Broadband Feasibility Study
Completed by Citynet
for
Northern Panhandle
Broadband Network

November 20, 2020

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Mr. Michael J. Paprocki
Executive Director
Brooke Hancock Jefferson
Metropolitan Planning Commission
124 North 4th Street
Steubenville, OH

Dear Mr. Paprocki:

Citynet is pleased to present to you the attached Broadband Feasibility Study, which contains the following information:

- A design of a middle mile network that will bring connectivity to Brooke and Hancock counties
- The identification and total count of each location within each of these counties
- Proposed fiber routes that need to be constructed to enable gigabit broadband service to each of the end users
- A breakdown of the FCC's Rural Digital Opportunity Fund (RDOF) eligible service areas
- Estimated costs associated with the Design, Construction and Provisioning of the Middle Mile and Last Mile fiber routes
- 10 year cash flow pro forma

Because our evaluation of these two counties, Citynet has increased interest in expanding our fiber network into the northern panhandle, and more specifically Brooke and Hancock counties. Citynet is in the process of bidding on the FCC's RDOF reverse auction program as this report is being finalized. We will be in contact with you soon to report of any successes that we have regarding your member counties.

We look forward to being a part of the solution of bringing next generation broadband and telecommunication services to Brooke and Hancock counties.

Sincerely,

James Martin
President and CEO

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Introduction

From the way that we educate our kids to the manner that we deliver healthcare to our citizens, the need for broadband touches almost every facet of our lives. Unfortunately for those living and working in rural America, a digital divide has occurred with the more urban areas where broadband providers can earn a decent return on investment benefitting from companies competing to provide services to the businesses and residents located there. Meanwhile, the people and businesses located in rural areas have been neglected by a one-provider system that functions largely as an unregulated monopoly, or has no service whatsoever. The end result is that the people and businesses located in rural areas often have no choice but to pay the only provider in town hoping that they receive service, but with no recourse when that provider fails them.

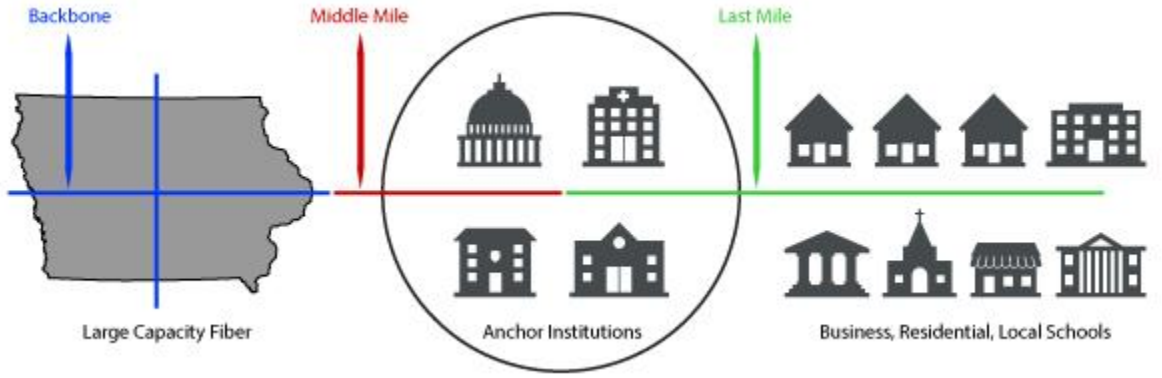
As a result of this divide, the federal government has moved from a thought process of providing funding to one provider (typically the incumbent telephone company), and implemented policies and funding opportunities that will result in competition in these rural markets by subsidizing competitive providers allowing them to access business opportunities that have never before been available. As a result of this change in perspective, over the next five years communities throughout rural America will begin to see the advantages of access to true broadband service on par with the service that is available with the more populated areas of the nation. With the closing of the "Digital Divide", the viability of these communities will be forever changed in a positive manner in so many ways including:

- New Economic Development Opportunities: With access to a true broadband connection, local businesses can connect to millions of consumers in just a few clicks of a button.
- Improved Educational Opportunities: Access to true high speed Internet allows children and adults of all ages to access online programs from elementary school up to college and graduate degrees, as well as continuing education opportunities.
- Access to Healthcare: Rural hospitals and clinics can securely connect to larger medical centers with specialists and more advanced equipment resulting in the availability of better health care service to those living in more rural areas.
- Increased Job Growth Opportunities: Companies looking to grow and expand into new areas place a high importance on the existing infrastructure, including broadband availability, of the communities being considered.

