

# **City of Lakeland Strategic Broadband Plan**

## **APPENDIX C**

### **Lakeland Broadband Opportunities Playbook**



# Lakeland Broadband Opportunities

This Broadband Opportunities Playbook evaluates and provides analysis for the Lakeland to consider as it considers expanding its network to support additional broadband needs within the City of Lakeland. The opportunities outlined below include a diverse cross section of options available to Lakeland, which include opportunities that range from little to no cost (implementing Broadband-Friendly Public Policies), to more risky full residential retail deployment (Fiber-to-the-Home Provider). Through analysis of these opportunities, Magellan in cooperation with the City of Lakeland Broadband Leadership Team will develop a recommended roadmap that the City can consider as they to begin making key investments in broadband infrastructure.

The broadband roadmap that will be developed out of this Playbook will provide a step-by-step approach to expanding Lakeland’s fiber services to more organizations in Lakeland. This roadmap will focus on leveraging more of Lakeland’s existing dark fiber and will build a plan to enable Lakeland to expand its operations to connect more organizations, which may include businesses, community anchors, broadband providers, and other public organizations.

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# 1. Formalize Broadband-Friendly Public Policies

Magellan believes that Lakeland's most immediate strategy to encourage next-generation broadband infrastructure growth to its public and private sectors will be to formalize broadband-friendly public policies. In meetings with Lakeland Electric and various Lakeland government departments, it was discovered that many progressive broadband-friendly considerations are clearly already in place with the utility and government departments, on an informal basis. Many of these informal policies exist because they are often the common sense thing to do, and most are generally accepted as best practices.

In support of this strategy, Lakeland should immediately look to implement broadband-friendly public policy tools. These policy tools influence how broadband services develop throughout the community and show the community and prospective newcomers that Lakeland is serious about promoting broadband growth and accessibility.

## 1.1 What are Broadband-Friendly Public Policies?

Broadband-friendly public policies are tools that Lakeland can formalize to encourage broadband infrastructure growth. These include many items that are already informally performed by the City of Lakeland and Lakeland Electric now, such as practices that reduce the duplication of effort and minimize the cost associated with installing utility and broadband infrastructure within its jurisdiction. Below is a list of ways that Lakeland can encourage broadband development through the adoption of broadband-friendly policies:

- Evaluate fees levied on broadband providers for constructing broadband infrastructure to ensure they do not discourage broadband investment.
- Develop methods to streamline the broadband permitting processes within public rights-of-way to ensure broadband providers do not face unnecessary obstacles to building infrastructure.
- Develop a process so that Planning and Public Works Departments coordinate with the Lakeland to identify projects that could install infrastructure at reduced costs.
- Identify opportunities to install broadband infrastructure in conjunction with public and private construction projects.
- Maintain broadband infrastructure specifications in a city-owned GIS-based fiber management system, requiring updates as built, and implement processes for accurate documentation.
- Lakeland should adopt policies that incorporate broadband as a public utility and create a policy framework to promote its deployment in public and private projects as appropriate.
- Draft policies to the Lakeland's specific needs and adopt them into local policy, codes, and standards (including dig-once, joint trenching, engineering standards, etc.).
- Incorporate broadband concepts into Lakeland's Capital Improvement Plans (CIP), as appropriate, and make a commitment to fund broadband infrastructure.

### **1.1.1 Comprehensive Broadband Standards and Joint Trenching Policies**

Incorporating broadband infrastructure requirements into Lakeland's land development statutes will allow and encourage broadband construction in conjunction with other capital projects. For example, installation of fiber-optic conduit during all projects involving roads, sidewalks, trails, or lighting projects where the ground is to be opened for other purposes would be less costly than installing conduit through standalone broadband projects. Since the majority of costs to build broadband infrastructure in Lakeland is incurred through trenching, boring, and restoration, this strategy can alleviate significant costs by opening the ground once instead of multiple times. In many states and municipalities, this formalized policy is referred to as a "Dig Once" policy.

The City of Lakeland, through the use of its Capital Improvement Plan and interdepartmental communications, can determine projects that could best utilize this strategy. This policy should also be coordinated with Lakeland Electric and broadband service providers to minimize the need to overbuild and to ensure that all service providers have an opportunity to place their infrastructure in capital projects as well. These Joint Trenching policies can facilitate more opportunities to install conduit, fiber, and other infrastructure due to lower costs. Standardization of these agreements across all potential owners of underground infrastructure can be established to ensure all parties are aware of the joint trenching opportunities as they become available.

### **1.1.2 GIS and Infrastructure Record Keeping**

As part of implementing broadband-friendly public policy measures, the City should require that Geographic Information System (GIS) documentation of all broadband infrastructure installations, upgrades, and other items to be maintained and updated as incurred. If the City does not currently have a GIS, Magellan strongly suggests that the city invest in a GIS-based fiber management system to capture and track documentation of its broadband infrastructure. This will allow the city to maintain a clear understanding of locations of the broadband infrastructure such as conduit, vaults, pull boxes, transitions, fiber-optic cable, and other outside plant resources.

## **1.2 How Would Lakeland Implement Broadband-Friendly Public Policies?**

Implementing broadband friendly-public policies requires the City of Lakeland to evaluate current land use, permitting, construction, and right-of-way policies and informal policies and procedures to determine how these formalized broadband-friendly policies can be tailored to incent development of broadband infrastructure.

Formalizing these policies will enable more opportunities for the installation of broadband infrastructure in conjunction with other public and private infrastructure projects occurring within the City's jurisdiction. Many of these public policy tools will be codified and implemented according to Lakeland's existing procedures and ordinances, and must pass the Lakeland City Council approval processes.

### *Are There Any Risks?*

There is little financial risk in implementing policy tools because they require little upfront funding if managed correctly. In some cases, municipalities have struggled with incorporating broadband into their existing land use policies because they are unfamiliar with how to manage a new “utility” type of asset. This requires the collaboration of multiple departments and the ability of these departments to work together to a common goal. The city should expect that some new business and operational processes would be required as well as changes to existing processes in order for the policies to be effective.

### *Additional Considerations*

- Lakeland should review its pole attachment agreements and related costs, as well as its rates for leasing dark fiber strands to ensure fees are in line with the market.
- Lakeland should develop a broadband investment infrastructure fund to support the expansion of the city’s broadband infrastructure, which would be required through the implementation of public policy options. The city could budget an annual fund contribution of \$100,000 per year initially.

## 2. Expand the Availability of Surflakeland

The City of Lakeland maintains the Surflakeland wireless network, which provides free wireless Internet access in strategic areas throughout Lakeland, including select municipal facilities, parks, and downtown public spaces. This service is free, best-effort Internet access that is readily available to Lakeland's visitors. As a best-effort service, the service is provided for convenience, does not provide any guarantees or service level agreements, and is not meant to provide critical emergency services or commercialized access.

