PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 1

**PULSE BROADBAND, LLC FTTH FEASIBILITY STUDY REPORT**

**LYNDON TOWNSHIP, MI**

April 29, 2016

Pulse Broadband LLC has been engaged by Lyndon Township to complete a detailed feasibility study for building a fiber-to-the-home network and offering double play telecom services (Internet and VoIP Telephone) offered to its entire area.

Pulse completed an on-site field review by Pulse technical outside plant staff. We utilized this visit to evaluate some of the initial assumptions built into the model and review the condition of the plant. We completed a bandwidth analysis to determine the availability of internet hand-off points and pricing. We conducted a thorough field assessment, analyzed aerial and underground construction, defined cost differences, and determined real- world costs for Lyndon’s footprint. Finally, we completed detailed financial modeling to evaluate economic feasibility. It is our pleasure to provide the results of this independent feasibility study.

The feasibility study provides details for all of our calculations, but the highlights include:

1. Fiber plant miles. We received PDF maps provided by Consumers Energy and cross referenced the calculated miles with Washtenaw Road Commissions shape files. We calculated 64.6 miles for your fiber plant. This figure was discussed with the Broadband Cooperative and some roads were removed to bring the final assumption to 62.8 miles. This mileage was used in both construction method models. 2. Aerial construction using Consumers Energy poles. The cost of construction to Lyndon Township (not including ISP costs) is $5,931,816. This includes $107,765 of pole assessment fees to Consumers Energy and $2,682,354 make ready estimates based on preliminary information from Consumers Energy. Final make ready costs can only be determined by Consumers Energy. Pulse Broadband used its best efforts at estimating those costs based on a conversation with Consumers energy. 3. 100% underground construction. If Lyndon Township decides to bypass Consumers Energy and builds all

underground, then the total cost of construction increases to $6,295,086. 4. ISP partner. Our model projects $659,214 as startup costs for the ISP. Based on $46.50 core offer prices, we believe the ISP can operate at breakeven. Lyndon Township might have a tough time generating interest with only 600 estimated customers. We suggest vetting ISP’s as part of next steps.

We look forward to working with Lyndon Township on this important strategic, regional infrastructure project which will bring the capability of gigabit broadband access to your residents and communities. We’ve included a paragraph at the beginning of the report to provide credibility for any reader unfamiliar with Pulse. Please free to distribute our report for any required business purposes and include my contact information as needed.

Sincerely,

Eric Freesmeier, CEO eric@pulsebroadband.net (314) 324-7347

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ABOUT PULSE BROADBAND Pulse was formed with the sole purpose of partnering with rural America to bring fiber technology to underserved areas. Since our formation in 2008, we have partnered with electric cooperatives, municipal entities, and private groups to build over 5,000 miles in successful FTTH projects. In addition to our fiber design and construction management expertise, we offer a full suite of telecom services, from feasibility studies of a new network to back office support services for existing companies. This 360° view of the industry, along with our years of hands-on experience, give Pulse the distinction of being one of the true leaders in the rural Fiber-to-the-Home industry.

There is no project too small, or too large, which is outside the scope of our expertise. Our projects have ranged in size from 25 miles with 900 passings to 1,800 miles with 26,500 passings. Each project has been unique and our collaborative approach with every owner has brought a customized solution. The variations and complexities of each project have given us invaluable real-world experience. These experiences enable us to take a deep-dive with each new client to ask the right questions, inspect critical areas, and discover hidden problems to ensure our studies, models, and designs produce the most accurate outcomes.

Pulse Broadband is a full-service firm offering feasibility studies, financial modeling, fiber design, technology selection, construction management, vendor (bandwidth, VoIP, video and network management) negotiations, and back office support. Our working knowledge in each of these critical areas allows us to make more informed decisions. Whichever service our clients need; this holistic approach gives them the confidence that they are setup for success.

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BANDWIDTH ANALYSIS **ANALYSIS OF PROVIDERS** Terie Hannay, our VP of Planning and Integration, conducted a thorough investigation of all local providers. She gathered their initial pricing, terms and connection points. Terie is happy to report that bandwidth is readily available at competitive prices.

The below quotes were received for the Township Hall at 17751 N. Territorial Road. We have requested additional quotes for the Dexter fire station at 12088 N. Territorial Road and also the Chelsea Library at 221 S. Main Street. Based on preliminary responses from vendors the pricing and availability for these two alternative locations will be the same or similar to the schedule below.

The top quote received for the Lyndon Township is from Birch Communications, a strong mid-tier provider. Their pricing for a 500MB circuit is $2,199 and a 1GB is $2,499. The ISP model reflects $3,300 so the ISP has flexibility to choose their provider. Refer to the chart below outlining the available carriers and their preliminary pricing and terms (3 years).

