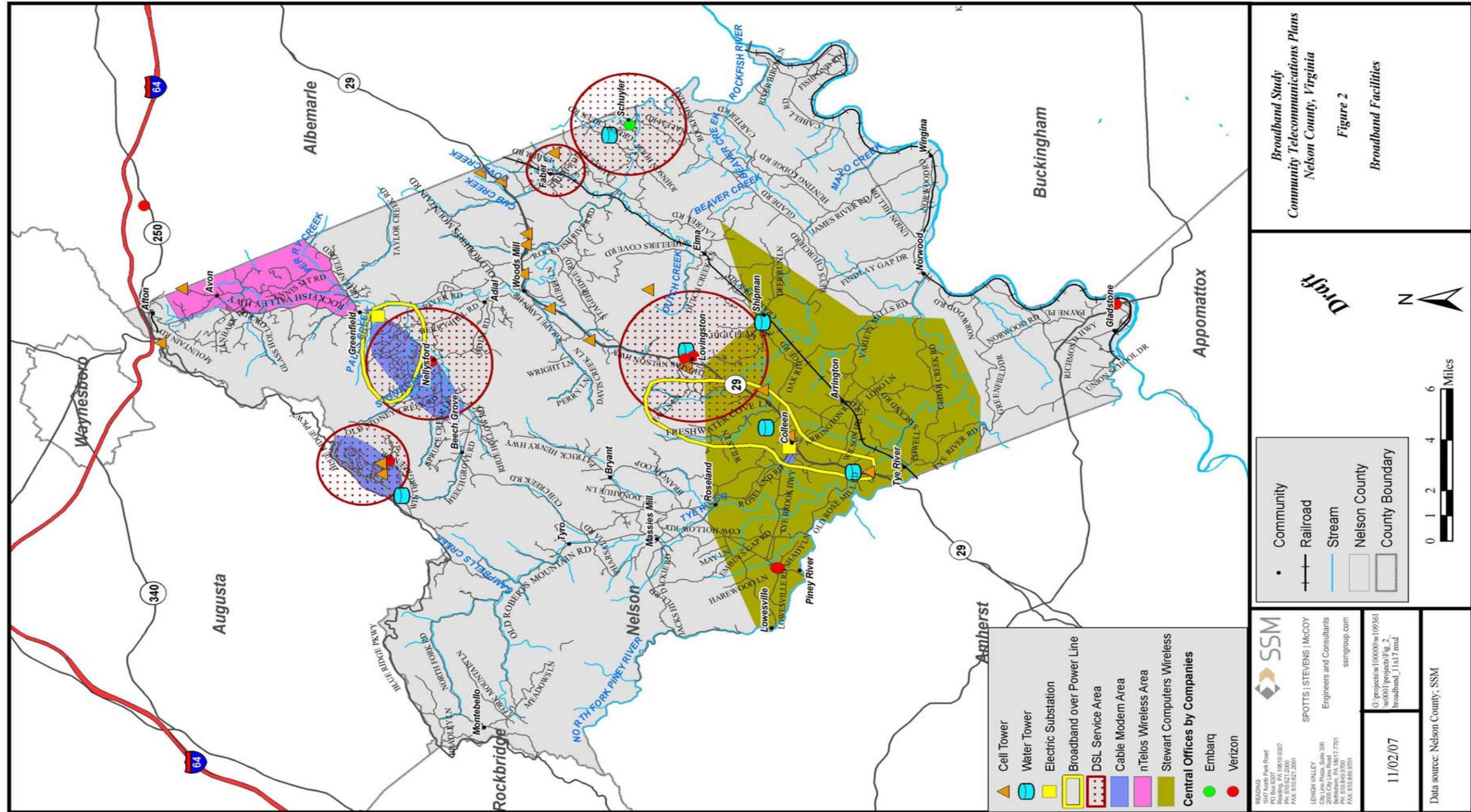
Figure 3

Population Density
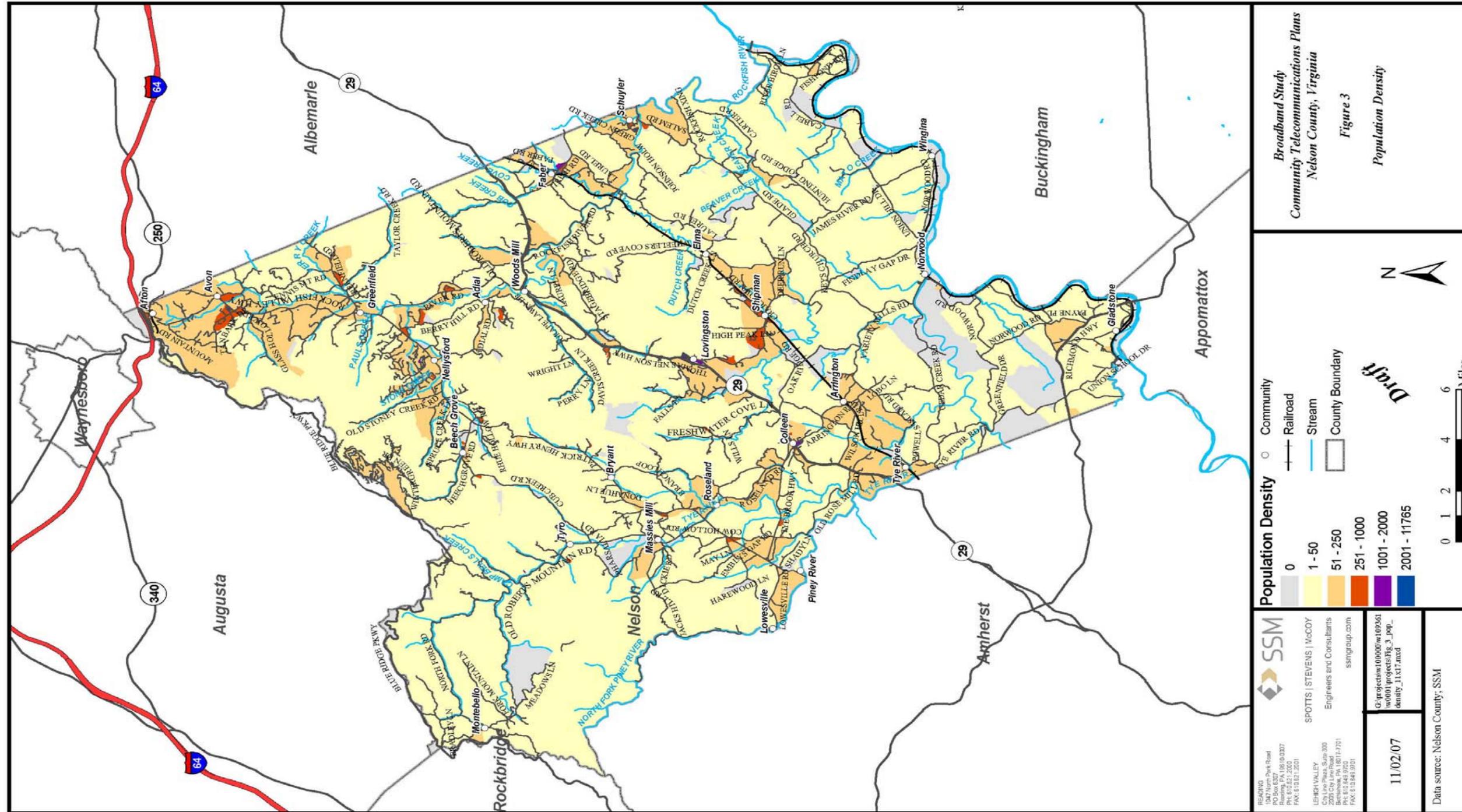
Figure 4: Housing Density

Broadband Study
Community Telecommunications Plans
Nelson County, Virginia
Figure 4

Housing Units density per Square Mile

House Units Per S.Q. Mile	
0	
1 - 50	
51 - 250	
251 - 600	
601 - 1000	
1001 - 3158	

○ Community
Railroad
Stream
County Boundary

Draft

N

0 1 2   4   6 Miles

SSM

SPOTTS | STEVENS | McCOY
Engineers and Consultants
ssmgroup.com

READING
1047 North Park Road
PO Box 3337
Reading, PA 19605-0337
PH: 610.621.2000
FAX: 610.621.2001

LEHIGH VALLEY
City Line Plaza, Suite 300
3500 City Line Road
Bethlehem, PA 18017-7701
PH: 610.844.9700
FAX: 610.844.9720

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11/02/07

Data source: Nelson County; SSM

1.3   Survey Methodology

A total of 2,500 residential surveys were distributed from residential lists procured by IBT personnel. Mailing address lists for County businesses were provided and a total of 500 business surveys were distributed. Public school district officials and higher education personnel were interviewed via telephone for more detailed responses.

Residential and business input was provided from both mailed and on-line surveys. A two-page survey (see Appendix A, Section 7.0) polled basic demographic data, Internet usage habits, method of access (e.g. dial-up, DSL, cable modem), satisfaction with current providers, and monthly cost of access to the Internet. The survey could be completed and returned postage-paid with a minimum of user effort. The mailed survey was augmented by an online survey version. The domain name of www.VAbroadbandstudy.com was purchased and used to make an exact replica of the mailed survey available for easy online entry. The results of the online survey are combined with the mailed survey results.

A targeted survey response rate of 10% was anticipated, returning a statistically valid sample size at a 95% confidence level. Response to the Nelson County surveys was much higher however, resulting in return rates of 24% (600) residential and 20% (103) business. The high response rate by residents is attributed to the efforts of County economic development personnel and the project management team in marketing the online survey and distributing additional survey copies throughout the community. This effort ensured that all County citizens were afforded the opportunity to provide input for the market assessment.

1.4   Local Internet Services

Residential

Subscription Internet access is available to all residents via dial-up service at pricing ranging from $10 to just over $20 per month from a variety of providers. Access via Digital Subscriber Line (DSL) is available in the Lovingston, Schuyler, Nellysford and Wintergreen Resort areas. Speeds and pricing range from 768 Kbps/128 Kbps for $14.99 to 5 Mbps/768 Kbps for $54.95 per month from Verizon and Embarq. Cable modem service is available in the Stoney Creek development, Wintergreen Resort and along a portion of Hwy. 29 in the Nellysford/Wintergreen area at prices ranging from $20 to $50 per month. Customers can choose from speed tiers of 768 Kbps/512 Kbps to 3.5 Mbps/1 Mbps. High-speed wireless access is available in only two small areas of the County from two providers at speeds ranging

from 256 Kbps to 1.5 Mbps at costs of $35 to $70 per month. Access via satellite provider HughesNet is available to all residents and businesses in the County with download speeds of 700 Kbps to 1.5 Mbps, ranging in price from $60 to $80 per month. WildBlue is an additional satellite provider targeting rural subscribers, with a choice of three tiers delivering download speeds of 512 Kbps to 1.5 Mbps, and ranging in price from $49.95 to $79.95 per month.   Nelson Cable is a retailer of Wild Blue services, but combined billing with cable TV service is not available. Satellite subscribers must either purchase equipment at costs in the hundreds of dollars or pay higher rates which include the necessary equipment.

Central Virginia Electric Cooperative (CVEC) has deployed broadband over powerline (BPL) to premises served by the Colleen substation. This area served as the testing grounds for the new service, and the area is now being upgraded to enhance the BPL service. Using the electric lines to the premise, Internet access is available at symmetrical (up and down) speeds ranging from 256 Kbps to 3 Mbps. As a pilot, customers experienced delays and service interruptions; continuing upgrades to the system will improve service reliability and the stability of the network. The next area scheduled for BPL deployment is the area served by the Martins Store substation. Service pricing ranges from $29.95 for the 256 Kbps tier to $89.95 for the 3 Mbps tier. While this provides an alternate to dial-up, pricing is higher than for DSL that may be available to some customers in the vicinity of the Colleen substation. Additionally, customers are required to purchase equipment for receiving the signal within the home requiring a $99 one-time equipment charge.

Another alternative to dial-up is cellular broadband access via a wireless data card. National cellular providers Verizon and Sprint provide service to some areas of the County. The local provider Alltel provides the most complete local coverage, and offers broadband services throughout most parts of the County at download speeds of 400-700 Kbps with peaks up to 2.4 Mbps. There are some small areas of the County without service, and other areas further away from the serving towers that may only be capable of speeds of 40-70 Kbps with peaks up to 144 Kbps. Pricing for the data card services is approximately $60 per month and does not require a mobile phone subscription as well. Most cell phone providers are now offering web access from mobile phones for an additional fee of approximately $20 per month. Cell phone and data card access is an option for remote workers such as rural health nurses, and employee access from home or on the road.

Costs vary widely when comparing providers and services by speed of service. Residential service is typically greatly oversubscribed[1], and speeds are typically advertised as "up to". All products are not available to all County residents, and in most cases speeds available are dependent upon the subscriber's distance from the provider's facility or equipment. The exception to this is satellite Internet service which requires a clear view to the southwestern sky. In addition to regular monthly fees for service, subscribers may be subject to one time fees for installation or equipment. The costs for services by speed of service are as follows:

Table 1.41: Current Residential Internet Options (rounded to nearest dollar)							
Speed (down/up)	Dial Up (unlimited)	Wireless Stewart Computer	Wireless nTelos	DSL (assuming phone service)	Cable	BPL	Satellite
Max 56 Kbps	$10-$25						
256 Kbps/128 Kbps		$50					
256 Kpbs/256 Kbps						$30	
512 Kbps/256 Kbps		$60					
700 Kbps/128 Kbps							$60
768 Kbps/128 Kbps				$15			
768 Kbps/384 Kbps				$20			
768 Kbps/448 Kbps							
768 Kbps/512 Kbps					$20-$25		
1 Mbps/200 Kbps							$70
1 Mbps/1 Mbps						$50	
1.5 Mbps/200 Kbps							$80
1.5 Mbps/448 Kbps		$70					
1.5 Mbps/512 Kbps			$35	$25			
3.0 Mbps/640 Kbps				$35			
3.0 Mbps/768 Kbps				$30			
3.0 Mbps/1.0 Mbps					$30-$35		
3.0 Mbps/3.0 Mbps						$90	
5.0 Mbps/768 Kbps				$45			
Additional Fees (Set-up/Equipment)		$150 Deposit	$50 Set up fee	Installation fees may apply		$99 Charge for adaptor	$200 One time

Business

Subscription Internet access is available to all businesses via local and national dial up service providers at pricing similar to residential access. Costs to business customers for faster-then-dial up service are typically higher than that offered to residential customers due to increased support and quality of services

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[1] The practice of providing much lower total available bandwidth than each user is purchasing individually. If, for example 100 customers were sold "up to" 1 Mbps, and the ISP supplies only 1Mbps total, the service is oversubscribed 100 to 1. In periods of low or moderate usage it may work well, but provides very slow service during peak periods.

agreements. DSL access is often used by small businesses that have few users and are not 'data intense', primarily due to cost limitations. These businesses must be able to operate with the amount of bandwidth available at any given moment. Wireless Internet service is available to businesses located in the Nelson Center and the Afton Mountain areas. Wireless is in use by only 3% of businesses currently.

Many medium to large (and even some small) businesses can satisfy their needs with a full or partial T1 line that they can portion between voice and data services. Depending upon the number of telephone lines and frequency of use, voice traffic may use a relatively small percentage of bandwidth. Greater amounts of bandwidth are required for transferring data files, frequent Internet use and connecting branch offices. T1 lines offer dedicated bandwidth to each user with higher reliability than DSL. T1 lines are available throughout most areas of the County at costs typically ranging between $800 and $1000 per month, or in channel increments at lower cost. Businesses currently subscribing to T1 service are serviced by AT&T, Sprint, and Verizon. Service is provisioned over the local telephone company's copper lines, although service agreements and Internet access may be provided by competing providers (e.g. AT&T). Very high bandwidth needs (e.g. greater than 10 Mbps) can be met currently by a full or partial DS3 (45 Mbps) at rates well above $1500 per month; no businesses reported subscribing to DS3 service. The table below details the service levels available and pricing in a speed comparison fashion.

Table 1:42: Current Business Internet Options (rounded to nearest dollar)								
Speed	Dial Up	Wireless Stewart Computer	Wireless nTelos	DSL	Cable	Satellite	BPL	T1
Max 56 Kbps	$10-$25							
256 Kbps/128 Kbps		$50						
256 Kpbs/256 Kbps							$70	
512 Kbps/128 Kbps				$30				
512 Kbps/256 Kbps		$60						
768 Kbps/128 Kbps				$30				
1 Mbps/1 Mbps							$130	
1.5 Mbps/300 Kbps						$100		
1.5 Mbps/384 Kbps				$65				
1.5 Mbps/448 Kbps		$70						
1.5 Mbps/512 Kbps			$35-$45					
1.5 Mbps/1.5 Mbps								+/- $1000
3.0 Mbps/512 Kbps				$90				
3.0 Mbps/768 Kbps				$40-$80				
3.0 Mbps/3.0 Mbps							$230	
3.5 Mbps/1.0 Mbps					$40-$50			
3.5 Mbps/1.2 Mbps					$45-$60			
5.0 Mbps/640 Kbps				$100				
7.1 Mbps/768 Kbps				$100-$200				
Additional Fees (Set-up/Equipment)		$150 Deposit	$50 set-up one time	1yr contract, $150/install		$600 one time	$99 Adaptor Charge	Install fees typically apply

1.5   **Residential Use and Unmet Demand**

Internet Access

Residential survey respondents ranged in age from under 20 to over 65 years old. Over 60% of responses represented working age adults in the 20 to 59 age range. Response from citizens aged 60 and above was proportionate with census demographic characteristics for those age groups. Responses from families with children at home represented 64% of the survey group. The ages of children living at home are represented as follows:

Under 5	**5 – 17**	**18 or older**
15%	**63%**	**32%**

Computers are in the homes of 92% of survey respondents, and 88% of the total survey group subscribes to an Internet access service. These overall percentages in Nelson County are higher than national estimates, and a comparison by age group indicates no significant disparity between young adults and older generations as is typically common in rural areas.

Computer Ownership and Internet Access By Age Group		
Age Group	**No Computer in the Home**	**No Internet Access**
Under 20	0%	0%
20 - 24	0%	50% *
25 - 34	<1%	11%
35 - 44	3%	6%
45 - 54	7%	11%
55 - 59	2%	5%
60 - 64	6%	9%
65 or Older	18%	21%
Families with Children at Home	3%	6%

*Not statistically relevant; low number of responses for this age group by comparison.

The majority of Internet users (63%) are subscribing to a dial-up Internet service. This is in sharp contrast to national estimates of between 72%[2] and 78% of active home Internet users going online via a broadband connection[3].

