3500 words

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Proposing Fiber-Optic Infrastructure in Orange Beach

Definition of Terms

"Fiber optic cable is a high-speed data transmission medium. It contains tiny glass or plastic filaments that carry light beams. Digital data is transmitted through the cable via rapid pulses of light.[1]"

High-Speed Broadband: "This refers to high-speed data transmission in which a single cable can carry a large amount of data at once. The most common types of Internet broadband connections are cable modems (which use the same connection as cable TV) and DSL modems (which use your existing phone line)[2]", alternatively using a fiber-optic connection.

"VoIP stands for "Voice Over Internet Protocol," and is often pronounced 'voip.' VoIP is basically a telephone connection over the Internet. The data is sent digitally, using the Internet Protocol (IP) instead of analog telephone lines."[3]

"Fiber to the home (FTTH), also called "fiber to the premises" (FTTP), is the installation and use of optical fiber from a central point directly to individual buildings such as residences, apartment buildings and businesses to provide unprecedented high-speed Internet access."[4]

Small City: Encompasses local government and its resident population, implying interconnectivity or symbiosis with one needing the other.

[1] Tech Terms, Fiber Optic Cable, Accessed January 30, 2017, https://techterms.com/definition/fiber_optic_cable
[2] Tech Terms, *Broadband*, Accessed January 30, 2017, https://techterms.com/definition/broadband
[3] Tech Terms, VoIP, Accessed January 30, 2017, https://techterms.com/definition/voip
[4] TechTarget.com, *Fiber to the home*, Accessed January 30, 2017, http://searchnetworking.techtarget.com/definition/fiber-to-the-home

Executive Summary

Orange Beach is a community of 5,629 permanent residents, according to the U.S. Census Bureau[5]. The municipality is located on a barrier island on Alabama's Gulf Coast, comprising 15.9 sq. mi,[6] having incorporated in 1984. Below you will find a Demographic Profile[7], an Economic Overview[8], and a table of Average Housing Market Prices[9], defining Orange Beach as a middle class to upper-middle class community.

Orange Beach Demographics Profile

Statistic	Orange Beach	Alabama	National
Population	5,629	4,817,678	314,107,084
Population density (sq mi)	383	94	91
Median age	48.2	38.2	37.4
Male/Female ratio	1.2:1	0.9:1	1.0:1
Married (15yrs & older)	74%	57%	55%
Speak English	89%	95%	79%
Speak Spanish	5%	3%	13%

ECONOMY OVERVIEW

The unemployment rate in Orange Beach, Alabama, is 5.50%, with job growth of 1.78%. Future job growth over the next ten years is predicted to be 38.05%.

Orange Beach, Alabama Taxes

Orange Beach, Alabama,sales tax rate is 10.00%. Income tax is 5.00%.

Orange Beach, Alabama Income and Salaries

The income per capita is $35,908, which includes all adults and children. The median household income is $57,750.

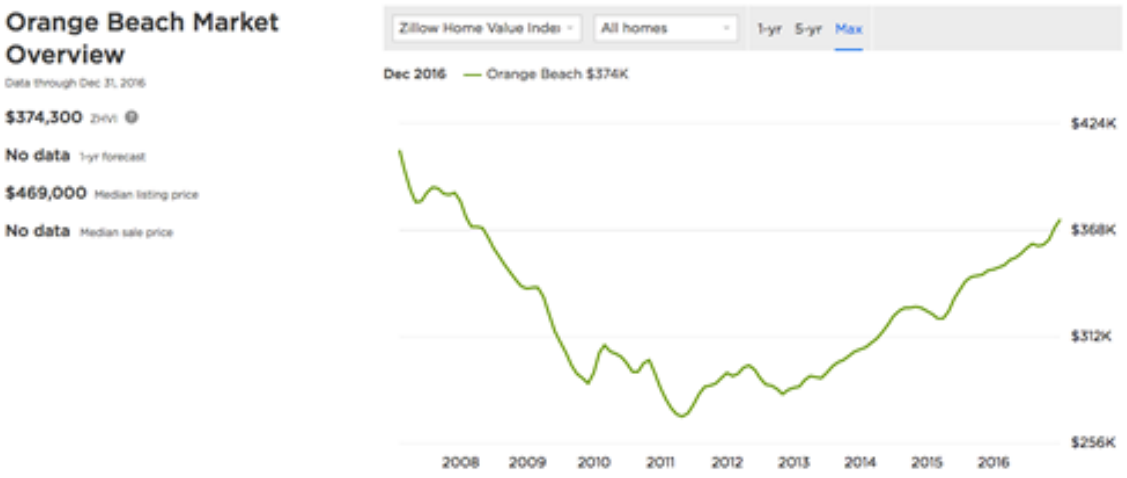
[5] U.S. Census Bureau, *Google's Public Data*, Accessed February 2, 2017, https://www.google.com/publicdata/explore?ds=kf7tgg1uo9ude_&met_y=population&idim=place:0157144:0132272:0119744&hl=en&dl=en