Middle Mile Network

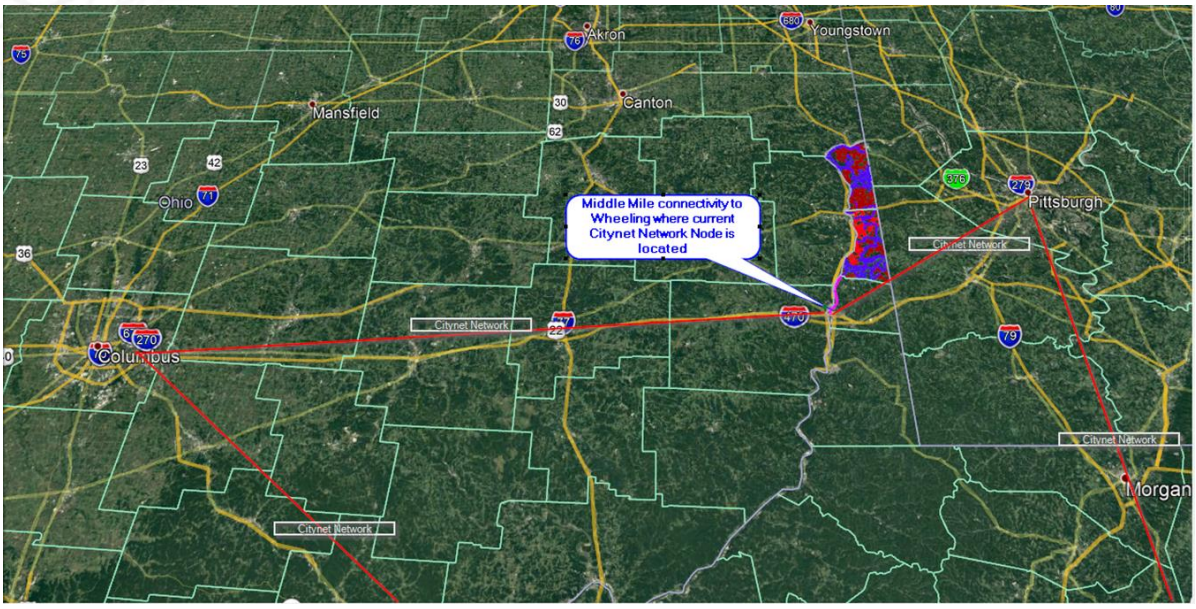
There are three basic components that allow the Internet to function. The first component is the Internet backbone. The core Internet backbone generally runs between and connects the major cities throughout the country. The first challenge that must be addressed in delivering quality broadband service in West Virginia is that the core Internet backbone is not accessible in West Virginia. Therefore, providers must find a way to connect a community to the Internet backbone. This is achieved by investing in a middle mile network that extends the Internet backbone to the community. A middle mile network is defined as "the segment of a telecommunications network linking a network operator's core network to the local network plant." In this instance, Citynet has evaluated the most cost effective way to connect the communities throughout Brooke and Hancock counties to the Internet backbone, which will be discussed later in this report. The last mile network is defined as infrastructure used to connect an ISP's middle mile network to the individual customer. The diagram below illustrates each of these three components of broadband infrastructure.

