Westport Island

The Westport Island Broadband Committee has already done significant work considering their options for better internet connectivity. Working to partner with Spectrum (Charter Communications) to expand their operational footprint was unfortunately delayed when the required data from Spectrum was not supplied in timely manner and the deadline for a ConnectME grant was missed. Given the significant work of the Committee to engage Spectrum, another attempt seems prudent, especially given that the information needed is in hand and can be used to complete the grant application well in advance.

However, since that first attempt to engage Spectrum, a growing interest to invest in fiber optics system that would cover the whole community with world-class speed and reliability has emerged as a potential option. This approach would solve the situation in areas not covered by Spectrum, while bringing an alternative service and choice to residents. Axiom has created a fiber optic construction budget that would cover every home with accompanying operations revenue and expense modeling, to help the town make a decision about their approach moving forward: Spectrum expansion or a new fiber optic installation.

Spectrum Plan

CHARTER WESTPORT ISLAND, ME SERVED STREETS

Legend
— TWC Served Streets
— Streets
▢ Municipal Boundary

Spectrum service covers the majority of homes in the community, in the most densely populated areas, while leaving a good amount of the island unserved or underserved by Consolidated Communications. It seems unlikely that Spectrum would consider a large expansion into areas that they themselves have determined to be unprofitable. However, if the town were able to secure a significant subsidy to cover the majority of the community, this might heighten the interest of Spectrum.
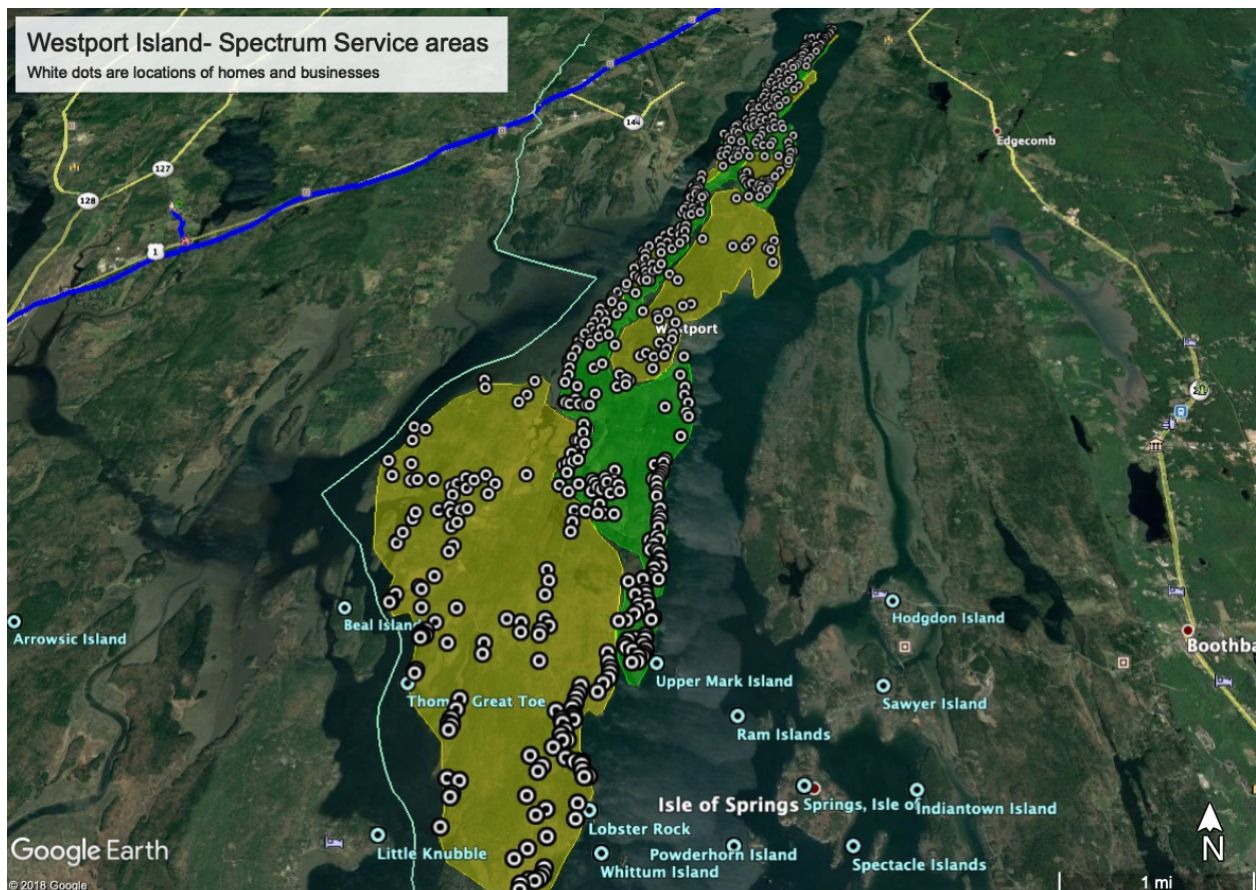
Green areas= currently covered by Spectrum
Yellow areas= No Spectrum service