[6] Wikipedia, *Orange Beach*, Accessed February 2, 2017, https://en.wikipedia.org/wiki/Orange_Beach,_Alabama

[7] Area Vibes, *Orange Beach Demographic Profile,* Accessed February 3, 2017, http://www.areavibes.com/orange+beach-al/demographics/

[8] Best Places, *Orange Beach Economy,* Accessed February 3, 2017, *http://www.bestplaces.net/economy/city/alabama/orange_beach*

[9] Zillow.com, *Orange Beach Market Overview*, Accessed February 3, 2017, http://www.zillow.com/orange-beach-al/home-values/



The purpose of fiber-to-the-home is to change the way we live[10] (Videos: https://youtu.be/jzLYh3j6xn8), increase incomes, bolster property values and ensure we are being seen to be interacting with our residents, businesses and schools in a positive way. Fiber will allow professional families to re-locate here, working from home, letting these same families have the choice of home-schooling their children, learning online for university students, making it possible for grandparents to video-chat with their grandchildren across the country about hatchlings in the Osprey Nest, defining a better quality-of-life.

Orange Beach's small size and isolated location make it ideally suited to offer FTTH to its residents. City Council must decide if a public-private partnership with a reliable vendor makes sense, given the vendor will supply Internet content and be responsible for the customer-service component and billing, contractually obligating the vendor to a high-level of technical support to residents and visitors who subscribe to their service, as the primary ingredient for success.

Proposing a public-private partnership is important for the City as we cannot build a FTTH network alone, possibly allocating taxpayer monies ($1 Million) with matching funds from the vendor to build out the entire-residential area, is a determination the Executive will have to make.

Introduction

"Does fiber-optic infrastructure make small cities happier?" I asked myself.

Let's look at this problem from two sides. The one is conducting the business of the municipality such as building permits, business licenses and so on, leading to the other side where reliable, high-speed broadband is vital for our residents, students and visitors.

The importance of data speeds and the Internet are pivotal for the day-to-day functionality of a modern municipality, requiring employees to use E-Mail, access myriad servers for financial data or sports-team registrations. The better the connection, the less frustration with staff, the higher their productivity, providing better customer service.

[10] Corning, *A Day of Glass 1 & 2,* Accessed February 3, 2017, https://youtu.be/jzLYh3j6xn8

Data speeds also affect the quality-of-life for residents and businesses. In a beach town like Orange Beach, where most of the jobs are service-industry based, being able to attract work-from-home families and home-school opportunities depends on fast-data capacity that is available with fiber optics buried in the ground, protected from storms and natural disasters.

The entire community has a stake in a fiber project. There is the vendor, having invested resources, putting "glass" in the ground. The municipality has a stake in the vendor's Franchise Agreement, letting the vendor use the city's rights-of-way for burying infrastructure, occasionally getting use of a few strands of fiber plus a negotiated fee as compensation. The local businesses have a stake, needing Internet, Video and VoIP connectivity to survive. The residents and visitor have a stake, connecting multiple devices in any household is common today, requiring dependable high-bandwidth connections for everyone.

The key policy area is FTTH, addressing specifically the needs of Orange Beach as a small city. Our city departments including Fire and Police are all interconnected with fiber optics and VoIP telephony. We understand this technology very well; wanting to bring these essential services to our residents is the next step, imagining a modern city.

Fiber in the ground was not always available, migrating from copper-based DSL, having budgeted in "baby steps" to upgrade our municipal infrastructure, gradually getting funding approved by City Council from 2009, completing the build-out over several years. The city's inter-office grid was finished in 2012 for data, adding the VoIP-Telephone component in 2014.