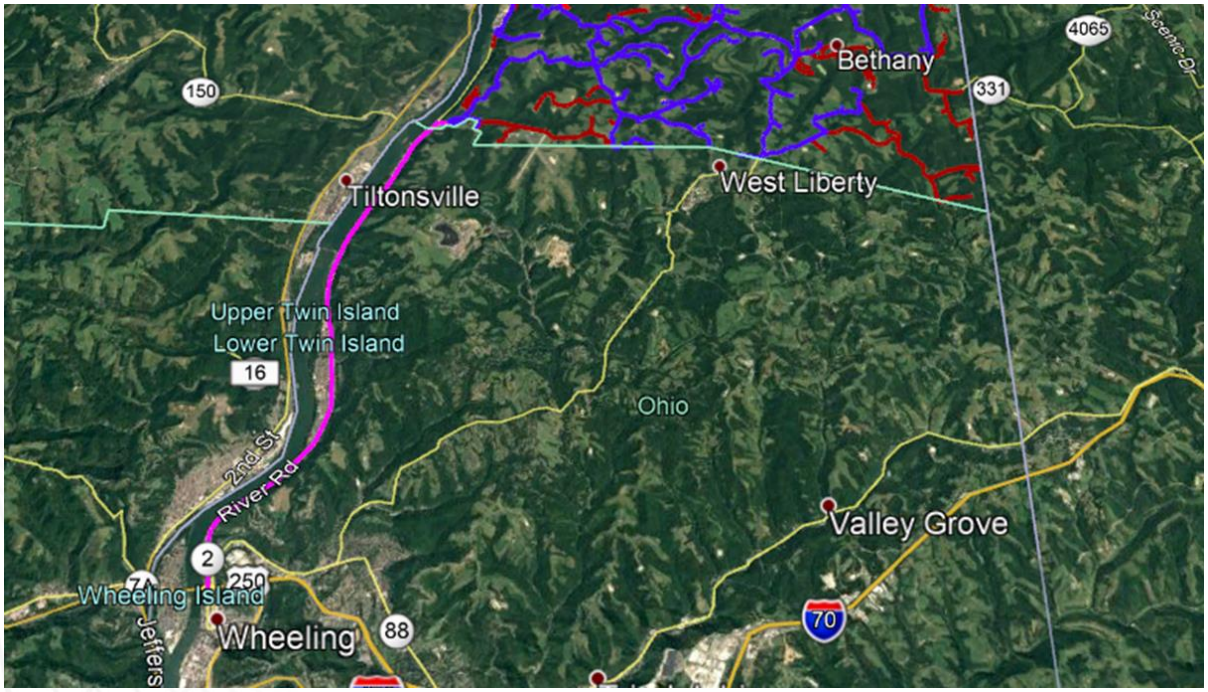
Diagram 1. Internet Backbone, Middle Mile, and Last Mile



As discussed above, the first step Citynet, or another provider, must make in providing broadband service to the residents and businesses in Brooke and Hancock counties is to extend connectivity from the Internet backbone into your communities. Based on the proximity of these counties to access points along the Internet backbone, we have determined that the most cost effective method to bring connectivity to these counties is by connecting to access points in Columbus and Pittsburgh. It is critical that there are two connections extending from the backbone into the desired service area because this provides redundancy to the end users allowing the provider to reroute traffic in and out of these communities in the event there is damage to one of the routes, which would prevent an outage to those customers.

As illustrated in the two maps below, the Middle Mile network designed by Citynet will connect the Southern part of Brooke County to the Citynet Node in Wheeling, WV (9 miles). The middle mile network will traverse the already planned fiber through Brooke and Hancock County. Citynet uses diverse circuits from the Wheeling node to connect to the POPs in Columbus and Pittsburgh for Tier 1 Internet connectivity.