**Summary of Provider Offerings**

**Provider 500 MB 1 GB Installation Term**

Cogent $3,287 $5,035 $2,000 3 yrs.

ATT $3,144 $4,336 $0 3 yrs.

XO Communications $4,107 $8,633 $0 3 yrs.

Level 3 $4,873 $6,000 $0 3 yrs.

Birch $2,199 $2,499 $0 3 yrs.

ACC $2,944 $4,136 $1,500 3 yrs.

US Signal $3,665 $5,554 $0 3 yrs.

123.Net $3,639 $4,999 $0 3 yrs.

TelNet WW $2,545 $3,945 $0 3 yrs.

Century Link $6,086 $8,569 $0 3 yrs.

ComLink $3,285 $4,630 $0 3 yrs.

CONCLUSION Multiple providers have provided reasonable quotes and guidance that other locations would be similar. Bandwidth pricing could be negotiated further. We are confident that the ISP can provide adequate service with these prices.

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ELECTRIC PLANT DATA Consumers Energy supplied Pulse Broadband with information about the electric plant in Lyndon Township’s footprint. Consumers Energy supplied 36 PDF prints of the electric plant. These maps visually showed the layout of the plant and pole locations. These maps, however, were lacking critical pieces of data:

• Total number of poles

• Span lengths for aerial and underground

• Defined scale

• All prints drawn to the same scale

In order to determine the number of utility poles in Lyndon’s footprint, Pulse manually added the number of poles from the 36 PDF files. The number of calculated utility poles is 1,936. Since there was no scale, nor were prints drawn to the same apparent scale, Pulse estimated a scale for each print. This was accomplished by taking each individual print, finding a scaled map of the same real-world location, and transferring this scale to the print. The lengths of electric spans were then measured and totaled for each print.

CONSUMERS ENERGY MAP CALCULATION The number of utility poles (1,936) used for aerial construction were calculated as described above. The proposed path for aerial construction utilized the path of Consumers Energy’s electric plant. The path and maps (36 PDF prints) were supplied by Consumers Energy. The length of aerial spans was calculated using the following steps:

• Identify scale on each map, reference point on Google Earth

• Define sections of Consumers Energy plant used for construction

• Measure each line on each map

• Sum spans on each map

• Sum total spans from 36 prints

The path for underground construction was determined by a combination of Alan’s on-site visit, Consumers Energy’s plant, and Washtenaw Road Commission data. The path and length of underground construction was calculated using the following steps:

• Identify scale on each map, reference point on Google Earth

• Define possible path along roads following power

• Identify path along roads that do not follow power

• Measure each line on each map

• Sum underground path on each map

• Sum underground path from 36 prints

The following tables summarizes the estimated data:

**Data calculated using Consumers Energy maps**

Number of Utility Poles 1,936

Total Calculated Miles 65

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The following map illustrates the proposed path for the fiber network based on Consumers Energy PDF maps:

*Figure 1. Map Illustrating Proposed Path for Fiber*

VERIFY MILEAGE In order to verify the mileage, Pulse referenced the data supplied by Washtenaw Road Commission. Pulse was provided the road data shapefile for Lyndon Township from the Washtenaw Road Commission. This data provided all roads within Lyndon Township’s footprint, regardless if they would be within the path of the broadband network. Pulse completed the following steps to determine a more accurate count of road miles used for construction of the broadband network:

1. Tally road miles from the Washtenaw Road Commission shapefile 2. Identify roads that would not be within the path of construction 3. Subtract these roads from the shapefile 4. Tally all remaining road miles representing the proposed path of construction

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The following pictures depict the roads contained within the Washtenaw Road Commission shapefile and suggested roads to remove from the fiber network:

*Figure 2. Map depicting Washtenaw Road Commission Shapefile Figure 3. Map depicting roads (highlighted in RED) removed.*

The following picture depicts the actual roads used in the calculation of road miles to be compared to the figure from the Consumers Energy calculation:

*Figure 4. Map depicting net road miles used for calculation.*

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**Comparison of two methods**

Consumers Energy 65

Washtenaw Road Commission 64.6

CORE BUSINESS MODEL ASSUMPTIONS Our financial models make the following assumptions for both construction methods:

1. Distributed Split Architecture 2. GPON Technology 3. ISP will run operations

a. Headend costs will be removed from network cost estimate b. GPON ONT will be removed from network cost estimate c. Installation will be removed from network cost estimate d. Base monthly service rate of $46.50 will be required to cover above costs plus the operation

expenses to run their business 4. Lyndon Township needs total upfront amount to build network 5. Pulse estimates 50% of homes will take service and Lyndon Township will pay the construction of the

drop. The assumed drop length is 600 ft. in the model. The township could reduce costs by requiring home owners with drop lengths (which includes some footage back to the terminal along the main pole line) over 300 ft. to cover their own additional costs. Aerial model savings would be $410,000 and underground model savings would be $735,000.

