

CLACKAMAS COUNTY BOARD OF COUNTY COMMISSIONERS

Policy Session Worksheet

Presentation Date: 4/7/2020 **Approx. Start Time:** 11:00 am **Approx. Length:** 30 Min

Presentation Title: ISP Pilot Project

Department: Technology Services

Presenters: Dave Cummings, CIO / Director, Technology Services, Duke Dexter, CBX Coordinator

Other Invitees: Dave DeVore, Ron Sandner, Scott Brown

WHAT ACTION ARE YOU REQUESTING FROM THE BOARD?

Approval of the Clackamas Broadband eXchange (CBX) program moving forward with a Proof of Concept (POC) project to become an Internet Service Provider (ISP) as outlined in the latest CBX Business Operations Plan.

EXECUTIVE SUMMARY:

CBX has built a successful fiber infrastructure for the purposes of leasing high capacity dark fiber to schools, government agencies, fire / life / safety, utilities and similar institutions in and around Clackamas County at greatly reduced pricing. CBX has continued to grow into adjacent counties. However CBX only provides dark fiber at this time.

CBX is currently working on a POC project to develop partnerships with established ISP vendors to provide full solutions to County locations currently under-served with CBX providing the fiber infrastructure and the ISP providing the internet services. However, there are also areas in the County where ISP partnerships are not feasible due to the lack of business potential to maintain an ISP vendor investment. In these situations it may require CBX to be both the fiber and ISP provider. Currently CBX requires more experience, staffing and funding to become a full ISP. Therefore CBX is proposing to ramp up our capability by proceeding with several POC projects in areas where there is definite business potential (such as business parks) to provide added experience, funding and knowledge to slowly move into the ISP market where other ISP vendors do not want to invest. These POC projects would help position CBX in both skill and revenue to grow into an ISP in the under-served locations throughout the County. Such growth is crucial for the continued economic development of the County and expansion of services for the residences such as the capacity to telecommute from home.

FINANCIAL IMPLICATIONS (current year and ongoing):

Is this item in your current budget? YES NO

What is the cost? \$ ~ \$38,660 What is the funding source? CBX Funds 602-0271

This is based on the estimated cost for construction, equipment and build out of 1 POC Business Park with an estimated 7 customers. This also includes 6 months of ISP coverage with no revenue until starting with month 7. Actual costs will vary with the location and customer count of the POC. After a 6 month grace period, customers will be billed to recover the costs of the build out and ISP services.

STRATEGIC PLAN ALIGNMENT:

- How does this item align with your Department’s Strategic Business Plan goals?
This is in alignment with Technology Services’ goals of building a high performance dark fiber infrastructure
- How does this item align with the County’s Performance Clackamas goals?
This is in alignment with the County’s goals of:
 - Build a strong infrastructure through these projects to help position CBX in both skill and revenue to grow into an ISP in the under-served locations throughout the County. Such growth is crucial for the continued economic development of the County and expansion of services for the residences such as the capacity to telecommute from home.
 - Access for all utilizing the key initiative of making high speed internet available throughout the County

LEGAL/POLICY REQUIREMENTS:

Approval to proceed with the proposed ISP POC projects would require a change in the current policy that CBX only provide dark fiber leasing to allow CBX to provide ISP services as well.

PUBLIC/GOVERNMENTAL PARTICIPATION:

N/A

OPTIONS:

Staff present this proposal before the Board of County Commissioners with two options:

- 1) Deny proceeding with ISP POC projects. Continue to operate as a dark fiber provider.
PRO: Reduced risk, no potential competition, no additional staff or resources required
CON: Dark fiber only, no growth of services, no coverage of under-served County areas
- 2) Allow CBX to proceed with POC projects as CBX both the fiber and Internet provider in some low risk locations. This will allow CBX to build experience, develop ISP service and support processes, start a new potential revenue source to help fund fiber connectivity to remote residents and enable CBX to apply for USGS grants. CBX will be better positioned to provide potential ISP services in the future if required for under-served regions of the County.

RECOMMENDATION:

Staff respectfully recommends the Board of County Commissioners approves option 2 allowing CBX to proceed with POC projects as CBX both the fiber and Internet provider in some low risk locations. This will allow CBX to build experience, develop ISP service and support processes, start a new potential revenue source to help fund fiber connectivity to remote residents and enable CBX to apply for USGS grants. CBX will be better positioned to provide potential ISP services in the future if required for under-served regions of the County.

ATTACHMENTS:

CBX Operations – Business Plan 2020-03

SUBMITTED BY:

Division Director/Head Approval _____
 Department Director/Head Approval ___ DC _____
 County Administrator Approval _____

For information on this issue or copies of attachments, please contact Dave DeVore@ 503-723-4996

Clackamas Broadband Exchange (CBX)
Operations/Business Plan

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1. Executive Summary

The CBX, a Clackamas County enterprise within the Technology Services Department, has seen steady growth in the years since its formation. This growth has given CBX a network footprint that serves 306 connections, which include both public and private sectors as well as telecom providers. Today's current fiber plant encompasses approximately 325 route miles. This dark fiber (1) has provided a great service to its customers and an even greater benefit to the County as a whole and recently has expanded to adjoining counties, as CBX and fiber connectivity become a regional concern.

2. Organizational History

In 2000, Clackamas County commissioned a Communications Needs Assessment and Feasibility study as a means to better understand the County's communications status and requirements.

The study revealed that the County Government was in need of access to affordable, high-speed communications infrastructure and services. A plea to the local telecoms was made but not considered by them as part of their current financial planning.