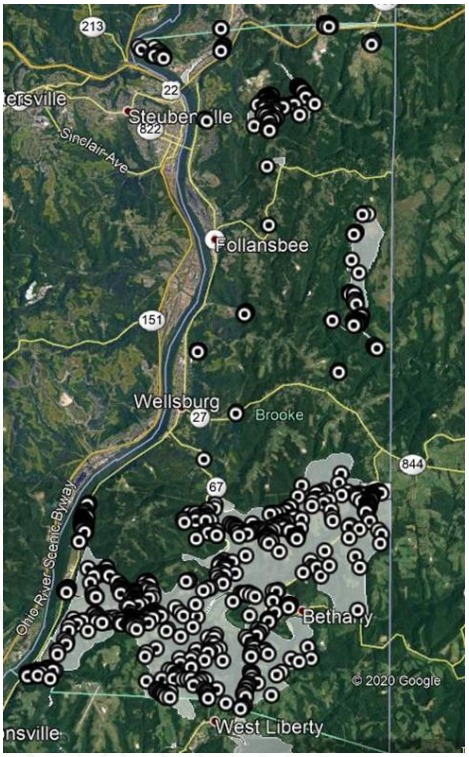
Location of End Users and Fiber Routes

As part of this study, Citynet was contracted to identify each viable location along the proposed fiber route. In order to do so, Citynet worked with the West Virginia State GIS Coordinator to upload the data for every address (commercial and residential) that is included in the State's 911 database. Once each of these locations was "pinned" or identified on the map, we then drew the fiber routes that were necessary to connect each household back to the middle mile network. As previously discussed, this analysis was being conducted just prior to the beginning of a major federal broadband subsidy program being overseen by the Federal Communications Commission. The Rural Digital Opportunity Fund program allows providers to participate in a reverse auction that allows each participant to bid for funding in defined eligible services across the country. The analysis regarding the location of end users and fiber routes will be broken down below by county and by whether or not the locations are included in eligible service areas for this program.

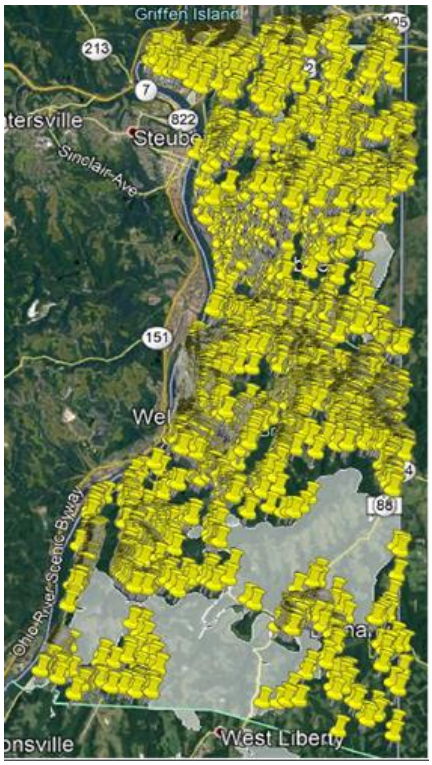
Brooke County

Based on the data generated by the West Virginia Statewide Addressing and Mapping project and provided to Citynet by the State GIS Coordinator, there are a total of 14,974 viable addresses located in Brooke County. Of these 14,109 locations are located outside of the RDOF eligible service areas, and 865 addresses are located in the eligible service areas.