CONSTRUCTION COMPARISON: AERIAL VS. UNDERGROUND The majority of broadband networks will incorporate a hybrid design utilizing both aerial and underground construction. The selection of preferred construction will be based upon such factors as ease of construction, reduction in make-ready costs, environmental, and permitting. When an entity does not own the poles, this adds another layer for decision making. Pulse’s financial model incorporates the costs of all factors and produces results to assist in determining the preferred construction method. Consumers Energy is the local provider of electricity and owns the poles within Lyndon’s footprint. Lyndon Township, with the assistance of Michigan Broadband Cooperative and Pulse Broadband, has obtained various costs associated with aerial construction utilizing Consumers Energy’s utility poles. The following table summarizes the additional costs:

**Estimated Costs to Consumers Energy**

**Price Units Total Cost**

Pole Assessment $57.25/pole 1,882 $107,765

Pole Replacement $3,000/pole 565 $1,694,118

Make-Ready Construction $750/pole 1,317 $988,236

**Total Additional Aerial Construction $2,790,119**

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In addition to the upfront costs incurred during construction, Lyndon Township will be required to pay annual pole rent and maintenance fees to Consumers Energy. The following table shows the value of the annual pole rent:

**Simple Present Value Annual Ongoing Operating Costs**

**Price Units Total Cost**

Pole Attachment Fee $8.50/pole 1,882 $16,000

Annual Maintenance Fee $3.50/pole 1,882 $6,588

Total Annual Ongoing Costs $22,588

**X 20 years $451,765**

The below table shows the model for aerial construction costs:

**Total Project Costs – Aerial Model**

Pole Assessment $107,765

Pole Replacement $1,694,118

Other Make Ready $988,236 Aerial Construction $1,453,761 UG Construction $328,303 Permits $1,800 Drop Construction $906,068 Simple PV Pole Rent/Maintenance $451,765 **Total $5,931,816**

At the on-site field review, Alan Van Buskirk and Rudy Tober were made aware of Lyndon Township’s desire to explore the option for 100% underground construction. A critical factor driving the need for underground construction is Lyndon Township does not own the utility poles. Lyndon Township wants to compare the upfront cost of underground construction versus the upfront and on-going costs of aerial construction. Lyndon Township also desires to have the most advanced broadband network, which they believe involves underground construction. An underground network is also more protected from weather.

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The following table shows the model for 100% underground construction costs:

**Total Project Costs – Underground Model**

Pole Assessment $0

Pole Replacement $0

Other Make Ready $0

Aerial Construction $0 UG Construction $4,708,554 Permits $36,000 Drop Construction $1,550,532 Simple PV Pole Rent/Maintenance $0 **Total $6,295,086**

CONSTRUCTION MODEL COMPARISON The following table compares the costs for the two models:

**Total Project Costs – Model Comparison**

**Aerial/UG Underground**

Pole Assessment $107,765 $0

Pole Replacement $1,694,118 $0

Other Make Ready $988,236 $0 Aerial Construction $1,453,761 $0 UG Construction $328,303 $4,708,554 Permits $1,800 $36,000 Drop Construction $906,068 $1,550,532 Simple PV Pole Rent/Maintenance $451,765 $0 **Total $5,931,816 $6,295,086**

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DETAIL PROJECT COSTS – AERIAL MODEL CAPITAL BUDGET ASSUMPTIONS Capital costs to construct the network will be approximately $6,000,000. The timeline anticipated for the build is 12 months based on achievable milestones plus the construction preparation time. The following assumptions were made in the capital projections for the financial model:

• Outside Plant Construction:

o 62.8 miles of distribution plant will be constructed over the course of 12 months. Construction is

assumed to begin in Month 4 and to be completed by Month 16. o The cost of aerial construction is estimated at $69,319 per mile. Make ready costs for Consumers Energy is $42,707 per mile. Total aerial labor excluding make ready is $11,302 (plant labor less make ready plus technical labor). Materials cost per mile is $8,239. We have assumed a majority (60%) of fiber will be 96 count fiber. The $69,319 referenced above includes professional services discussed below. o The cost of underground construction is estimated at $104,542 per mile. The model assumes a fixed number of pedestals based on homes passed. This causes higher than anticipated cost per mile when a low number of underground miles are assumed in the model. The $104,542 referenced above includes professional services discussed below.

• Drop Construction:

o 579 homes are expected to sign up for services over the course of two years. o The cost of drop construction is $1,565 per home. Labor is $1,380 and materials are $147. Aerial pole line is utilized and 30% underground for drops is assumed. Conduit is not utilized unless boring (driveways and sidewalks) is required. o Drop length of 600 feet is assumed per home. o Inside the home installation including ONT electronics will be the responsibility of the ISP partner.