In 2009, Clackamas County applied for an American Recovery and Reinvestment Act of 2009 (ARRA) grant under the Broadband Technology Opportunities Program (BTOP) administered by the National Telecommunications and Information Administration (NTIA).

In 2010, Clackamas County was awarded a BTOP grant and began to develop the Clackamas Broadband eXchange (CBX).

NorthSky Communications began construction between March 2011 and October 2013 for the infrastructure planned in the BTOP Grant. Additional construction and expansion has continued as additional funding and partners became available to increase the scope of the initial project. CBX is proud of the fact that the project was able to come in on budget and exceed the original scope with our customers and infrastructure than planned. To this day, CBX has remained debt free.

CBX's current revenues provide not only for ongoing program expenses, but contingency for repairs and capital for ongoing expansion to new agencies, underserved regions and new service opportunities.

Since October 2013 the CBX project has successfully converted to a self-sustaining utility service for the County with revenue based on affordable rates for public and private agencies.

Dark Fiber – which is also known as unit **fiber** or black **fiber** – is an unused optical **fiber** that has been laid. It is usually used in Telecom and Network Communications

3. Accomplishments / Current Status

CBX has accomplished a lot since 2013.

- The enterprise has built a community network that provides multiple large fiber rings (2) throughout rural Clackamas County.
- Fiber Ring in the City of Lake Oswego.
- Multiple fiber rings in the city of West Linn.
- High-speed low cost fiber connectivity to all schools and public agencies within the County.
- Fiber connectivity to the Pittock, the Regional Central Fiber Hub in downtown Portland. This connectivity is quite desirable for local telecoms and is now an essential component for the growth of the CBX.
- A fiber link that does not cross bridges or fault lines which would entail a low risk fiber connectivity from the Portland area to Denver Colorado enabling COOP connectivity in regional emergencies thus allowing local telecoms to offer more reliable and cost effective services.
- The Kiwanis Project up Hwy 26 collaborating ISP services through Sandy Net to homes in that area.
- Partnership with the City of Sherwood to provide low cost high-speed internet connectivity to local business within the County.
- Approval by the BCC to expand the CBX into adjoining counties was given at the Feb 17th, 2017 Policy Session which has helped in developing partnerships on projects that will bring revenue back into Clackamas County to help further our fiber footprint to unserved areas.
- Potential fiber projects with Washington County for traffic lights.
- Fiber connectivity to the MAJCS CCOM/911 organizations of our neighboring counties.
- Fiber connectivity within school districts in Multnomah County.

4. CBX Objectives/Strategies

With the successful completion of the grant phase of construction, CBX has been offering dark fiber and has continued to expand the fiber plant. The ongoing challenge of developing sustainable models dedicated to broadband expansion throughout the County will greatly enhance our economic development.

Fiber Ring - a ring network is a network topology in which each node connects to exactly two other nodes, forming a single continuous pathway for signals through each node - a ring. Data travels from node to node, with each node along the way handling every pa

While the initial goal of establishing a large fiber backbone has been accomplished, CBX will continue to find ways to expand the public network and increase its fiber footprint to achieve low cost access for all.

With several regional telecommunication providers now utilizing CBX to expand their services, the goal of providing a backbone for new services opportunities is developing. CBX is currently in negotiations with several additional providers to build upon this success and develop new opportunities including new construction service areas, partnerships, and new solutions to achieve access for all within the county.

CBX, in concert with other agencies such as SandyNet, City of Sherwood, Clackamas ESD, Multnomah ESD, Stone Creek Golf Course, Reliance Connects, and several other local telecoms, are already coordinating with potential new businesses and industries to locate to the greater Portland area and utilize CBX as a crucial service related to their business. CBX is developing these partnerships to design, construct and market broadband solutions for data-centric industries. This is new territory for Clackamas County, as such partnerships develop to expand economic opportunities on multiple levels and services.

CBX must remain debt free and financially self-sufficient, relying on generated revenue from the lease of dark fiber, both by connection and in complete fiber strands and any Grant funding that can be acquired.

There are specific strategies that the CBX will need to continue to focus on. The strategies include service offerings comprising dark fiber installation and ISP/partnerships to achieve access for all. These areas of focus are key drivers to maintain sustainability and growth. CBX will maintain current fiber build projects while seeking proof of concept projects with partnering ISP's to reach County residences and businesses with access and services. This approach will help fund future expansion into remote under/un-served areas of the county that have a need for internet connectivity. Regional partnerships with adjoining counties to enable CBX to bring revenue back into the county will develop our fiber footprint to out rural areas.

See Attachment A – CBX Current Dark Fiber Revenues / Expenses Sheet

5. Product Offerings

Dark Fiber Installation

CBX offers Dark Fiber transport over its backbone. Will continue to grow this backbone regionally increasing opportunities for all ISP'S/Agencies wishing to reach urban and regional customers.

ISP / Partnerships

CBX currently collaborates with other telecom Internet Service Providers creating a great opportunity for CBX to increase utilization of the dark fiber and generating revenue. With the sales force these ISP's offer they have a greater opportunity and operational/support to sell services in Clackamas County than what CBX can currently do on its own. Furthermore, since these ISP's have great insight into the needs of their current customers they can be used to help attract new businesses to Clackamas County.

Partnerships with other public agencies also offers CBX great opportunities. CBX is currently collaborating with the Clackamas Educational Service District (CESD), the City of Sandy (SandyNet), the City of Sherwood, and Reliance Connects and the list is growing.