Internet Access Methods

Cable Modem, Dial-up, DSL, Satellite, Wireless, Cellular — 63%, 12%, 15%, 2%, 2%, 4%
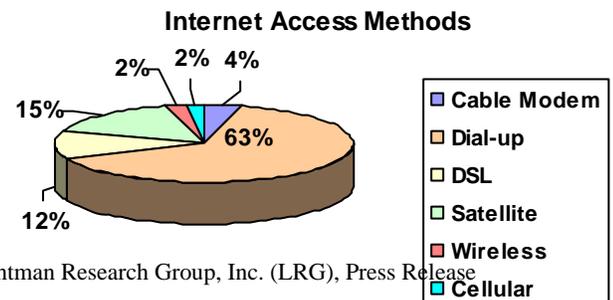
[2] Source: *Over Half of U.S. Households Subscribe to Broadband Internet*; Leichtman Research Group, Inc. (LRG), Press Release 7 June 2007, http://www.leichtmanresearch.com/press/060707release.html
[3] Source: *Over Three-Fourths of U.S. Active Internet Users Connect Via Broadband at Home in November*; Nielsen/NetRatings, 12 December 2006, http://www.netratings.com/pr/pr_061212.pdf

Residents were asked to assess their Internet access on speed and customer service. Current speeds are considered inadequate by 68% of subscribers, and 41% of subscribers describe their provider's customer service and support as inadequate. The majority of those dissatisfied with the speed of their Internet connection are using dial-up for access, but dissatisfaction is evident among subscribers of services that are faster than dial-up but slower than DSL and cable modem speeds.

Residential Dissatisfaction with Current Internet Speed (Bandwidth) by Access Method					
Dial-Up	Satellite/Cellular	Digital Subscriber Line	Cable Modem	Broadband over Power Line	Wireless
80%	14%	2%	<1%	2%	2%

A majority of dial-up subscribers is interested in moving to a faster-speed service, yet 77% state services are not available to them. Cost is also a limiting factor however, as 26% state higher speed services are too expensive. Dial-up subscribers are currently paying below or slightly above $20 per month for service.
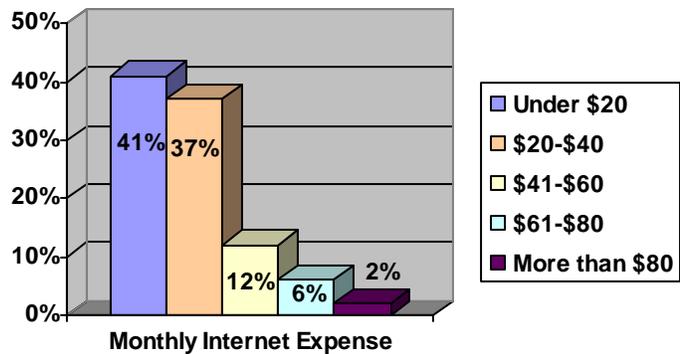
Internet access in the home is important to the overwhelming majority of residents; 74% rate access as Very Important and another 17% describe it as Somewhat Important. This importance is quantified as a vast majority (78%) of residents is using the Internet to work from home and/or to complete school or job training course work.

Using the Internet for Work or School	
	% of Internet Users
Use the Internet to Work From Home:	45%
Internet Access Required to Complete Coursework for School or Job Training:	38%
Using at least once per Week	62%
Using at least once per Month	38%
	% of Families with Children at Home
Using the Internet to complete school work:	73%

Internet security is a top priority of businesses today. In particular, businesses that allow remote access to the company's network must constantly guard critical company information from attack by unauthorized users. In addition to a firewall, businesses are commonly utilizing a virtual private network (VPN) to grant access and encrypt data. The extra layers of encryption and authentication increase the bandwidth required to pass information to and from the company's server. Remote employees using a dial-up Internet service have a particularly difficult time maintaining a constant connection and experience significant delay in exchanging large data files. As such, dial-up users experience a greater level of frustration than broadband users when trying to work from home. Of all survey respondents, 45% use the Internet to work from home and 37% of their employers require access to the company through a VPN. Dial-up users account for 47% of remote workers using a VPN, and the vast majority state higher speed services are not available to them. Teleworking is a top goal of states as a way to reduce traffic congestion and pollution, and holds the promise of increasing quality of life for workers desiring to live in a rural setting. An always-on, high-speed connection to the Internet for rural workers is necessary to enable productivity and an efficient use of time.

The many activities that residents are performing online underscore the high value placed on access, and validate the demand for higher-speed access methods. Email has long been the most frequently used Internet application by citizens of all ages. In more recent years activities such as obtaining directions, making travel reservations, researching purchases, and performing financial transactions have increased in popularity. Activities that influence social and economic changes such as online learning, job search, access to health and medical information and selling products or services online are steadily gaining in popularity as more Americans are exploring the Internet's vast reach. Large majorities of residents are turning to the Internet for access to news and community information.

Nelson County residents are actively using a wide variety of Internet applications that increase productivity and provide social and economic benefits. The availability of online courses to improve job skills is one area where public education is needed to educate residents on the benefits and how to access this training option. An additional application that is of *interest* to many but needs some basic education and encouragement to stimulate use is selling products or services online. Given Nelson County's significant distance from high-density commercial areas, e-commerce is critical for enabling rural entrepreneurs to compete with urban businesses.

Residential Online Activities in the Past 6 Months	
Internet Activity	% of All Residents
Searched for travel related information	80%
Visited a news website	78%
Purchased products or services	77%
Searched for health or medical information	68%
Visited a state or local government website	65%
Researched a major purchase	60%
Performed a financial transaction with a bank	58%
Downloaded or watched video online	30%
Searched for information related to school work	28%
Searched for a job	19%
Communicated with a teacher	14%
Took an online course	13%
Sold products or services	11%

Wireless Internet access is becoming more widespread, increasing consumer awareness of the service. Where once wireless service could be found only in retail locations such as coffee shops, hotels, airports, and some libraries, wireless wide area networks are becoming more common today. Additionally many new computers (both desktop and laptop) are equipped with standard wireless network cards, enabling ease of use. A large number of consumers have adopted the use of wireless home networks as an alternative method to reach computer work stations, and for using portable devices anywhere in the home. Residents were questioned as to their likelihood of subscribing to an affordable wireless high-speed Internet service if it was available to them, and the response was overwhelmingly positive.

Residents' Interest in Affordable Wireless Internet Access	
Very Likely to Subscribe	74%
Somewhat Likely to Subscribe	15%
Not Likely to Subscribe	8%

Pay TV Services

Nationally, approximately 85% of households subscribe to a pay TV service. Cable's share as of December, 2006 is estimated at 58.8% according to the National Cable and Telecommunications Association industry statistics[4]. Subscribers located in areas with population densities of 25 homes per mile or less are typically not served by cable systems and therefore are more likely to subscribe to satellite

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[4] Source: *National Cable and Telecommunications Association*; Cable Industry Statistics, as of December 2006; www.ncta.com

services such as DirecTV. Local provider Nelson Cable serves only limited portions of Nelson County: Wintergreen Resort, the Stoney Creek development, and the area in around Lovingston and Shipman. Of the residential survey participants, only 17% do not subscribe to a pay TV service. Presumably a portion of these residents are receiving local channels via off-air antennas; the upcoming transition to all-digital signal transmission by television stations in 2008 will require additional equipment to receive the digital signals or subscription to a pay TV service. For homes located outside of the areas currently served by Nelson Cable, satellite will be the only option available.

Pay TV Subscribers	
Pay TV Method of Access	% of Responses
Cable	10%
Satellite	73%

The majority of pay TV subscribers currently receive expanded programming consisting of local off-air channels and analog cable programming. Minimum basic programming consists typically of local off-air channels; public, education and government channels; and shopping networks with perhaps a cable channel such as The Weather Channel.

Monthly expenses for Pay TV service are much higher than for Internet access; the majority of subscribers are spending between $51 and $75 per month for service.
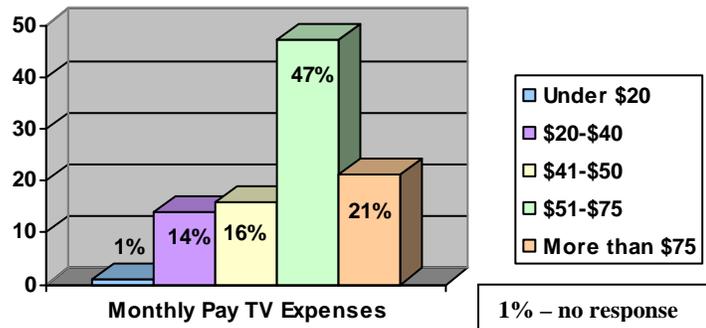
Voice Services

Voice communication services include regular wired service (also known as 'plain old telephone service' or POTS), cellular, and the newer voice service using the Internet (Voice over Internet Protocol or VoIP) as the transport medium. Nationally, more Americans are dropping regular wired service in favor of one or both of the other services presumably as a way to reduce monthly expenditures. The adoption of VoIP services is an important issue, as currently Universal Service Fees and fees for e911 are not always

collected on calls made over the Internet depending upon the provider used. Residential subscriber percentages and monthly rates for voice services are reported as follows:

Voice Communication Methods and Spending						
Voice Service	% With Service	% Without Service	Monthly Expenditure			
			No Charge	Under $35	$35 to $75	More Than $75
Regular (Wired) (2% unknown)	94%	4%	-	21%	64%	9%
Cellular (2% unknown)	80%	18%	-	15%	41%	24%
Voice over Internet	2%	99%	<1%	1.5%	-	-

Industry estimates of VoIP penetration vary widely, but analysts do agree that this form of voice communication is expected to increase in popularity at a rapid rate. One of the more aggressive estimates is the prediction that VoIP will be used in 62% of broadband households by 2010[5]. Because of the availability of access at no charge using the Internet only (calls do not ever touch the telephone network) the exact numbers of nation-wide subscribers are not known. Hybrid varieties of VoIP that pass calls using the Internet and then connect to the switched telephone network are becoming more widely adopted as cable and telephone companies roll out new packages of fixed price service for unlimited local and long distance calls. Embarq, Verizon and Nelson Cable do not offer VoIP services in Nelson County at this time. The national cable provider Comcast offers a 'Digital Voice' product in markets where they have upgraded the cable system infrastructure, and has recently begun planning activities to deploy this service in neighboring Albemarle County in the Greenwood area. Nelson Cable is considering adding VoIP as a future service in areas where they are currently upgrading infrastructure with fiber to support higher bandwidth services.

## 1.6   Overall Residential Satisfaction

Overall, residents in the County are satisfied with their current voice service, but express high levels of dissatisfaction with the video and Internet services available to them. Two-thirds of residents are unhappy with the few options available for Internet access; numerous comments echoed frustration with not having a choice of providers for any of the communication technologies – voice, video or broadband Internet.

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[5] IDC, subsidiary of International Data Group; *IDC Anticipates 34 Million More Residential VoIP Subscribers in 2010*; Press Release 13 June 2006; http://www.idc.com/getdoc.jsp?containerId=prUS20211306

	Satisfaction with Current Providers		
	Telephone	**Video**	**Internet**
Satisfied	**71%**	**43%**	**25%**
Not Satisfied	**20%**	**35%**	**66%**
No Opinion	**9%**	**22%**	**9%**

Resident expectation of pricing for services and willingness to pay for improved services from a new provider in the form of a combination package was tested. Nearly one-third state a package price of $85-$100 per month for voice, video and Internet service is attractive to them. Nationally, Comcast has successfully deployed voice services by promoting a combined voice, video and Internet package for $100 per month. Verizon's fiber optic services (marketed as FiOS) also offer savings for combining three services into one 'triple-play' package, priced in the neighborhood of $100 per month. Only 16.5% of Nelson residents show no initial interest in combining services from one provider.
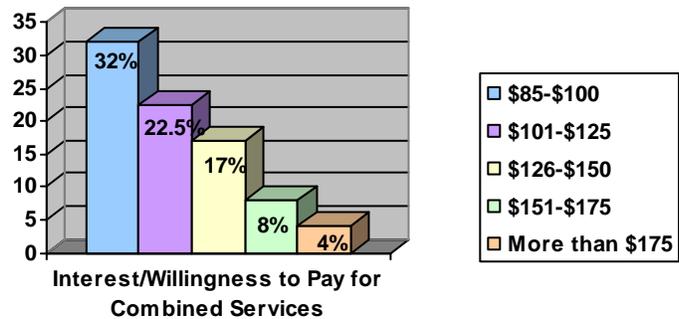
Interest/Willingness to Pay for Combined Services

In response to the last survey question **"What changes or improvements to communication technology in Nelson County would best meet your needs?"** 60% of the survey participants offered comments. A complete list of the comments is included in the Appendix section of this report. In general, the majority of comments addressed the following issues:

- Desire for high-speed Internet access
- Poor cell phone reception
- Poor off-air TV reception
- High cost of all services
- Desire for bundled service offerings (telephone, Internet, TV, and cell for one price)
- Frustration with limited choice for services and providers

1.7 Business Use and Unmet Demand

Internet Access

Respondents to the business survey are primarily small businesses, employing 1-4 persons with annual revenue or sales of $50k - $500k per year. The size and type of responding businesses are represented in Table 1.7-A on the following page.

Annual Revenue or Sales

- ☐ Less than $50k
- ☐ $50k - $500k
- ☐ $501k - $1 million
- ☐ Over $1 million
- ☐ Not Provided
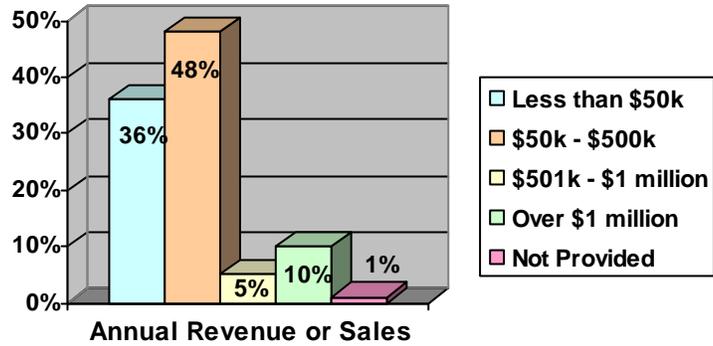
	Table 1.7-A: Businesses by Type and Number of Employees								

% of Response	Business Type	Number of Employees								Total
		None	1-4	5-9	10-19	20-49	50-99	100-249	250 or more	
7%	Accounting/Architectural/Engineering	1 14%	6 86%							7 7%
7%	Agricultural/Forestry/Mining	3 43%	4 57%							7 7%
22%	Business and Personal Services	4 17%	17 74%	2 9%						23 22%
5%	Communication/Technology	1 20%	2 40%	2 40%						5 5%
16%	Contractor or Construction		13 76%		2 12%	2 12%				17 17%
5%	Education		2 40%		2 40%	1 20%				5 5%
5%	Finance/Insurance/Real Estate	3 60%	2 40%							5 5%
5%	Healthcare	1 20%	2 40%		1 20%		1 20%			5 5%
2%	Home Business		2 100%							2 2%
5%	Hotel/Lodging		5 100%							5 5%
6%	Non-classified	2 33%	4 67%							6 6%
14%	Retail Trade	2 13%	9 60%	2 13%		2 13%				15 14%
1%	Wholesale Trade		1 100%							1 1%
	Total:	17 16%	70 68%	6 6%	5 5%	5 5%	1 <1%	0 -	0 -	103

The Internet is in use by 96% of all businesses. Most (84%) report 1 to 5 workstations with access to the Internet. Dial-up is the most commonly used method of access by small businesses employing 5 or less persons, and is in use by 56% of businesses reporting revenue of $500k or less annually. Current DSL, cable modem and T1 bandwidth/speeds are considered adequate to meet the needs of 90% of businesses using those methods of access. Access methods in use by all businesses are as follows:

Business Method of Internet Access
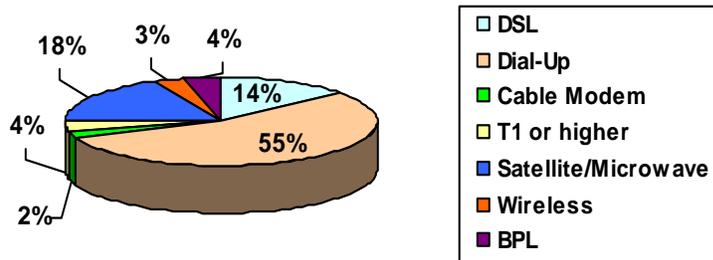
Dial-up access does not meet the needs of 93% of the businesses using this method of access. Connections are too slow and do not provide enough bandwidth. The number one reason reported for not subscribing to higher speed access is that higher speed

services are not available. Only a small percentage (3%) state higher speed services are too expensive. Users of faster than dial-up services also express some level of dissatisfaction with their current services.

- All T1 subscribers state the price of service is too high (</>$1000 per month)
- All BPL subscribers state service is unreliable
- All nTelos wireless subscribers state service is unreliable
- 75% of satellite subscribers state service is too slow
- DSL subscribers are dissatisfied with speed and service:
  - 29% connection too slow
  - 29% service is unreliable
  - 29% price is too high
  - 14% poor customer service

Access to the Internet is considered Very Important or Critical by 73% of businesses. Business end-users are generally unsure as to what speeds or amount of bandwidth they are receiving. Only 6% report subscribing to service at speeds above 1.5 Mbps. Two-thirds of businesses overall state their current method of Internet access is inadequate to meet their needs. The majority of businesses dissatisfied with their current speeds are located in or near Afton and Roseland. Only 12% of businesses are very satisfied with their current provider and service.

Satisfaction with Current Providers	
	% of All Internet Users
Very Satisfied	12%
Somewhat Satisfied	37%
Somewhat Dissatisfied	30%
Very Dissatisfied	20%

Reasons for Dissatisfaction with Current Providers	
	% of All Internet Users
Poor connection speed, not enough bandwidth	**66%**
Service is unreliable	26%
Price too high	20%
Poor customer service	8%
Problems with Email	5%
Lack of technical support	4%

Monthly Internet Expenses

- Under $30
- $30 - $50
- $51 - $100
- $101 - $300
- More than $300

49% 18% 24% 3% 4%
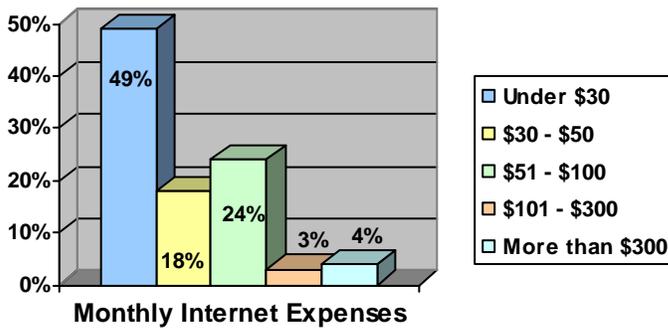
Current monthly expenses for Internet access do not exceed $50 per month for the majority (67%) of businesses. Only 4% of all businesses report Internet expenses in excess of $300 per month.