• Professional Services:

o The mapping of the outside plant is required to create the fiber design. This will require an estimated 754 hours over the course of six months to complete. The design of the outside plant is estimated at 356 hours over the course of six months to complete. o Project management for project planning, inspection of contractors and invoice approval/reconciliation is estimated to require a crew of two over the course of 12 months for a total of 3,780 hours. o Drop surveys to provide the fiber route from the distributed split to the side of the house for contractors is estimated at 261 hours to map and draft. These will be completed over the course of a year.

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CAPITAL BUDGET

**Township PROJECT: SERVICE AREA: Unit Cost No. of Total FTTH Network Lyndon Township, MI Units Costs**

**OUTSIDE PLANT LABOR Pre-Construction** Complete Make Ready Construction 42,707.20 $ 59.7 **2,548,236 $**

Pole Assessment 150 $ - **- $** PM99 (Move Pole Facilities) 72.00 $ 188 **13,553 $** CO12(6M) [Hang stranded fiber] 0.95 $ 31,504 **29,929 $** CO24(6M) [Hang stranded fiber] 0.95 $ 31,504 **29,929 $** CO48(6M) [Hang stranded fiber] 0.95 $ 31,504 **29,929 $** CO96(6M) [Hang stranded fiber] 0.95 $ 189,027 **179,576 $ Aerial** CO144(6M) [Hang stranded fiber] 1.05 $ 31,504 **33,080 $** PM2A [Aerial Bond] 4.50 $ 376 **1,694 $** PF3-3 [Place Screw Anchor] 40.00 $ 179 **7,160 $** PE1-3 [Place down guy] 24.00 $ 179 **4,296 $** PF3-AUX [Install auxiliary eye] 8.00 $ 119 **955 $** PM69 [Place fiber storage loop] 50.00 $ 119 **5,967 $** BMUDT [Trench Conduit] 5.50 $ 13,265 **72,958 $** BMUDD [Bore Conduit] 12.00 $ 3,316 **39,795 $** BFO12 [Pull Fiber] 0.90 $ 1,658 **1,492 $** BFO24 [Pull Fiber] 0.90 $ 1,658 **1,492 $** BFO48 [Pull Fiber] 0.90 $ 1,658 **1,492 $** BFO96 [Pull Fiber] 0.90 $ 9,949 **8,954 $ Underground** BFO144 [Pull Fiber] 0.90 $ 1,658 **1,492 $** BM71 [Rock Adder] 10.00 $ 829 **8,291 $** BD5 [Pedestals] 60.00 $ 579 **34,740 $** BM2-A [Grounding] 40.00 $ 579 **23,160 $** BM80 [Risers] 50.00 $ 66 **3,316 $** BM53 [Markers] 20.00 $ 99 **1,990 $** BHF [Handholes] 300.00 $ 33 **9,949 $** SPL [Install Splitter] 50.00 $ 21 **1,034 $** SPL-CBN [Install Splitter Cabinet] 1,000.00 $ 5 **5,147 $** HACO12 [Splice Enclosures for 12 ct] 125.00 $ 66 **8,291 $** HACO24 [Splice Enclosures for 24 ct] 125.00 $ 66 **8,291 $ Technical** HACO48 [Splice Enclosures for 48 ct] 135.00 $ 66 **8,954 $** HACO96 [Splice Enclosures for 96 ct] 150.00 $ 50 **7,500 $** HACO144 [Splice Enclosures for 144 ct] 150.00 $ 66 **9,949 $** TERM 150.00 $ 290 **43,425 $** HO1 [Splicing with bi-directional testing] 25.00 $ 10,540 **263,502 $ Total 3,449,517 $**