The City of Lake Oswego has done a market study and identified a neighborhood that is very pro fiber to the home and surveys indicate those residents are willing to support the cost of such a build thru special assessment. The City has approached CBX and is very interested in having the CBX build this fiber plant. The exact definition of this partnership is still undefined as to whether the City of Lake Oswego would actually become their ISP.

The City of Milwaukee is also a potential partner and is watching where we are going with CBX.

If more of the cities within Clackamas County would, work together on projects to get fiber to the home/business with their support and financial help a cost effective fiber model would be achieved. Working together through partnerships is a great way to expand economic development within Clackamas County.

ISP / Stand Alones

In situations where there are no interest in partnership, service offerings by local telecoms, CBX would find it necessary to offer the ISP services itself. This could entail giving business and home owners throughout the county a choice in telecom services with lower costs and higher speed services. This initially would be expensive and the ROI could take longer depending on the location of the services.

6. Roles and Responsibilities including Staffing Costs

CBX will begin by growing a full crew to continue to bid on and construct dark fiber installation. If necessary, when dark fiber is developed to locations where no other carrier is willing to offer services, CBX will have to establish a business setup with essential staffing to market and support such actions. The initial staffing structure would look as follows:

CBX structure for fiber builds and ISP services: (Staffing requirements)

1 CEO (Dave DeVore) -

1 Network Engineer (Scott Brown IT Administrator)

1 Customer Service Agent (Duke Dexter Project Coordinator)

1 Crew Supervisor Communications Foreman (Vacant).

2 Outside Plant/Home Install workers (Existing Field Operators (Vacant)

1 Administrative Office account billing staff personnel Admin Specialist (Vacant)

Part Time 10% - Dave DeVore – CBX CEO (\$26,201). Under administrative direction, to organize, direct and manage technical, administrative and program operations for Clackamas Broadband eXchange (CBX); to provide highly responsible and complex administrative support to the Director of Technology Services for the County; and to do other work as required.

Full Time 100% - Duke Dexter – CBX TS Project Coordinator (\$186,030). Under general direction, to plan, organize and coordinate Clackamas Broadband eXchange (CBX) projects; to coordinate and facilitate task forces responsible for project development and evaluation; to implement strategies and action plans; and to do other work as required.

Full Time 100% - Scott Brown – CBX IT Administrator, Senior (\$156,200). Under the direction of the TS Project Coordinator, to provide enterprise level support, planning, design, maintenance and implementation of Clackamas Broadband eXchange (CBX); to act as the County's technical expert within CBX; to assist and support other CBX group members for the purpose of issue resolution or technology development and integration; to regularly act as project lead over assigned project staff and teams; and to do other work as required.

Full Time 100% - Crew Supervisor Communications Foreman (\$85,916). Responsible for completion of underground and aerial telecommunications construction related activities while ensuring compliance with all code and safety regulations.

Full Time 100% - Field Worker Equipment Operator (\$78,451). Responsible for mainly cable placement utilizing equipment specific to task in the telecommunications field and general construction as directed by Communication Foreman.

Full Time 100% - Field Worker Equipment Operator (\$78,451). Responsible for mainly cable placement utilizing equipment specific to task in the telecommunications field and general construction as directed by Communication Foreman.

Full Time 100% - Administrative Office Staff (\$88,605). Responsible for account billing and receiving, Participates in the administration and preparation of contract documents, grant applications and bid materials.

Annual Salary & Benefits Total - \$699,994, Home Base of Operations – TS2 Building

7. Overall CBX Growth Recommendations

Considering where the CBX is today in relation to staffing, knowledge and funding, we recommend the following:

- 1) Continue Fiber build projects within and in adjacent County's to generate revenues.

CBX will continue to bid on fiber projects within and outside the County to expand the CBX fiber footprint and bring in needed revenues for continued sustainable operation and the fiber footprint to rural areas of the County.

- 2) Perform Proof of Concept (PoC) projects to residential and business areas to develop our business knowledge of becoming an ISP on a limited but growing basis.

In order to increase our knowledge and demonstrate that we can perform CBX recommends a phased approach connecting Commercial Businesses, and Residential through shared partnerships and CBX solutions where necessary and starting with (PoC) Proof of Concept low risk projects.

This approach entails doing projects developing successful templates to provide sustainable services to locations within the County.

To initiate this phased approach we need to do two such projects (Business and Residential) to determine if we can actually do this with little or no risk and maintain sustainability. Once the PoC's are established and sustained, we can expand these templates to other areas of the county seeking eventual access for all.

The concepts would be to one residential location and one business location. The residential location would be to an area, which has a potential for future growth once the piloted grouping of homes are served sustainably. The business location can be a single business park or a series of businesses along the CBX fiber path.

- 3) Fully implement larger ISP offerings into urban and rural areas of the County by partnership or standalone County ISP Services.

Business Park fiber builds within the County are our best avenue for bringing in needed revenues to fund residential fiber builds. After our PoC projects we need to explore an expansion of this footprint as well as taking a look at expanding Fiber connectivity to large sections of the un-der / un-Served areas of the County. Increased knowledge of the ISP business, adequate support staffing and necessary funding will have to be in place before we do this.

- 4) For now, we should not go beyond PoC projects until the CBX has grown in its knowledge base, staffing, revenues to support collaborating, and becoming an ISP itself in a continued sustainable manner. We should review the stand alone ISP option again this time next year to see how our PoC projects have developed and if we are in better shape to undertake such a big responsibility.