Although nearly all businesses currently have Internet access and consider access important, it appears many businesses are not taking full advantage of all the Internet has to offer. Advertising and online sales use is good at 30% or more of all businesses, but applications that eliminate rural barriers such as distance learning, online training and video-conferencing are not being fully utilized. Some businesses have incorporated the Internet into the daily operation of the business beyond just communicating with employees and customers through email - tasks such as accounting and banking that can be conducted via online access save the business time and creates efficiency. These efficiencies contribute to the importance of cost-effective and dependable Internet access. Video conferencing and the use of VPNs will utilize more bandwidth than dial-up will support, and the lack of high-speed options in Nelson County undoubtedly hinders business adoption of these types of applications. The table that follows illustrates how Nelson County businesses are using the Internet – currently and expected future use. The applications targeted for future use and the percentage of businesses that anticipate incorporating these additional uses into their operations are indicators of the incremental speed and bandwidth that will be required in the near future.

How Businesses Are Using the Internet Current and Future Interest		
Internet Use	**Current Use %**	**Anticipated Future Use %**
E-Mail	89%	4%
Communication between offices	78%	9%
Purchasing materials or services	71%	11%
Accounting/Banking	62%	14%
Research	61%	6%
Customer service	54%	15%
Transferring data files	44%	18%
Advertising	40%	**27%**
Hosting your web site	34%	**30%**
On-line sales	31%	16%
Training	**18%**	**22%**
Distance Learning	**17%**	**23%**
Video-conferencing	**9%**	**20%**
VPN connections	**7%**	15%
Voice service	**6%**	19%
Telemedicine	**5%**	6%

In contrast to lower-than-expected Internet application usage, 67% of all business survey respondents identified one or more growth opportunities their business would consider if an affordable high-speed Internet service were available to them. The high percentage of businesses that would consider offering services over the Internet indicates future growth in e-commerce in Nelson County. Additionally, it appears a strong percentage of businesses understand the value of Internet marketing. Growth and expansion opportunities identified are as follows:

Growth and Expansion Considerations with Affordable High-speed Access

- ☐ Increase advertising and marketing — 44%
- ☐ Add additional location — 4%
- ☐ Hire additional employees — 6%
- ☐ Expand current business — 37%
- ☐ Offer additional services over the Internet — 36%

Percent of All Businesses
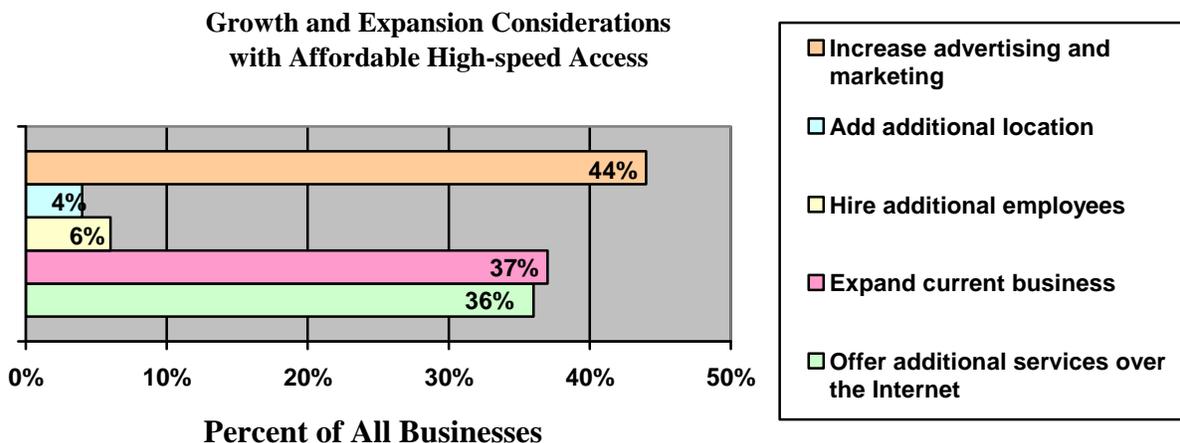
Wireless Internet access has been a rapidly evolving technology with new standards released well ahead of consumer adoption. Until recently, uncertainty existed among consumers as to the security of using this technology to transmit sensitive data. Businesses are beginning to view wireless access as a cost-

effective means of connecting branches and accessing the Internet. A majority of all business survey respondents (92%) indicate they are very to somewhat likely to use wireless high-speed Internet access service if it was available to them. Of businesses that state current Internet speeds and bandwidth is inadequate, nearly all are interested in high-speed wireless as an option to meet their bandwidth needs.

Voice Services

Businesses were surveyed as to the phone services they are using and their monthly expenditure for each. While most businesses maintain regular telephone lines, the majority are spending less than $100 per month for service. This indicates business customers on average have only one (1) line and a low amount of long distance usage.

Business Voice Communication Methods and Spending					
			Monthly Expenditure		
Voice Service	% With Service	% Without Service	Under $100	$100 to $300	More Than $300
Regular (Wired)*	90%	<1%	61%	27%	2%
Cellular*	73%	18%	46%	24%	3%

*9% unknown – did not identify

Business cell phone use is not as high in Nelson County as in suburban communities where typically 80% or more subscribe to service. The majority are spending less than $100 per month. End-users provided numerous comments that expressed frustration with poor cellular coverage throughout the County.

Business Voice Communication Methods and Spending							
	% of		Monthly Expenditure				
Voice Service	Internet Subscribers with Service	% Without Service	No Charge	Under $35	$35 to $45	$46 - $100	Over $100
Voice over Internet (VoIP)	4% of Internet subscribers	96%	2%	1%	-	1%	-

The greatest advancement in the use of technology for businesses to date is voice over the Internet (VoIP) phone service. Voice traffic is digitized and transported along with data, greatly reducing per call spending. Incumbent telephone providers realize savings as well, and service is available to businesses from local and national providers. Only 4% of businesses with Internet access have adopted this method of voice service.

Like residential VoIP, service is available in a variety of ways. Service for voice calling using only the Internet and never entering the public switched telephone network (PSTN) is available from national

providers such as Skype. A number of plans are available from this and other providers offering reduced monthly charges for calling plans that include a combination of Internet and PSTN use for voice service. Businesses nationwide are under increasing pressure to reduce monthly spending on voice communication as most are subscribing to mobile (cellular) service in addition to fixed service at the business's physical location. Business adoption of VoIP nationwide is expected to increase exponentially as a method of reducing high communication costs. Service is increasingly becoming available from facilities-based providers offering higher levels of security and support businesses demand. Voice service is not currently available from incumbent DSL or cable service providers in Nelson County.

Interest in purchasing voice and data services from one provider for one 'bundled' package price was tested at various price points. Over one-half of all businesses indicated they would be willing to spend $100 or less per month for two services. By comparison, nearly half of businesses indicate they currently spend less than $30 for Internet access and less than $100 for regular telephone service per month.

In response to the last survey question **"What changes or improvements to communication technology in Nelson County would best meet your needs?"** 65% of the business survey group offered comments. A complete list of the comments is included in the Appendix section of this report. In general, the majority of comments addressed the following issues:

▪ Desire for increased Internet access speeds, more bandwidth needed

▪ "Broadband" access specifically requested

▪ Affordable access options

▪ DSL or cable modem availability to more areas

▪ Better cell phone coverage throughout the County

1.8   Education and Healthcare Use and Unmet Demand

When taking steps to make your community attractive to businesses considering relocation options, family quality of life issues will typically weigh-in equally as important as having the right business climate. In addition to recreation and cultural entertainment attractions, two other major considerations are a community's quality of health care and education.

Education

K-12 schools and higher education institutions are eligible to obtain Internet access through NetworkVirginia at state-negotiated rates with local service providers. The Nelson County school district purchases a partial DS3 (10 Mbps minimum) Internet connection for distance learning and Internet access for the middle and high school. The school board office is connected via T1 with same connectivity to the elementary schools. Bandwidth is allocated between schools on a first come, first served basis. Internal network connections are wired in most schools, with some wireless in use such as for the mobile computer labs. Computers are located in all classrooms and teachers are actively utilizing technology.

The Nelson County School District has been actively investing in and implementing technology over the past few years. A significant technology investment has been made to equip teachers with tools for presentation and instruction for all grades. Teachers are using presentation stations and most recently, small tablet-sized boards to increase their mobility in the classroom. Students have access to computer stations and labs in the classroom. Students attending Nelson County schools today are tomorrow's tech-savvy adults.

Videoconferencing is an optimum use of technology to more adequately allocate teaching time, but uses a greater amount of network bandwidth. Distance learning video programs are available for teachers to use in the classroom, but increased use of these powerful learning tools threaten the availability of precious bandwidth – the School District works constantly to conserve bandwidth shared between all schools. Teachers are ready to utilize additional technology resources for educating students should the bandwidth become available to them. The Nelson County School District could greatly leverage learning opportunities through technology with an increase in bandwidth at affordable rates.

Survey response from the Education sector of the business community represented 5% of the survey group. Most were small businesses providing education services with less than twenty (20) employees; all were using either dial-up or satellite for Internet access. Each indicated high-speed services were not available to them, and dissatisfaction with their current providers. Stating that access to the Internet was critical to their business, all were interested in using wireless as an access option if it were available.

Healthcare

The Blue Ridge Medical Center in Arrington and the Stoney Creek Family Practice in Nellysford are members of The University of Virginia (UVA) Health System serving Nelson County. Currently the

Medical Center uses a T1 connection to the Internet that is adequately meeting their needs. A secure T1 (1.5 Mbps symmetric bandwidth) connection to UVA allows the medical center access to patient records and to utilize telemedicine services.

Healthcare providers represented 5% of the business survey group, and all but one location subscribes to faster than dial-up service. Only the facility using dial-up expressed dissatisfaction with the speed of their connection. A gap exists however, in that doctors do not have universal access from their homes as high-speed service is not available in all areas.

Advanced applications in telemedicine, the ability to view higher resolution radiology images and the adoption of new technology and applications by the medical center and local health providers will require higher bandwidth access to the region. Rural health services provided by mobile workers would be enhanced by wireless access for mobile terminals on site.

Municipal/Public Safety

There are no incorporated towns within Nelson County, and municipal facilities consist of the Courthouse, Planning Department, Tourism Office, Recreation Office, and Registrar. The Courthouse facility is connected to the Planning Department building via leased T1 service; the other facilities are networked wirelessly via a point-to-point line of sight system maintained by the County IT staff. All facilities share the Courthouse T1 (1.5 Mbps) connection for Internet access. The Sheriff's office is connected to Dispatch via fiber installed by the County. Currently the County does not offer the ability to perform government services online beyond downloading building permit forms.

Public safety facilities include the Sheriff's office next to the Courthouse Dispatch Center, and volunteer fire and rescue stations located throughout the County. The only fire and rescue station manned by paid staff is located in the Wintergreen Resort, providing daytime coverage support in the County. Volunteer stations are not connected to the County network. Recent FIPS (Federal Information Processing Standards) requirements for fire incident reporting on a monthly basis have led to stations subscribing to dial-up access for completing reports, and the slow connections are making this task time-consuming and difficult. Most of the stations are not within reach of DSL. Sheriff Deputy's do not have access to mobile data, and must spend time in the office to complete reports. The County has experienced an increase in emergency call volume each year, and mobile access would allow respondents to spend more

time in the field. Additionally, Internet access in vehicles would allow officers to run their own vehicle and warrant checks, relieving Dispatch to attend to emergency calls.

1.9   Gap Analysis

DSL service appears to be unavailable to a large majority of consumers. Customers reporting DSL availability are located in Schuyler (Embarq), Lovingston (Verizon), Nellysford (Verizon), and Wintergreen Resort (Verizon). Market survey results indicate current subscribers are all located within a 2-3 mile radius of the telephone central office, the typical service range and maximum reach of DSL equipment. It does not appear that DSL remote equipment has been deployed that would extend the reach to additional subscribers. While dial-up subscribers are located throughout the entire County, the largest concentrations of dissatisfied dial-up subscribers are located in the areas of Greenfield to Avon, Massies Mill and Roseland, and Adial and Woods Mill.   Numerous comments from both residential and business subscribers indicate a strong demand for DSL service specifically. Of the businesses that are currently subscribing to DSL service, 71% are dissatisfied with their current provider either because of low speed or inadequate service. Residential DSL subscribers appear to be satisfied with service both in speed of connection and customer service.

Businesses requiring higher speed access immediately account for 65% of survey respondents and 81% of all businesses express some level of dissatisfaction with current providers. Although the majority of business users were unsure as to how much bandwidth they are currently receiving, the greatest amount of frustration is attributed to slow speeds and a lack of bandwidth.

Wireless is currently available in only two small areas of the County. Stewart Computer Services has one established service area near the Nelson Center, but is planning future deployments in other areas of the County. Only one resident indicated subscribing to Stewart Wireless for service, and is very satisfied with service and speed. nTelos has a small service area located near Rts. 635 and 151 in the Afton Mountain area. nTelos residential customers are satisfied with service, but business customers state the service is unreliable and too slow to meet their needs. The majority of all residents and businesses are interested in wireless as an access option, even those that state their current connection methods are meeting their needs.

Cable modem access is available only in the Stoney Creek and Wintergreen areas. Cable TV is also available in the Lovingston/Shipman area, but the infrastructure has not been updated to support cable

modem service; however, DSL is available in this area as well and is considered a competitive threat to entry by the local cable provider. The high numbers of satellite subscribers throughout the County provide little incentive for the local cable provider to make networks investments beyond high-density areas. Without assistance in accessing capital, it is unlikely the current cable provider would invest in extending cable infrastructure to reach additional subscribers. Additionally, the cost of cable modem Internet service is typically $40-$45 per month, a tougher sell to dial-up users currently paying $20 per month or less.

Price will be a limiting factor in decisions to purchase higher speed services. Nearly all users of dial-up services are dissatisfied with slow speeds, but most spend at or below $20 per month for service. While most state higher speed services are not available to them, 14.5% stated what high-speed options are available are too expensive. For dial-up users outside of the reach of DSL or cable modem, the options available include satellite, perhaps cellular, or T1 - all options that range in cost from as low as $50 to in excess of $1000 per month. Of those businesses that are dissatisfied with current providers and service, 20% cite price as a reason. Of those businesses citing price dissatisfaction, 75% are currently paying less than $100 per month for service. This indicates significant pressure for new broadband access methods at pricing below current service expenditures.

Schools exhibit the greatest bandwidth needs, primarily to access and distribute distance learning resources among individual schools. Current Internet connections (partial DS3, approximately 10 Mbps throughput) are sufficient at this time for Internet access, but currently bandwidth is being conserved. There are distance learning resources available to the schools that can not be utilized without an increase in bandwidth, but current budgets limit increased spending for higher speeds.

The public library could benefit from access to affordable higher speed services, both for connecting to the main library circulation system in Charlottesville and for Internet access for public computers. The library connects to Charlottesville currently via a T1 frame relay connection, and the bandwidth is strained. Since the library circulation system is accessed through the network connection, staff needs a portion of the bandwidth reserved for their use with the remainder sufficient to support fairly constant use by patrons. Beyond bandwidth for Internet access, the library is in need of updated, faster computers. Current library hours of operation are during normal working hours, with the exception of two nights per week and limited hours on Saturday. The library is not open at all on Sunday. This limits access by

patrons who have no computer or Internet access at home, particularly students who need the access to complete school assignments and job seekers.

1.10   Response mapping

Most respondents to the residential and business surveys provided their physical address for mapping purposes. Addresses were geocoded and using GIS techniques, responses to various survey questions were overlaid onto the County base map.

Figure 5 on the following page identifies the physical location of all residential survey respondents that provided address information, and their type of Internet connection. **Figure 6** identifies the location of business respondents and methods of access. The large numbers of dial-up subscribers are easily identified by the red dots. DSL subscribers (tan dots) are concentrated within the 2-3 mile areas surrounding the telephone central offices near the center of each town.

Figure 7, page 37, identifies residents using the Internet for school or job training (white squares) or to work from home (green squares). All residents and businesses that are dissatisfied with the speed of their current service are represented by black dots.

Figure 8, page 38, depicts the interest in high-speed wireless service by residents and businesses indicating dissatisfaction with current Internet speeds and overall dissatisfaction with the options currently available. Residents and businesses in all parts of the County indicate they are very to somewhat likely to subscribe if service were available. Interestingly, there is a significant amount of wireless interest in the Afton Mountain area where nTelos currently provides service. The business customers of nTelos wireless all stated dissatisfaction due to unreliable service.

**Figure 5: Residential Internet Connections and Survey Responses**

**Figure 6: Business Internet Connections and Survey Responses**

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Figure 6

Survey Responses
Business Internet Connections

Draft

N

0 1 2 4 6
Miles

Business Internet Connections
- Cable modem
- Broadband over powerline
- DSL
- Dial-up
- Satellite or microwave
- T1 line
- Wireless
- No connection/Internet at Home

Business Park
Growth Corridor
Major Employer

Community
Railroad
Stream
Nelson County

SPOTTS | STEVENS | McCOY
Engineers and Consultants
ssmgroup.com

11/02/07

Data source: Nelson County; Survey; SSM

Broadband Study
Community Telecommunications Plans
Nelson County, Virginia

Figure 7

Internet Use and Satisfaction

Legend

Inadequate Current Internet Speed

Internet Use From Home for Work

Internet Use From Home for School/Job Training

Internet Satisfaction
- Dissatisfied, Business
- Dissatisfied, Residential

Business Park
Growth Corridor
Major Employer

- Community
- Railroad
- Stream
- Nelson County

SPOTTS | STEVENS | McCOY
Engineers and Consultants
ssmgroup.com

11/02/07

Data source: Nelson County; Survey; SSM

ICON BROADBAND TECHNOLOGIES

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Figure 8: Wireless Interest

Broadband Study
Community Telecommunications Plans
Nelson County, Virginia

Figure Fig 8

Inadequate Speed, Wireless Interest
and Survey Responses
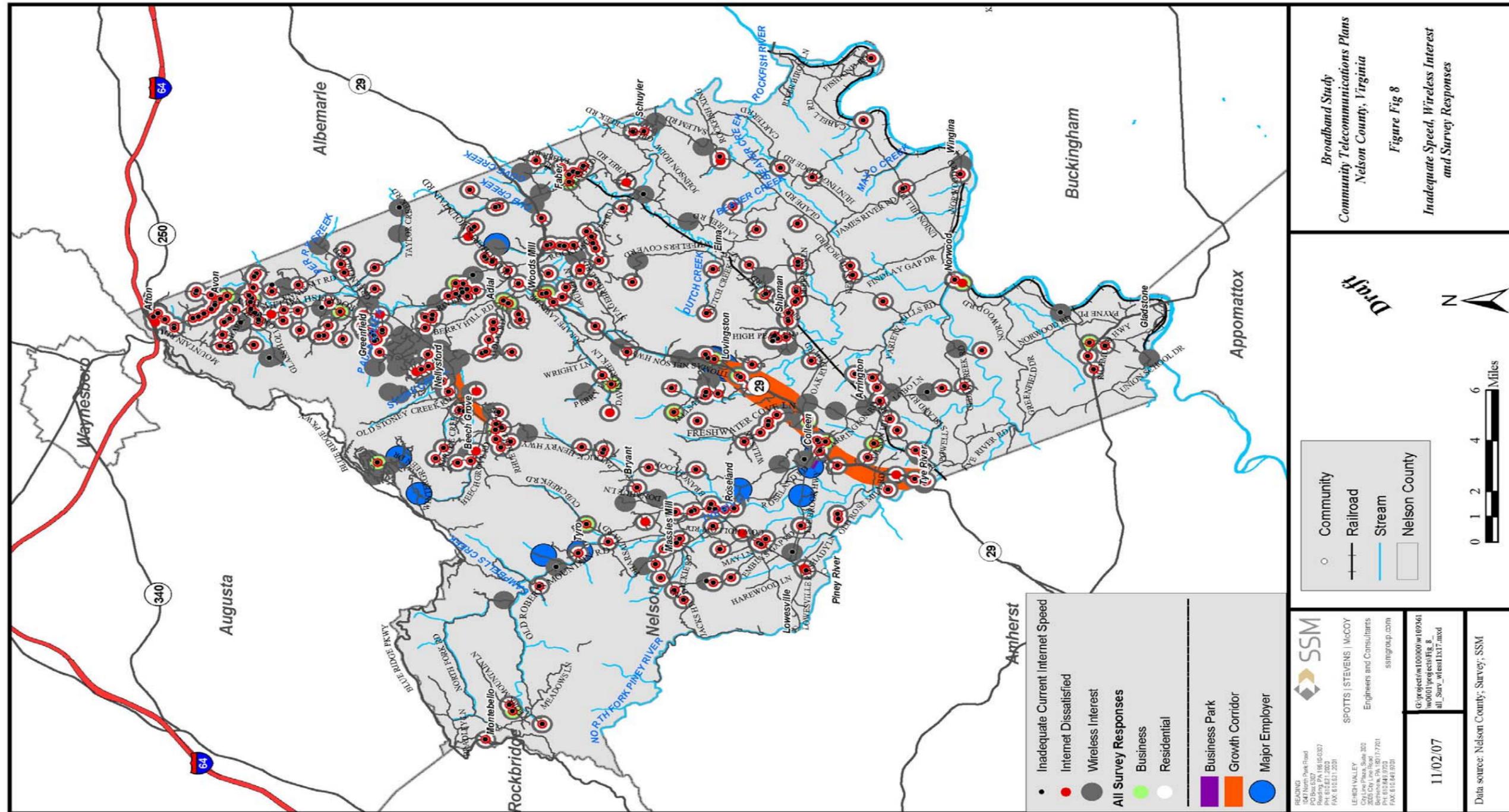
2.0   Broadband Education and Training