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 13

**Township PROJECT: SERVICE AREA: Unit Cost No. of Total FTTH Network Lyndon Township, MI Units Costs**

**OUTSIDE PLANT MATERIALS**

12 ct. Loose Tube Fiber 0.30 $ 37,207 **11,162 $** 24 ct. Loose Tube Fiber 0.35 $ 37,207 **13,023 $ Fiber** 48 ct. Loose Tube Fiber 0.45 $ 37,207 **16,743 $** 96 ct. Loose Tube Fiber 0.70 $ 223,245 **156,271 $** 144 ct. Loose Tube Fiber 1.00 $ 37,207 **37,207 $** 1/4" EHS Strand 0.14 $ 319,520 **44,733 $** Lashing wire 0.038" Type 302 1,600' Roll 24.00 $ 282 **6,758 $** Weaver(Bonding Clamp) 1.75 $ 555 **972 $** #6 Bare Copper Ground Wire 0.34 $ 989 **336 $ Aerial** Anchor 8" Helix 26.89 $ 179 **4,813 $** Sno-Shoe (pair) 39.95 $ 119 **4,767 $** Stainless Steel Strap 0.20 $ 4,003 **801 $** 1/2" Spacer 0.12 $ 4,003 **480 $** Guy Guards 3.08 $ 179 **551 $** Auxilliary Eye 14.39 $ 119 **1,717 $** #4 Split Bolt 0.81 $ 376 **305 $** Preformed Deadend 1/4" Strand 3.21 $ 1,111 **3,566 $** 12" x 5/8" Machine Bolt w/ Nut 1.07 $ 941 **1,007 $** 2"x1/8" Flat Square Washer 0.30 $ 2,240 **672 $** 5/8"-11 Square Nut 0.22 $ 1,497 **329 $ Stranded Hardware** 3 Bolt Clamp 4.38 $ 1,129 **4,947 $** 3 Bolt Clamp Curved 5.48 $ 376 **2,063 $** 5/8"Thimble Eye Bolt 3.90 $ 179 **698 $** Bug nut(D Lash Clamp) 0.30 $ 4,003 **1,201 $** Guy Hook - Ram's Head 3.01 $ 179 **539 $** Arnco 1.25" HDPE Conduit 0.52 $ 16,581 **8,622 $** Channell 24x36x24 Handhole 193.40 $ 33 **6,414 $** Channell Pedestal 55.00 $ 579 **31,845 $** Pedestal Stickers 0.70 $ 579 **405 $ Underground** 0.75" Flex Conduit - 20' 9.70 $ 133 **1,287 $** Screw Lags 0.25 $ 1,327 **332 $** 5/8" x 8' Copper Ground Rod 10.31 $ 612 **6,311 $** Ground Rod Clamp 0.90 $ 612 **551 $** Warning Marker 14.60 $ 99 **1,453 $** "A" Splice Enclosure 220.00 $ 133 **29,183 $** "C" Splice Enclosure 250.00 $ 116 **29,081 $** "D" Splice Enclosure 285.00 $ 66 **18,903 $** Splice Trays for A Enclosure 20.00 $ 265 **5,306 $ Technical** Splice Trays for C Enclosure 22.00 $ 399 **8,777 $** Splice Trays for D Enclosure 25.00 $ 398 **9,949 $** Aerial Clamps for FOSC 450 25.82 $ 315 **8,141 $** Splitter Cabinets 5,000.00 $ 5 **25,733 $** Splitters 800.00 $ 21 **16,543 $** AirFOSC 150.00 $ 290 **43,425 $** Splice Protector (sleeves) 0.27 $ 10,540 **2,846 $ Total 570,770 $**

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**Township PROJECT: SERVICE AREA: Unit Cost No. of Total FTTH Network Lyndon Township, MI Units Costs**

**DROP TO THE HOME**

CO2(6M) [Hang stranded fiber] 0.90 $ 208,440 **187,596 $** BMUDT [Trench No Conduit] 2.00 $ 125,064 **250,128 $** BMUDD [Bore Conduit] 12.00 $ 13,896 **166,752 $** BFO2 [Pull Fiber] 1.00 $ 138,960 **138,960 $ Labor** BM83 [Drop Riser Guard] 25.00 $ 232 **5,790 $** BM(0.75) [House Cane] 13.00 $ 232 **3,011 $** PM2A [Aerial Bond] 4.50 $ 347 **1,563 $** BM2-A [Grounding] 40.00 $ 347 **13,896 $** NID [Place NID Housing] 25.00 $ 579 **14,475 $** HO1 [Splicing] 25.00 $ 579 **14,475 $** HO1T [Testing] 4.00 $ 579 **2,316 $** 2 Ct. Loose Tube Fiber 0.20 $ 347,400 **69,480 $** Lashing wire 0.038" Type 302 1,600' Roll 24.00 $ 156 **3,752 $** 0.75" Flex Conduit - 20' 9.70 $ 232 **2,247 $** Arnco 0.75" HDPE Conduit 0.30 $ 13,896 **4,169 $** Weaver(Bonding Clamp) 1.84 $ 347 **640 $ Materials** #6 Bare Copper Ground Wire 0.38 $ 347 **130 $** #4 Split Bolt 1.33 $ 347 **462 $** 5/8" x 8' Copper Ground Rod 10.31 $ 347 **3,582 $** Ground Rod Clamp 0.90 $ 347 **313 $** Splice Protector (sleeves) 0.27 $ 695 **185 $** Calix 700 Series ONT Enclosure - $ 579 **- $**

**Total 1,051,831 $ PROFESSIONAL SERVICES**

OSP Field Verification/GPS Mapping 86.11 $ 754 **64,902 $ Plant Design/Mgmt** OSP Drafting/Design 83.53 $ 356 **29,729 $** OSP Project Management/Inspection 92.46 $ 3,780 **349,500 $** Service Entrance Mapping/Drafting 85.00 $ 261 **22,147 $ Drop Design/Mgmt** Service Entrance Mgmt/Inspection - $ - **- $ - $ Total 466,277 $**

**GRAND TOTAL 5,628,396 $**

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MODEL ASSUMPTIONS AND OUTPUT The below inputs drive the 20-year Pulse financial model created for Lyndon Township.