The CBX has a formula for success, which entails the following ingredients:

- . Necessary capital funds to payroll projects
- . Adequate staffing to complete and support projects
- . Adequate time to go forward at a controlled rate
- . Proper tools to provide services
- . Build solid knowledge base through Proof of Concept projects

Proof of Concepts:

CBX and SandyNet are currently collaborating on a residential PoC project to bring internet services to a neighborhood up highway 26 called the Kiwanis Project. This project has already been approved by the Clackamas County BCC and is currently underway. SandyNet will be the ISP provider which a much more economical business arrangement than being a sole ISP ourselves. The footprint of this project will grow as we become sustainable in our initial phase.

Let us look at how these concepts would work:

Proof of Concept (PoC) Residential ISP Partnership Offering (Kiwanis)

Pros:

- Network/customer support provided by SandyNet
- Limited cost for a small sampling of residents
- No start up/operational ISP costs for CBX
- Minimal Risks
- New source of revenue for CBX

Cons:

- Potential increased load for backbone fiber repair
- Blowback from existing carriers
- Lower than expected take rate

Costs:

- IP space provided by SandyNet

- Fiber backbone construction (\$50K) – Includes reinforcing the existing backbone with strand and placing new Clearfield Lateral distribution fiber.
- Fiber lateral construction (\$73K) – Includes all lateral drop fiber, exterior connection and wall penetration into the house.
- New network gear for ISP delivery (\$14,378K) –

Item Quantity PPQ Total

Kiwanis Camp

E3-2	1	10,156.00 \$	10,156.00 \$
Alarm Cable	1	156.00 \$	156.00 \$
Pole Mount	1	120.00 \$	120.00 \$
OIM GPON B+ I-Temp	4	499.00 \$	1,996.00 \$
AC Power Supply	2	396.00 \$	792.00 \$
10G XFP 80K BiDi	2	450.00 \$	900.00 \$
10G SFP+ 80k BiDi	2	129.00 \$	258.00 \$

14,378.00\$

See Attachment B – Full Kiwanis Project Expense/Revenue Sheet

The take rate - refers to the number of users or site visitors that take action on an offer. It is also known as the visitor to lead conversion rate or the form completion rate. An attractive offer will have a higher take rate, as more consumers will want to sign up.

Feasibility:

The Kiwanis Project is located just north of Highway 26 on Forest Service Roads 29, 31, 35, 35A and 35B. This small community (134 homes) is severely underserved and provides an ideal PoC due to its proximity to an existing CBX fiber line. The Kiwanis Project is a partnership between Clackamas Broadband eXchange (CBX) and the City of Sandy (SandyNet). CBX will be providing and maintaining the physical fiber infrastructure and SandyNet will provide the ISP service along with any required customer service. This partnership draws on the strengths of both parties to deliver a much-needed service to a severely underserved area of Clackamas County.

In 2018 an outreach survey was done by Clackamas County PGA and results indicated that residents of the remote areas up Hwy 26 wanted access to affordable, higher speed Internet Services. This is where we call the Kiwanis Project PoC is an ideal example to test the ability of CBX to collaborate with an existing ISP to deliver much needed affordable internet services to severely underserved areas in Clackamas County. If this PoC proves successful, it could be a model for other areas that are in desperate need of higher bandwidth to keep up with today's ever-increasing dependency on internet services.

Proof of Concept (PoC) Business Offering

This concept location has not yet been determined.

Pros:

- Limited network/customer support requirements
- Limited cost for a small sampling of businesses
- Willing to pay larger install fees and monthly fees than residential
- Promotes Economic Development

Cons:

- Potential increased load on help desk
- Law suits or price drops from Comcast and other existing carriers
- Potential competition with partners
- Requires support system like help desk

Costs:

- IP space (up to 7) provided by carrier at \$460/month
- \$400/month for transport
- Network equipment upgrades (\$12.5K)
- Fiber construction of customers laterals (\$21K)
- Potential of additional support costs

See Attachment C - Business Stand Alone ISP Bare Bones – Work Sheet

Feasibility:

- Providing Internet access to select commercial entities would require minimum upfront investment (\$33.5K) by the County to start offering services. This would be to businesses already close to or on the network.

This small group of businesses would allow CBX the opportunity to provide ISP services to show that the staff/department has the knowledge to create and operate an ISP.

If providing services ourselves (CBX), to lower operational and financial risks of initial businesses signing up for the new services, we would offer the first 3-6 months free so the businesses can maintain their existing telecom services and see which service platform makes more business

sense for their operation. If the CBX solution proves to be a higher level of connectivity and is a financially better solution for them then at the 4-7month mark, they would start to be billed for services by CBX and they can then drop their other carrier thus giving them the highest possibility of success with their new internet connection.

8. Expansion Plan and Funding

The CBX needs to evaluate the un-served and under-served areas of the county to determine what areas are next to expand into once funding and CBX capacity is sufficient.

See Attachment D - Un-served and Under-Served Area Maps

CBX funding sources are limited to the following sources:

The CBX has an annual growing and sustainable revenue source obtained through the leasing of its dark fiber, which is outlined in attachment A.

Future dark fiber build projects for specific entities

Leasing of our existing dark fiber backbone

ISP Partnerships

Grant Funding – Could be for Distance Learning and Telecommunications USDA Grants

USDA Grants that help rural communities acquire the technology and training necessary to connect educational and medical professionals with the teachers and medical providers who serve rural residents at the local level. (Requires applicant to be an ISP)

We also need to keep in mind that once we start offering services over our Fiber backbone we will have to start paying PGE for pole attachments, as that was part of the free use agreement to attach our fiber to their poles. Cost estimates for this have not been negotiated at this time.