Working with Spectrum to price out the areas currently unserved by Spectrum to help the Broadband Committee and Select Board better understand the cost and size of the problem would help determine how much subsidy would be required to build out cable service to every home. This could them be compared to the cost of creating a municipally owned fiber optic system.

Fiber Optic Plan

Expanding Spectrum service is a good option, but communities can be uncomfortable investing in privately owned infrastructure. In addition, Spectrum service, while superior to Consolidated Communications DSL or satellite service still brings limitations and can be frustratingly unreliable at times. Spectrum's delivery system gets taxed at high use times during the evening, and users often experience degraded service during those times. The Westport Broadband committee recognizes

these limitations and has asked that Axiom put together a plan to bring world-class fiber optics to the community. The intention of this section is not just to price out the cost of constructing such a system, but to also work through a model that would have the revenue generated by subscribers to the new system cover the cost of a bond or low-interest low that the municipality would back. The vision would be that any new system installation would not be taxpayer funded. When there is a market failure, and the private sector fails to provide the demanded service, many towns are increasingly taking matters into their own hands. Across Maine, a handful of communities have installed their own systems and contracted with an ISP to operate the publically owned system. The Institute for Social Self-Reliance has many examples of successful broadband initiatives across the United States as well as resources that can help guide community thinking. They have a Community Broadband Network page located at: https://ilsr.org/broadband/.

The Fiber system we propose would provide:

- Equal Access to All- no matter where you live on Westport Island your home would have access to the same speeds and reliability as any other resident
- Lightning Fast Speed & State of the Art Reliability- The system would be built to withstand fluctuations in demand, would be capable of delivering up to a Gigabyte (1000Mbps) to each premise and use the most reliable technology on the market
- Symmetrical Service- A fiber optic system allows for same download and upload speeds
- Futureproof- This technology would allow Westport to never fall behind again, with little to no upgrades to the system over the next 20 plus years

Fiber optic cable path
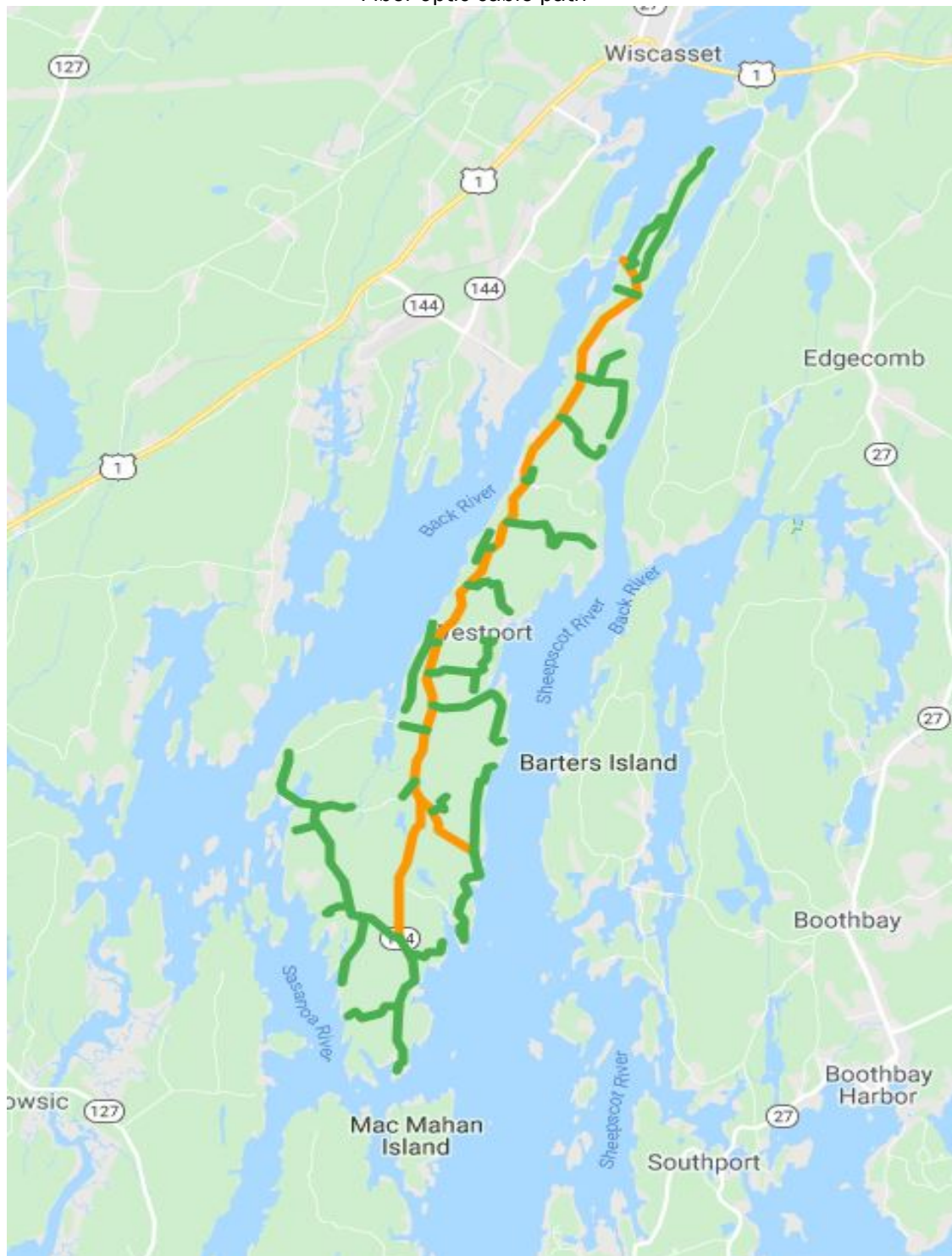
Orange= High Count trunk fiber
Green= Lower Count drop fiber