**Plant Statistics:**

**Construction Statistics:** Homes Passed 1,158

Make Ready Per Aerial Mile $42,707 Small Bus Passed 0

Aerial Production 75 miles per month Large Commercial 0

UG Production 5 miles per month Total Miles 62.8

Avg. Length of Drop fiber along main 400.0 UG % 5.0%

Avg. Length of Drop fiber from main to ONT 200.0 Do you own the poles? No

UG Drop % 40.0% Pole Condition Good

Avg. Feet between splices 500.0 Underground Construction Conditions Good Number of Substations 0

**Capital Expenditures**

**Summary of Total Capital Required**

**Construction Costs** $5,370,486 **Ongoing Capital Costs at Launch** $561,330 **Total Project Capital Costs** $5,931,816

**Construction Costs**

Unit Cost x Quantity = Total Headend/Office Space $204,722 0 $0 Cabinet Equipment $89,722 0 $0 Aerial Construction (A) $69,319 59.7 $4,136,116 Underground Construction (B) $104,542 3.1 $328,303 Drop Construction (C) $1,565 579 $906,068 **Total Construction $5,370,486**

*Details for construction costs above:*

(A) Aerial Cost Per Mile (B) Underground Cost Per Mile (C) Drop Cost Per Home

Plant Labor (inc. Make Ready) $48,340 Plant Labor $66,591 Plant Labor $1,326 Technical Labor $5,670 Technical Labor $5,670 Tech. Labor $54 Fiber $3,732 Fiber $3,732 Fiber $120 Aerial Materials $1,356 UG Materials $18,327 Materials $27 Technical Mat. $3,151 Technical Mat. $3,151 NID Enclosure $0 Design $1,507 Design $1,507 Design $38 Constr. Mgmt $5,565 Constr. Mgmt $5,565 Constr. Mgmt $0 Total Aerial $69,319 Total UG $104,542 Total Drop $1,565

**Ongoing Capital Costs at Launch**

Cost x Quantity = Total Pole Assessment $57 1,882 $107,765 Permits $1,200 1.5 $1,800 Simple PV of Pole Rent (20 yrs) $22,588 20 $451,765 Plant Maintenance Materials $0 0 $0 **$561,330**

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 16

DETAIL PROJECT COSTS – UNDERGROUND MODEL CAPITAL BUDGET ASSUMPTIONS Capital costs to construct the network will be approximately $6,300,000. The timeline anticipated for the build is 15 months based on achievable milestones plus the construction preparation time. The following assumptions were made in the capital projections for the financial model:

• Outside Plant Construction:

o 62.8 miles of distribution plant will be constructed over the course of 15 months. Construction is

assumed to begin in Month 4 and to be completed by Month 19. o The cost of aerial construction is $0. o The cost of underground construction is estimated at $74,967 per mile. Labor is $53,689 per mile including both plant and technical (splicing). Materials are $12,636 per mile which includes fiber, conduit, splitters, splice enclosures and other underground materials. The $74,967 referenced above includes professional services discussed below.

• Drop Construction:

o 579 homes are expected to sign up for services over the course of two years. o The cost of drop construction is $2,678 per home at 100% underground. Labor is $2,492 (all underground) and materials are $148. Drops do not include conduit unless boring (driveways and sidewalks) is required. o Drop length of 600 feet is assumed per home. o Inside the home installation including ONT electronics will be the responsibility of the ISP partner.

• Professional Services:

o The mapping of the outside plant is required to create the fiber design. This will require an estimated 754 hours over the course of six months to complete. The design of the outside plant is estimated at 356 hours over the course of six months to complete. o Project management for project planning, inspection of contractors and invoice approval/reconciliation is estimated to require a crew of two over the course of 15 months for a total of 4,860 hours. o Drop surveys to provide the fiber route from the distributed split to the side of the house for contractors is estimated at 261 hours to map and draft. These will be completed over the course of a year.