9. Supporting Research

For purposes of developing our own ISP model, we have reviewed a Case Study of the Components of being an ISP (SandyNet) for lessons learned to help further develop our own proof of concept projects.

Case Study:

This is a brief history of one of our ISP partners and the components that the City of Sandy used to be an ISP. This will give us an idea of what it takes to offer this type of service should the County be approved to also provide this option.

SandyNet started offering Internet in 2003 after GTE (then Verizon, now Frontier) was unable to service City Hall with DSL. They only had capacity to service 96 customers and all connections were used up.

They started offering service in two different ways. One was co-locating DSL equipment in the GTE central office and the other was placing some 900Mhz wireless equipment at the Fire Department, a hilltop in Boring, and a tower they built in Boring.

All of this work was done with contractors except modem provisioning with the city manager and finance director doing tech support. Billing was done through the utility billing department.

In 2005 the City hired their first full time tech and stopped using contractors. During the next two years an additional 900Mhz site was added, the edge network was upgraded, the City got a 100Mbps connection back to the Pittock for Internet access and they started deploying WiFi to the home instead of the 900Mhz wireless.

A few of the larger businesses in the downtown core were hooked up using funds from the Oregon Lottery. The downtown fiber was placed during an aerial-to-underground beautification project and also using Urban Renewal funds.

Throughout the years, the sewer/water fund helped float the SandyNet budget when things were tight.

The WiFi equipment was faster and cheaper than the 900Mhz equipment, so SandyNet started to see many more customers sign up with the new service offering.

In 2008 there were two full time staff members plus an occasional high school intern taking care of all customer support requests and building out the network.

In 2010 the City received a BIP grant as part of the stimulus and built three new tower sites for rural broadband. To feed these remote sites they extended fiber to the towers – this ultimately played a large role in being able to support their fiber to the home project a few years down the road.

With Netflix streaming becoming super popular the WiFi system was not able to keep up with demand. From 2010 to 2014 the staff of 3 spent their days trying to find ways to expand their capacity to the customer but it was a losing battle with WiFi. So in 2014 they signed with OFS to build a fiber to the home network.

In late 2015, the City hired three more staff to do home installs and outdoor construction. Previously they had hired all the work out, but the demand was so high that the city could not afford to use contractors anymore.

Currently they have:

- 1x Director/Network Engineer
- 1x Customer Service Agent
- 3x Outside Plant/Home Install workers

The City also has a SysAdmin to support the internal City network. In the next year they are proposing to hire another Network Engineer.

All SandyNet employees are trained to do field work and installations. From the time there was only 1 employee to now, climbing towers, bucket trucks, ladders, etc were all part of the job. It didn't matter if you were a director or an engineer, you did what needed to be done to serve the customers.

Former City Manager Scott Lazenby and his successor, Seth Atkinson had a very "citizen/customer first" policy. If there was an issue with the Internal City network and an issue with a SandyNet customer, "we were directed to help the SandyNet customer first".

By doing the work in-house, they are able to respond to issues faster and not have to worry about procurement rules as much. The City also follows State procurement rules, so they could single source to \$10k, instead of \$5k like Clackamas County. They are also allowed to purchase used equipment. Their SandyNet van was \$6000 from the Oregon Lottery/DAS surplus. The bucket truck was \$12,000 from PGE (used). By not purchasing everything new they were able to reduce their startup and operational costs.

Along with the "citizen/customer first" directive, SandyNet was not one to nickel and dime customers for anything. From free on-site visits, to helping connect their TV to the WiFi, to replacing cables and equipment for free – it was all part of the goal to make a happy customer. An inventory of materials and equipment were kept in stock and would be pulled from as it was needed along with the flexibility to buy from Ace Hardware, Home Depot, Best Buy, Platt Electric, etc to get the job done.

Billing is still done through the existing City utility billing system.

SandyNet uses CBX Fiber to get from Sandy to the Pittock building in Portland and from Sandy to the Clackamas ESD, where they then use the ESD's DWDM system to get a second connection to the Pittock.

At the Pittock they lease a rack and have a stack of network switches to connect to multiple upstream providers and to NWAX for peering. They purchase Internet Access from Silverstar Telecom, Hurricane Electric, and Clackamas ESD.

The hardware components of the SandyNet ISP model are:

1. Edge (this is the Internet service, router w/BGP, IP addresses, AS number, servers, firewalls, etc)

- 3x Upstream Internet providers

- 2x Switches @ the Pittock, connecting to 2x Switches @ SandyNet

- 2x Routers – CISCO ASRs

- Their own IP address space w/AS numbers

- Servers live in the City's vmWare environment

2x Firewalls – CISCO ASAs

2. Transport (this is switches, middle mile fiber, etc)

They run a standard CISCO network. Some is new hardware, a lot is refurbished – saves a lot of money buying used/refurb hardware and to date none of it has failed.

3. Access (this is the equipment that actually serves the customers – maybe in remote cabinets)

SandyNet uses Calix g.PON. They issued an RFP with specific requirements that only Calix could meet. Now that Calix is the selected vendor, they use single source all hardware purchases.

The equipment is \$20,000/shelf – a total of 512 homes could be served per shelf. They have 9 shelves @ SandyNet

4. Premise (the equipment at each customer premise)

Customer modem/router costs \$220. Between labor and materials, there is an additional \$100-\$150 to install a customer.

Installing conduit to the side of the house is also done by their crews – about \$100-\$250 in materials and then \$100-1000 in labor costs depending on the length of drop.