Lakeland has made extensive investments in this infrastructure and designed the network to insure that components can support an expanded deployment covering a greater area of Lakeland. While expanded access in strategic locations of Lakeland may already be planned, expansion into residential areas has yet to be evaluated. Surflakeland could provide a basic level of free access to many residential areas of the city, providing much needed access to Internet services, which is currently either unavailable or unaffordable. Lakeland's Surflakeland network could be used to help solve the "digital divide" issue present in many low-income neighborhoods throughout the City.

While Surflakeland can provide needed access into these key neighborhoods, it could also be a potential "slippery slope" for the City as it evaluates further expansion. The City would need to develop a Go/No-Go Matrix on where and how to expand services. The concept of "what you do for one, you must do for all" could easily be argued by residential communities throughout the city, even some that may not be considered "low income."

The costs to deploy Surflakeland would include:

- Access Points and supporting components (switch, UPS, outdoor cabinet, etc.)
- Fiber backhaul
- Additional wholesale Internet capacity for increased users

Return on Investment would be difficult to calculate, as access to Surflakeland is free. Assuming free access is continued in an expanded footprint, no revenue would be realized through this initiative. However, providing Internet access to low-income neighborhoods delivers positive "off balance sheet" socio-economic returns as it bridges an otherwise negative digital divide issue that affects Lakeland and many others cities.

The costs associated with deploying additional access points are very much determined on an individual case basis. While the access points are relatively inexpensive, the supporting components and expansion of the fiber backbone could easily reach tens of thousands of dollars depending on where an access point is to be deployed.

Lakeland could evaluate a number of other options to deploy wireless services, including forming a partnership with Gigabit Lakeland – a group willing to deploy wireless in concert with Lakeland's fiber assets. If structured correctly, Lakeland could lease its dark fiber capacity while a third-party manages the delivery of the actual wireless services – alleviating the City's role in managing the actual operation of this service.

### 3. Connect all Polk County Schools in Lakeland

In the 2013-14 school year, the Polk County School District (PCSD) served approximately 96,000 students through more than 150 schools and programs for grades pre-K through grade 12. As such, PCSD is a significant user of educational and instructional technologies that support its students' needs. Many of these technologies require high-speed broadband Internet and connectivity between schools to enable students, teachers, and administrators to use them effectively. The need for additional bandwidth between schools grows significantly, as more online applications are enabled through PCSD. This trend is likely to continue into the foreseeable future.

In recent years, PCSD has expanded its Wide Area Network (WAN) to connect more schools and administrative facilities to a high-speed fiber-optic backbone managed by local service providers such as Verizon and Bright House Networks. PCSD also utilizes dark fiber from several local municipalities in the area. The PCSD WAN is a critical resource that enables the PCSD to implement many of the educational technologies required in its curricula. This network connects more than 150 schools and administrative facilities to one another across a fiber-optic backbone.

The existing network was procured by PCSD through a competitively bid E-Rate contract via the USAC Schools and Libraries Program, which allows PCSD to receive discounts up to 80% on telecommunications services. These discounts are actually considered subsidies, paid for through federal sources for the 2015-2016 school year.

#### 3.1.1 Polk County Schools E-Rate Analysis

Funding Year	471	FRN	SPIN	Service Provider	Service*	Original Requested Amount	Funded	Disbursed	Util. %	Discoun	Contract Award Date	Service Start Date	Service End Date	Contract End Date
2015	1038700	2841387	143016811	Bright House Networks, LLC	IA	\$148,588.80	\$148,588.80	\$0.00	0%	80%	1/28/2014	07/01/2015		8/30/2017
2015	1038734	2841393	143016811	Bright House Networks, LLC	T	\$724,723.20	\$724,723.20	\$0.00	0%	80%	02/25/2014	7/1/2015		06/30/2017
2014	968538	2845582	143016811	Bright House Networks, LLC	T	\$751,900.32	\$751,900.32	\$689,241.96	92%	83%	02/25/2014	7/1/2014		06/30/2016
2014	971653	2845671	143016811	Bright House Networks, LLC	IA	\$97,083.36	\$97,083.36	\$88,393.08	92%	81%	01/29/2014	07/01/2014		06/30/2017
2013	898535	2443785	143001435	Verizon Florida Inc.	T	\$649,607.80	\$649,607.80	\$647,449.80	100%	83%	01/28/2010	7/1/2013		06/30/2014
2013	899142	2474958	143016811	Bright House Networks, LLC	IA	\$100,860.00	\$100,860.00	\$100,860.00	100%	82%	02/14/2012	7/1/2013		06/30/2014
2012	848783	2352802	143001435	Verizon Florida Inc.	T	\$488,847.96	\$488,847.96	\$244,423.98	50%	81%	05/18/2009	7/1/2012		5/21/2014
2012	851043	2352725	143001435	Verizon Florida Inc.	T	\$683,156.40	\$674,925.80	\$337,462.80	50%	82%	01/26/2010	07/01/2012		06/30/2014
2012	851045	2352712	143016811	Bright House Networks, LLC	IA	\$77,711.40	\$77,711.40	\$38,855.70	50%	81%	02/14/2012	07/01/2012		8/30/2014
2012	873800	2285138	143004824	Bellsouth Telecommunications, LLC	T	\$234,734.44	\$234,734.44	0	0%	77%	1/12/2009	07/01/2012		06/30/2015
2011	81140	2216343	143016811	Bright House Networks, LLC	IA	\$51,516.00	\$51,516.00	\$25,758.00	50%	81%	2/11/2009	07/01/2011		8/30/2012
2011	817032	2222842	143001435	Verizon Florida Inc.	T	\$598,377.78	\$598,377.78	\$299,188.89	50%	81%	05/18/2009	07/01/2011		05/21/2014
2011	817042	2222850	143001435	Verizon Florida Inc.	T	\$612,048.00	\$612,048.00	\$306,024.00	50%	82%	01/28/2010	7/1/2011		06/30/2013

The PCSD maintains an E-Rate contract for Priority 1 Telecommunications or “wide-area networking” services for approximately \$724,723 per year with a current provider. This contract provides connectivity to PCSD schools and administrative facilities. E-Rate provides discounts averaging 80% of this total contract cost, and PCSD is responsible for paying the remaining 20% of the contract, or approximately \$181,000 through its own internal funding allocation. PCSD’s current contract for these services is in force for the existing school year and has the ability to extend the contract for two additional one-year terms. They can decide to terminate the contract after 2016-2017 school year.

While PCSD operates over 150 schools and supporting facilities throughout Polk County, a significant number of these, over 50 are located within the City of Lakeland and the greater

Lakeland Electric service territory. The PCSD currently utilizes the E-Rate program to procure telecommunications services to connect its schools and facilities, as well for Internet services. Clearly, the E-Rate program offers a significant amount of money, and it would benefit the success of any broadband and telecommunications initiative in Lakeland to serve the USAC Schools and Libraries Program. This funding could help support the infrastructure to the schools and libraries in Lakeland, to keep money in the local economy and grow the network to benefit the larger community.