Fiber path with homes
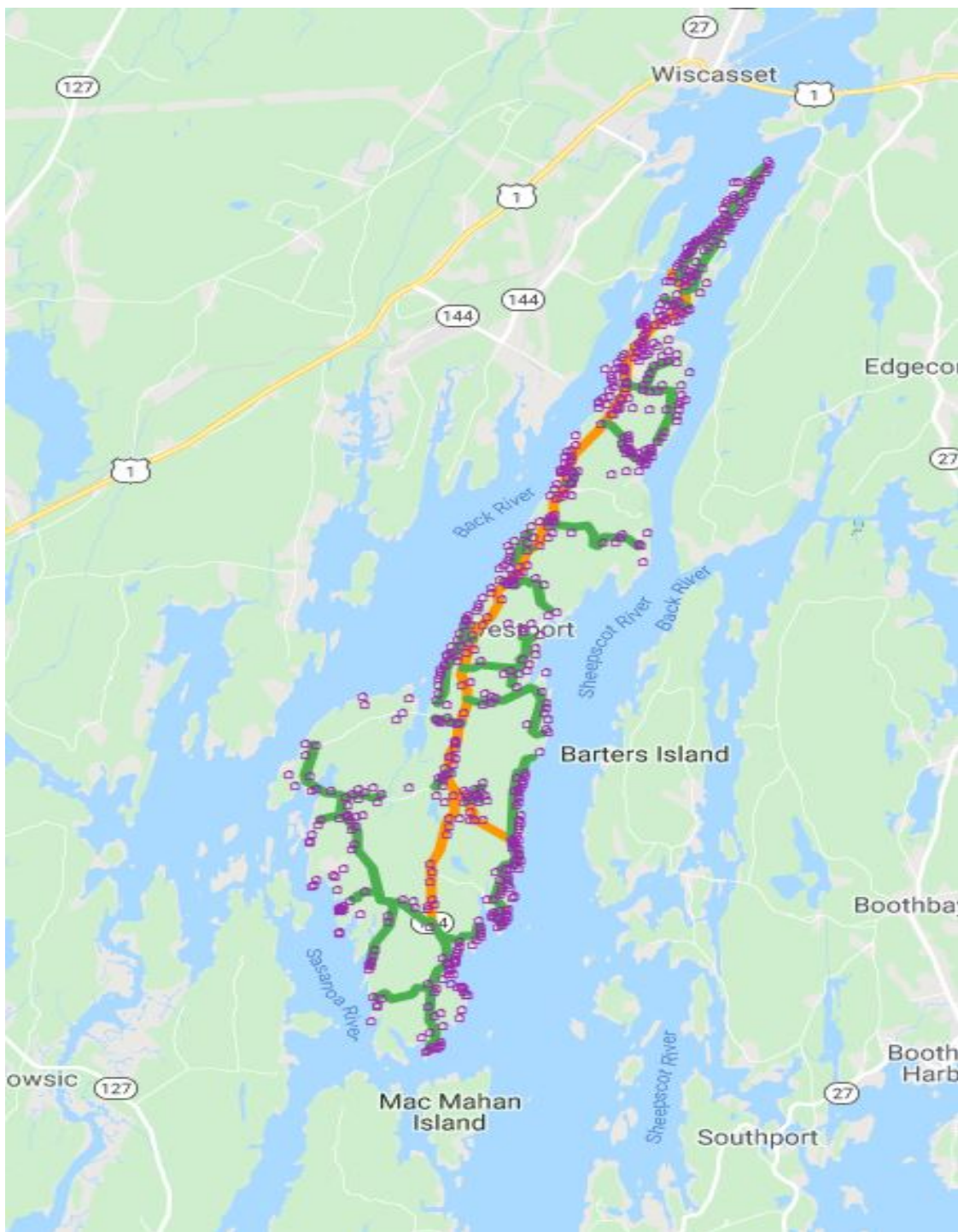
This is the same fiber map with E911 addresses added to give you a good visual of the density of homes across the community. The map does not depict each connection from the fiber to the individual homes. However, we have built into our pricing model connections to every home that wants service. All homes would be capable of receiving a connection from this construction design.