5. Back office (workflow process, customer support, billing, contracts, paperwork, permits, legal, etc)

Customer support is handled by 1-2 people @ the SandyNet office. Support hours are 9-5 M-F. Next-business day support for issues after hours or on weekends. If it is a large scale outage or an outage to an enterprise customer then it is a standard 4hr response time.

Billing is handled by the Utility billing clerk, .25FTE of their salary is paid for by SandyNet.

Contracts are done internally and with the help of the City attorney.

City of Sandy does was not required to pull a permit for working in the ROW.

They are registered with the State PUC as a CLEC – this originated when they started offering DSL through the phone lines but they have maintained the registration.

Special Note

The SandyNet model was used as a template for developing the CBX Proof of Concept models and once PoC is validated will continue to be referenced as a reliable source of information for future expansion projects. The components of the CBX PoC projects will be more simplistic than that of SandyNet. Our initial projects are of a much smaller scale with the ROI of lesser risk than that of the City of Sandy. Still the processes and similar components will be utilized to form our version of the projects that make sense for the CBX and its continued success and sustainability.

Attachment A

CBX Current Dark Fiber Revenues / Expenses Sheet

Attachment B
Kiwanis Expense/Revenue Sheet

Kiwanis ISP Pilot Project

Kiwanis ISP Project (10 yr ROI)							
			20 homes	40 homes	60 homes	80 homes	100 homes
Construction	\$50,000	\$417	\$21	\$10	\$7	\$5	\$4
Equipment	\$14,378	\$120	\$6	\$3	\$2	\$1	\$1
replacement	\$200		\$10	\$5	\$3	\$2	\$2
Power			\$1	\$1	\$1	\$1	\$1
CBX Fiber MRC	\$255		\$13	\$6	\$4	\$3	\$3
drop/house	\$1,220		\$10	\$10	\$10	\$10	\$10
CBX Reimbursement			\$61	\$36	\$28	\$24	\$21
CBX Maintenance			\$5	\$5	\$4	\$4	\$3
SandyNet Fee			\$18	\$18	\$18	\$18	\$18
SN Maintenance			\$6	\$6	\$6	\$6	\$6
MRC 300 mg			\$90	\$65	\$56	\$52	\$48
MRC 1G			\$110	\$85	\$76	\$72	\$68

\$50,000 Backbone Construction

\$14,378 Equipment Costs

\$73,200 Lateral Construction

\$137,578 total start up cost

\$6,706

3060

\$9,766 Net Annual Profit

\$29,520 Gross Annual Profit

Kiwanis ISP Project (5 yr ROI)							
			20 homes	40 homes	60 homes	80 homes	100 homes
Construction	\$50,000	\$833	\$42	\$21	\$14	\$10	\$8
Equipment	\$14,378	\$240	\$12	\$6	\$4	\$3	\$2
replacement	\$200		\$10	\$5	\$3	\$2	\$2
Power			\$1	\$1	\$1	\$1	\$1
CBX Fiber MRC	\$255		\$13	\$6	\$4	\$3	\$3
drop/house	\$1,220		\$20	\$20	\$20	\$20	\$20
CBX Reimbursement			\$98	\$60	\$47	\$40	\$37
CBX Maintenance			\$5	\$5	\$4	\$4	\$3
SandyNet Fee			\$18	\$18	\$18	\$18	\$18
SN Maintenance			\$6	\$6	\$6	\$6	\$6
MRC 300 Mb			\$127	\$89	\$75	\$68	\$64
MRC 1Gb			\$147	\$109	\$95	\$88	\$84

- 1) SandyNet will monitor and service the ISP connections (8 am - 5 pm, M - Fr).
- 2) CBX will manage and maintain the fiber plant (24/7/365).
- 3) SandyNet will invoice for monthly fees.
- 4) \$100 connection fee.
- 5) Initial contract for one year. Month to month after that.
- 6) Fee for resident use will be \$65 for 300 Mb and \$85 for 1 Gb

Attachment C

Business Stand Alone ISP Bare Bones – Work Sheet

Clackamas County ISP Proof of Concept

Assumptions for Projections

Business - 1 Gig Symmetrical Business Service

Year	New	Existing	Disconnects	Total Subs	Regular Monthly Rate Subs	Total Active Subs
2020						
January	0	0	0	0		0
February	0	0	0	0		0
March	0	0	0	0		0
April	0	0	0	0		0
May	0	0	0	0		0
June	0	0	0	0		0
July	3	0	0	3	3	3
August	3	3	0	6	6	6
September	1	6	0	7	7	7
October	0	7	0	7	7	7
November	0	7	0	7	7	7
December	0	7	0	7	7	7

Income

2020 Monthly Rates & Install Fees

	Regular Mon \$199	Installation Fee \$0	Disconnect Fee \$0	Total ISP Income
January	\$ -	\$ -	\$ -	\$ -
February	\$ -	\$ -	\$ -	\$ -
March	\$ -	\$ -	\$ -	\$ -
April	\$ -	\$ -	\$ -	\$ -
May	\$ -	\$ -	\$ -	\$ -
June	\$ -	\$ -	\$ -	\$ -
July	\$ -	\$ -	\$ -	\$ -
August	\$ 597	\$ -	\$ -	\$ 597
September	\$ 1,194	\$ -	\$ -	\$ 1,194
October	\$ 1,393	\$ -	\$ -	\$ 1,393
November	\$ 1,393	\$ -	\$ -	\$ 1,393
December	\$ 1,393	\$ -	\$ -	\$ 1,393
	<u>\$ 7,363</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ 7,363</u>