The State Educational Technology Directors Association (SETDA) released “The Broadband Imperative” report recommending schools increase their broadband speeds to 1Gbps per 1,000 students and staff by 2017-2018. The report recommends that internal WANs connecting schools within districts should be 1Gbps by 2014-2015 and 10Gbps by 2017-2018. These speeds will be needed to meet a growing demand for web-based instruction and a skyrocketing number of student-owned web devices. PCSD has not met the 2014-2015 capacity targets as of yet.

### **3.2 City of Lakeland Opportunity**

The City of Lakeland’s fiber-optic network has the potential to become a key resource to provide WAN services to PCSD. PCSD has expressed interest in utilizing the City’s fiber network in the past for its connectivity needs. With appropriate excess capacity, the City could extend the fiber backbone to the majority of PCSD schools. The fiber connectivity will help accommodate PCSD’s future needs for additional bandwidth by providing WAN connectivity that can scale to greater bandwidths, which would support PCSD’s long-term growth of classroom, teaching, and administrative technologies.

The City of Lakeland’s fiber network could potentially provide WAN transport services for the PCSD using either a dark fiber or lit transport model. Lakeland would need to provide redundant connections into the PCSD’s data center, which is located in Bartow, FL. It is important to note that Lakeland and Bartow already maintain a single fiber interconnect point which could provide a route from Lakeland into the PCSD’s data center. A secondary route, which has yet to be identified, would most likely route through Winter Haven to provide a true redundant fiber path.

Based on the analysis conducted in this study, the City of Lakeland may be able to provide these services at a discount to what is currently charged to PCSD while enabling more bandwidth to serve the needs of PCSD’s students, teachers, and administrators. Upfront investment will be required by the City to extend its current network to each school; therefore, the business case developed in this study should be refined to accommodate the City’s budgetary constraints.

This opportunity also requires that the City of Lakeland is able to meet the requirements of the USAC Schools & Libraries Program (commonly known as E-Rate) to ensure that PCSD’s 80% average discounts for WAN services remain intact. This will require the City to comply



with the rules and regulations of the E-Rate program and become an E-Rate service provider. The City has several viable options to provide this service and should determine the most appropriate option through further discussions with PCSD.

Under a Lit Transport Model, Lakeland could provide 1Gbps or 10Gbps connections to each school or PCSD facility, with multiple 10Gbps, 40Gbps or 100Gbps connections back to the PCSD’s data center. Lakeland would need to price these connections competitively with the current transport services being provided to the PCSD to insure their ability to secure the contract.

### 3.3 Financial Analysis

#### 3.3.1 Lakeland Cost Structures (Startup and Annual Operation)

Capital costs have been estimated at \$20,000 per school site X 50 sites.

	Program Startup Costs	Capital Costs	Annual Operations and Maintenance	5 Year Program Costs
Estimated Cost for 50 Sites	\$85,000	\$1,450,000	\$132,000	\$2,195,000

#### 3.3.2 Rate Structure Analysis

Model uses \$20k capital per site x 50 sites x 5 years.

Tiered Rate Structure		Gigabit Per Site Rate Structure
\$2,195,000	Total Cost	\$2,195,000
\$1,803,000	Total Revenue	\$2,700,000
-\$392,000	5 Year Payback	\$505,000

#### 3.3.3 Alternative Rate Structure Analysis

Uses \$10k capital per site x 50 sites x 5 years.

Tiered Rate Structure		Gigabit Per Site Rate Structure
\$1,615,000	Total Cost	\$1,615,000
\$1,803,000	Total Revenue	\$2,700,000
\$188,000	5 Year Payback	\$1,085,000

### 3.4 Polk County Regional Opportunity

While the City can easily reach PCSD facilities within Lakeland and the greater Lakeland Electric service territory, there are a significant number of facilities out of reach of Lakeland’s network that are located in other municipalities in Polk County. While Lakeland’s opportunity could stand on its own, further analysis should be provided at the regional level to determine the potential opportunity for all PCSD facilities to be provided access by the vast amount of municipal fiber located throughout the Polk County.

The cities of Bartow, Winter Haven, Haines City and others would potentially have to build out their networks to serve these other sites and would ideally interconnect to each other to form a high-speed fiber ring that spans the county. Each city within the region could aggregate the school onto the ring, which would be routed back to the PCSD data center via diverse fiber paths.

This regional approach will require an operating structure that takes into account each municipality’s assets, and provide a revenue share back to each municipality participating. This operating structure and organization have yet to be identified, however, it is important to note that this discussion is currently underway with the Polk Vision Broadband committee.

#### 3.4.1 Proposed Lit Circuit Rates

Lakeland’s proposed rates are approximately 10% below current contract rates.

		Lakeland	Current PCSD Contract Rates
Bandwidth	10 Mbps	\$275	\$308
	100 Mbps	\$500	\$560
	200 Mbps	\$750	\$800
	1000Mbps (1 Gbps)	\$900	\$1,512
	10000Mbps (10 Gbps)	\$1,200	\$1,200

## 4. Expand Dark Fiber Services

The City of Lakeland has provided dark fiber leases to various third parties in the communities for several years and is currently recording annual revenue in excess of \$300,000. The City does not market or brand its current fiber offering and is currently managed as more of a “one off” service to interested Lakeland entities.

Using a “Crawl-Walk-Run” approach, the City could take its dark-fiber leasing program to the next level by actually branding and marketing the asset and service. While dark-fiber leasing has a finite ability to affect the telecommunications market, it could allow the City to grow its revenue with minimal expansion of operational capabilities. The City’s ability to grow its program will be directly influenced by the amount of excess fiber capacity available in any given fiber segment.

The City could also look at the possibility of forming a Public Private Partnership (PPP) with a last-mile retail provider that would have interest in entering the Lakeland market. Through lease of its dark fiber capacity, a retail provider could enter the Lakeland market using the existing city fiber assets, ultimately forgoing a full fiber buildout. The City of Lakeland would negotiate a revenue share with the potential partner based on gross revenue generated from the network. This revenue share would provide the City with system revenue, which could be used to calculate ROI and payback.

While PPPs have been very popular as of late, its impact on the community could be minimal, especially due to the size of the City of Lakeland. A PPP would introduce a single new provider to the market, which could “shake up” the current market paradigm. A successful negotiation of a PPP would include a revenue share to the City of the gross revenue generated from the City’s broadband assets.

A revenue share of 5%-10% of gross revenue could be expected and would generate a consistent annual revenue stream. This revenue share would be paid by the private partner through subscriber fees collected for the provision of broadband services. Negotiation of the revenue share is a balancing act as this is typically a pass-through of fees collected from local subscribers. Therefore, the higher the revenue share, the higher the fees passed onto the subscriber through service fees. Of course, the lower the revenue share, the lower the fees. It will be important for the City to understand the level and timeframe of payback it is willing to consider and should adjust the revenue share accordingly.