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 17

CAPITAL BUDGET

**Township PROJECT: SERVICE AREA: Unit Cost No. of Total FTTH Network Lyndon Township, MI Units Costs**

**OUTSIDE PLANT LABOR Pre-Construction** Complete Make Ready Construction 0.00 $ 0.0 **0 $**

Pole Assessment 150 $ - **- $** PM99 (Move Pole Facilities) 72.00 $ 0 **0 $** CO12(6M) [Hang stranded fiber] 0.95 $ 0 **0 $** CO24(6M) [Hang stranded fiber] 0.95 $ 0 **0 $** CO48(6M) [Hang stranded fiber] 0.95 $ 0 **0 $** CO96(6M) [Hang stranded fiber] 0.95 $ 0 **0 $ Aerial** CO144(6M) [Hang stranded fiber] 1.05 $ 0 **0 $** PM2A [Aerial Bond] 4.50 $ 0 **0 $** PF3-3 [Place Screw Anchor] 40.00 $ 0 **0 $** PE1-3 [Place down guy] 24.00 $ 0 **0 $** PF3-AUX [Install auxiliary eye] 8.00 $ 0 **0 $** PM69 [Place fiber storage loop] 50.00 $ 0 **0 $** BMUDT [Trench Conduit] 5.50 $ 265,301 **1,459,155 $** BMUDD [Bore Conduit] 12.00 $ 66,325 **795,903 $** BFO12 [Pull Fiber] 0.90 $ 33,163 **29,846 $** BFO24 [Pull Fiber] 0.90 $ 33,163 **29,846 $** BFO48 [Pull Fiber] 0.90 $ 33,163 **29,846 $** BFO96 [Pull Fiber] 0.90 $ 198,976 **179,078 $ Underground** BFO144 [Pull Fiber] 0.90 $ 33,163 **29,846 $** BM71 [Rock Adder] 10.00 $ 16,581 **165,813 $** BD5 [Pedestals] 60.00 $ 579 **34,740 $** BM2-A [Grounding] 40.00 $ 579 **23,160 $** BM80 [Risers] 50.00 $ - **- $** BM53 [Markers] 20.00 $ 1,990 **39,795 $** BHF [Handholes] 300.00 $ 663 **198,976 $** SPL [Install Splitter] 50.00 $ 21 **1,034 $** SPL-CBN [Install Splitter Cabinet] 1,000.00 $ 5 **5,147 $** HACO12 [Splice Enclosures for 12 ct] 125.00 $ 66 **8,291 $** HACO24 [Splice Enclosures for 24 ct] 125.00 $ 66 **8,291 $ Technical** HACO48 [Splice Enclosures for 48 ct] 135.00 $ 66 **8,954 $** HACO96 [Splice Enclosures for 96 ct] 150.00 $ 50 **7,500 $** HACO144 [Splice Enclosures for 144 ct] 150.00 $ 66 **9,949 $** TERM 150.00 $ 290 **43,425 $** HO1 [Splicing with bi-directional testing] 25.00 $ 10,540 **263,502 $ Total 3,372,098 $**

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 18

**Township PROJECT: SERVICE AREA: Unit Cost No. of Total FTTH Network Lyndon Township, MI Units Costs**

**OUTSIDE PLANT MATERIALS**

12 ct. Loose Tube Fiber 0.30 $ 34,821 **10,446 $** 24 ct. Loose Tube Fiber 0.35 $ 34,821 **12,187 $ Fiber** 48 ct. Loose Tube Fiber 0.45 $ 34,821 **15,669 $** 96 ct. Loose Tube Fiber 0.70 $ 208,925 **146,247 $** 144 ct. Loose Tube Fiber 1.00 $ 34,821 **34,821 $** 1/4" EHS Strand 0.14 $ 0 **0 $** Lashing wire 0.038" Type 302 1,600' Roll 24.00 $ 0 **0 $** Weaver(Bonding Clamp) 1.75 $ 0 **0 $** #6 Bare Copper Ground Wire 0.34 $ 1,242 **422 $ Aerial** Anchor 8" Helix 26.89 $ 0 **0 $** Sno-Shoe (pair) 39.95 $ 0 **0 $** Stainless Steel Strap 0.20 $ 0 **0 $** 1/2" Spacer 0.12 $ 0 **0 $** Guy Guards 3.08 $ 0 **0 $** Auxilliary Eye 14.39 $ 0 **0 $** #4 Split Bolt 0.81 $ 0 **0 $** Preformed Deadend 1/4" Strand 3.21 $ 0 **0 $** 12" x 5/8" Machine Bolt w/ Nut 1.07 $ 0 **0 $** 2"x1/8" Flat Square Washer 0.30 $ 0 **0 $** 5/8"-11 Square Nut 0.22 $ 0 **0 $ Stranded Hardware** 3 Bolt Clamp 4.38 $ 0 **0 $** 3 Bolt Clamp Curved 5.48 $ 0 **0 $** 5/8"Thimble Eye Bolt 3.90 $ 0 **0 $** Bug nut(D Lash Clamp) 0.30 $ 0 **0 $** Guy Hook - Ram's Head 3.01 $ 0 **0 $** Arnco 1.25" HDPE Conduit 0.52 $ 331,626 **172,446 $** Channell 24x36x24 Handhole 193.40 $ 663 **128,273 $** Channell Pedestal 55.00 $ 579 **31,845 $** Pedestal Stickers 0.70 $ 579 **405 $ Underground** 0.75" Flex Conduit - 20' 9.70 $ - **- $** Screw Lags 0.25 $ - **- $** 5/8" x 8' Copper Ground Rod 10.31 $ 1,242 **12,808 $** Ground Rod Clamp 0.90 $ 1,242 **1,118 $** Warning Marker 14.60 $ 1,990 **29,050 $** "A" Splice Enclosure 220.00 $ 133 **29,183 $** "C" Splice Enclosure 250.00 $ 116 **29,081 $** "D" Splice Enclosure 285.00 $ 66 **18,903 $** Splice Trays for A Enclosure 20.00 $ 265 **5,306 $ Technical** Splice Trays for C Enclosure 22.00 $ 399 **8,777 $** Splice Trays for D Enclosure 25.00 $ 398 **9,949 $** Aerial Clamps for FOSC 450 25.82 $ 315 **8,141 $** Splitter Cabinets 5,000.00 $ 5 **25,733 $** Splitters 800.00 $ 21 **16,543 $** AirFOSC 150.00 $ 290 **43,425 $** Splice Protector (sleeves) 0.27 $ 10,540 **2,846 $ Total 793,626 $**