The most significant point-of-conflict is cost. We are actively searching for a reliable partner to carry this technology to the curb, as if it were another utility like gas, water, electricity or sewer, leaning heavily on a partner's expertise for the build-out and the customer-service component. The City of Orange Beach is simply not armed to do this.

Economic Development, quality-of-life, emergency management, schools and social-media relationships depend on high-speed connectivity, like every living organism depends on air to survive, we depend on the Internet. Today, the Internet is integrated into the fabric of our global society, as we are connected to each other in ways unimaginable ten years ago. FTTH will change Orange Beach, building the foundations for economic growth, perhaps felt from Bear Point and Beaver Creek for generations to come, serving as an example to small cities across the South.

Overview

Alabama Law speaks to Municipal Broadband, "Public providers wanting to offer telecommunications services must conduct a public hearing and hold an election. Service can only be provided within the utilities territory. Local taxes or other funds may not be used to pay for expenses."[11] The above may not apply to Orange Beach, as the city does not own a Municipal-Broadband Utility with a complicated customer-service component, like billing and repairs.

[11] Fiber to the Home Council, Inhibiting Connection: *State policy impacting expansion of municipal broadband networks, Table 1: State Laws Restricting Municipal Broadband*, Alabama Code 11-50B et.seq., Accessed January 31, 2017, http://www.ftthcouncil.org/p/cm/ld/fid=45

FTTH is critical to future economic development with more families able to work from home with a high-speed connection, assuming Orange Beach will not be the provider, partnering with a reliable third party, bringing better service to our residents is key.

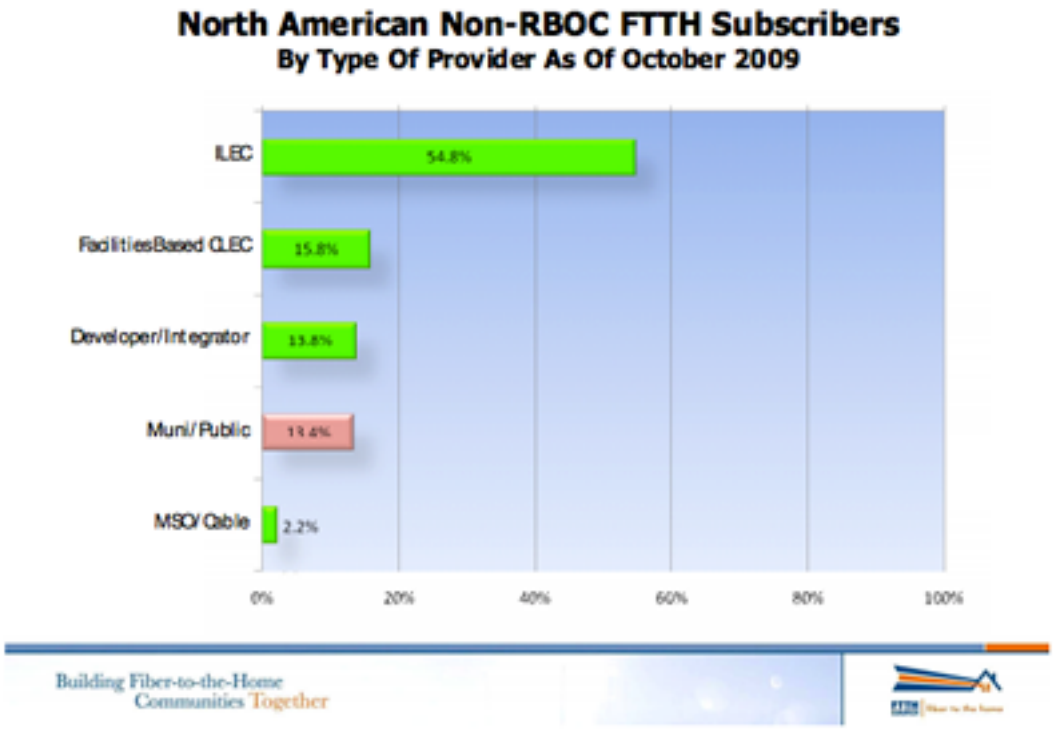
Would this approach work?

The answer is yes, if communications issues are addressed in the contractual stage. For example, when problems arise "Little Johnnie" will call City Hall complaining his connection is down, referring him to the customer-service number will be our role, inconveniencing both city staff and the customer, understanding these things will happen, ensuring a tight contract with a third party to minimize the affect of phone transfers and poor customer service is vital.