The value and return of dark fiber expansion is very difficult to quantify, as it is very much dependent on the opportunity presented. The City of Lakeland would not make any investments until an opportunity presents itself. This allows the City to determine how it will expand its network based on an individual case basis. This is not a “build it and they will come” scenario.

The City of Lakeland would utilize a Request for Information or Invitation to Negotiate process to identify potential providers that may be willing to partner with the City to use its fiber assets.

#### 4.1.1 Dark Fiber Analysis

	Dark Fiber
SERVICES OFFERED	<ul style="list-style-type: none"> <li>• Dark fiber only</li> <li>• Current model</li> </ul>
CUSTOMERS	<ul style="list-style-type: none"> <li>• Service providers</li> <li>• Community anchors</li> </ul>
OPPORTUNITY	<ul style="list-style-type: none"> <li>• Less exposure</li> <li>• No retail services</li> </ul>
RISKS	<ul style="list-style-type: none"> <li>• Slow growth</li> <li>• Lower participation from service providers</li> </ul>
COMMUNITY BENEFIT	<ul style="list-style-type: none"> <li>• Additional broadband infrastructure</li> <li>• Potential for new providers to enter market</li> </ul>
INITIAL CAPITAL REQUIRED	<ul style="list-style-type: none"> <li>• \$0</li> </ul>
USE OF CAPITAL	<ul style="list-style-type: none"> <li>• N/A, current model is opportunity driven</li> </ul>
FINANCIAL METRICS	<ul style="list-style-type: none"> <li>• N/A, current model is opportunity driven</li> </ul>

## **5. Launch as an Open Access Provider**

### **5.1 What is an Open Access Provider?**

An open-access provider owns and operates the physical fiber-optic network and transport services through which retail service providers deliver services to end users. Instead of providing dark fiber, an open-access network provides a wholesale transport connections or bandwidth to service providers. Retail service providers purchase services from the provider to reach end users using fiber-optic lit connections. This model alleviates the open-access provider from managing any end user services or customers. It allows retail providers to use the open-access network to reach more customers without the need to build costly fiber infrastructure to subscribers; the open-access provider is responsible for this function. Cities find open-access a compelling business model because it allows them to focus on the operating infrastructure and a low level of active electronics, and it allows them to attract multiple service providers to their networks, which helps stimulate competition and keep prices low for subscribers.

In an open-access network, the City of Lakeland would not provide any retail services directly but would provide a new wholesale fiber solution to service providers that would utilize the network to serve businesses, community anchors and potentially residents within Lakeland or the greater electric service territory. In doing so, the City could potentially provide a new source of broadband access to service providers while maintaining neutrality and nondiscrimination and alleviating competitive risks with Lakeland's existing service providers. In an open access network, the City's customers are service providers rather than retail customers, allowing the City to maintain transparency and avoid any direct "customer service" issues with customers using the network.

### **5.2 How does Lakeland Become an Open Access Provider?**

Becoming an open-access provider would require the City of Lakeland to create an appropriate organizational and operational structure to manage wholesale telecommunications services. Some considerations for the City to evaluate in implementing an open-access network include the additional operations and management responsibilities required to maintain the network, recruitment, negotiation, and provision of new services, and financing requirements to build the network.

The City will be also responsible for implementing and maintaining network electronics to manage services on the network. While this equipment is relatively easy to manage it does require the City to have technical resources and the right operational structure to provision and monitor services as they are deployed.

In order for service providers to consider providing services over Lakeland's network, the City must establish Service Level Agreements (SLA) that are similar to what service providers receive in the current telecommunications industry and in turn what they provide to their

retail customers. The City will also need to define business and operational processes to manage the network and ensure that service providers' needs are met. Further, deployment of an open access network requires new funding for construction of last-mile fiber, network electronics, operational support systems, and potentially new staffing or an outsourced network operator who will manage the network on the City's behalf.

### **5.3 How do Customers Subscribe to Services?**

Service providers would interconnect with the City's open-access network through a Network-to-Network Interface (NNI) with the City's network electronics. The City would strategically deploy field equipment, known as Optical Line Terminals (OLTs), in service areas throughout the City to serve local business districts (and potentially neighborhoods in the future). This equipment would connect back to a centralized colocation facility or data center where service providers would interconnect with the City's network. Several data centers are currently available within the City of Lakeland that could accommodate these needs.

Service providers would request new connections to their customers from the City. Once a customer signed with a service provider, the service provider would order transport service to the new customer. Once the service provider signed a service order with the City and paid any upfront charges, the City would build the last-mile fiber connection to the end customer and provision a transport service through its network back to the interconnection point with that service provider. The City would charge a monthly recurring fee to the service provider for use of the transport service for a certain contract term and at a certain bandwidth. The City would maintain a rate structure based on bandwidth, with increasing charges for more bandwidth. This would allow the City to upcharge the service providers as customers utilize more bandwidth and implement a tiered pricing structure from lower-speed services to 1 Gbps and 10 Gbps services.

### **5.4 Are there any risks?**

The City's key risks in developing an open-access network include the burden of managing an active telecommunications services network and securing participation from local service providers. To operate an open-access network, the City would need to maintain management and operations personnel with relevant expertise and skills to ensure service level guarantees to both customers and their service providers. In an open-access network, the City's customers are service providers who require strict service level agreements to certify an open-access network for use. Providers will often test these networks to ensure service quality before use. The City would need to achieve and enforce these service quality guarantees to attract and secure service providers on its network. Providers are often skeptical of municipal capabilities to perform these functions and a lengthy process of recruitment may ensue to convince providers to use the City's open-access network.

One alternative would be to enlist the services of a network operator to manage the City's open-access network. Cities have done so when the requirements to manage these networks

stray too far from their core competencies. There are many network operators capable of performing these functions but the services would come at a cost. These costs would need to be analyzed in a financial plan for the network to determine if outsourcing the management of the open-access network could be sustained financially.

**5.5 Where would Lakeland offer this service?**

As indicated below in Figure 1 and Figure 2, the City of Lakeland would target the Airport Park and the Downtown Core initially as its service area. The City would build out the feeder/distribution network within these areas, which would allow any business or anchor located within these areas the ability to take service from a service provider operating on Lakeland’s network without any substantial aid to construction costs. When a business signs a service order for service, the provider would in turn order a circuit from the City who would then construct the fiber lateral, otherwise known as the “drop” to the businesses premise. These service areas have initially been identified due to the aggregate number of businesses located in each area.