Brooke RDOF Locations MAP



Brooke Non-RDOF Locations Map

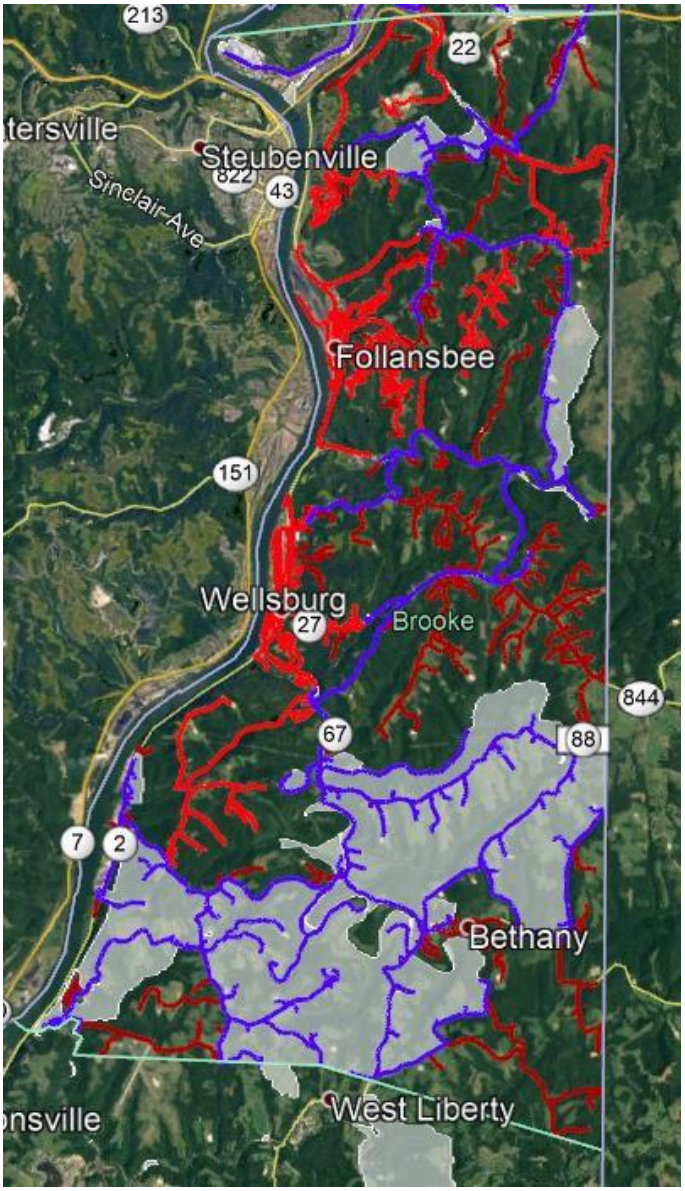


As mentioned earlier, once each of the addresses was uploaded into the kmz file, we then drew fiber routes to connect each of the addresses to the network. By doing so, we can determine an estimated total number of fiber miles needed to provider a Fiber to the Premise (FTTP) solution to provide broadband service to each address.

White Shaded Areas – RDOF Blocks

Red Fiber Routes—Non-RDOF Eligible Service Areas

Purple Fiber Routes—RDOF Eligible Service Areas



Brooke County Fiber Mileage

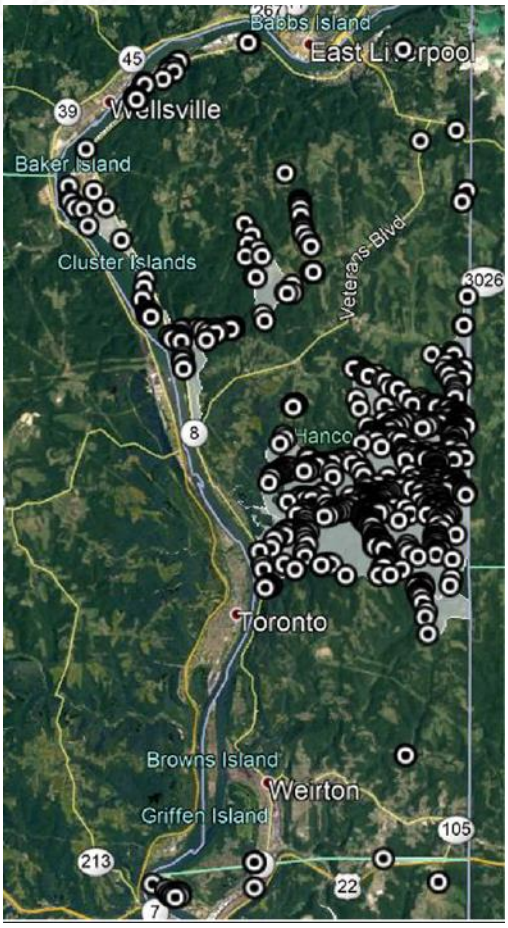
Based upon the fiber routes drawn to connect each of the 865 addresses located inside of the RDOF eligible service areas in Brooke County, the ISP would be required to construct approximately 108 miles of last mile fiber.

Based upon the fiber routes drawn to connect each of the 14,109 addresses located outside of the RDOF eligible service areas in Brooke County, the ISP would be required to construct approximately 179 miles of last mile fiber.