Axiom
every connection counts

Cost

Category Description		Cost
Bill of Materials		$1,112,749
Pole Licensing Application		$32,914
Utility Pole Make Ready	Estimate	$173,025
Utility Pole Replacement	Estimate	$230,700
Regen Hardware		$242,655
Customer Premise Drop Cable	Estimate	$66,330
Customer Premise Installations		$452,250
Total		$2,310,623

The total cost of the budget contains several line items that may change and lower the cost of the project overall. A lot of additional costing information will be learned by proceeding with the pole licensing process. For example, we have made some assumptions based on past experience, but the true understanding of the costs associated with pole attachments and make-ready - the cost of other users of the poles moving their lines to "make-ready" a space for a new cable - only will come through the licensing process. In addition, pole replacement costs are estimated and will not be known till the pole make ready work is completed.

This budget contains the hardware for 100% of homes to be connected, however, we calculate a take rate of 50% in year one, which would reduce the up-front cost of customer premise installations by approximately $250,000. Along with other potential reductions, we would expect the cost of construction to be $2M or less.

Breakdown of Cost Components

Bill of Materials
This category is materials and equipment cost for the entire project, minus the CO/Regen Hardware & Installation and the cost of drop cable, which are separate line items in the budget.

Pole Licensing Application
This plan requires the placement of fiber optic cabling to be placed on existing utility poles across the community. In order to receive approval, a several step process of several months is required, but begins with the application. The cost of the application is based on the number of utility poles you would like to attach to.

Utility Pole Make-Ready
Make-Ready is the cost of making the poles ready (make ready) to accept a new fiber cable. In order to install new fiber optics cable on utility poles, a licensing process is in place that evaluates each pole for readiness to accept a new cable. Each provider (other than the electrical) would move the current lines to accommodate a space for a new cable. The cost of this process is estimated in our calculations and can change depending on the application process costs associated with each pole.

Axiom
every connection counts

Replacement Poles (10%)
We estimate that 10% of the poles, through the licensing process might need replacement. There are two major reasons for pole replacements. First, the amount of equipment or utility lines on a pole deem it necessary to increase the height of the current pole to allow for an additional line to be placed on it (pole too short). Or the current pole is aged to the point where it would be unsafe to place the additional line strain on the pole without a replacement pole. (Aged poles). We make an estimate, but these the evaluation of each pole will take place during the pole licensing process.

CO/Regen Hardware & Installation
CO refers to Central Office, which is a term of art that Internet Service Providers use to describe where the equipment that would be needed to power the system and where the internet would be distributed from to each home. Regen hardware is the equipment that would be used to power the internet system and control each individual connection through this central system. These costs also include a heated and cooled utility shack that would house the equipment.

Customer Premise Cable
This is an estimated cost of the fiber to connect each home from the street to the home.

Customer Premise Installations
These costs are associated with the equipment needed at each home. This is the cost of connection 100% of the homes.

Revenue and Expense Model

A critical component to considering a new fiber optic system would be to explore how the construction of the system would be paid for.

As part of Axiom's commitment to our mission to help rural communities more fully understand what ISPs are facing serving a small community, we have created a revenue and operational expense budget that will help the Broadband Committee and the select board better understand the feasibility of this approach.