2.1   Local Technology Training and Resources

The State of Virginia recognizes the value of reliable, cost-effective high speed communication technology and the resulting impact on economic development and quality of life for Virginia residents. Technology is a focus in all areas of State oversight, and opportunities abound for incorporating technology into the daily lives of citizens. Aside from setting standards for technology use within government, technology training standards are a core education requirement in Virginia public schools. Adults seeking to become proficient in using computers and technology applications have many choices for learning, with flexible programs aimed to reduce potential barriers such as distance, time, and cost.

K-12 Schools

The Standards of Learning (SOL) for Virginia Public Schools include computer/technology as a core standard, with the goal of producing "Technology Literate" students that "possess technology skills that support learning, personal productivity, decision making, and daily life."[6] The skills learned during childhood lay the foundation for continuous learning and encourages adoption of new technologies and applications throughout adulthood.

Computer applications and Internet research are introduced early in grammar school years, integrated in all content areas rather than one specific course. Students are tested at various grades to ensure competency. By the end of grade 5, students should understand computer principles and technology, be able to process, store, retrieve, and send electronic information, and communicate using software. By the end of grade 8, students should become more skilled at communication using computer software, networks, and telecommunications; and practice processing, storing, retrieving, and transmitting electronic information. Throughout high school, students are expected to use technology and computer applications to collaborate with peers, express ideas and present work, perform Internet research, and possess an understanding of basic technology operations and concepts. Upon graduation from high school, students will be prepared to enter college or the workforce skilled at using technology for research, problem-solving, decision-making, and communication.

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[6] *Six-Year Educational Technology Plan for Virginia, 2003-2009; Computer/Technology Standards of Learning*

High school students have additional opportunities for study through State and District-approved online classes. Online classes, completed during students' time outside of normal school hours, allow for college-credit courses (Advanced Placement or AP) to be completed prior to graduation for students that have the aptitude for advanced learning. Additionally, some AP classes are available through traditional classroom instruction.

Students have an additional means of receiving advanced education while completing required high school coursework through an attractive dual-enrollment program. Piedmont Virginia Community College works with the Nelson County school district to offer classes taught at the high school but are college-level courses. Students receive both college credit and credit toward high school graduation when they successfully complete the course.

Teachers have access to online courses at home and through the school district providing instruction on implementing technology into classroom learning. Teachers are proficient in basic computer knowledge and classroom applications, and have been provided technology tools for presenting material to students and measuring comprehension. All teachers have completed basic technology instruction courses and could continue to receive further instruction using online resources. Additional technology training is available to teachers through the Shenandoah Valley Technology Consortium, assisting educators with instructional use of technology. EdTech (Enhancing Education Through Technology) grant funding from the State allows teachers to achieve certification in National Educational Technology Standards for Teachers (NETS*T). These standards promote effective technology integration in the classroom. Mobile labs are available for participating teacher use for a 3 week period. Courses are offered in Harrisonburg, a significant distance from Nelson County.

The school district has invested in computer labs and stations throughout all of the County schools. 21st century learning tools such as presentation stations and wireless tablets are in use by teachers and students. Students will advance to either higher education or directly into the workforce accustomed to using technology daily.

Nelson Academy of Virtual Learning

The Nelson Academy of Virtual Learning offers an alternative to the typical public school learning environment for students in grades K-12. Students are assigned a certified public school teacher to assist and interact with assignments and learning, though no home visits are required. In accordance with normal public school policy, there are no tuition or book fees required. Virtual leaning students need a

computer and Internet access, but high-speed access is not required. Student work is reviewed online by their assigned teacher, with testing for academic and computer proficiency (SOL) as required by State law.

Adult Education

GED classes are offered at the Nelson Center during the day and at the Nelson County High School in the evenings. Classes, materials and pre-testing are free to any adult that has not graduated from high school. Online classes and streaming video is available for those unable to attend traditional classes. The PBS LiteracyLink website[7] offers interactive lessons and activities as part of their Pre-GED and GED Connection program. eLearn Virginia is another online option for adults who wish to work towards GED completion, enhance job skills, or earning a Career Readiness Certificate[8].

Higher Education

Education institutions not only design their academic/vocational programs to meet state and industry wide mandates and certifications, but also many higher institutions offer some degree of customized curriculum and internships or apprenticeships to meet local employer needs. Community colleges located outside of the County in Charlottesville and Lynchburg serve Nelson County's higher education, workforce preparation and business development needs.   Specialized training and certification programs and public/private partnerships for workforce development training through outreach sites are targeted towards industries currently doing business in the County, or identified as target industries for economic development. One objective of such initiatives is to help prevent what is often referred to as "brain drain", the migration of, young people from the area to pursue careers elsewhere. High quality education is a factor along with other quality of life issues influenced by bandwidth availability, considered by young professionals and craftsman when making a decision on where to live and work.

It is common for higher education institutions to make an effort to become integrated with the local community, partnering, to some degree, on mutually beneficial initiatives. The higher education partners work with the local school district, providing opportunities for students to receive academic and technical training to ensure an effective transition from high school to college and/or the workplace.

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[7] http://litlink.ket.org/wesged.aspl

[8] Program details available online at www.crc.virginia.gov

Piedmont Virginia Community College located in Charlottesville is a partner with the County school district providing opportunities for dual enrollment. PVCC works closely with the Nelson County high school and business/industry partners to develop technical preparation (Tech Prep) programs of study that will lead students to high paying/high skill careers. High school students following a Tech Prep career pathway may be eligible to earn credit for work completed in high school under the dual enrollment scenario. The Information Systems Technology program at PVCC provides four associate degrees and seven certificate programs, designed to meet the needs of 1) those seeking a degree with specialization and 2) those seeking to improve their skills and advance themselves in the Information Technology field. Information Systems Technology program courses of study available through LFCC are as follows:

- Computer Science

- Economics

- English (Composition and technical writing)

- Information Technology Design and Database

- Information Technology Essentials

- Information Technology Networking

- Information Technology Programming

- Mathematics

- Student Development (Orientation to the IT professions)

Central Virginia Community College located in Lynchburg is another two-year higher education option for Nelson County residents. Technology programs of study include administrative support technology and electronics technology. Distance learning courses, both credit and non-credit are available for improving job skills. Technology-focused continuing education classes are limited to basic level courses such as introduction to computers and buying/selling on the Internet. Classes that offer certification/re-certification are available through the online continuing education providers Ed2Go, ACT Center, and JER Online.

Several liberal arts colleges are near Nelson County, though technology degree programs are not core areas of study offered. These colleges and the technology areas of study are:

- Sweet Briar College south of Amherst: Computer Science Basics

- Randolph College in Lynchburg: Computer Science Basics

- Liberty University in Lynchburg: Computer Science and Engineering, including Software Engineering

- Lynchburg College in Lynchburg: Computer Science Basics

The University of Virginia in Charlottesville offers the most advanced technology programs in the immediate vicinity of Nelson County. A joint grant opportunity allowed the University's backbone network to be upgraded to a fiber-optic 622 Mbps powerhouse connected to the Internet2 research network. This access enables the University to conduct research on the next-generation of computer networks. The Department of Computer Science and Engineering teaches the design and analysis of computer systems, including both hardware and software aspects and their integration. Extensive Computer Science degrees are available, as well as degrees that combine Science, Technology and Society for advancing human welfare.

There is no higher education satellite facility located in Nelson County. Counties that have a higher education facility located in the community report an increase in the numbers of students transitioning from tech and career prep programs to college, and from two-year to four-year degree programs. Students participating in dual enrollment scenarios are graduating high school with a year or more of college completed. Not only does the student gain the advantage of earning a degree at a faster rate, but overall college tuition expenses are reduced as well. Dual enrollment options increase in the number of students transitioning to higher education.

Distance-learning classes offered through the Virginia Community College System are available through both Central Virginia Community College and Piedmont Virginia Community College. The Virginia Community College System offers an extensive variety of courses available through online access.[9] Distance learning provides the opportunity for students to complete courses not available through traditional instruction at the colleges. Classes are web-based and require independent study. This method requires access to the Internet and basic technology skills such as an understanding of computer fundamentals, web browsing, email use, and use of a word processing application. Nelson County Public School graduates should already possess the technology proficiency necessary for online course completion.

Distance learning is critically important for allowing students to complete degree programs, while remaining close to family and work. When students are forced to leave their communities to pursue higher education, many do not return to apply their knowledge locally. The out-migration of young adults reduces a community's ability to maintain a skilled, 'technology-literate' workforce and attract new businesses to the area. The access to advanced learning opportunities provided by the community higher

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[9] The Virginia Community College Online Resource for Students, http://www.vccs.edu/vccsonline/index.html

education partners enable Nelson County students to get the training and certification they need, while keeping them close to home and saving on education expenses.

Workforce Training and Continuing Education

There are several opportunities for workforce training assistance that is coordinated among the Virginia Department of Labor, the Virginia Community College System, and the Nelson County School District. One aspect is apprenticeship related instruction, designed to train and place skilled labor directly into the workforce. Instruction is based on specific trade areas and the courses are developed in cooperation with industry leaders. Specialized curriculums are designed to meet specific needs within the trade as well as meet local employer needs. Apprenticeship related instruction is planned by working directly with sponsoring employers to develop the appropriate academic, technical and core course work for the apprentices[10].

As part of the Virginia Workforce Network, a Comprehensive Workforce Job Center is located in Charlottesville serving Nelson County. A One-Stop Career Resource Center is located in Lovingston at the Nelson Center. The One-Stop Center assists anyone looking for employment, providing a wide variety of resources. Citizens have access to computers with word processing software and Internet access. Staff assists citizens with job search and resume preparation along with focusing efforts on skill development and retraining needs. The Job Center staff provides assistance with basic computer and Internet use, but does not provide technology training classes.

Piedmont Virginia Community Colleges is a community partner in workforce training. One example of community stakeholders working together is a new pilot program to implement Virginia's Career Readiness Certificate (CRC) program[11]. Virginia's Career Readiness Certificate helps employers by certifying that a recipient possesses core skills in applied math, reading for information, and locating information — skills that are required by at least 85% of all jobs profiled by ACT Workkeys® in the country. This skill assessment will assist individuals in defining what types of jobs they are qualified to apply for, and what additional training is needed to reach higher levels of certification. The Workkeys assessment is recognized by thousands of companies in the U.S. and by state and federal agencies. Upon completion of each level of assessment, the job seeker receives a certificate that assures potential

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[10] Workforce Development Service; see http://system.vccs.edu/workforce/ari/index.htm

[11] Program details available online at www.crc.virginia.gov

employers of his/her qualifications. Additionally, a Skills Bank is available for employers to search for certificate holders in a given zip code or region.

Business Training Resources

The State of Virginia has numerous resources available to businesses for growing and competing digitally. One-on-one assistance is available from regional agencies such as the Virginia Employment Commission and the One-Stop Center in Charlottesville and the satellite One-Stop services at the Nelson Center. Additionally, small/medium businesses and individuals have access to many online resources for e-commerce education and financial assistance through the Virginia Electronic Commerce Technology Center (VECTEC). Another example of Virginia's pro-business focus is the Virginia Department of Business Assistance (VDBA). This department's goal is to connect businesses with the resources they need to meet challenges and realize market opportunities. "Since almost 99% of Virginia businesses are defined as small and they create the majority of new jobs, there is a special emphasis on building the capacity of these bold entrepreneurs."[12] The State maintains a resource directory for businesses at business.virginia.gov. Additional resources for technology education and implementation are available from the Virginia Center for Innovative Technology (CIT). CIT's mission is to accelerate Virginia's next generation of technology and technology companies.

Small Business Development Center

The Central Virginia Small Business Development Center (SBDC) serving Nelson County is located in Charlottesville. The centers offer free counseling services, business planning, seminars and training events, and provides information and other services to new and existing small and medium-sized businesses.   The SBDC is the best resource for aspiring entrepreneurs to gain knowledge on the requirements for going into business, financial management issues, marketing issues and techniques, business plan development and implementation, and the qualifications for obtaining start-up funds. The center also serves the experienced owner who wants to expand a business, solve business problems, do strategic planning, develop new ideas, enter new markets, or access expansion capital. Seminars and appointments with counselors are held at the Center in Charlottesville. Current seminars for businesses include How to Start a Business and Introduction to QuickBooks.   The SBDC also works in concert with SCORE volunteers reaching out to offer experience and advice to new and existing businesses. A new

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[12] Louisa M. Strayhorn, Director, Virginia Department of Business Assistance, *Connecting Businesses with Resources;* http://www.dba.state.va.us/about/default.asp

program of peer advisory groups has recently launched called "Business Advantage Circles". Working groups of non-competing business owners will meet monthly to discuss and resolve issues confronting the business owners. A similar network uniting Nelson County business owners would provide opportunities for experienced business people to mentor to new and existing businesses within the County.

SCORE

The service corps of retired executives (SCORE) is a non-profit association that aims to mentor to aspiring entrepreneurs and foster the growth of new businesses. Retired executive volunteers present low-cost seminars and free business consulting as a resource partner with the Small Business Administration. One particular seminar is aimed at educating businesses on how to market and sell on the Internet. Classes are held in Charlottesville at either the Jefferson-Madison Library or the Chamber of Commerce.

Community Centers

Four community centers are located throughout the County. These buildings were all once schools and as such are located within high-density areas; Fleetwood Center in Massies Mill, Rockfish Valley Center in Afton, Schuyler Center in Schuyler, and the Heritage Center in Lovingston. These Centers are in an optimal position to provide training to both residents and businesses.

The Rockfish Valley Center has seven (7) computers available for public access, but connects to the Internet via satellite so the shared connections are very slow. DSL service is not available to the Center, and the cost of a T1 line is prohibitive. Verizon has refused the Center's request for DSL service, offering a suggestion that the Center to partner with a higher education provider such as PVCC as a training sponsor. If the Center were a satellite education facility, PVCC could apply for a grant for service. In the past the Center has provided training classes through volunteers, but there are no ongoing classes. Patrons of the Center continually request training classes, most specifically in the areas of basic computer troubleshooting and Microsoft Office applications.

The Heritage Center offers basic computer and software instruction to citizens of all ages. Workshops and individual classes are scheduled throughout the year providing instruction on Microsoft Office applications for improving job skills at reasonable cost. The Fleetwood and Schuyler Centers do not offer computer access or training.

Public Library

Citizens without computers or home Internet access and visitors to the County can access the Internet and several applications at no charge through the Nelson County Public Library in Lovingston. As a branch of the Jefferson-Madison Regional Library, this location connects to the main library in Charlottesville to access the circulation system. The J-MRL upgraded the catalog and circulation system to provide state-of-the-art online digital services. The system maintains a virtual library with access to over 35 databases that are accessible in the Nelson County library as well as using remote access. These online databases provide access to newspapers, magazines, and a wide range of electronic resources. These resources are available for free to library patrons.

The Nelson branch provides access to computers and free Internet access. Station access is being used for many functions. These include leisure activities such as surfing the Internet and email, to more critical job-search related functions such as working on resumes, researching job opportunities, and applying for jobs advertised by national databases such as Monster.com. It is a common practice for companies to require job applications be submitted only through an online process. Additionally, many students without computers or the Internet at home are relying on the library for access.

The Internet access connection is shared between public users and staff access to the library circulation system in Charlottesville. The speed and quality of access within the library is subject to several factors: 1) the numbers of users accessing a single Internet connection, 2) the types of applications using the Internet bandwidth, and 3) slow processing capabilities of aging computers.

The library does not provide wireless Internet access to users with wireless-enabled laptops or other devices. While each branch has had inquiries as to this service most commonly from business travelers, the limited bandwidth would be further strained by additional users. The majority of users are reported as regulars, who either do not have a computer at home or have no Internet access and come to the library to read email, online news and magazines, and general Internet searching.

Computer classes are not offered at the library. Space is a limiting factor along with the ability to fund a training position. Those patrons that do inquire about training classes are interested in basic computer and Internet use, with some requests for instruction on how to sell products over the Internet.

The library offers later closing hours on Mondays and Tuesdays, with the rest of the weekday closing at 5:00-5:30 pm. These hours of operation may be insufficient to accommodate working families not arriving home from work until 6:00 pm or later.

Mon	Tues	Weds	Thurs	Fri	Sat
12:30 pm - 8:00 pm	12:30 pm - 8:00 pm	10:00am - 5:30 pm	10:00am - 5:30 pm	10:00 am - 5:00 pm	10:00 am - 2:00 pm

Public Safety Education Resources

APCO (Association of Public Safety Communication Officials) offers extensive training courses for public safety and emergency personnel. Training options consist of traditional instructor-led classes hosted by public safety agencies to online courses and web seminars. Through a partnership with Jacksonville State University and the Institute for Emergency Preparedness, public safety employees can receive certification and degrees without leaving the County. Numerous other training courses are available online through agencies such as FEMA, Department of Homeland Security, US Fire Administration, and the Virginia Department of Emergency Management. To complete online courses, a student need only be skilled with basic computer knowledge to go online and use a web browser such as Internet Explorer. Accessing mission-critical training online seeks to close the preparedness gap between rural and urban public safety entities.