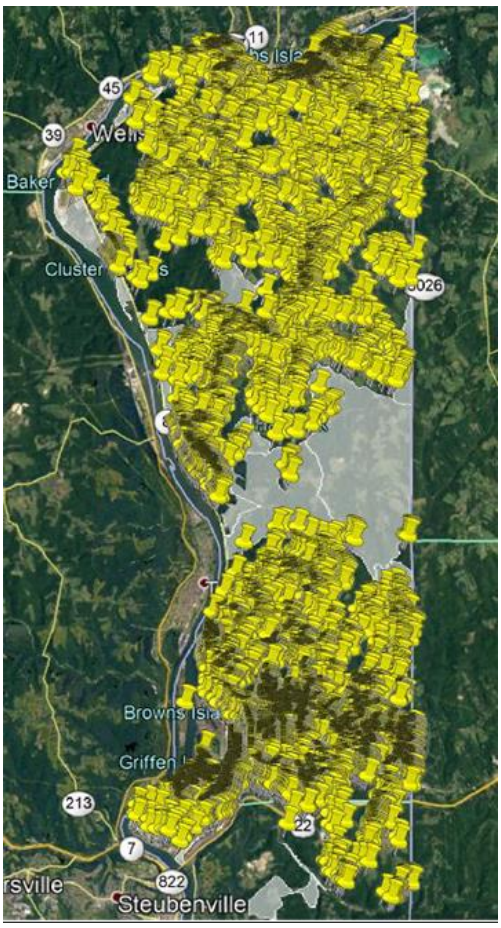
Hancock County

Based on the data generated by the West Virginia Statewide Addressing and Mapping project and provided to Citynet by the State GIS Coordinator, there are a total of 17,177 viable addresses located in Hancock County. Of these 16,469 locations are located outside of the RDOF eligible service areas, and 708 addresses are located in the eligible service areas.

Hancock County RDOF Locations Map



Hancock County Non-RDOF Locations Map

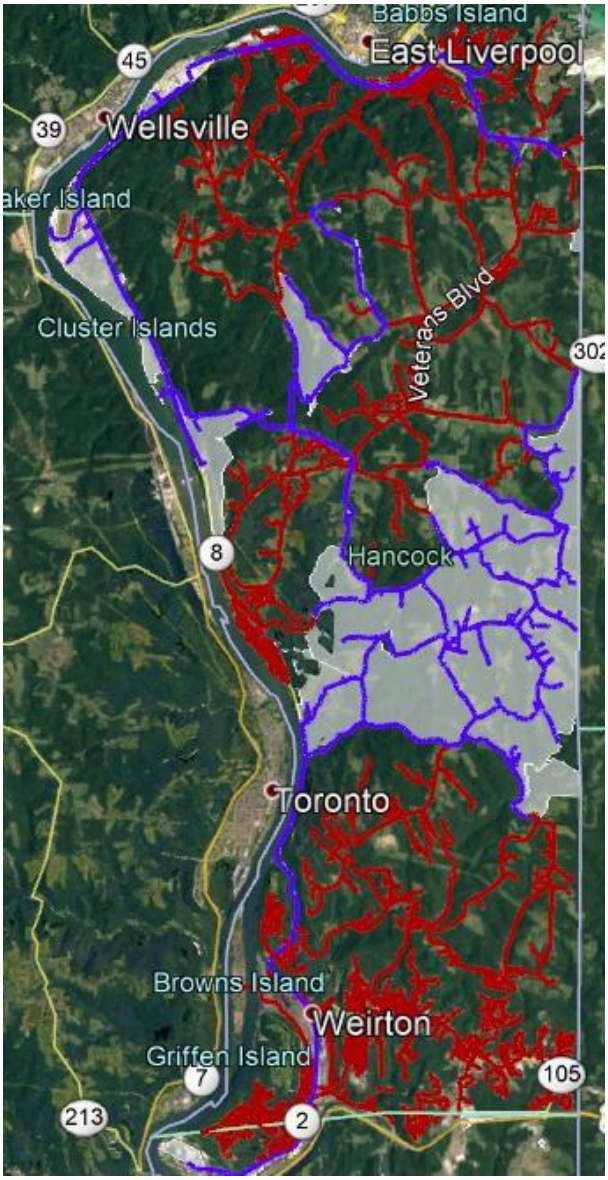


As mentioned earlier, once each of the addresses was uploaded into the kmz file, we then drew fiber routes to connect each of the addresses to the network. By doing so, we can determine an estimated total number of fiber miles needed to provider a Fiber to the Premise (FTTP) solution to provide broadband service to each address.