It's important to understand that these are just an illustration of how Axiom would envision operating a system and what potential customer rates could look like. The projected revenue is based on service levels and take-rates that are solely Axiom's and are intended for illustration only. Each provider would have their own revenue and expense models.

Revenue

Rate Group	# of Subscribers	Monthly Rate	Annual Revenue
25/5Mbps	148	$69.99	$124,302
50/10Mbps	42	$79.99	$40,315
100/20Mbps	21	$109.99	$27,716
Business Class-50/50M	5	$109.99	$6,599
Seasonal		Yearly rate	
25/5Mbps	64	$713.99	$45,695
50/10Mbps	18	$815.99	$14,687
100/20Mbps	9	$1121.99	$10,098

TOTALS	307 (50%)		**$269,412**

- The Rate Groups and monthly cost are entirely Axiom's and may differ depending on provider
- Take-rate is the estimated number of homes we believe would take service. In Westport Island's case we believe a 50% take-rate is achievable- , slowly adding customers over the first 5 years of operation as people in town convert slowly from other providers..

Expenses

Yearly Operating Expenses		Yearly Cost
Bandwidth		$55,728
Phone Technical support		$3,943
Administrative support		$2,078
FC support (local)		$14,032
FC support (Remote)		$53,438
	TOTAL	**$129,219**

Bandwidth is the cost of bulk wholesale internet.
Phone tech support is the estimated cost to maintain phone support for customers for the year.
Administrative Support is the cost of billing/collections and support for billing questions.
Local Field Crew is the cost of Axiom hiring a local person to conduct simple trouble shooting at the home. Field Crew (Remote) is the cost of dispatching Field Crew from Machias to deal with more serious issues- breakage, splicing, etc.

Two important takeaways of this section:

◊ How critical take-rate is to the overall viability of the project (less subscribers, less chance that the system can pay for itself through subscriber revenue
◊ The monthly operating expenses are generally fixed, no matter the number of subscribers (there is not a direct correlation between subscriber counts and expenses)

Financial Model

Cost to Borrow

For the purpose of this section we suggest using $2M as the borrowed figure, a 3% interest rate and a 10-year, 15-year or 20-year payback to help understand the cost of borrowing compared to projected revenue and expenses of delivering service and operating the system.

Term-$2M Loan/Bond		Monthly Payments	Annual payment
20 Years at 3%		$11,091.95	$133,103.42
15 Years at 3%		$13,811.63	$165,739.59
10 Years at 3%		$19,312.15	$231,745.79

Estimated Revenue	307 (50%)		$269,412/annually

Estimated revenues can cover the cost of a low interest loan. This model estimates the take-rate at 50%, so depending on the number of subscribers, the amount available for payback will vary.

If you assume that an Internet Service Provider will need to operate and manage the system and do all of the billing and servicing of customers, that cost, and just as importantly, roles and responsibilities, will need to be negotiated. Depending on how the model for ownership is developed, the expense to operate the system may be evaluated more closely, but our modeling can give you a good example of the expenses that a municipally owned system would be responsible for.

Estimated ISP Expenses			$129,219/annually

There is a lot to investigate here, including what level of profit an ISP might expect to operate a system of this size. The bottom line is that a negotiated monthly payment to an operator would need to be negotiated and the ISP would need to cover the cost of operation and some level of profit. As the Broadband Committee considers this approach three areas of focus will help further evaluate Axiom's assumptions.

- Construction Cost- the cost of constructing the system cannot be fully known until additional due diligence is undertaken
    - The committee working with Axiom can get a better idea of the assumptions in our construction cost analysis
    - Sending out an RFP for construction is recommended to create a competitive environment for the construction of the system
- Internet Service Provider- Better understanding the Revenue and Expense modeling will help the Committee arm themselves to better negotiate with an ISP
    - Assumptions of revenue and expenses likely change depending on the ISP
        - Choosing an ISP through RFP may also help evaluate each responders capabilities and willingness to work with the town
- Revenue Modeling is absolutely crucial to assess the risk of a project
    - Forensic analysis of Axiom assumptions will help the Committee model different subscriber rates and take rates to better assess viability

Final Thoughts

- Further investigate a no-cost taxpayer model for Fiber optic system
    - Capital Funding options
    - Revenue Model/Ownership
    - ISP attraction

- Spectrum expansion should be considered to areas most critically in need of better service
    - ConnectME infrastructure grants available in Spring of 2020
    - Unclear if Spectrum would undertake a full expansion across all areas currently unserved
    - Cost for full Spectrum expansion unknown

Axiom
every connection counts