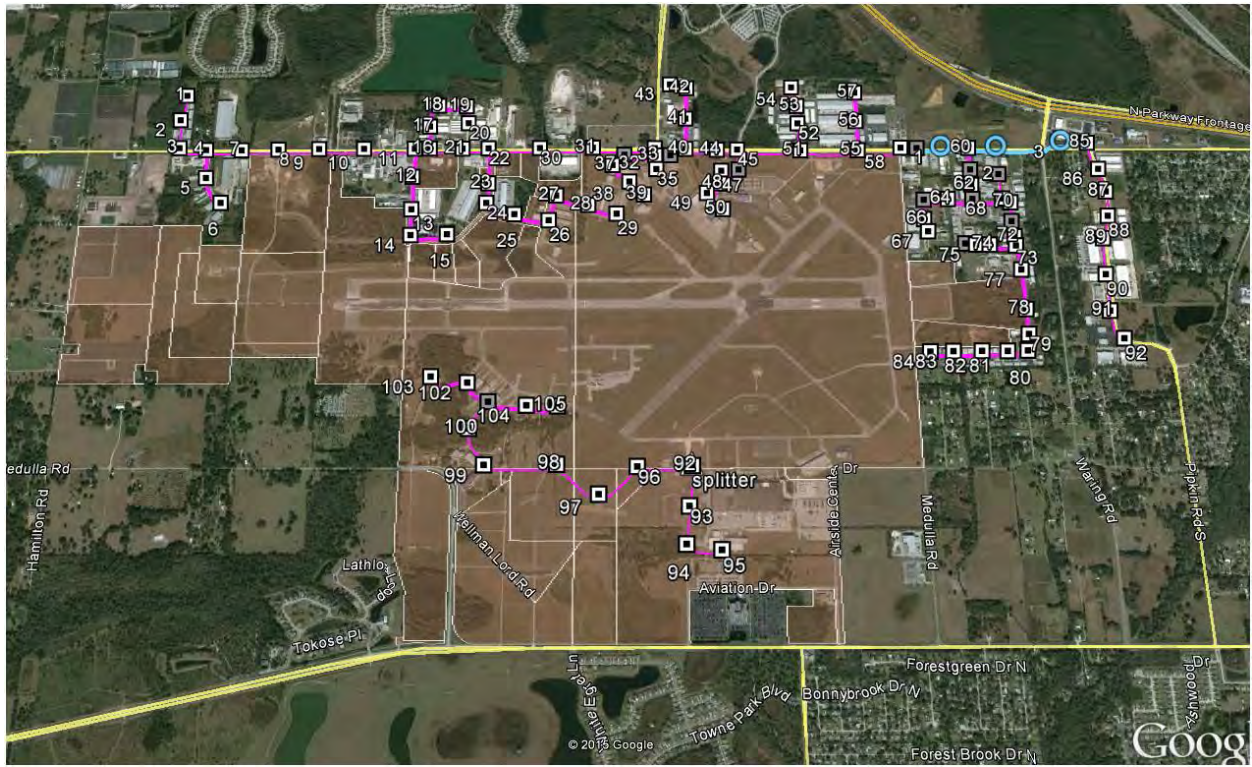
While the initial capital estimates were developed to support these service areas, the network equipment and supporting components can scale to support a much larger service area than has been initially included. Lakeland could very easily extend its open-access service offering into the greater Lakeland area.

**5.5.1 Business Counts and Capital Costs for Each Service Area**

	Downtown Core	Airport Park	Total
Businesses Passed	794	200	994
Capital Costs	\$795,087	\$977,374	\$1,772,461



Figure 1: City of Lakeland Airport Park, Broadband Service Area







### 5.5.2 Circuit Growth and Staffing

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Business Circuits	6	21	53	115	177	231	270	303	319
Dedicated Circuits	0	0	2	4	6	6	6	6	6
Total Circuits	6	21	55	119	183	237	276	309	325
Full-time Employees	1	1	1.5	2	2.5	3	3	3	3

### 5.5.3 Potential Monthly Fee Structure for Circuits

	Potential Monthly Fees
<b>Best-Effort Circuits</b>	
50/10 Mbps	\$109.99
100/25 Mbps	\$134.99
200/50 Mbps	\$209.99
300/50 Mbps	\$279.99
500/100 Mbps	\$384.99
1000/50 Mbps	\$799.99
<b>Dedicated Circuits</b>	
50 Mbps	\$499.00
100 Mbps	\$999.00
500 Mbps	\$1,999.00
1000 Mbps	\$2,599.00
<b>Installation &amp; Activation</b>	
Best-Effort	\$99.00
Dedicated	\$999.00

#### 5.5.4 City of Lakeland Open-Access Analysis

	Open Access Provider
SERVICES OFFERED	<ul style="list-style-type: none"> <li>• Wholesale lit fiber</li> </ul>
CUSTOMERS	<ul style="list-style-type: none"> <li>• Service providers</li> <li>• Community anchors</li> </ul>
OPPORTUNITY	<ul style="list-style-type: none"> <li>• Less exposure</li> <li>• No retail services</li> </ul>
RISKS	<ul style="list-style-type: none"> <li>• Operating expertise</li> <li>• Delivering service levels</li> </ul>
COMMUNITY BENEFIT	<ul style="list-style-type: none"> <li>• Multiple new providers (competition)</li> <li>• Broadband infrastructure investments</li> <li>• Portion of telecom spend kept local</li> </ul>
INITIAL CAPITAL REQUIRED	<ul style="list-style-type: none"> <li>• \$4.4 million</li> </ul>
USE OF CAPITAL	<ul style="list-style-type: none"> <li>• Fiber distribution buildout</li> <li>• GPON equipment</li> <li>• Operating funds</li> </ul>
FINANCIAL METRICS	<ul style="list-style-type: none"> <li>• Positive Net Income by Year 7</li> <li>• Free Cash Over 10 Years - \$650,000</li> </ul>

## **6. Launch as Retail Services Provider**

### **6.1 What is a Business Services Provider?**

As a business broadband provider, the City would expand its current network to provide two core services to businesses in the Lakeland service area: Internet and voice. In addition to these two core services, the City has the opportunity to provide value added services to local businesses. These services include but are not limited to hosting, data backup, and cloud services. Many value added services can be delivered on top of Lakeland's network through the cloud. Delivering Internet services to businesses allows the City to use this delivery platform to provide new services with relative ease, particularly when they are Internet or cloud based.

The City will also be able to offer transport services that provide connectivity between two points in the network, allowing businesses with multiple locations in Lakeland to connect to one another. Transport can also provide a branch office with connectivity to its company headquarters if located outside of Lakeland. In these cases, the City will be able to offer "Type-II Services" to other service providers, allowing them to interconnect with the Lakeland network to provide last-mile connectivity to a local branch office from a connection to a corporate site located in another geographic region.

The City will also have the opportunity to provide some hosting and colocation services at its data center should Lakeland choose to construct a facility. This data center facility would enable service providers, businesses, and organizations to utilize Lakeland's local hardened facility to collocate technology and infrastructure. This offering may also be attractive to other community anchors in the area as a disaster recovery facility that provides redundancy and a hot standby site for these organizations.