White Shaded Area – RDOF Blocks

Red Fiber Routes—Non-RDOF Eligible Service Areas

Purple Fiber Routes—RDOF Eligible Service Areas



Hancock County Fiber Mileage

Based upon the fiber routes drawn to connect each of the 708 addresses located inside of the RDOF eligible service areas in Hancock County, the ISP would be required to construct approximately 79 miles of last mile fiber.

Based upon the fiber routes drawn to connect each of the 16,469 addresses located outside of the RDOF eligible service areas in Hancock County, the ISP would be required to construct approximately 254 miles of last mile fiber.

Estimated Costs of Design, Construction, and Provisioning of the Network

Brooke County Fiber Feasibility
Study Cash Flow Proforma

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Total Customers Served	**0**	**420**	**840**	**1,680**	**2,520**	**3,360**	**4,200**	**4,410**	**4,410**	**4,410**	**4,410**
Cash Inflows											
RDOF Support	163,740	163,740	163,740	163,740	163,740	163,740	163,740	163,740	163,740	163,740	1,637,400
Customer Revenue, Net	0	204,750	582,750	1,165,500	1,921,500	2,677,500	3,433,500	3,953,250	3,969,000	3,969,000	21,876,750
Total Cash Inflows	163,740	368,490	746,490	1,329,240	2,085,240	2,841,240	3,597,240	4,116,990	4,132,740	4,132,740	23,514,150
Cash Outflows											
Engineering Costs	876,785	0	0	0	0	0	0	0	0	0	876,785
Construction Costs	2,300,040	4,600,080	2,268,095	0	0	0	0	0	0	0	9,168,215
Network Equipment Costs	500,000	0	0	0	0	0	0	0	0	0	500,000
Customer Acquisition Costs	0	420,000	420,000	840,000	840,000	840,000	840,000	210,000	0	0	4,410,000
Operating Expenses	150,000	199,987	282,434	401,249	561,399	736,244	921,647	1,066,679	1,107,804	1,146,970	6,574,413
Total Uses of Cash	3,826,825	5,220,067	2,970,529	1,241,249	1,401,399	1,576,244	1,761,647	1,276,679	1,107,804	1,146,970	21,529,413
Net Cash Flow	(3,663,085)	(4,851,577)	(2,224,039)	87,991	683,841	1,264,996	1,835,593	2,840,311	3,024,936	2,985,770	**1,984,737**
Cumulative Net Cash Flows	(3,663,085)	(8,514,662)	(10,738,701)	(10,650,710)	(9,966,869)	(8,701,873)	(6,866,280)	(4,025,969)	(1,001,033)	**1,984,737**	

Brooke County Fiber Feasibility Study Assumptions & Summary

	RDOF Area	Non-RDOF Area	Total Combined
Total Projected Annual Customer Revenue, Maximum Take Rate Achieved	**$159,300**	**$3,809,700**	**$3,969,000**
• Service Area Total Customer Potential	591	14,109	14,700
• Customer Take Rate	30%	30%	30%
• Assumed Citynet Customers	177	4,233	4,410
• Average Revenue Per Customer, Net	$75	$75	$75
• Route Miles	108.00	179.00	287.00
• Build Cost, Per Mile	$35,000	$35,000	$35,000
• Total Build Cost	$3,780,000	$6,265,000	$10,045,000
• Acquisition Cost Per Customer	$1,000	$1,000	$1,000
• Total Customer Acquisition Costs	$177,000	$4,233,000	$4,410,000
• POPs	-	1	1
• Cost Per POP	$500,000	$500,000	$500,000
• Total Cost for POPs	$0	$500,000	$500,000
• Total Project Costs	$3,957,000	$10,998,000	$14,955,000
• FCC RDOF Initial Funding	$2,339,140	$0	$2,339,140
• Expected RDOF Actual Support %	70%	0%	70%
• Expected RDOF Actual Funding	$1,637,398	$0	$1,637,398
• Fiber Construction Only RDOF Shortfall	($2,142,602)	($6,265,000)	($8,407,602)
• Total Project Costs Shortfall	($2,319,602)	($10,998,000)	($13,317,602)
• Positive Cash Flow Achieved			Year 4
• Cumulative Positive Cash Flow Achieved			Year 10