Monthly Costs for 1 Gig

	2020
HE.net	\$ 460
Cogent	
NWAX	
Transport	\$ 400
	<u>\$ 860</u>

Projected Capital Costs		Depreciation	
7 IP Addresses Max		Equip Life:	5 Years
		Drop Life:	20 Years
		Annual	Monthly
Router	\$ -	\$ -	\$ -
Switch	\$ 10,000	\$ 2,000	\$ 167
Optics	\$ 1,000	\$ 200	\$ 17
CPE	\$ 1,500	\$ 300	\$ 25
Drops	\$ 21,000	\$ 1,050	\$ 88
IP addresses	\$ -	\$ -	\$ -
	\$ -	\$ -	\$ -
	\$ -	\$ -	\$ -
Total:	<u>\$ 33,500</u>	<u>\$ 3,550</u>	<u>\$ 296</u>

Assumes funding project from existing capital reserves from CBX.

Using a 5 year depreciation model (straight line) for equipment and 20 year for fiber.

Franchise fees and taxes will be a pass through and wash to the bottom line. None are projected in this model as a result.

No installation fee is charged for POC.

Clackamas County ISP Proof of Concept

Financial Projections 2020

Income Item Description	Hours to Source, Sign, Install	Quantity of Items Sold by Category												Total Billable Units	Active Standard Price Subs at Year End	Disconnects		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec					
ISP - 1 Gig Standard Rate	0.5							3	6	7	7	7	7	7	7	37	7	
ISP - Office Park Installation Fee	24							3	3	1	0	0	0	0	0	7		
Disconnect Fee Income	1																	0
total subs																		

Totals	0	0	0	0	0	0	0	6	9	8	7	7	7	7	44
Hours Required to Source, Sign & Install	0	0	0	0	0	0	0	73.5	75	27.5	3.5	3.5	3.5	3.5	186.5

Income	Revenue Per Item	Revenue Dollars by Category												Totals	
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
ISP - 1 Gig Standard Rate	\$199	\$0	\$0	\$0	\$0	\$0	\$0	\$597	\$1,194	\$1,393	\$1,393	\$1,393	\$1,393	\$1,393	\$7,363
ISP - Office Park Installation Fee	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Disconnect Fee Income	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gross Income		\$0	\$0	\$0	\$0	\$0	\$0	\$597	\$1,194	\$1,393	\$1,393	\$1,393	\$1,393	\$1,393	\$7,363

Cost of Goods Sold (COGS)	Actual \$'s or % of Sales	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Monthly Coats (IE net, COGENT, NWAX, Transport)	\$ 860							\$ 860	\$ 860	\$ 860	\$ 860	\$ 860	\$ 860	\$ 5,160
Installation Expenses														\$ -
Customer Service Expenses														\$ -
Subtotal - COGS		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 860	\$ 860	\$ 860	\$ 860	\$ 860	\$ 860	\$ 5,160

Gross Margin		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (263)	\$ 334	\$ 533	\$ 533	\$ 533	\$ 533	\$ 2,203
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Expenses	% Income or Flat \$	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Advertising														\$0
Banking/Merchant Discount Fees	1.00%							\$6	\$12	\$14	\$14	\$14	\$14	\$74
Commissions	0.00%													\$0
Computer & Internet Services	0.75%													\$0
Contract Labor	0.00%													\$0
Depreciation	\$296							\$296	\$296	\$296	\$296	\$296	\$296	\$1,775
Dues & Subscriptions	\$0													\$0
Insurance	\$0													\$0
Interest Expense	\$100													\$0
Licenses, Permits & Taxes	\$ -													\$0
Office Supplies & Expenses	\$0													\$0
Payroll	\$0													\$0
PR Taxes, W/C & Benefits @ 25% of PR	0%													\$0
Professional Fees (Accounting/Audit & Legal)	0%							\$0	\$0	\$0	\$0	\$0	\$0	\$0
Rent	\$0													\$0
Storage Fees	\$0													\$0
Supplies/Small Tools & Eq.	\$0													\$0
Telephone	0.00%													\$0
Travel	\$0													\$0
Utilities	0.00%													\$0
Other	0.00%													\$0
Other	0.00%													\$0
Other	0.00%													\$0
Total Expenses	0.00%	\$0	\$0	\$0	\$0	\$0	\$0	\$302	\$308	\$310	\$310	\$310	\$310	\$1,849
Net Income/(Loss)		\$0	\$0	\$0	\$0	\$0	\$0	(\$565)	\$26	\$223	\$223	\$223	\$223	\$354
Net Income/(Loss) as a % of Income		0%	0%	0%	0%	0%	0%	-95%	2%	16%	16%	16%	16%	5%
Cumulative Net Income/(Loss)		\$0	\$0	\$0	\$0	\$0	\$0	(\$565)	(\$539)	(\$315)	(\$92)	\$131	\$354	

Debt Service Net of Depr	None
Capital Purchases	\$ 33,500
NO Debt Service Due to Internal Fund Allocation for Independent ISP Office Park Test	\$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ -
Remaining Assets to Depreciate	\$31,725

Clackamas County ISP Proof of Concept

	2020
# of Subs	7
# of Disconnects	0
Rates	
Monthly - 1 Gig - Regular Rate	\$ 199
Installation Fee	\$ -
Disconnect Fee	\$ -
Income	\$ 7,363
Less	
COGS	\$ 5,160
Gross Margin	\$ 2,203
Gen & Admin Costs	\$ 1,849
Annual Net Income	\$ 354
Cumulative Net Income	\$ 354
<i>COGS as a % of Income</i>	<i>70%</i>
<i>Gross Margin as a % of Income</i>	<i>30%</i>
<i>Gen & Admin Costs as a % of Income</i>	<i>25%</i>

Note (1)

Note (1)

In 2020, the %'s are higher due to a partial year of projections.