### **6.2 What services would Lakeland offer?**

The City would initially offer Internet and voice services to businesses and anchors located in the Lakeland service area, initially in the Downtown Core and within the general vicinity of the Airport Park. The network would allow the City to provide shared broadband services using Gigabit Passive Optical Network (GPON) technology and dedicated broadband services using Active Ethernet (AE) technology. GPON is a shared technology which provides an "up to" bandwidth but at much greater speeds than cable or DSL. GPON has the ability to offer up to a 1 Gbps connection to every subscriber but does not provide guaranteed bandwidth at all times. Actual bandwidth is subject to other users in the system who are vying for bandwidth at the same time.

GPON services are an excellent option for businesses small to large that do not require a guaranteed line rate connection (i.e. 1 Gbps available all of the time). Large businesses and others with high-bandwidth, consistent data needs would subscribe to the dedicated service based on Lakeland's AE platform. This platform would guarantee full bandwidth on the service

purchased 100% of the time. The AE product is priced significantly higher because of this guarantee.

### **6.2.1 Business Internet**

Business Internet services will provide high-performance, scalable Internet services to businesses in the service area. The City's business Internet services will provide tiered services that allow businesses to purchase exactly the right amount of bandwidth for their Internet needs. The City also has the opportunity to provide symmetric service; a significant benefit to businesses that the competition cannot support today. Instead of rebranded residential services, which the local DSL and cable providers offer in the market, the City will be able to offer direct, symmetric, fiber-optic Internet to businesses at affordable prices. The City's business Internet services will provide the highest performing, most reliable services in the market, and will compete on this differentiating advantage to drive significant market share in the small, medium, and large business market. The City's business Internet services will also be targeted at Lakeland's community anchors including schools, hospitals, and other critical organizations.

Lakeland will maintain redundancy with its upstream Internet providers and provision sufficient supply of Internet to ensure customers receive the services for which they subscribe. The City's Internet service will connect to the major Internet backbone to ensure high performance and low latency to the major Internet sites across the world. Lakeland will be able to offer its customers IP addresses directly from its own allocation from the American Registry of Internet Numbers (ARIN).

### **6.2.2 Business Voice, Hosted PBX & SIP Trunking**

By leveraging VoIP technology, the City will offer its business customers flexibility and affordably while providing reliable and feature-rich business phone services. The City would provide a private label voice offering, which will minimize incremental operating costs as it grows. The private label option allows the City to offer voice services with very little upfront capital investment and use a license fee model to grow.

## **6.3 Where would Lakeland offer this service?**

As indicated below in Figure 3 and Figure 4, the City of Lakeland would target the Downtown Core and the Airport Park initially as its service area. The City would build out the feeder/distribution network within these areas that would allow any business or anchor located within these areas the ability to take service without any substantial aid to construction costs. When a business signs a service order for service, the City would construct the fiber lateral, otherwise known as the "drop" to the businesses premise. These service areas have initially been identified due to the aggregate number of businesses located in each area.



While the initial capital estimates were developed to support these service areas, the network equipment and supporting components can scale to support a much larger service area than has been initially included. Lakeland could easily roll these services into the greater Lakeland area, making greater use of the initial sunk capital to expand its business service offerings.

Figure 3: City of Lakeland Downtown Core, Broadband Service Area

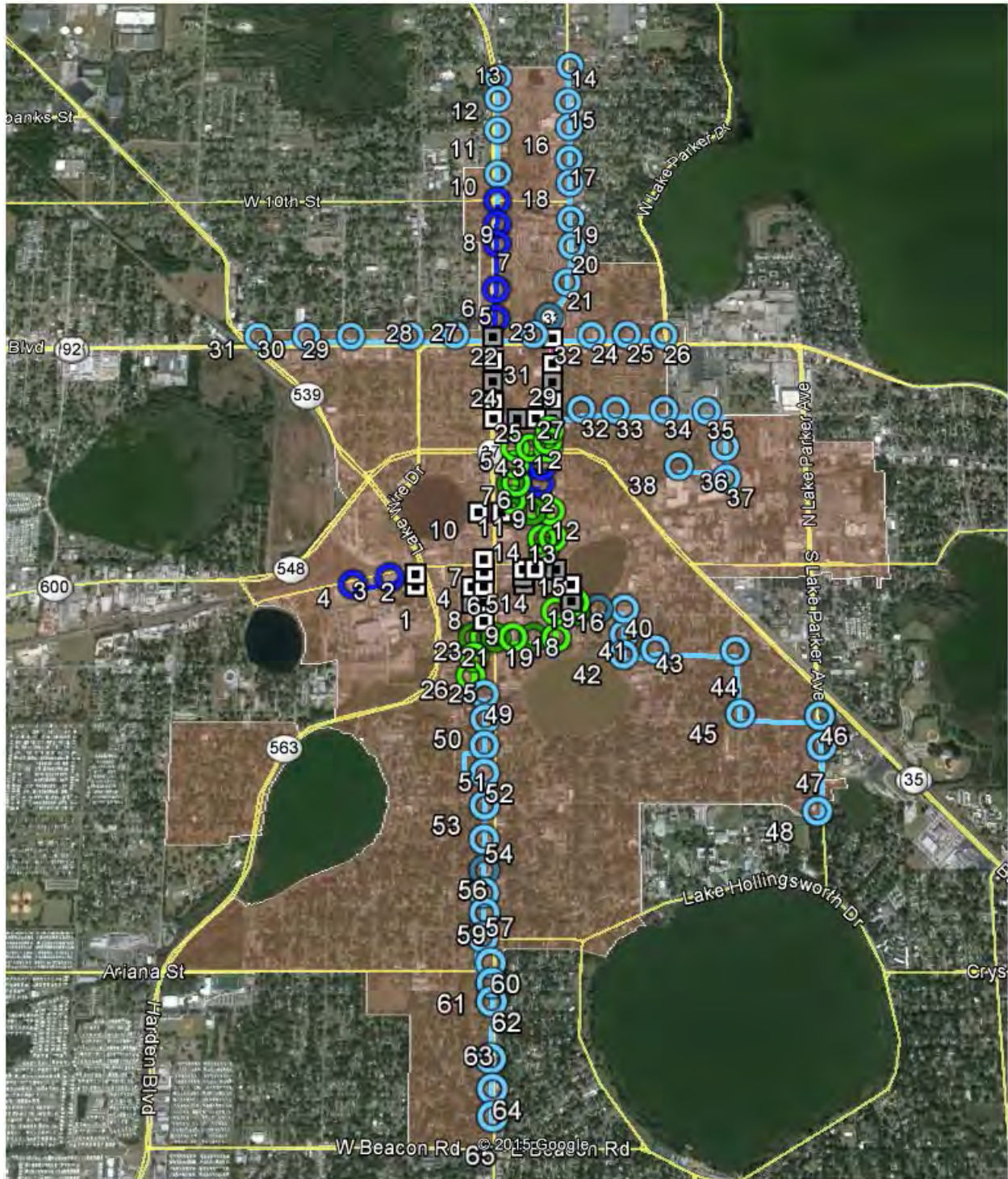
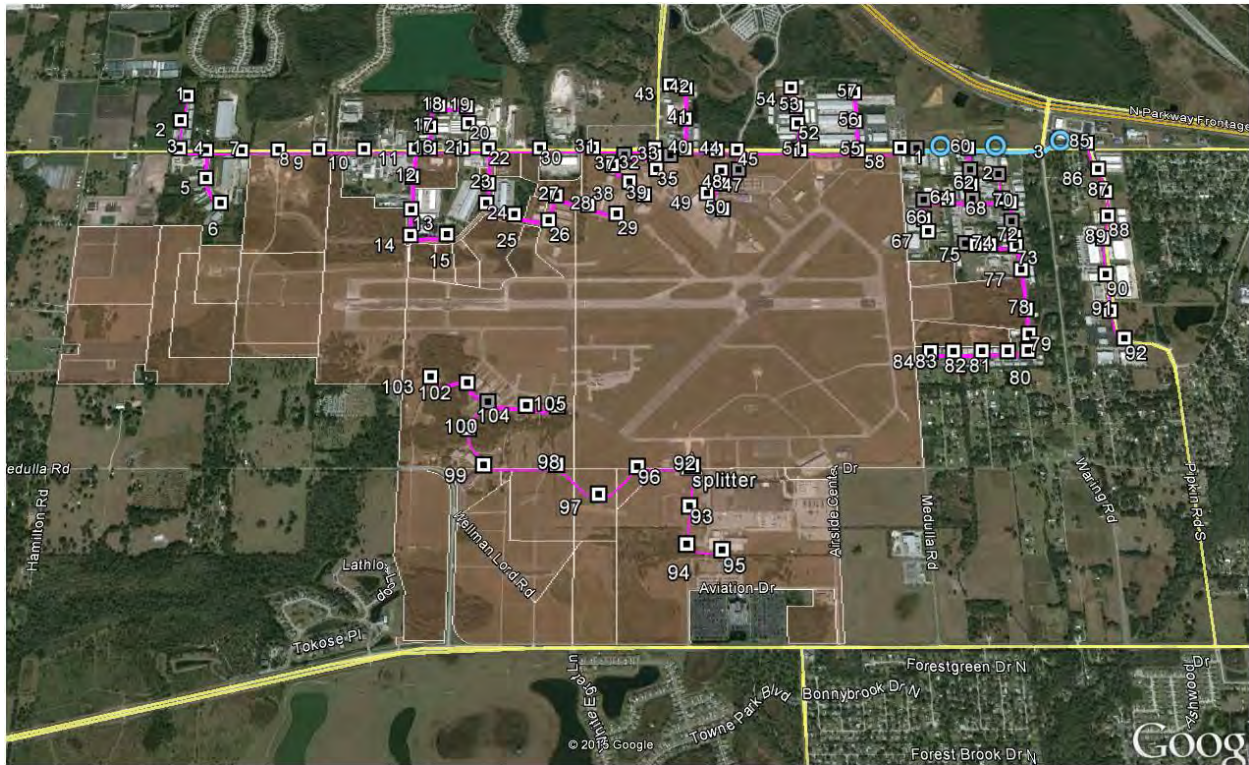