2.2   Current and Future Education/Resource Gaps

Training Classes

There are limited opportunities within the County for acquiring computer and application training. The Heritage Center offers classes for a reasonable materials fee. The library and other community centers report continuing interest expressed by citizens for training on basic computer use, troubleshooting and Microsoft Office applications to improve job skills. The Heritage Community Center is currently the only Center to offer classes on basic computer use and applications. The Rockfish Valley Community Center is in an optimum position to provide training, but must rely on volunteers as they have no funding for training. Seven (7) computers acquired through a grant that are available in a classroom setting. Previous discussions with the PVCC to support classes and instructors indicated low dual enrollment participation at the High School did not warrant establishing a facility within the County. The Center is

eager to support requests for training and to assist with supporting higher education needs as a satellite higher education facility with County support.

Computer Access

Currently, free access to computers and the Internet is available at the Library, Rockfish Valley Community Center, and the Heritage Center. Each location has a limited number of computer stations available, and limited bandwidth shared among users. While there are a percentage of citizens coming to these locations that do not have computers or Internet at home, a greater number use the facility for higher speed access and a more enjoyable and efficient use of online time.

Help Desk Support

Residents and small businesses that consider themselves computer literate and are using the Internet are less inclined to seek training on specific applications, knowing enough to 'get by'. A significant number of both residents and businesses express frustration with service provider customer service. There is a need for a local help desk to provide immediate support for issues that may not require action on the part of service providers. Basic computer troubleshooting and how to determine whether a problem is with software or hardware seem to be the most common questions that need support by more experienced personnel.

Computer Equipment

Income levels vary, and some residents simply cannot afford to purchase computers. While results of the residential market survey show less than 3% of families with children do not have a computer in the home, the library reports many students come there to use computers. For these students, free Internet access at a local library or community center is critical. Dial-up Internet access can be obtained for as little as $9.95 per month if the household receives local telephone service, but the up-front cost of acquiring a computer is prohibitive for many low-income families.

Funding

All local sources contacted for input into this study exhibit an understanding of the necessity of affordable training options and the importance of marketing those options to the community. Nearly all are confined by a lack of available funding resources, but have been successful in leveraging funding for current programs that are meeting identified goals. State and federal grants for technology and workforce development training are currently flowing through higher education partners. The library is

limited in funding to increase space, purchase new computers, and increase bandwidth purchased but acknowledges these are high priorities during budget preparations.

2.3 Broadband Education Development Strategies

Higher Education Learning Opportunities

Communities that have local facilities for higher education and adult continuing education classes typically have a higher percentage of young adults transitioning to college. Community Colleges are critical partners with local schools to provide opportunities, and are eligible for grant funding to assist the community. The lack of a local facility in Nelson County hinders efforts to promote higher education benefits to students and provide affordable and convenient opportunities to improve the community through adult continuing education. The Rockfish Community Center recognizes the need for local training and technology education - the Center has facility space and is interested in assisting the school district and the PVCC with meeting community education needs.

In other communities where the local community college has established a satellite location, the County and incorporated towns have contributed to meet funding needs. The goal of these communities is to provide the skilled labor for businesses that are located there currently or are considering locating to their County. A local facility can focus directly on meeting the training needs of local businesses, keeping more skilled workers and college-educated youth in the community.

Computer Refurbishing and Redistribution

The majority of residents and businesses participating in the end-user surveying process has computers and are using the Internet to some extent. Efforts to develop a technology-literate community should begin very early in the public school system - results of the County needs assessment show less than3% of families with children do not have a computer at home. Computer donation programs that supply refurbished computers to students should be explored, particularly to reach those with younger school aged children for early intervention. Federal computer donation programs should be reviewed[13], and local drives to encourage large employers to donate computers are suggested. Technical students and retired technology professionals are excellent resources for refurbishing donated computers. Microsoft is a partner in computer refurbishing and redistribution, providing license transfer of Windows software and support. Many computer vendors such as Dell encourage equipment recycling and provide support for

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[13] Computers for Learning, EO 12999; http://www.computers.fed.gov/public/aboutProg.asp

redistribution to low-income families and non-profit groups.   The States of Maine, Maryland and California have legislatively recouped funds from computer manufacturers to support recycling programs, keeping dangerous elements out of landfills while putting usable computers into the hands of those that can use them.

Computer Purchase Program

The City of Quincy, Florida was proactive in assisting families with children to purchase computers. The County School District cited telecommunications as a necessary tool for increasing student scores on State mandated competency tests. Working with the Dell Corporation and a local credit union, the City offered a program whereby families could purchase computers and dial-up Internet access.   The NetQuincy purchase program and a Homework Helpline established with the School District enabled parents and students to utilize technology in their own homes.   Subsequent Florida Comprehensive Assessment Tests (FCAT) required for graduation, resulted in high pass rates for students who participated in the City's Homework computer lab, proof that the program was achieving its objective. The City of Quincy is currently implementing a fiber optic network throughout the city limits as technology adoption by residents and businesses has resulted in a need for access at broadband speeds.

Community Intranet

In small communities information is commonly communicated by word-of-mouth, followed by radio and newspaper. While this is typical for small towns in years past, it is insufficient for reaching the masses today. A cohesive means of instilling a sense of community and creating a 'connected community' is the use of a community intranet, or portal whereby residents can easily access community information.   An example is the current Eastern Shore Portal (www.easternshorevirginiaportal.com).   It is critical that information is updated frequently. Citizens should be encouraged to utilize the Community Portal as their start page, where they can get instant news and information. Opportunities for training, seminars and workshops should be prominently featured along with upcoming community events.   Key to the Community Portal's success are links to the school districts, community health providers, online learning sites, and local businesses, enticing users to explore and frequent the site.   In addition, this site should serve as the entrance to Economic Development information vital to those considering the County for a new business location.

The current Nelson County website is a great source of local information. An additional feature that is needed is to include business education resources and to help with expanding e-commerce. Marketing is a critical component of the Community Portal's success – locally and beyond.

e-Government

A large number of residents are turning to the Internet for news; in the past six months, 78% have visited a news website and 65% a state or local government site. This represents an opportunity to promote e-government services to citizens, saving time and increasing productivity. This highlights the opportunity to expand government services online by providing access to forms, online payments when possible, council meeting minutes, and contact information.

e-Commerce

While Nelson County has the advantage of Interstate 29 connecting Charlottesville to Lynchburg, the majority of the County is located a considerable distance from this route, resulting in a low flow of commerce from those 'passing through'. It is critical for County businesses to be proactive in marketing their products and services, and the Internet offers a tremendous opportunity to reach those who may never happen upon their business. A community portal would provide a starting point for businesses to begin advertising online, with additional effort aimed at educating businesses on the value of having their own website with a link from the community portal. Home-based businesses should also be included in the business listings on the portal.   In this manner, the portal itself operates as a business incubator.

Training on Internet Use

The majority of residents and businesses are using the Internet, but not currently realizing the full advantages the Internet offers. There is sufficient interest among both residents and businesses to support training classes on selling goods and services on the Internet.   Training should include hands-on workshops whereby students actually place an item for sale on an online auction such as eBay. Additional training should be aimed at businesses on where and how to market their business online.

Entry level training should be low to no-cost to encourage as many as possible to participate, and to reach as many segments of the population as possible. The Community Centers have classroom space available for training. A critical need is to identify and market Internet resources for online training and job search. In preparation of participating in the Career Readiness Certificate program, residents can complete

training online prior to taking assessment tests at the Job Center. The resources to advance skills and to find employment should be marketed to County citizens.

Lead by Example

Local businesses that have established websites, are conducting commerce via the Internet, and have embraced technology are the perfect spokespersons for educating others on the advantages of technology. Opportunities for business leaders to assist can be organized by the Chamber of Commerce and promoted through economic development workshops and marketed through a Community Portal. Local networking groups provide support for business success, and additional groups should be encouraged throughout the County. Networking groups are becoming popular in many large cities, especially among young business people who have become accustomed to social networking.

Business Investment in Workforce Training

Local businesses that will take an active role in workforce training are eligible for funding assistance from the Virginia Department of Business Assistance through the Worker Retraining Tax Credit program[14]. The Worker Retraining Tax Credit may be claimed by employers who provide qualifying retraining for their employees through noncredit classes approved by the Virginia Department of Business Assistance (VBDA) or through an apprenticeship agreement approved by the Virginia Apprenticeship Council. For qualified employees who attend Virginia community colleges the employer can claim 30% of all training costs. For those employees who attend private schools, the employer may claim the actual costs up to $100 per qualified employee. Qualifying apprenticeship programs may include credit and noncredit classes. Businesses qualify for assistance when the retraining of an employee will promote economic development bringing new income into Virginia, stimulates additional employment, improves existing processes, products or services or is the basis for further economic growth.

Current efforts by public school and higher education workforce training partners to engage local businesses in offering apprenticeship opportunities should include marketing the economic development benefits of employee training, and the financial benefits available to employers.

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[14] Source: http://system.vccs.edu/workforce/WDS/taxcredit.htm   All questions related to the Workforce Retraining Credit should be directed to the Department of Business Assistance wfs@dba.state.va.us or by calling 804-371-8120

The Broadband Experience

Those who are subscribing to a broadband method of Internet access such as DSL could not imagine going back to slow dial-up. Many residents were first introduced to the Internet at the workplace, and adopted Internet access at home primarily for email communication with family and friends. Many moved beyond simple applications such as email, to transferring digital pictures, and now video. As the applications continue to evolve and more information becomes easily accessible, a greater value is placed on the speed of the connection.

Municipalities who have led the way by building fiber optic networks in their communities have made kiosks available for their citizens to see, feel and experience 'broadband'. Community venues include city halls, local shopping mall exhibits, chamber of commerce events, and public works buildings. An additional resource for broadband education is available through Virginia's Center for Innovative Technology (CIT). CIT presents a 'Broadband 101 -Untangling the Wires' seminar aimed at educating businesses on the broadband basics, introducing the efficiencies and applications of broadband, and the basics of security and networking. Similar seminars or exhibitions aimed at residents and home-based businesses would be beneficial in providing examples of the power of the Internet.

Encourage Local Provider Service Marketing

Too many businesses do not understand the value of Internet applications beyond email and research. Overall, 29% are spending in excess of $100 per month for regular phone service, and presumably long-distance accounts for a large portion of that expense. Many commented that phone service is too expensive, yet Voice over Internet service offers an affordable alternative and only 4% of businesses with Internet access are taking advantage of this service today. Conversely, 19% indicated interest in using the Internet for voice service in the future. Too many businesses are unaware of the security feature of using VPN (virtual private network) for remote access to their networks and sensitive information; only 7% are currently using this, and only 15% indicate interest in future use. A larger percentage of businesses (20%) are interested in video conferencing, an application that functions optimally with a broadband connection. All of these applications are available for use today, and Internet providers offer services to support their use. Service providers should tailor marketing of these products towards local businesses, with emphasis on the value these applications can potentially provide to the business.

Many small businesses also use POTS lines for authorizing credit card transactions. At various times there is a long delay waiting for approval. To the extent that this could be done over a broadband

connection, they could save the cost of a phone line while adding a high speed connection usable for other purposes as well as authenticating credit card transactions. Too often the benefit of a service is not realized until it is actually seen. During peak business times, the delays caused waiting for approvals reduce the total business flow. Doubtless other possibilities exist which would increase business productivity and profit at minimal cost. Education is a key to increasing demand.

3.0   Appendices

Appendix A: End-User Surveys

Residential End-User Survey

Nelson County desires to be forward-thinking on behalf of residents, businesses, and those considering a move to Nelson County. Our goal is to lead in developing economic assets for future growth in the County.

A critical component of economic development is state-of-the-art communication technology. High-speed (broadband) Internet access, digital television programming, and affordable options for telephone service are available today in *some* areas of the County.   The Nelson County Office of Economic Development is assisting with a study to determine what services are available in our communities and most importantly, what services citizens desire. This study will be used to develop strategies for bringing those services to our communities.

You have been selected to participate in this study. Spotts, Stevens and McCoy (SSM), a private consulting firm, is conducting this survey as part of the communications study. They will collect these questionnaires and compile the data. Your answers are confidential and will be used in a report only as summaries in which no individual's answers can be identified. Only your street address will be used for geographical planning purposes. Your privacy will be respected. The survey should be completed by a head of the household, 18 years of age or older.

Please lend us *your voice* and take part in this study. We realize your time is valuable and sincerely appreciate your assistance. Please take a few minutes to complete this questionnaire. When finished simply drop it in any mailbox. No return postage is necessary. **Time is of the essence and we ask that you return this survey right away.**   Your opinion DOES matter – improving our communities is everyone's business. Thank you for your support.

Questions? Please call the Nelson County Economic Development office at (434) 263-7015

This survey is also available online at **www.VABroadbandStudy.com**

Residential demographic data is collected for documenting statistics of the survey pool and to comply with state and federal grant guidelines. Your individual responses will not be shared.

1. Please provide your street address for geographical planning purposes only:

Street Address   **Zip Code**

_____   _____

2. What is your age?   ☐ Under 20 ☐ 20-24
☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-59
☐ 50-64 ☐ 55 or Over

3. Do you have children living at home?
☐ Yes ☐ No *If yes, please indicate age groups:*
3a) ☐ Under 5 ☐ 5-17 ☐ 18 or Over

4. Does your household have a personal computer?   ☐ Yes ☐ No

5. Which of the following best describe the type of Internet service you subscribe to at home?
☐ No Internet at home   ☐ DSL
☐ Dial up on telephone line   ☐ Satellite
☐ Broadband over Powerline   ☐ Cellular
☐ Cable Modem   ☐ ISDN
☐ Wireless (from service provider, not home network)

6. What is the name of the company that provides your Internet connection?
_____
☐ Not Sure   ☐ No Internet Access

7. Please rate your current Internet service on the following two items:
       7a) Speed of connection (bandwidth)?
☐ Adequate –meets all my needs
☐ Inadequate –does not meet my needs

       7b) Service and support?
☐ Adequate –meets all my needs
☐ Inadequate –does not meet my needs

8. To the best of your knowledge, how much are you currently paying per month just for Internet access?   ☐ No Internet access   ☐ $41–$60
              ☐ Under $20   ☐ $61–$80
              ☐ $20–$40   ☐ More than $80

9. How important is Internet access to you or your household?
☐ Very Important   ☐ Somewhat Important
☐ Not Important   ☐ No Opinion

10. If you do not subscribe to a high-speed (faster than dial-up) Internet service at home, why not?
☐ Not available in my area
☐ Too expensive
☐ Not interested in this service
☐ Using high-speed elsewhere
☐ Lack of Internet service set-up support
☐ Lack of computer set-up and use support

11. Does anyone in your household use the Internet to work from home?   ☐ Yes   ☐ No
              If yes, please answer the following:
11a) Does your employer utilize a virtual private network (VPN)?   ☐ Yes   ☐ No

12. Does anyone in your household use the Internet to complete school assignments or job training course work?
☐ Yes, at least once per week
☐ Yes, at least once or twice per month
☐ No

13. In the past 6 months, which of the following activities have you performed online?
☐ Searched for travel related info
☐ Searched for health or medical info
☐ Purchased products or services
☐ Sold products or services
☐ Visited a news website
☐ Visited a state or local government website
☐ Searched for info related to school work
☐ Researched a major purchase
☐ Performed a financial transaction with a bank
☐ Communicated with a teacher
☐ Searched for a job
☐ Took an online course
☐ Downloaded or watched video online

14. If affordable **wireless** high-speed Internet access was available in your community, how likely would you be to subscribe to this method of Internet access?
☐ Very likely   ☐ Somewhat likely   ☐ Not likely

15. Do you subscribe to a pay TV service?
☐ Yes, cable   ☐ Yes, satellite
☐ No

16. To the best of your knowledge, how much are you currently paying for cable or satellite TV each month? *Do not include Internet access fees.*
☐ Under $2 ☐ $20-$40   ☐ $41-50
☐ $51-$75 ☐ More than $75 ☐ No Pay TV

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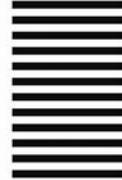
17. Please indicate the phone service(s) you subscribe to <u>and</u> your total monthly expenses for each:

a) Regular telephone service (wired): ☐ Yes ☐ No
☐ Under $35   ☐ $35-$75   ☐ More than $75

b) Cell phone service: ☐ Yes ☐ No
☐ Under $35   ☐ $35-$75   ☐ More than $75

c) Voice over Internet phone service: ☐ Yes ☐ No
☐ No Charge   ☐ Under $35   ☐ $35 or More

18. Thinking about your current communication expenses, how much would you be willing to pay for a combination package of high-speed Internet, telephone and pay TV services?
☐ $85-$100   ☐ $151-$175
☐ $101-$125   ☐ More than $175
☐ $125-$150   ☐ Not Interested

19. Are you satisfied with the current voice, video and Internet services available to you?

Internet: ☐ Satisfied   ☐ Not Satisfied
Video: ☐ Satisfied   ☐ Not Satisfied
Telephone: ☐ Satisfied   ☐ Not Satisfied

Comments—Suggestions
20. What changes or improvements to communication technology in Nelson County would best meet your needs?

_____
_____
_____
_____

Your opinion is very valuable—thank you for your time and support. Individual responses to survey questions are confidential.

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Business End-User Survey

Nelson County desires to be forward-thinking on behalf of residents, businesses, and those considering a move to Nelson County. Our goal is to lead in developing economic assets for future growth in the County.

We know that as a business owner and operator you understand the value and necessity of cost-effective communication options. To ensure the economic health and vitality of our business community, municipal leaders are working to ensure that the services you need are available and competitively priced. The Nelson County Office of Economic Development is assisting with a study to determine what services are available in our communities and most importantly, what services our businesses need. This study will be used to develop strategies for bringing those services to our communities.

We believe it is important to know what communication services your firm requires to grow and prosper. That is why we are asking for **your** assistance in a survey of the communication needs of our business community. Your business has been selected to participate in this survey. Spotts, Stevens and McCoy (SSM), a private consulting firm, is conducting this communications survey. SSM will collect these questionnaires and compile the data. Your answers are confidential. No information will be published by name without your permission and the privacy of your firm will be respected. The survey should be completed by the business owner or the person responsible for purchasing communication services for your business. Only your business address will be used for geographical planning purposes.

Please lend us *your voice* and take part in this business survey. We realize your time is valuable, and sincerely appreciate your assistance. Please take a few minutes to complete this questionnaire. When finished simply drop it in any mailbox. No return postage is necessary. **Time is of the essence, and we ask that you complete and return this survey right away.** Your opinion DOES matter – improving our communities is everyone's business. Thank you for your support.