According to a Public Policy Paper by the Fiber-to-the-Home Council,[12] 5.25 million American Homes are now connected to a fiber network. Asking if fiber networks are as vital to civic life as road, water and sewer?

Fiber networks being included into our concept of community life is essential. Once we accept the premise that fiber-optic networks are a necessity, going forward with a plan to build out Orange Beach is much easier.

Fiber-to-the-Home subscribers, showing Municipal Utilities near the bottom.[13]



[12] Fiber to the Home Council, Municipal Fiber to the Home Deployments 2009: Next Generation Broadband as a Municipal Utility Accessed January 31, 2017, http://www.ftthcouncil.org/p/cm/ld/fid=45

[13] Fiber to the Home Council, Municipal Fiber to the Home Deployments 2009: Next Generation Broadband as a Municipal Utility Accessed January 31, 2017, http://www.ftthcouncil.org/p/cm/ld/fid=45

This graph shows that FTTH projects are still in their infancy, especially in residential neighborhoods, usually fiber networks are operated by Public-Electric Utilities like:

- Bristol, VA,
- Dalton, GA,
- Chelan County, WA,
- Grant County, WA,
- Jackson, TN,
- Kutztown, PA, and
- Reedsburg, WI

The above may be the most successful examples per the FTTHCouncil.org paper in 2009,[14] but people have had new innovative ideas since then, proposing a public/private partnership in Orange Beach has not been tried, giving us a chance to take a different approach, enabling our residents to take classes from home, creating an educational environment for their children at the same time, building a connected community.

The point of conflict is still cost and the complexity of partnering with a for-profit enterprise, assuming the city's participation can match the partner's capital, keeping prices down for our residents is essential, without being seen to be subsidizing.

Let's take a minute to reflect, if the partner puts up so much capital, needing 30% market penetration before building fiber to the curb in a specific neighborhood, creating possible gaps in coverage where the build-out point of 30% penetration is not reached.

Do we want complete coverage? If so, the city must step up with at least a match of the partner's funds, providing financial incentives and Franchise Fee inducements, allowing the project to cover every residential area in Orange Beach with fiber to the curb.

Understanding the social-cost conflict is important, because broadband offers opportunities for families and businesses. People who cannot participate, because they live in an unsubscribed area below the required 30% penetration are harmed, experiencing a social downside that could divide our community, thinking we want to uplift and unite our community, not divide it along lines of a perceived social stigma, because the unsubscribed live "across the tracks".

These are examples of inspired communities, having taken up the mantel of connectivity for their residents.

[14] Fiber to the Home Council, Municipal Fiber to the Home Deployments 2009: Next Generation Broadband as a Municipal Utility Accessed January 31, 2017, http://www.ftthcouncil.org/p/cm/ld/fid=45

SYSTEMS SERVING LARGE PERCENTAGE OF SERVICE AREA (41)			SYSTEMS SERVING LIMITED FTTH AREAS, OR JUST STARTING (16)
Auburn IN	Jackson TN	Radium Hot Springs BC	Abingdon, VA
Barnesville MN	Kutztown PA	Reedsburg WI	Ashland, OR
Bellevue, IA	Lafayette LA	Rochelle, IL	Baldwin, WI
Bristol TN	LENOWISCKO VA	Sallisaw OK	Cedar Falls IA
Bristol VA	Lenox IA	Shawano WI	Clallum PUD WA
Brookings, SD	Loma Linda CA	Spencer IA	CMON BC
Burlington VT	Marshall MO	Tullahoma TN	Crosslake MN
Chattanooga TN	Mason County PUD WA	UTOPIA UT	Danville VA
Chelan PUD WA	Mi-Conection NC	Wilson NC	Glasgow KY
Churchill County, NV	MINET OR	Windom MN	Holland MI
Clarksville TN	Morristown TN		Ketchikan AK
Crawfordsville IN	North Kansas City MO		Monticello MN
Dalton GA	Phillipi WV		Pend Oreille PUD WA
Douglas County PUD WA	Powell WY		Sylacauga AL
Gainesville FL	Pulaski TN		Taunton MA
Grant County PUD WA	Quincy FL		Tifton GA

What kind of "take rate" can we expect if we help underwrite this project? According to the Fiber-to-the-Home Council's national survey 30% is normal.[15]