Figure 4: City of Lakeland Airport Park, Broadband Service Area



### 6.3.1 Business Count and Capital Costs for Each Service Area

	Downtown Core	Airport Park	Total
Businesses Passed	794	200	994
Capital Costs	\$795,087	\$977,374	\$1,722,461

### 6.3.2 Customer Growth and Staffing

	2016	2017	2018	2019	2020	2021	2022	2023	2024
Voice	0	10	31	62	93	125	158	180	191
Business Internet	6	38	99	183	268	332	374	407	423
Dedicated Internet	0	0	4	8	12	16	18	20	20
Total Internet	6	38	103	191	280	348	392	427	443
Full-time Staff	1	1.5	2	2.5	3	4.5	6	6	6

### 6.3.3 Potential Monthly Fee Structure

	Potential Monthly Fees
<b>Business Voice</b>	
Voice - 1 - 3 Lines	\$42.95
Voice - 5 - 8 Lines	\$41.95
Voice - 9 Lines or more	\$39.95
<b>Business Internet</b>	
50/10 Mbps	\$109.99
100/25 Mbps	\$134.99
200/50 Mbps	\$209.99
300/50 Mbps	\$279.99
500/100 Mbps	\$384.99
1000/50 Mbps	\$799.99
<b>Anchor &amp; Dedicated Internet</b>	
50 Mbps	\$499.00
100 Mbps	\$999.00
500 Mbps	\$1,999.00
1000 Mbps (1 Gbps)	\$2,999.00
<b>Installation &amp; Activation</b>	
Business	\$99.00
Anchor	\$999.00



### 6.3.4 City of Lakeland Business Services ISP Analysis

	Business Services Provider
SERVICES OFFERED	<ul style="list-style-type: none"> <li>• Internet services</li> <li>• Voice services</li> <li>• Lit transport</li> </ul>
CUSTOMERS	<ul style="list-style-type: none"> <li>• Businesses</li> <li>• Community anchors</li> </ul>
OPPORTUNITY	<ul style="list-style-type: none"> <li>• More control</li> <li>• Greater community benefits</li> <li>• Greater return on investment</li> </ul>
RISKS	<ul style="list-style-type: none"> <li>• Competitive environment</li> <li>• Customer uptake</li> </ul>
COMMUNITY BENEFIT	<ul style="list-style-type: none"> <li>• New fiber based services</li> <li>• Telecom spend kept local</li> <li>• Local support and operation</li> </ul>
INITIAL CAPITAL REQUIRED	<ul style="list-style-type: none"> <li>• \$4.4 million</li> </ul>
USE OF CAPITAL	<ul style="list-style-type: none"> <li>• Fiber distribution buildout</li> <li>• Gigabit Passive Optical Network (GPON) equipment</li> <li>• Data center / Central Office</li> <li>• Operating funds</li> </ul>
FINANCIAL METRICS	<ul style="list-style-type: none"> <li>• Positive Net Income by Year 5</li> <li>• Free Cash Over 10 Years - \$1.6M</li> </ul>

## 7. Launch as a Fiber to the Home Service Provider

As a FTTH provider, the City of Lakeland would provide retail end user services to residents (and businesses/community anchors) over its fiber-optic network. These services may include Internet, voice and television, or any combination of the three. The City would manage the entire service platform, including delivery of Internet, voice, and television services to customers. Under this model, Lakeland builds fiber-optic infrastructure to individual residents and businesses throughout the broadband service area.