Questions? Please call the Nelson County Economic Development office at (434) 263-7015
This survey is also available online at **www.VAbroadbandstudy.com**

Business Demographic Data: This data is collected for documenting statistics of the survey pool and to comply with state and federal grant guidelines. Individual responses will not be shared.

1. Please provide your street address for geographical planning purposes only:

Street Address _____ **Zip Code** _____

2. How many employees work at this location?
☐ None ☐ 1-4 ☐ 5-9 ☐ 10-19
☐ 20-49 ☐ 50-99 ☐ 100-249 ☐ 250 or more

3. Which of the following best describes the type of business conducted at this location? *Check one.*
☐ Accounting/Architectural/Engineering
☐ Agricultural/Forestry/Mining
☐ Business and Personal Services
☐ Communication/Technology
☐ Contractor or Construction
☐ Education
☐ Finance/Insurance/Real Estate
☐ Government ☐ Healthcare
☐ Retail Trade ☐ Wholesale Trade
☐ Non-classified: _____

4. What is this location's annual revenue/sales?
☐ Less than $50k ☐ $50k-$500k
☐ $501k+ -$1 million ☐ Over $1 million

5. How many computers at this location have Internet access? ☐ None ☐ 1-5 ☐ 6-10
☐ 11-19 ☐ 20-50 ☐ 51-100 ☐ Over 100

6. How does this location connect to the Internet?
☐ No connection ☐ Satellite or microwave
☐ Dial-up ☐ T1 line
☐ DSL ☐ T3/DS3 line
☐ Cable modem ☐ Broadband over Powerline
☐ ISDN line ☐ Wireless (from service provider)

7. What is the name of the company that provides your Internet/bandwidth connection?
_____
☐ Not Sure ☐ No Internet Access

8. If you do not subscribe to an Internet service or a higher speed Internet service, why not?
☐ Not available ☐ Too expensive
☐ Not reliable or secure ☐ Not interested

9. To the best of your knowledge, how much are you currently paying per month for Internet access?
☐ Under $30 ☐ $30-$50 ☐ $51-$100
☐ $101-$300 ☐ $301-$500 ☐ $501-$1000
☐ $1001-$1500 ☐ Over $1500 ☐ Don't Know

10. What is your current Internet bandwidth or connection speed?
☐ Less than 200Kbps ☐ 200Kbps to 512Kbps
☐ 512+Kbps to 1.5Mbps ☐ 1.5+Mbps to 3Mbps
☐ 3+Mbps to 5Mbps ☐ 5+Mbps to 10Mbps
☐ Greater than 10Mbps ☐ Not Sure

11. How important is Internet/bandwidth access to your business?
☐ Very Important or Critical ☐ Somewhat Important
☐ Not Important

12. Please rate your current Internet service on the following two items:
 a) Speed of Connection (bandwidth)?
☐ Adequate—meets all our needs
☐ Inadequate—does not meet our needs

 b) Service and support?
☐ Adequate—meets all our needs
☐ Inadequate—does not meet our needs

13. How would you describe your overall satisfaction with your current Internet service?
☐ Very Satisfied ☐ Somewhat Dissatisfied
☐ Somewhat Satisfied ☐ Very Dissatisfied

14. What are your reasons for any dissatisfaction with your current Internet service?
☐ Price too high ☐ Problems with Email
☐ Service is unreliable ☐ Poor customer service
☐ Lack of technical support
☐ Connection too slow/not enough bandwidth

15. If an affordable **wireless** high-speed Internet service were available to you, how likely would you be to utilize this access method for your business needs?
☐ Very likely ☐ Somewhat Likely ☐ Not Likely

16. If an affordable high-speed Internet service were available to you, which of the following growth and expansion opportunities would your business most likely consider?
☐ Offer additional services via the Internet
☐ Expand current business
☐ Hire additional employees
☐ Add additional location
☐ Increase advertising/marketing efforts
☐ Other_____

17. Thinking of your current communication expenses, how much would you be willing to pay for a combination package of high-speed Internet and telephone services?
☐ $100 or less ☐ $176-$200
☐ $101-$125 ☐ $200-$299
☐ $125-$150 ☐ $300 or more
☐ $151-$175 ☐ Not Interested

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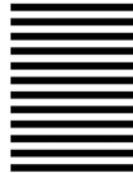
18. For what purpose(s) does this location currently utilize or plan to utilize an Internet connection? *Check all that apply.*

Purpose	Current Use	Future Use	No Interest
Advertising	☐	☐	☐
Communication	☐	☐	☐
Customer service	☐	☐	☐
E-Mail	☐	☐	☐
Hosting your web site	☐	☐	☐
On-line sales	☐	☐	☐
Purchasing materials or services	☐	☐	☐
Research	☐	☐	☐
Voice service	☐	☐	☐
Distance Learning	☐	☐	☐
Telemedicine	☐	☐	☐
Training	☐	☐	☐
Transferring data files	☐	☐	☐
Accounting/Banking	☐	☐	☐
Video-conferencing	☐	☐	☐
VPN connections	☐	☐	☐

19. Please indicate the phone service(s) used at this location _and_ your total monthly expenses for each:

a) Regular telephone service (wired): ☐ Yes ☐ No
☐ Under $100 ☐ $100-$300 ☐ More than $300

b) Cell phone service: ☐ Yes ☐ No
☐ Under $100 ☐ $100-$300 ☐ More than $300

c) Voice over Internet phone service: ☐ Yes ☐ No
☐ No charge ☐ Under $35 ☐ $35-$45
☐ $46-$100 ☐ $101-$300 ☐ Over $300

20. What changes or improvements to communication technology in Nelson County would best meet your needs?
_____
_____
_____

Thank you for your time and support! Please complete and return this survey right away.

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Appendix B: End-User Survey Comments

Residential

Response to Survey Question 20 – Comments/Suggestions

"What changes or improvements to communication technology in Nelson County would best meet your needs?"

1. Having high speed internet throughout the county, regardless of location.
2. Cost effective high speed internet (best possible upload and download capabilities) available area where I live . :-))
3. I want DSL
4. I am in zip code 22971. I have had broad band when i lived in Henrico. I enjoyed the speed of broad band and the dial up is to slow to really be useful.
5. Better cell service, internet connections for broadband, wireless service for internet.
6. Verizon needs to expand DSL, as it is effective and affordable, to the entire county.
7. Satellite internet is too expensive startup and monthly for slower than DSL service. Verizon doesn't have an ETA for DSL arrival here. I have APCO not coop power so not internet there. Terrain would prohibit wireless internet like it does cellphone use. I need DSL. How many years more must I wait?
8. Affordable high-speed connection.
9. Due to the geography of the area, running high speed lines (ie: fiber), could be very expensive. However, an alternative might be wide deployment of wireless internet coverage throughout the county. Now that more people are using laptop computers as their main operating platform, the above suggestion makes even more sense to me.
10. another local phone provider; better cell phone service
11. I need high speed for my work. I would like a less expensive one than I have now.
12. Faster internet, no dial-up
13. Our phone is company phone, so the combo package doesn't apply (phone/internet/TV).
14. high speed wireless (LOS) or cable in rural areas
15. broadband service
16. High-speed internet service should be available in all areas of the county. DSL is in Lovingston and I am only 5 miles from Lovingston but it's not available to me. That's sad!
17. high speed internet at a reasonable price
18. Some kind of affordable high speed internet. Satellite is marginally better than dial-up.
19. It is taking so long (around four years to date) to get either broadband-over-powerline or fiber optic service that I subscribed to dish, so now I don't need either of the others.
20. Needs to be reliable, affordable (not cheap necessarily), and supported.
21. access to broadband internet
22. My household needs DEPENDABLE highspeed internet access. Also, pricing should be "all-in", I am completely disgusted with a never ending stream of add-on fees.

23.   Being able to get on line and not get kicked off, my children being able to use the internet for school and homework and not having to wait minutes or hours to bring up pages needed.

24.   a choice of reasonably priced, market-driven telephone, TV and internet providers

25.   Would like more channels of video, faster Internet, and better cell phone service.

26.   I'm lucky where I am -- clear view of the southern sky for DirecTV and practically next door to Embarq (DSL arrived here about 2 years ago).

27.   higher speed and better reliability in broadband internet service

28.   Would LOVE to see wireless service in all areas of the county!!

29.   DSL would be best... then wireless... cable... Then BPL

30.   Broadband internet is needed.

31.   Better options need to be available for citizen's needs and income levels. BPL over the electric line is okay, but it constantly unstable and not dependable. Often down over the weekends, when a consumer uses the most.

32.   high speed internet, cell phone, home phone and TV bundles

33.   Still looking forward to BPL being available.

34.   A broadband internet service over a wire. The satellite service is too hit or miss during bad weather.

35.   We need DSL or Broadband in all areas. We are behind the times!

36.   Upgrade the cable service to digital cable. I have Nelson Co. Cable and it's just terrible. The reception is pitiful and the choice of stations is very limited.

37.   Better cell phone service (Verizon doesn't have any towers close to me, but I like their national coverage)

38.   Supplied high speed services in my area that are affordable with good customer service. Use in area personnel to supply customer service. Do a poll that involves using local services and personnel to offer a package to the area.

39.   Include Shipman, zip 22971 in your list

40.   I would like high-speed Internet, dial up doesn't do it.

41.   We need high-speed broadband service.

42.   We would like to see broad band in the Afton area other than through a satellite TV service.

43.   Affordable high-speed internet access

44.   Bundle Satellite TV, local/long distance wired, broadband internet, and reliable cellular service

45.   More high speed and wi-fi options in Nelson - I am not satisfied w/Wild Blue.

46.   High speed internet is desperately needed. After two years of suffering through CVEC's BPL intermittent and slow service I can assure you it does not work and will never will become a viable solution. Please consider trying to get wireless, high speed cell, or anything to address this need. Verizon like all the big players in communications could care less about underserved markets and because of deregulation no one will help.

47.   "High-speed Internet via a wired connection (e.g. Broadband over Powerline, DSL, Cable Modem). Failing that, some sort of Wireless Broadband service.

48.   Cable running past my house would be lovely!

49.   On the whole, we are pretty satisfied, though our services are on the expensive side.

50.   Affordable, reliable broadband is DESPERATELY needed. Satellite internet is a very poor option: unreliable, slow, and expensive.

51. High Speed Internet would solve most problems
52. high speed broadband and cable tv
53. Broadband!!!!
54. I REALLY NEED high-speed internet service that is better than satellite. My husband teaches online courses and being unable to access the internet for even short amounts of time is unacceptable. We especially need better options for high-speed internet access in the extremely rural areas. Lovingston and more populated areas already have cable options. That isn't an option where we live.
55. County wide cable
56. Our cell phone service is spotty due to the terrain. More towers might be beneficial.
57. Cell phones don't work well.
58. Faster net speeds
59. affordable high speed internet
60. Packages that are affordable for elderly are needed for phone & cable services.
61. I would like high speed internet to be available in our area. Satellite works okay but it does take a while to load and some sites are not accessible.
62. To be able to combine internet cable to telephone & internet in on bill.
63. Broadband internet
64. Some form of broadband service to our residence
65. TV is not a plus
66. Dial up has gotten increasingly slower. However I spoke to a friend last night & was told their internet service was not all that good by satellite.
67. DSL line, not satellite internet. I could work from home with high speed.
68. Have been hunting for BPL. Satellite is terrible for VPN access. Would prefer high speed cable access.
69. The best solution for me would be 10Mbps data speed without reduction due to system loading (more added subscribers)
70. Wireless internet, better cell phone options
71. I can't get cell service nor high-speed internet service- very frustrating
72. Internet is lacking in our county. We don't have the option of cable and our satellite won't give us our closest local stations.
73. More high speed options like fiber optics
74. Better cell phone service
75. One company that can provide a package of needed products that is affordable
76. Reliable high speed internet service
77. At this time we are relatively satisfied with our communication technology
78. They need to build a mall and some place for children to hang out instead of parking lots. A local swimming pool, bowling alley, movie theater, Walmart, skating rink too.
79. More DSL options
80. Run a construction business-need available service without tying up phone -faster on line without being knocked off!
81. I'm fine now
82. Verizon DSL service-only 4 miles away from substation. However DSL is not available to me...but Wintergreen which is >10 miles has it...Provide to ALL not just $$ people.
83. Higher speed reasonably priced internet service and greater coverage in cell phone coverage

84. high speed access
85. That we would have some high speed internet options through Verizon or somewhere
86. Affordable Internet access ($20 a month or less).
87. higher speed at a more affordable price
88. Broadband over the power lines. REA
89. Choices Higher speed internet access (3Mbps +) Lower cost on everything
90. One vendor for everything
91. Broadband via DSL or cable TV lines (preferred over wireless because of mountainous terrain--even the cell phone will not work here)
92. free wireless internet access
93. Somebody other than the cable company we have now
94. High speed internet would be great and I would likely subscribe if it was available in my area at an affordable price.
95. Please need hi speed internet - dial-up is a disaster!
96. Wireless internet access
97. More DSL availability
98. Hi speed internet!
99. We would love to have high speed, RELIABLE internet
100. High speed internet!!!
101. More cell towers on the mountain (they don't have to be an eyesore) this would improve cell hone service & wireless broadband. Wireless is where the future is. Landlines & cable are fast becoming obsolete!
102. I've been waiting for years to have wireless internet out here!
103. Dial up is to slow. Other options are too expensive
104. High speed internet
105. Faster & more reliable internet service
106. High-speed internet would be a huge help.
107. Better cell reception for all brands of cellphones, less dead spots
108. Reliable, affordable high-speed internet
109. Let us know what is available & cost - if cost will raised & how often
110. Introduce competition! All we have is a monopoly!
111. High speed internet, better cell reception, competition in cable & satellite services
112. Am happy as is
113. High speed internet would be most desired
114. Combo-cable TV Cable phone Cable internet I.E. Cox
115. For Nelson Co to be included in the Charlottesville satellite market. To be able to receive news, weather, traffic et al...to a city 40 miles or less away instead of being in the Roanoke network which is 150 +- miles away. Its weather & news is useless to Nelson County!
116. more options for HIGH SPEED internet connectivity
117. More towers for better cell service
118. Desperately need the expansion of a low-latency >512Kbps service - fiber to extension telco switches (to enable DSL) OR a wireless solution.
119. Broadband Internet thru Powerlines...ASAP!!!!!!!!
120. Need high speed internet to be able to work at home. Can't even consider it in my area. Even satellite access is too slow on the upload.

121. Broadband was available in my area. Expense to have access not over the cost of sat TV, telephone service & AOL that I am now paying.
122. Broadband available
123. Get local news channels - Roanoke if not local. Faster internet and downloading. Too many lost call (cell phone). TV satellite too many lost signals.
124. It is my opinion that all areas within the county should be considered when considering updated technology.
125. High speed telecommunications to the home/office is ESSENTIAL
126. Fiber optics to door
127. Better internet access!!
128. Faster more coverage for internet - more choices for providers for internet & cell phones
129. Wider high speed access 14400 dial up is not enough to do anything really and very frustrating.
130. Affordable, efficient, reliable high speed internet service.
131. via phone lines
132. DSL/High speed internet cable TV/satellite is ok but every time there is inclement weather you have neither.
133. Inexpensive DSL
134. Better TV service less cost TV service less cost phone service
135. T-1 equivalent probably wireless
136. Reliable high speed internet affordable don't need anymore dish companies
137. Access to cable TV in my area especially if internet were available as part of the deal
138. High speed internet-
139. I'm low tech - get along with what I have
140. High speed internet and personal individual channel choices for tv. not packages!
141. County needs to get up to speed with the communications technology that is available. We lag way behind.
142. High speed internet
143. Cell phone tower coverage
144. Good, secure wireless
145. Broadband at affordable prices. Greater programming choices in satellite TV.
146. High speed internet everywhere
147. Broad band
148. Additional choices for cable TV channels would move us to cable TV. When internet goes out, there's currently poor to no responsiveness. Would like 24-7 response when internet (cable) service fails.
149. High speed internet
150. Better cell phone coverage. DSL or any broadband technology that is not weather dependent (satellite)
151. Either high-speed cable or wireless >1.5 mbit/sec down load
152. High speed internet that is available to all and affordable as well as better cell phone service.
153. Availability of high speed digital communications not bundled with TV subscriptions. High speed internet from Verizon would be nice. WIRELESS with all these mountains & trees?
154. Better cell phone signal / reception

155. More competition!
156. Would like high-speed internet
157. More cell phone reception. My cell phone does not get reception in Nellysford.
158. I would like to have high speed
159. Local phone service to all county speed improvement for internet
160. NEEDS to be brought up to modern technology
161. Have satellite service that has Charlottesville stations and improve cable service for lower #channels (c'vill)
162. We need DSL or something similar! We would love to have Vonage, but with dial-up it's impossible.
163. More consistent internet connection with fewer interruptions
164. Remote areas are the areas most likely to have residents working from home-and have the least access to communication - HELP!
165. Inexpensive - or free! - wireless internet service in every household. Can't afford any of them. Thank you for this survey.
166. Internet & T.V. not disrupted by weather choice of phone company!!!! More choice in T.V. channel packages.
167. Nothing
168. Internet from satellite or through phone service Verizon doesn't haven it here even though they're my phone-They want $49 for internet alone if I could get it. That is way too high for the salary I get teaching.
169. Hi speed internet/cable
170. DSL
171. High speed internet access is definitely needed soon!
172. I'd like to not be knocked off the internet when there is a call. I want broadband that is not cost prohibited.
173. High-speed/wireless internet & phone service need be provided to all areas of the county.
174. Hi-speed internet access
175. I loose satellite internet often. I got rid of TV for that reason.
176. We REALLY need affordable high speed internet access!!!
177. HIGH SPEED INTERNET
178. High speed/cable service internet
179. Need cell phone service in Schuyler desperately. Internet over phone lines is adequate.
180. Please help the local electric coop increase their coverage of Nelson County with broadband over electric.
181. Some competition affording a wider array of offerings cable TV channel availability very poor DSL spotty availability Verizon only show in town!
182. I need High speed internet for my home business. Though I use satellite, it is often slow or if overcast does not work at all
183. HIGHSPEED INTERNET SERVICE SHOULD BE PROVIDED THROUGHOUT THE ENTIRE COUNTY, NOT JUST IN CERTAIN AREAS. IT SHOULD BE TREATED THE SAME AS TELEPHONE & ELECTRIC SERVICE.
184. High Speed Internet For $20/mo
185. HIGHSPEED INTERNET WOULD BE AN ASSET TO THE COMMUNITY AND ENABLE PEOPLE TO WORK FROM HOME & SAVE GAS$ & TRANSPORTATION

COSTS. I WOULD LOVE AFFORDABLE INTERNET ACCESS (WIRELESS). THANK YOU.