ESTIMATES OF US MUNICIPAL FTTH Take rate comparisons

As Of October 1, 2009 RVA LLC		Homes Connected	Homes Passed	Total	Estimated Take Rates of Stable systems after 4 years
Wholesale (Open access) Muni FTTH Systems	11	29,300	125,200	23%	30%
Retail Muni FTTH Systems	46	129,950	282,800	46%	54%
Total Muni FTTH Systems	57	159,250	408,000	39%	

Deciding how our public/private initiative will address profit sharing is negotiable. Of all the municipal systems currently serving residential customers across America with FTTH (NORTH AMERICA - 87 cities via 57 operators), **ONLY ONE** is in Alabama[16]: Sylacauga AL.[17], offering 1 Gbps capability, operating as a Public Utility: http://www.sylacauga.net/utilities/telecom/telecom.htm

Planning

The Federal Communications Commission (FCC) is the guiding light for Broadband Regulations, having a newly minted Chairman, appointed by President Trump in 2017: Ajit

[15] Fiber to the Home Council, FTTH Council FCC Filing on Municipal Experience with Open Access and Retail FTTH Systems, Accessed January 31, 2017, http://www.ftthcouncil.org/p/cm/ld/fid=45&tid=77&sid=925

[16] Fiber to the Home Council, FTTH Council FCC Filing on Municipal Experience with Open Access and Retail FTTH Systems, Accessed January 31, 2017, http://www.ftthcouncil.org/p/cm/ld/fid=45&tid=77&sid=925

[17] Sylacauga, Alabama, Telecommunications Department, Accessed January 31, 2017, http://www.sylacauga.net/utilities/telecom/telecom.htm

Varadaraj Pai, reportedly wants to quash burdensome regulations in the Telecommunications Sector. Although he is a staunch critic of net neutrality (the principle that Internet service providers should enable access to all content and applications regardless of the source, and without favoring or blocking particular products or websites.)[18], we must wait see what affect his ideologies will have on the American Internet.

Fiber to the Home (FTTH) in Master-Planned Communities (including condos) allows developers to capitalize on voice, video and high-speed data services that were traditionally left to cable and telephone companies. FTTH increases the value of residential, vacation and business properties by offering state-of-the-art technologies, creating new revenue streams for the developer.

These new opportunities create regulatory questions if the developer actually delivers content over his or her FTTH network. The developer is considered a "telecommunications carrier" if he lights the fiber himself or leases it to a third party, falling under Federal FCC jurisdiction, specifically the Telecommunications Act of 1934.

The developer must seek guidance if management of the FTTH network requires permission from the state, county or local authorities. In most states the developer is not regulated if he or she is not providing content over the FTTH network.[19]

Orange Beach wants the role of inspiring a FTTH community initiative not managing it, having oversight of the FTTH project is important. Protecting taxpayer funds, farming out content, customer-service and billing to a third party, using the city's rights-of-way for burying the fiber, bringing a connection to the curb is also important.

The problems again is cost, market penetration and boring fiber to the home, assuming we had a partner, contributing half of the total projected cost of $2 Million, building out to every neighborhood, requiring a substantial contribution of tax-payer dollars ($1 Million) from Orange Beach and political will, ensuring viability. Assuming the city had reserve funds for quality-of-life projects like this and City Council was willing to make a one-time investment in fiber infrastructure with a trusted partner, branding Orange Beach as a destination community for people who need and understand the importance of high-bandwidth homes, including families who home school their children, needing reliable service is an economic-growth incentive to invest in.

The cost of service must also be reasonable, ranging from $40 - $80 per month, being competitive with services already in this area, whether the city would subsidize broadband for residents is doubtful, preferably encouraging vigorous negotiations with a trusted partner.

The City of Sylacauga, Alabama offers fiber-to-the-home, as a Utility Board, offering a price structure different from our ideal pricing, perhaps reflecting the financial reality of FTTH:[20]

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[18] Network Neutrality, *Definition of Net Neutrality*, Accessed January 31, 2017, https://www.ocf.berkeley.edu/~raylin/whatisnetneutrality.htm

[19] Law Offices of Michael L. Glaser L.L.C., Legal And Regulatory Issues Arising From Fiber-To-The-Home Networks In Master-Planned Communities, Accessed February 1, 2017, http://www.telecomattorneys.com/fibernetworks.html

[20] City of Sylacauga, Utilities Board, *Telecommunications Rates,* Accessed February 1, 2017, http://www.sylacauga.net/utilities/telecom/telecom_rates.htm