Hancock County Fiber Feasibility Study
Cash Flow Proforma

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Total Customers Served	**0**	**420**	**840**	**1,680**	**2,520**	**3,360**	**4,200**	**5,040**	**5,138**	**5,138**	**5,138**
Cash Inflows											
RDOF Support	108,408	108,408	108,408	108,408	108,408	108,408	108,408	108,408	108,408	108,408	1,084,080
Customer Revenue, Net	0	204,750	582,750	1,165,500	1,921,500	2,677,500	3,433,500	4,189,500	4,622,100	4,624,200	23,421,300
Total Cash Inflows	108,408	313,158	691,158	1,273,908	2,029,908	2,785,908	3,541,908	4,297,908	4,730,508	4,732,608	24,505,380
Cash Outflows											
Engineering Costs	1,017,315	0	0	0	0	0	0	0	0	0	1,017,315
Construction Costs	2,300,040	4,600,080	3,737,565	0	0	0	0	0	0	0	10,637,685
Network Equipment Costs	500,000	0	0	0	0	0	0	0	0	0	500,000
Customer Acquisition Costs	0	420,000	420,000	840,000	840,000	840,000	840,000	840,000	98,000	0	5,138,000
Operating Expenses	150,000	199,987	282,434	401,249	561,399	736,244	921,647	1,118,147	1,253,628	1,297,891	6,922,626
Total Uses of Cash	3,967,355	5,220,067	4,439,999	1,241,249	1,401,399	1,576,244	1,761,647	1,958,147	1,351,628	1,297,891	24,215,626
Net Cash Flow	(3,858,947)	(4,906,909)	(3,748,841)	32,659	628,509	1,209,664	1,780,261	2,339,761	3,378,880	3,434,717	**289,754**
Cumulative Net Cash Flows	(3,858,947)	(8,765,856)	(12,514,697)	(12,482,038)	(11,853,529)	(10,643,865)	(8,863,604)	(6,523,843)	(3,144,963)	**289,754**	

Hancock County Fiber Feasibility Study Assumptions & Summary

	RDOF Area	Non-RDOF Area	Total Combined
Total Projected Annual Customer Revenue, Maximum Take Rate Achieved	**$177,300**	**$4,446,900**	**$4,624,200**
• Service Area Total Customer Potential	657	16,469	17,126
• Customer Take Rate	30%	30%	30%
• Assumed Citynet Customers	197	4,941	5,138
• Average Revenue Per Customer, Net	$75	$75	$75
• Route Miles	79.00	254.00	333.00
• Build Cost, Per Mile	$35,000	$35,000	$35,000
• Total Build Cost	$2,765,000	$8,890,000	$11,655,000
• Acquisition Cost Per Customer	$1,000	$1,000	$1,000
• Total Customer Acquisition Costs	$197,000	$4,941,000	$5,138,000
• POPs	-	1	1
• Cost Per POP	$500,000	$500,000	$500,000
• Total Cost for POPs	$0	$500,000	$500,000
• Total Project Costs	$2,962,000	$14,331,000	$17,293,000
• FCC RDOF Initial Funding	$1,548,680	$0	$1,548,680
• Expected RDOF Actual Support %	70%	0%	70%
• Expected RDOF Actual Funding	$1,084,076	$0	$1,084,076
• Fiber Construction Only RDOF Shortfall	($1,680,924)	($8,890,000)	($10,570,924)
• Total Project Costs Shortfall	($1,877,924)	($14,331,000)	($16,208,924)
• Positive Cash Flow Achieved			Year 4
• Cumulative Positive Cash Flow Achieved			Year 10