186. Install fiber optic everywhere
187. BROADBAND & VOIP DEFINATELY A NEED
188. CVEC INTERNET CONNECTION
189. The Combinations Package is a good start
190. HIGHSPEED ASAP WAS TOLD IT WOULD BE AVAILABLE BY 11/06!
191. WE NEED INTERNET (HIGHSPEED) CABLE TV, AND BETTER CELL PHONE RECEPTIONS BADLY!
192. NELSON COUNTY NEEDS TO GET GOING WITH THEIR TV AND INTERNET OVER POWERLINE, OR RISK LOSING BUSINESS. I FEEL LIKE I'VE MOVED TO THE EDGE OF THE EARTH!
193. Broadband or cable svc.
194. OUR NEEDS ARE MET!
195. FEWER INTERRUPTIONS DUE TO STORMS.
196. have cell phone service that will pick up anywhere in Nelson County
197. HIGH SPEED INTERNET ACCESS ASAP DIGITAL SAT.TV EVEN IF SOUTHERN EXPO. IS LIMITED
198. AFFORDABLE CABLE OR SATELLITE SERVICES
199. WE WOULD NOT PAY FOR TV ONLY HS INTERNET.
200. DSL CABLE SERVICE THROUGH TELEPHONE LINE FOR INTERNET
201. UPDATE, IMPROVE, EXPAND ALL- NO CELL SERVICE AT MY HOME SLOW DIAL UP,TV SATELLITE PACKAGES I DON'T 1/2 USE... FREQUENT PHONE PROBLEMS...
202. DIGITAL CABLE WITH HD OR FIAS
203. I am increasingly desperate for an affordable high-speed internet connection
204. I need DSL to work from home with VPN UVA hospital uses. It does not work with Wild Blue.
205. High speed internet, more options for phone system
206. High-speed internet
207. TV cable, high speed internet needs to be available in my area without having to use satellite
208. --cell reception everywhere --TV content is disgraceful (not your problem) --an affordable pkg - phone, TV, DSL
209. What happened to BPL that I "pre" signed up for 3-4 years ago?
210. High speed internet
211. Please bring high speed internet to the Afton area!
212. Want access to Broadband
213. Embarq offers a combination of internet, email and phone service not currently available in our area. I believe this would be more economical for us.
214. High-speed
215. None.
216. Get high speed internet available to all areas- would enable people to run a business from home in Nelson County
217. it would be a easy access to the web and you wouldn't have to wait an half an hour to get on line

218. The ability to get Charlottesville news stations-via TV -very important- we do not know of any pending threats
219. BPL.
220. Broadband internet- reliable, highspeed better cellphone reception local network tv stations (Charlottesville) particularly PBS
221. a combination package of telephone, internet, TV
222. Need more cell phone towers cell phone reception is bad
223. Reliable fast broadband ASAP, please!
224. affordable, efficient highspeed internet, & combination packages of highspeed internet, telephone & pay TV
225. Cellular svc not available at home
226. Highspeed, DSL anything is better than dial up
227. Cable is too high! A combo offer would be great. Also to be able to order just individual channels instead of packages. thanks-
228. To be able to have high speed internet at a reasonable monthly cost. I feel if one area of our county is offered high speed then the whole county should be able to have access to it!
229. More cell phone towers are desperately needed to support business and residences!! No cell coverage in most areas of the county.
230. Need access to broadband at reasonable cost. DSL, wireless etc
231. We need highspeed internet now!!
232. An affordable combination would be wonderful especially for old people like ourselves
233. package if included cell phone cable and regular phone satellite TV faster speed internet connection
234. high speed access
235. Faster internet, having broadband is my biggest concern. I have lost jobs because of the lack of a stable internet connection, along with the speed issue.
236. --One package for all--@ $100/month
237. Fiber optics & cable; we'd be willing to change if the costs were better than what we have now.
238. Cell and internet would help greatly. Very unsatisfied with Internet options.
239. High speed internet!!!
240. Faster internet speed!!
241. Improved TV cable package;(TV guide info, more HDTV, travel, bravo, tcm, national geographic, food TV, military) better reception- most people have to direct TV
242. faster internet service dial up is very slow & sometimes get disconnected
243. offer wired highspeed internet or affordable satellite-based high speed internet
244. DSL
245. We have been waiting to sign up for broadband when it is available in our Afton area
246. better cell phone coverage
247. highspeed internet(DSL) inexpensive TV
248. very important to have some form of DSL
249. high speed internet
250. inexpensive wireless access that is not satellite, which can be purchased at a reasonable price without cable tv & phone service
251. we need Broadband

252. get Charlottesville TV stations on satellite
253. High speed internet at a reasonable cost
254. make TV communication available to local areas vice Lynchburg or Roanoke that is no local in my zip code area
255. Dial up service is to slow. Downloading of videos is impossible. need broadband
256. How many more surveys are going have to do?
257. flexible reliable reasonable costing internet services
258. reliable fiber-DSL would be minimum & waste of money considering technology advances
259. We have been waiting for Broadband. Please Hurry! We feel like we are in the dark ages of communication without it!
260. High speed internet!
261. Affordable wireless highspeed internet access
262. We gave up on your promise of broadband
263. A television you can understand. i cannot get this back on track
264. Internet service and cell phone service-fast and not too expensive.
265. Affordable high speed internet
266. We don't want a computer
267. We need better cell coverage. I am not interested in the Internet or TV - haven't watched TV since 1989.
268. I would like to have DSL and cell phone service in my area.
269. Can't watch video online now with dialup, but would love to!
270. High-speed internet
271. Telephone service for exchange 831- Every call past a 4 mile radius is long distance costs
272. A high speed connection by any means would be a blessing. I am very happy w/DirecTV but not with satellite internet @ the prices they charge.
273. High speed internet is less than 1/2 mile from my house and I can't get it. This need to change! Nelson is falling behind in the technology needs of its residents.
274. As an educator, high speed internet would allow me to do my job better.
275. TV needs to get Charlottesville local channels and high speed internet
276. We need broadband!!!
277. DSL would best serve our needs. Or over powerline.
278. faster DSL cell phone service
279. Need faster response time to police/ems/fire/more people involved in community efforts/seems people have no incentive
280. Broad band internet access 2) Telephone service at a more reasonable cost
281. High speed internet
282. Get us high speed lines so we don't have to dial up
283. DSL internet access, better wireless phone service reception
284. Light fiber to my door
285. Make high speed internet access available. I could work from home and save one day travel to Lynchburg (64 miles round trip) per week.
286. Faster internet service one company for all one number to call for questions/charges/problems friendly service.
287. High speed internet
288. Broadband, high speed, etc. Something more than just dial up.

289. Broadband over power line!
290. County needs broadband internet service as soon as possible. I could do so much more with broadband.
291. Better TV reception to match HDTV sets on market.
292. Affordable high speed internet!!!
293. More affordable high-speed internet. Choice of phone company - Verizon too expensive.
294. If I would have high speed internet I could download faster and work from home!
295. I need high speed internet without high prices. I would prefer satellite service soon!
296. Faster internet. Local TV access. Cellphone service w/local #/Lynchburg local phone/Have Lynchburg # so local dist. to call from home.
297. Faster service & (dial up) connections. Lower rates by combining services.
298. Faster internet service. Satellite video that doesn't go out so often.
299. Broadband
300. Provide high speed (affordable) internet throughout the county.
301. Better cell signal. Access to high speed internet. More cable channels.
302. Cable, high speed internet!
303. Affordable, dependable FAST internet.
304. High speed access is needed especially for work.
305. Hurry up and get with the times!
306. Fix Broadband power lines!
307. Broadband
308. High speed internet that's affordable w/o satellite.
309. Please hurry!
310. Broadband
311. Faster internet with no site restrictions.
312. Faster internet
313. Faster internet
314. High speed internet, cellphone service /reliable / Less expensive TV
315. Video streaming high speed broadband needed
316. Wireless or high-speed internet access or a combination pkg. of internet, telephone, TV although TV is a much lower priority for our household than internet.
317. High speed broadband. 500 kilobytes per second or 4000 kilobits per second.
318. Availability of wired broadband capable of providing phone, internet & cable access.
319. A broadband network that really works. We have cancelled CEVA broadband & gone back to dial-up.
320. Broadband internet services availability.
321. High-speed internet, telephone & satellite TV in one package.
322. Better cell phone use & better internet service.
323. To have combined dish for satellite TV & computer.
324. Broadband wireless for all services
325. Reliable high speed internet at reasonable cost
326. High speed internet
327. Rural areas need fiber optic phone cables, more cellphone towers or better coverage. I would like to have an affordable package which includes all the above mentioned services.
328. Eliminate cell phone dead areas. Internet speed, dependability, affordability.

329.   I am less than a quarter of a mile from Verizon's high speed box and they have no plans to improve service in my area even though the land is mine and I already bundle my direct TV with my phone bill! I was told "all improvements would be in Northern Virginia area."

330.   Access choice for TV cable, internet, and phone service.

331.   High speed internet available @ a reasonable price not some giant cost since my use would be limited -

332.   Provide high speed internet/cable-like TV service. Improved phone service.

333.   High speed internet is the one commodity I really miss since my move to VA.

334.   Development of low-cost wireless internet availability.

335.   Bring Broadband to all areas of the county, not just select areas.

336.   Need Broadband internet service, soon.

337.   Verizon

338.   Available high speed internet satellite that's affordable.

339.   Get the broadband working & keep it up & running so that it's dependable.

340.   Need affordable high speed internet.

341.   Faster internet connection!

342.   Satellite for computer

343.   Lets join the 21st Century

344.   Don't know what options are available

345.   Outlaw telemarketers

346.   Nelson County offers local TV via cable TV only-FCC has missed the mark -our market is not Roanoke & Lynchburg-it is Charlottesville & local valley region have this fixed.

347.   Low cost hi speed would be good.

348.   Anything would be better than dial-up connections

349.   WISP.

350.   Reliable high speed Internet

351.   A system that does not go out based upon weather such as cloud cover, storms, or rain.

352.   High speed Internet

353.   Affordable high speed Internet!!! Choices for phone service.

354.   Cable or broadband not satellite Internet.

355.   We are more interested in updated utilities i.e. water and sewer.

356.   Faster Internet service that would be always accessible

357.   Affordable highspeed Internet or free

358.   Getting DSL in my area

359.   I would be very interested in high speed Internet. If I had to pay for TV to get it I would not subscribe. I look forward to the future.

360.   Clear phone lines. There is constant static on our phones. Sometimes we need to use our cell phones to call because the land line is so bad.

361.   We need some form of high speed internet access - badly.

362.   More and affordable HDTV channels. Fast and affordable internet service.

363.   Chronic interference on phone line makes it difficult to hear at times and causes computer to bump offline frequently.

Business
Response to Survey Question 19 – Comments/Suggestions

"What changes or improvements to communication technology in Nelson County would best meet your needs?"

1. Broadband access across the board for business and residential
2. Either Fiber, Cable, or DSL would be great for an area such as this...not too expensive, compared with the very slow dial up options and satellite options. I have used Cable and DSL in places like Nashville, TN, Stanford, KY, and Morgantown, WV and am spoiled :)
3. We need a redundant backbone. We need high-speed connections to residences; we need to invest in teaching children in the school and classes for "paper generation" adults.
4. Anything faster than dialup
5. Reliable service, not dependent on weather, certainly not IBOE.
6. Broadband access
7. High speed internet
8. High speed internet connection & ability to use cell phone throughout the county -- no dead zones
9. Verizon DSL is very reliable and works great for me
10. Need DSL
11. We need more than one provider-competition should lower the rates overall and force the provider to perform better
12. High speed internet access
13. DSL or H.S. wireless and any phone vendor but Verizon!
14. Reliable Bandwidth!!
15. High speed broadband
16. Higher speed internet service, but for under 30 dollars a month.
17. Better signal - no problems during storms
18. High speed internet access
19. High-speed access
20. High speed internet that is reliable - truly fast & affordable & needs to be protected in thunderstorms
21. High speed connection
22. High speed internet
23. Faster connections
24. High speed internet availability other than satellite. More on-line data from county gov't.
25. I'm lucky to have broadband. Without it my work would be very, very difficult.
26. Reliability and speed of broadband
27. I don't know enough about the technology to say.
28. Make it more affordable so we can invest more in taking care of people.
29. Fiber optics - DSL (Better) T1. Anything above dial-up.
30. Affordable high speed internet
31. DSL - high speed internet and Wi-Fi

32. An affordable high speed service
33. Wireless internet 24/7 service
34. Need high speed internet availability. Now cannot get it in this location except satellite which everyone says doesn't work that well.
35. Reliable high speed internet (affordable)
36. Cheap high speed
37. Reliable - affordable - high speed internet
38. Reliable high-speed internet faster the better
39. Hi speed internet - PLEASE!!
40. Wireless Internet
41. Direct high speed internet access, as opposed to DSL via telephone
42. Broad Band
43. Better cable company since I can not get a satellite signal
44. Reliable, affordable high-speed internet
45. Please! Need high speed internet desperately!
46. I am in favor of county-wide broadband
47. Reliable high speed internet. Satellite is not adequate.
48. High speed internet that is reliable
49. High speed internet allowing me to work from home instead of driving to Charlottesville - currently renting an office there.
50. Fast, cheap internet service
51. High speed internet connection or wireless connection
52. Internet access via DSL in the Faber area
53. More choices of internet service providers. I can get DSL at my office, but not cable. I can get cable at home, but not DSL.
54. Currently we only have one choice and that's Verizon. I would like to have the choice to move to another. I don't like monopolies.
55. DSL or cable broadband. Wi-Fi is suspect since we don't even have reliable cell phone coverage
56. we need competition for internet services which will lower cost and increase quality
57. Reliable fast high-speed internet access- critical
58. Need high speed internet
59. Allow wireless Wi-Fi to accelerate wired solutions later.
60. Anything on cable land line light fiber would be a god send - let's get with the program.
61. High speed internet
62. True high speed (not satellite)
63. It would be a great help to have at least DSL service w/enough servers that it is not hard to connect during peak business hours!
64. Speed
65. High speed Internet! DSL!
66. Clear phone lines. There is constant static on both of our phone lines.
67. Better cell phone reception!

Pg-35. Service Metric: For BIP applicants only, the applicant must provide a description of measurable service metrics and target service level objectives (SLOs) (e.g., the speed with which new service will be established, service availability, and response time for reports of system failure at a residence) that will be provided to the customer, and a description of the approach and methodology for monitoring ongoing service delivery and service quality for the services being employed.

Not Applicable

SERVICE AREA NAME: **Not Applicable – will not be providing other services in addition to Broadband Internet**

	Census Community	Year 1			Year 2			Year 3			Year 4			Year 5		
		Pkg 1	Pkg 2	Other	Pkg1	Pkg 2	Other	Pkg 1	Pkg 2	Other	Pkg 1	Pkg 2	Other	Pkg 1	Pkg 2	Other
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
TOTAL																

Rates:

Package 1: (ex. 150 basic channels / $35)

Package 2:
 (ex. 150 basic channels and Premium / $60)

Other (Specify):

Note: Complete a separate table for each service area. Column headings should be changed to reflect the name of the service package to be offered. Additional columns may be added for each year if more than three packages are offered.

SUBSCRIBER PROJECTION TABLE AND RATE PLANS
VOICE SERVICES

COMPLETE THE CHART BELOW FOR EACH PROPOSED FUNDED SERVICE AREA. FOR ALL OTHER SERVICE AREAS, PLEASE PREPARE A CHART THAT AGGREGATES THIS INFORMATION

SERVICE AREA NAME: **Not Applicable – Not providing other services in addition to Broadband Internet**

	Census Community	Year 1		Year 2		Year 3		Year 4		Year 5	
		Res	Bus	Res	Bus	Res	Bus	Res	Bus	Res	Bus
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
TOTAL											

Rates:
Residential Service:
Business Service:
Other (Specify):

Note: Complete a separate table for each service area.
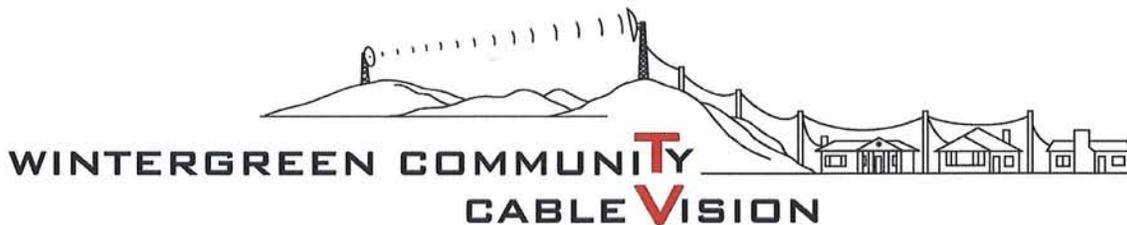
Nelson Cable Inc.
PO Box 395 – 400 Front Street, Lovingston, Virginia 22949
Phone (434) 263-4805 – Fax (434) 263-4821

August 7, 2009

Mr. Stephen A. Carter
Administrator
Nelson County
PO Box 636
Lovingston, VA 22949

Re: Nelson County Middle Mile Fiber Project

Dear Mr. Carter:

Thank you very much for the opportunity to express Nelson Cable's support for your proposed fiber optic cable infrastructure project. As the incumbent cable operator in Nelson County, our firm is a stakeholder in this county's economic future. Nelson Cable has made significant investments in our cable plant over many years to incorporate the additional bandwidth needs of our customers primarily in regards to digital television. Our firm has invested in fiber optics in a limited area of our footprint that contains the density of homes and potential subscribers sufficient to provide a return on our investment. The installation of fiber in this area has allowed us to provide high speed Internet service; our cable plant in the rest of the county is not robust enough to allow two-way communication services to the majority of our current television subscribers.

Our mountainous terrain makes building fiber optic cable infrastructure expensive. Where we can lease or otherwise purchase fiber access without having to build fiber optic cable networks, we can maintain our competitiveness in a prudent cost conscious manner. With the increasing demands of bandwidth for Internet access and digital television services, your proposed fiber infrastructure would provide a conduit for extending our services to subscribers throughout Nelson County. Access to this infrastructure for high speed transport would allow us to upgrade our cable plant and expand services to additional areas as we continue to meet our customers' needs. Most importantly, in this county's mountainous terrain your proposed fiber will provide the vehicle to transport communication signals between the north and south ends of the County.

It is our intent to also utilize towers included in the County's middle mile infrastructure project. We are believe it necessary to deploy WIMAX as a last mile solution because of the low population density. Nelson counties' middle mile project enables us to submit our own ARRA application for this project. A fiber backhaul is needed to insure bandwidth and affordability.

We look forward to continued discussions concerning our needs and culminating in an agreement wherein we can utilize your infrastructure to meet our bandwidth needs within Nelson County.

Sincerely,

Joseph Lee McClellan
President

August 10, 2009

Administrator, Broadband Initiatives Program (BIP)
Rural Utilities Service
U. S. Department of Agriculture
1400 Independence Avenue, SW
Stop 1599
Washington, DC 20250-1599

Dear RUS BIP Administrator:

This letter is written in support of the Application from Nelson County, Virginia, seeking funding
for its broadband fiber program via the American Recovery and Reinvestment Act of 2009 (ARRA).