20 Mbps Internet Service (up and down - full duplex)
Monthly Charges:
Residential or Commercial
$70.00

50 Mbps Internet Service (up and down - full duplex)
Monthly Charges:
Residential or Commercial
$220.00

100 Mbps Internet Service (up and down - full duplex)
Monthly Charges:
Residential or Commercial
$350.00

150 Mbps Internet Service (up and down - full duplex)
Monthly Charges:
Residential or Commercial
$500.00

Our goal is to make Orange Beach a FTTH City, providing the best Internet experience possible, at a reasonable price. Obviously, Internet is a priority with video, TV and VoIP Telephony as *a la carte* extras.

We would measure the effectiveness of this program with customer surveys, feedback to the city's helpdesk and logged-telephone calls. The provider would be required to give us monthly customer-call reports, what happened, how was it resolved, how long to resolution, and any added costs to residents if a repair was needed.

Key Issues

Our primary assumption is FTTH will improve the quality-of-life for subscribers, bringing digital connectivity with enough bandwidth so multiple people can enjoy data streams without interrupting other members of their family. Insufficient bandwidth per household is a problem in Orange Beach, dedicating fiber connections to each residence will change that.

Motivating a carrier to partner with us, seemingly easy given the growth in demand for streaming content, has not happened: "The number of hours Americans spend watching video over the Internet has grown 70% since June 2010 (Nielsen) Revenues from online video services grew by 175% between 2010-2012, from $1.86 billion to $5.12 billion (SNL Kagan). Real-time streaming of entertainment in prime time grew from 42.7% of downloads in 2010 to 67% by Sept. 2013 (Sandvine Global Internet Phenomena Report)."[21]

Orange Beach is an isolated community on a barrier island, presenting wonderful vacation venues, but large risk to reward opportunities for FTTH vendors, mostly preferring municipal areas with dense populations, making it easy to justify their

[21] FTTH Council, *Community Incentives*, Accessed February 2, 2017, http://www.ftthcouncil.org/p/cm/ld/fid=467&tid=79&sid=1352

investment to return ratio. This does not change the need in our community for high-speed broadband connectivity.

An alternative is "small cells" on light poles; delivering 5G service (very fast) cellular service to in-home Broadband Cards. The conflict here is cellular providers charge on a per Gigabyte per month basis for data usage, being tough to budget for a family with multiple devices.

Realistically fiber or small cells are the only possibilities for us to discuss, obviously fiber has a much higher build out cost than small cells, alternatively small cells are much more capital intensive for residential families to afford on a month-to-month basis.

The City of Orange Beach is in a position to declare for fiber, arguing that quality-of-life benefits out weigh the one time investment to put fiber-optics in the ground, clearly needing a partner, bringing fiber-networking expertise, providing content management, customer service and billing.

Counter Argument

"Who the hell cares about fiber? I don't even use the Internet," he said. Turning his golf cart into Bear Point.

The demographics in Orange Beach show residents of a certain age who do not want to be connected, do not want to pay for connectivity and do not want their taxpayer dollars spend on a fiber-optic build out for the city. I get it. They are conservative, raised on "rainy day" ideology, rejecting any educational assertions; technology is moving the world forward. This voting-block will not buy in, as is their right.

Conclusion

Orange Beach has a rare opportunity for innovation, grasping the chance, because we have reserve funds, aggressively investing in the future, re-inventing Orange Beach as the poster-child for fiber optics to small cities.

Living-in-denial of the need for better connectivity will only result in cable operators generating more dissatisfaction in the community, DSL operators continuing to have residents on the doorstep of City Hall because of poor service, pushing cellular carriers with a reliable but very expensive chance to fill the void, leaving Elected Officials looking like they are doing nothing about complaints. None of these scenarios generates feelings of happiness in our community.

The need for a capable partner is critical, alleviating the pain of bad connections and poor customer service, ostensibly increasing the quality-of-life in Orange Beach. I recommend we start the search today, interviewing several local-fiber providers, seeing if they are willing to invest monies, bore fiber, manage content, provide customer support and billing.

Disclaimer

The opinions and financial recommendations in this analysis are those of the author. They are not the official policies of the City of Orange Beach. No warranty, however, is implied. The information provided is on an "as is" basis. The author and the City of Orange Beach shall have neither liability nor responsibility to any person or entity with respect to any loss or damages arising from the information contained in this document.

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