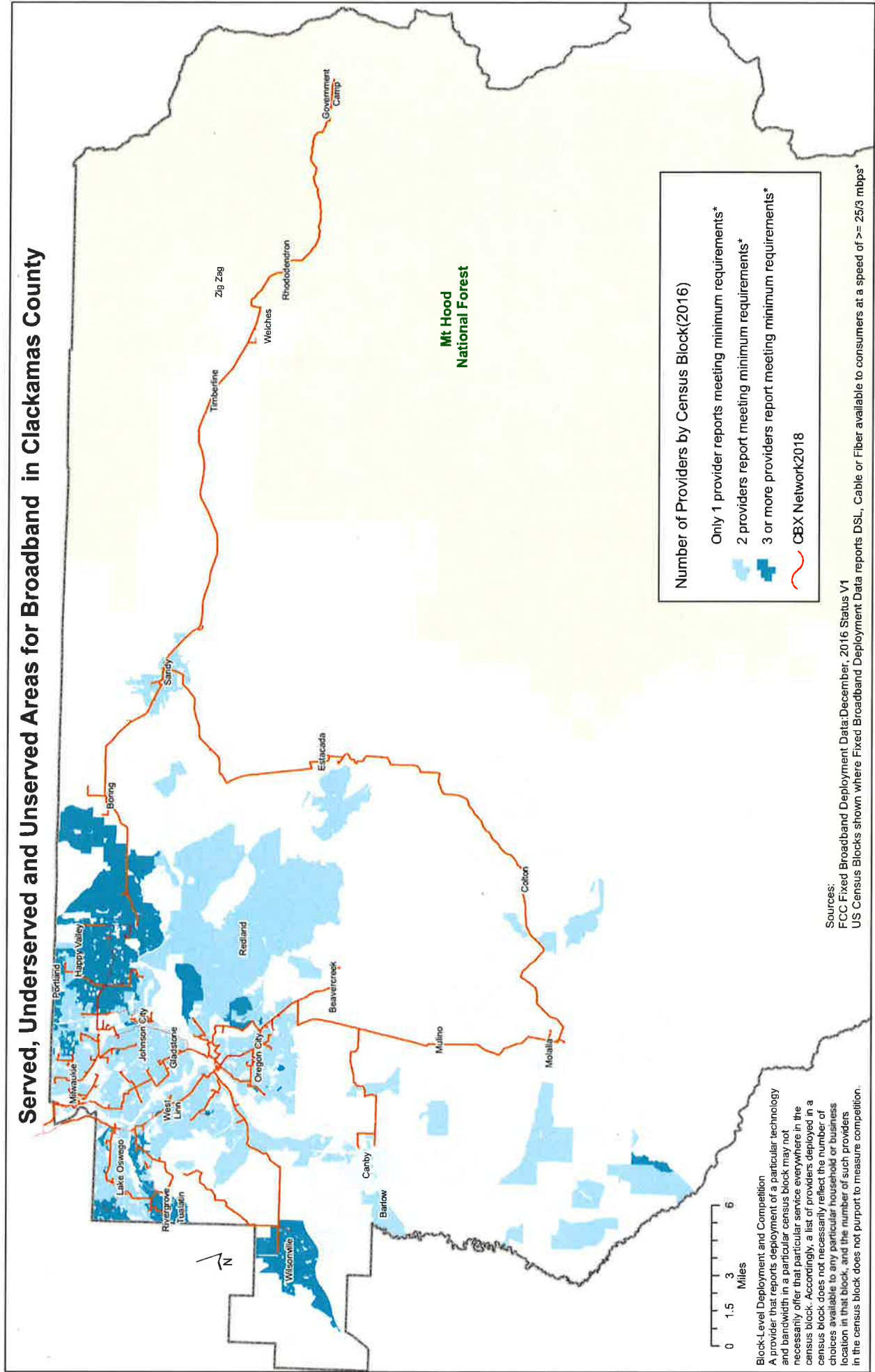
MRC	
1 Gb	
HE.net	\$ 460.00
Cogent	
NWAX	
Transport	\$ 400.00
Total:	\$ 860.00

Start Up Costs	
NRC	
7 IP	
Router	
Switch	\$ 10,000.00
Optics	\$ 1,000.00
CPE	\$ 1,500.00
Drops	\$ 18,000.00
IP addresses	
Total:	\$ 30,500.00

Attachment D

Un-served and Under-Served Areas

Served, Underserved and Unserved Areas for Broadband in Clackamas County



Number of Providers by Census Block(2016)

- Only 1 provider reports meeting minimum requirements*
- 2 providers report meeting minimum requirements*
- 3 or more providers report meeting minimum requirements*
- CBX Network2018

Block-Level Deployment and Competition
 A provider that reports deployment of a particular technology and bandwidth in a particular census block may not necessarily offer that particular service everywhere in the census block. Accordingly, a list of providers deployed in a census block does not necessarily reflect the number of choices available to any particular household or business location in that block, and the number of such providers in the census block does not purport to measure competition.

Sources:
 FCC Fixed Broadband Deployment Data: December, 2016 Status V1
 US Census Blocks shown where Fixed Broadband Deployment Data reports DSL, Cable or Fiber available to consumers at a speed of >= 25/3 mbps*