As a last-mile supplier of broadband services in parts of Nelson County and a current RUS Borrower
under its Broadband Access Loan and Loan Guarantee Program, IBEC currently uses copper-based
T1 middle-mile access technology to deliver broadband content and Internet connectivity to its
residential and business customers. The goal of Nelson County's Application is to make fiber access
available more widely in Nelson County, so that the middle-mile point of presence can move further
toward the end-user and broadband in general becomes more widely available within Nelson
County. As a last-mile service provider, the success of the proposed project would greatly assist
IBEC in delivering the best, highest-speed, and most cost-competitive broadband services possible
to the citizens of rural Nelson County.

IBEC understands the importance of providing broadband access to rural America. Broadband will
enable job creation and retention, educational opportunities, and enhanced rural medicine &
economic development, while in general, improve the quality of life for the citizens that choose to
live and work in rural America. We are proud to be a part of this effort and look forward to utilizing
Nelson County's fiber network to improve our own broadband service offerings and in so doing,
better the lives of Nelson County residents.

IBEC pledges its support of the goals of the ARRA program and wholeheartedly urges your
consideration of Nelson County's Application as it strives to improve the lives of the citizens there.

Sincerely,

Steven E. Turner
Chief Operating Officer

CENTRAL VIRGINIA ELECTRIC COOPERATIVE

11 August 2009

Steve Carter, County Administrator
County of Nelson
P. O. Box 336
Lovingston, VA 22949

Dear Mr. Carter:

Thank you for the opportunity to express our enthusiastic support for the Nelson County Broadband Project application for stimulus funding under the American Recovery and Reinvestment Act. As a rural electric distribution provider serving most of Nelson County, we are acutely aware of the unique challenges that the terrain and small pockets of development create in providing utility services in the county. We are also aware of the tremendous need and desire of county residents to have a broadband option for internet access.

Presently, there is not a viable option for true broadband speed internet access in most areas of the county. Home businesses are challenged to compete, students have limited options for online research and/or classwork, and many businesses are not interested in locating new facilities in the county due to the limitations of internet access. We have regular communication from the 8500 electric accounts we serve in the county requesting that CVEC participate in any project that will provide broadband access.

Nelson County has worked diligently in reviewing options and developing a plan to provide an economical broadband solution for its citizens. Clearly, the county leaders and the county staff have identified this project as crucial to the county for economic development, for educational opportunities, and for improvement to the quality of life in this rural area.

Central Virginia Electric Cooperative participated in the broadband management team process and has actively supported broadband deployment through private sector efforts in Nelson County. Our interest in broadband is based on the needs of today but sits on the very foundation of the cooperative's creation.

CVEC is a not-for-profit rural electric utility that was established by local residents to address the unmet need for rural electrification. The effort to address the unmet need for rural broadband service is a parallel effort to rural electrification that began during the Great Depression. It is the challenge of our generation and the opportunity that will advance our efforts well into the future. Broadband internet access is quickly becoming the necessity of today that central station electricity was in the Depression.

Central Virginia Electric Cooperative stands ready to work with the local leaders in Nelson County on the broadband project. CVEC offers our strongest endorsement for the Nelson County application for broadband deployment funding.

Sincerely,

Gary E. Wood
President and CEO

**BOARD OF
SUPERVISORS**

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Deputy Clerk

DEBRA K. McCANN
Director of Finance and
Human Resources

NELSON COUNTY
1807
VIRGINIA

7 August, 2009

Administrator
Rural Utilities Service
U.S. Department of Agriculture
Washington, D. C. 20250-1500

Assistant Secretary
National Telecommunications and Information Administration
U. S. Department of Commerce
Washington, D.C. 23230

Re: Nelson County, VA Telecommunications Project

Gentlemen:

The Nelson County Board of Supervisors is pleased to submit to your respective offices its applications for ARRA funding for the Nelson County, Virginia Telecommunications Project. The Board authorized and formally endorsed on July 14, 2009 the submission of applications to your agencies to secure funding for this critically important local initiative.

The County's applications are based upon a two-year, three phase planning project that utilized state and local funding to devise a middle mile project that will enable private/public providers to have open access to a fiber optic backbone network the County proposes to complete with ARRA funding assistance.

The project is a priority objective of the Board of Supervisors, as the County's elective officials recognize the very limited access to broadband technologies that are available to the County's businesses and residents. The limited access to high bandwidth services (above 5 Mbps) severely handicaps the County in the areas of economic and community development, including public safety and education. It is imperative that the County secure funding from the ARRA through one or both of your agencies to provide for the implementation of the Nelson County, Virginia Telecommunications Project.

Please accept this communication as the Board of Supervisors complete support of this project and its request for favorable consideration of the County's applications.

Respectfully,

Stephen A. Carter
County Administrator

May 22, 2009

Ms. Maureen A. Kelly
Nelson County Economic Development and Tourism
PO Box 636
Lovingston, VA 22949

Dear Ms. Kelly,

Thank you very much for the opportunity to express the support of the Blue Ridge Medical Center (BRMC) Staff and Board of Directors for the Nelson County Broadband Project. Because high speed internet access is so vital to effective exchange of health care information for our patients, I have been delighted to be part of the advisory group for this effort during months of planning and research. BRMC has over 12,000 active health records, and in 2008 had over 51,000 patient encounters in the medical center, the schools, and the community. We provide affordable access to health care using a sliding fee scale and a number of low-cost and cost free services for underserved residents. BRMC serves at least 7,000 Nelson County low to moderate income individuals.

As a member of the Broadband Committee I have had an opportunity to keep the importance of health care information front and center in the consideration of the development of broadband access in our county. With access to adequate network bandwidth, we have tremendous opportunities to increase communication and information opportunities for our patients through a patient portal system. We could also take much better advantage of the telemedicine opportunities that provide direct connections with healthcare specialists at the University of Virginia. Presently we are using a T1 line which provides us with transmission data rate of 1.5 Mbit/s on the download but presently we can experience only a 10/th of that speed on the upload. Additionally a T1 is geared towards the average use of 60 internet users or less, which we are presently at, leaving no space for growth. To meet the challenges of our growing practice we need a minimum of 44 Mbit/s both download and upload as well as the ability to average at least 100 users at a time . It is our intent to subscribe to fiber optic services delivered over the proposed Nelson County network.

Blue Ridge Medical Center transitioned from paper charts to electronic health records in June, 2007. Using this technology we can send prescriptions directly to pharmacies, transfer information related to referrals for specialty care, and accept information from other providers much more easily and with less risk than ever before. Accuracy, tracking ability, and health outcomes have all improved. HIPAA compliant transfer of information is actually faster, safer, more accurate, and much more cost effective—but has resulted in a dramatic increase in the use of the internet as a tool for communication. This trend can only continue as we see increasing numbers of patients and our communications for and about these patients follows suit. In the process we expect to employ more local residents to help with medical records personnel, more health care professionals, and more experts in information technology. We feel that broadband access is absolutely critical to providing quality health care for the people in the BRMC service area and anticipate the creation of at least 10 jobs over the next 2 years.

I hope the message is clear that high speed internet is an essential component of health information technology, and that improved health outcomes and effective patient flow are dependent upon adequate access in our County.

Thank you very much for your hard work and great committee collaboration as we continue to pursue the goal of an excellent broadband infrastructure in our locale.

Sincerely,

Peggy Whitehead,
Executive Director

CENTRAL
VIRGINIA
ELECTRIC
COOPERATIVE

11 August 2009

Mr. Steve Carter, County Administrator
County of Nelson
P O Box 336
Lovingston, VA 22949

Dear Mr. Carter:

We understand that the Nelson County Broadband Authority would like to install overhead fiber optic cable along our electric distribution lines in Nelson County as part of its project to provide broadband access throughout the county. Central Virginia Electric Cooperative (CVEC) would welcome the opportunity to work with the county on this project to assure successful completion. The need for broadband internet service in the county is critical, and CVEC would like to provide support where possible for the project.

CVEC has developed a standard pole attachment agreement. We have forwarded an electronic version of the document to the county for review. We would like the county to execute that document, which sets out the terms and conditions of the joint use of the poles. We will be glad to assist where possible with modifications or pole replacements where necessary to address clearance issues. We will use our best efforts to minimize the level of work and expense, but we would ask the county to contribute the cost for that work.

The agreement also specifies the annual charges for pole attachment to cover the cost to the shared facilities. We understand that Nelson County is seeking a waiver of the attachment fees for the first five years of the project. A waiver would require approval by our Board of Directors. At their upcoming meeting on Wednesday, 19 August, the CVEC staff will recommend that the Board approve a waiver of the fees for the first five years. We will let you know their decision by 20 August.

Again we look forward to working with the Nelson County and the new Broadband Authority on the project to provide broadband access across the county.

Sincerely,

Gary E. Wood
President and CEO

Nelson County, VA Telecommunications Broadband Middle Mile Network

GPON Passive Optical Network

Voice
Public Switched Telephone Network (PSTN) +

TDM

Class 5 Switch +

Data
Internet and VoIP +

IP

Ethernet Switch

Gig-E

Optical Line Terminal (OLT) *

Video
Video Content Suppliers +

IP

Streaming Video

RF

Optical Amplifier +

Splitter Pedestal

Tower Wireless Access Network #

Business Optical Network Terminals (ONT) +

Residential Optical Network Terminals (ONT) +

Multi-Dwelling Units (MDU) Optical Network Terminals (ONT) +

Last Mile Networks By Private Providers (Except Gov't Facilities and Certain Anchor Tenants ONT and Tower Structure [Not Electronics] See Description in Application)

* Project Component of Application
# Limited Quantity Identified in Application
+ Existing or to be Provided by Others

Map labels

Network Interconnection

Tower Wireless Access Network

Point of Presence (POP)

Core Backbone Node

Public Switched Telephone Network (PSTN)

Network Operation Center (NOC)

Montebello

Point Of Presence (POP)

Server + Server + Server + Server +

Layer 2 Switch +

Firewall

Router +

Layer 2 Switch +

Fiber Converter *

Switch Traffic Shaper +
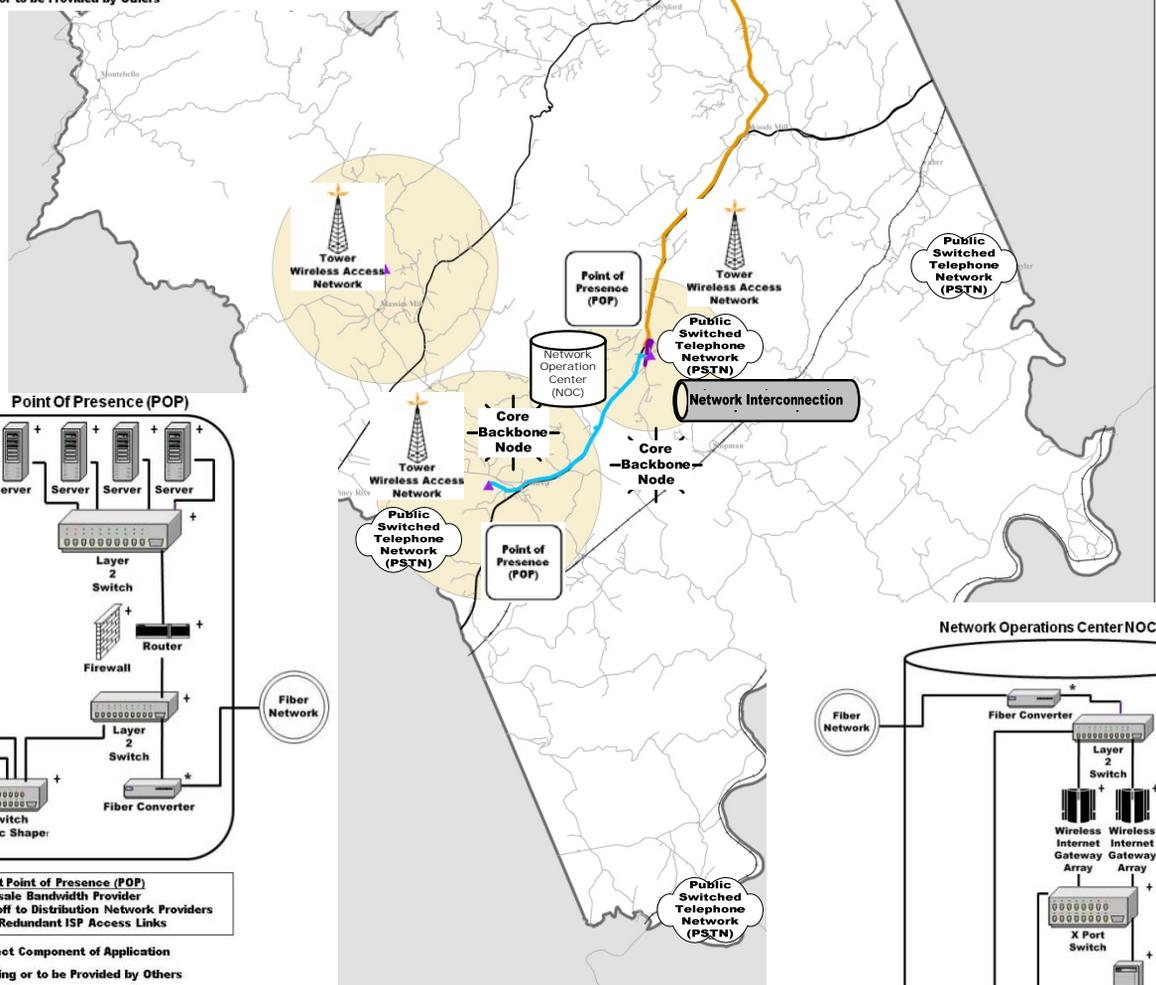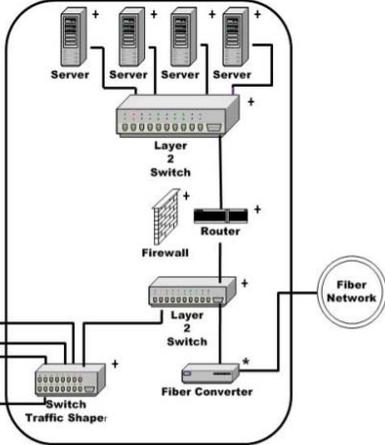
Fiber Network

Internet Point of Presence (POP)
- Wholesale Bandwidth Provider
- Hand-off to Distribution Network Providers
- 100% Redundant ISP Access Links

* Project Component of Application
+ Existing or to be Provided by Others

Legend

▲ Proposed Towers

Proposed Middle Mile Fiber
— Rockfish Elementary to Lovingston
— Lovingston Distribution Fiber
— Rockfish Elementary to Afton
— Lovingston to Colleen
Future Wireless Coverage

Community Broadband Planning
Nelson County, Virginia

Proposed Fiber Routes
and Towers
with Future Wireless Service Areas

Network Operations Center NOC

Fiber Network

Fiber Converter *

Layer 2 Switch +

Wireless Internet Gateway Array +

Wireless Internet Gateway Array +

X Port Switch +

EMS Server +

Firewall +

Router +

Layer 2 Switch +

Fiber Converter +

Server +

ISP / Internet +
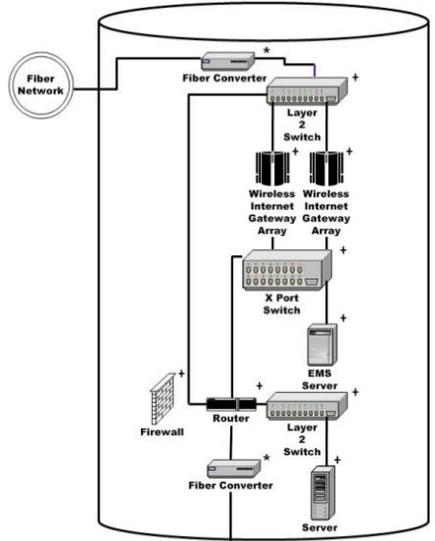
Provider

Network Operating Center
- Network Management and Monitoring
- Dual PSU and Dual Common Control
- UPS
- Diesel Generator Backup

* Project Component of Application
+ Existing or to be Provided by Others

Broadband Infrastructure Application
Submission to RUS (BIP) and NTIA (BTOP)

Certification Requirements BTOP

U.S. Department of Commerce
Broadband Technology Opportunities Program

(i) I certify that I am authorized to submit this grant application on behalf of the eligible entity(ies) listed on this application, that I have examined this application, that all of the information and responses in this application, including certifications, and forms submitted, all of which are part of this grant application, are material representations of fact and true and correct to the best of my knowledge, that the entity(ies) that is requesting grant funding pursuant to this application and any subgrantees and subcontractors will comply with the terms, conditions, purposes, and federal requirements of the grant program; that no kickbacks were paid to anyone; and that a false, fictitious, or fraudulent statements or claims on this application are grounds for denial or termination of a grant award, and/or possible punishment by a fine or imprisonment as provided in 18 U.S.C. § 1001 and civil violations of the False Claims Act.

(ii) I certify that the entity(ies) I represent have and will comply with all applicable federal, state, and local laws, rules, regulations, ordinances, codes, orders and programmatic rules and requirements relating to the project. I acknowledge that failure to do so may result in rejection or deobligation of the grant or loan award. I acknowledge that failure to comply with all federal and program rules could result in civil or criminal prosecution by the appropriate law enforcement authorities.

(iii) If requesting BTOP funding, I certify that the entity(ies) I represent has and will comply with all applicable administrative and federal statutory, regulatory, and policy requirements set forth in the DOC Pre-Award Notification, published in the Federal Register on February 11, 2008 (73 FR 7696), as amended; DOC Financial Assistance Standard Terms and Conditions (Mar. 8, 2009); DOC American Recovery and Reinvestment Act Award Terms (April 9, 2009); and any Special Award Terms and Conditions that are included by the Grants Officer in the award."

6 AUGUST, 2009
(Date)

(Authorized Representative's Signature)

Stephen A. Carter

Name:

County Administrator

Title:

August 10, 2009

Mr. Stephen A. Carter
County Administrator
County of Nelson
PO Box 336
Lovingston, VA 22949

Dear Mr. Carter,

On behalf of the public safety agencies in Nelson County I am writing to express support for the County's broadband initiative.

Advances in technology are rapidly expanding opportunities for the exchange of information that enhances the ability of public safety agencies to fulfill their responsibilities. Access to advanced broadband communications is essential to the public safety community being able to take advantage of these opportunities.

As you know, Nelson County is a rural county with extremely limited access to broadband services. Deployment of broadband services throughout the County will enable public safety agencies to provide detailed data to field personnel that are essential to the efficient and effective delivery of services to citizens. These services will enable law enforcement personnel to access information in the field that would not otherwise be available as well as allow EMS agencies to transmit pre-arrival patient data to hospitals and call data to required agencies. Access to these services is also essential to providing for communications interoperability among public safety and public service organizations.

Advanced broadband communications will greatly enhance communications capabilities and enable public safety and other governmental and service agencies to operate and communicate more effectively in the County.

Sincerely,

Susan Rorrer
Susan Rorrer
Information Systems Director