FTTH is the most aggressive model that Lakeland could undertake for a number of reasons. These reasons include the following:

- Market size
- Electric service territory rural makeup
- Operational requirements
- Funding requirements

Included in this analysis is deployment of FTTH services to all homes and businesses within the City of Lakeland city limits and the Lakeland Electric service territory. The financial analysis has been developed using industry average costs per passing and per subscriber estimates. In addition, we have utilized the number of meter accounts from Lakeland Electric to determine the various cost structures. The subscriber counts are as follows:

- Within city limits:
  - Residential subscribers: 44,001
  - Business subscribers: 7,242
- Within service territory (rural):
  - Residential subscribers: 59,400
  - Business subscribers: 5,583

### 7.1.1 City of Lakeland FTTH Analysis - Capital Costs and Funding

		Cost per Passing Feeder/Distribution		Total Feeder Distribution Costs		Funding Required	
	Total Units	Low	High	Low	High	Low	High
City Limits	51,243	\$609	\$825	\$31.2M	\$42.3M	\$70M	\$120M
Service Area	116,226	\$928	\$1,113	\$107.8M	\$129.4M	\$220M	\$270M

### 7.1.2 City of Lakeland FTTH Analysis - Financial Performance

			Positive Net Income		Free Cash Flow Over 20 Years	
	Uptake	Subscribers >5 Years	Low	High	Low	High
City Limits	45%	23,000	Year 5	Year 6	\$56M	\$43M
Service Area	45%	55,000	Year 6	Year 7	\$98M	\$89M

### 7.1.3 City of Lakeland FTTH ISP Analysis (Service Area)

	Fiber To The Home Service Provider
SERVICES OFFERED	<ul style="list-style-type: none"> <li>• Internet services</li> <li>• Voice services</li> <li>• Lit transport</li> <li>• Video</li> </ul>
CUSTOMERS	<ul style="list-style-type: none"> <li>• Businesses</li> <li>• Residents</li> <li>• Community anchors</li> </ul>
OPPORTUNITY	<ul style="list-style-type: none"> <li>• More control</li> <li>• Greater community benefits</li> </ul>
RISKS	<ul style="list-style-type: none"> <li>• Operating expertise</li> <li>• Delivering service levels</li> <li>• Execution of retail service delivery</li> <li>• Competition</li> </ul>
COMMUNITY BENEFIT	<ul style="list-style-type: none"> <li>• Lakeland offers new services - competition</li> <li>• Broadband infrastructure investments</li> <li>• Telecommunication spending kept local</li> </ul>
INITIAL CAPITAL REQUIRED	<ul style="list-style-type: none"> <li>• \$220-270 million</li> </ul>
USE OF CAPITAL	<ul style="list-style-type: none"> <li>• Fiber distribution buildout</li> <li>• Gigabit Passive Optical Network (GPON) equipment</li> <li>• Data center / Central Office</li> <li>• Operating funds</li> </ul>
FINANCIAL METRICS	<ul style="list-style-type: none"> <li>• Positive Net Income by Year 6-7</li> <li>• Free Cash Over 10 Years - \$89-98 million</li> </ul>

## 8. Business Model Comparison

### 8.1.1 City of Lakeland Business Model Analysis

	Dark Fiber	Open Access	Business Services ISP	FTTH ISP
SERVICES OFFERED	<ul style="list-style-type: none"> <li>Dark fiber only</li> <li>Current model</li> </ul>	<ul style="list-style-type: none"> <li>Wholesale lit fiber</li> </ul>	<ul style="list-style-type: none"> <li>Internet services</li> <li>Voice services</li> <li>Lit transport</li> </ul>	<ul style="list-style-type: none"> <li>Internet services</li> <li>Voice services</li> <li>Lit transport</li> <li>Video</li> </ul>
CUSTOMERS	<ul style="list-style-type: none"> <li>Service providers</li> <li>Community anchors</li> </ul>	<ul style="list-style-type: none"> <li>Service providers</li> <li>Community anchors</li> </ul>	<ul style="list-style-type: none"> <li>Businesses</li> <li>Community anchors</li> </ul>	<ul style="list-style-type: none"> <li>Businesses</li> <li>Residents</li> <li>Community anchors</li> </ul>
OPPORTUNITY	<ul style="list-style-type: none"> <li>Less exposure</li> <li>No retail services</li> </ul>	<ul style="list-style-type: none"> <li>Less exposure</li> <li>No retail services</li> </ul>	<ul style="list-style-type: none"> <li>More control</li> <li>Greater community benefits</li> <li>Greater return on investment</li> </ul>	<ul style="list-style-type: none"> <li>More control</li> <li>Greater community benefits</li> </ul>
RISKS	<ul style="list-style-type: none"> <li>Slow growth</li> <li>Lower participation from service providers</li> </ul>	<ul style="list-style-type: none"> <li>Operating expertise</li> <li>Delivering service levels</li> </ul>	<ul style="list-style-type: none"> <li>Competitive environment</li> <li>Customer uptake</li> </ul>	<ul style="list-style-type: none"> <li>Operating expertise</li> <li>Execution of retail service delivery</li> <li>Competition</li> </ul>
COMMUNITY BENEFIT	<ul style="list-style-type: none"> <li>Additional broadband infrastructure</li> <li>Potential for new providers to enter market</li> </ul>	<ul style="list-style-type: none"> <li>New competition</li> <li>Broadband infrastructure investments</li> <li>Portion of telecom spend kept local</li> </ul>	<ul style="list-style-type: none"> <li>New fiber based services</li> <li>Telecom spend kept local</li> <li>Local support and operation</li> </ul>	<ul style="list-style-type: none"> <li>New competition</li> <li>Broadband infrastructure investments</li> <li>Telecommunication spending kept local</li> </ul>
INITIAL CAPITAL REQUIRED	<ul style="list-style-type: none"> <li>\$0</li> </ul>	<ul style="list-style-type: none"> <li>\$4.4 million</li> </ul>	<ul style="list-style-type: none"> <li>\$4.4 million</li> </ul>	<ul style="list-style-type: none"> <li>\$220-270 million</li> </ul>
USE OF CAPITAL	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Fiber distribution buildout</li> <li>GPON equipment</li> <li>Operating funds</li> </ul>	<ul style="list-style-type: none"> <li>Fiber distribution buildout</li> <li>GPON equipment</li> <li>Data center / CO</li> <li>Operating funds</li> </ul>	<ul style="list-style-type: none"> <li>Fiber distribution buildout</li> <li>GPON equipment</li> <li>Data center / CO</li> <li>Operating funds</li> </ul>
FINANCIAL METRICS	<ul style="list-style-type: none"> <li>N/A</li> </ul>	<ul style="list-style-type: none"> <li>Positive Net Income by Year 7</li> <li>Free Cash Over 10 Years - \$650,000</li> </ul>	<ul style="list-style-type: none"> <li>Positive Net Income by Year 5</li> <li>Free Cash Over 10 Years - \$1.6M</li> </ul>	<ul style="list-style-type: none"> <li>Positive Net Income by Year 6-7</li> <li>Free Cash Over 20 Years - \$98-89M</li> </ul>