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 19

**Township PROJECT: SERVICE AREA: Unit Cost No. of Total FTTH Network Lyndon Township, MI Units Costs**

**DROP TO THE HOME**

CO2(6M) [Hang stranded fiber] 0.90 $ 0 **0 $** BMUDT [Trench No Conduit] 2.00 $ 312,660 **625,319 $** BMUDD [Bore Conduit] 12.00 $ 34,740 **416,880 $** BFO2 [Pull Fiber] 1.00 $ 347,400 **347,400 $ Labor** BM83 [Drop Riser Guard] 25.00 $ 579 **14,475 $** BM(0.75) [House Cane] 13.00 $ 579 **7,527 $** PM2A [Aerial Bond] 4.50 $ 0 **0 $** BM2-A [Grounding] 40.00 $ 0 **0 $** NID [Place NID Housing] 25.00 $ 579 **14,475 $** HO1 [Splicing] 25.00 $ 579 **14,475 $** HO1T [Testing] 4.00 $ 579 **2,316 $** 2 Ct. Loose Tube Fiber 0.20 $ 347,400 **69,480 $** Lashing wire 0.038" Type 302 1,600' Roll 24.00 $ 0 **0 $** 0.75" Flex Conduit - 20' 9.70 $ 579 **5,616 $** Arnco 0.75" HDPE Conduit 0.30 $ 34,740 **10,422 $** Weaver(Bonding Clamp) 1.84 $ 0 **0 $ Materials** #6 Bare Copper Ground Wire 0.38 $ 0 **0 $** #4 Split Bolt 1.33 $ 0 **0 $** 5/8" x 8' Copper Ground Rod 10.31 $ 0 **0 $** Ground Rod Clamp 0.90 $ 0 **0 $** Splice Protector (sleeves) 0.27 $ 0 **0 $** Calix 700 Series ONT Enclosure - $ 579 **- $**

**Total 1,696,295 $ PROFESSIONAL SERVICES**

OSP Field Verification/GPS Mapping 86.11 $ 754 **64,902 $ Plant Design/Mgmt** OSP Drafting/Design 83.53 $ 356 **29,729 $** OSP Project Management/Inspection 92.22 $ 4,860 **448,200 $** Service Entrance Mapping/Drafting 85.00 $ 261 **22,147 $ Drop Design/Mgmt** Service Entrance Mgmt/Inspection - $ - **- $ - $ Total 564,977 $**

**GRAND TOTAL 6,516,996 $**

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 20

MODEL ASSUMPTIONS AND OUTPUT The below inputs drive the 20-year Pulse financial model created for Lyndon Township.

**Plant Statistics:**

**Construction Statistics:** Homes Passed 1,158

Make Ready Per Aerial Mile $0 Small Bus Passed 0

Aerial Production 75 miles per month Large Commercial 0

UG Production 5 miles per month Total Miles 62.8

Avg. Length of Drop fiber along main 400.0 UG % 100.0%

Avg. Length of Drop fiber from main to ONT 200.0 Do you own the poles? No

UG Drop % 100.0% Pole Condition Good

Avg. Feet between splices 500.0 Underground Construction Conditions Good Number of Substations 0

**Capital Expenditures**

**Summary of Total Capital Required**

**Construction Costs** $6,259,086 **Ongoing Capital Costs at Launch** $36,000 **Total Project Capital Costs** $6,295,086

**Construction Costs**

Unit Cost x Quantity = Total Headend/Office Space $204,722 0 $0 Cabinet Equipment $89,722 0 $0 Aerial Construction (A) $27,944 0.0 $0 Underground Construction (B) $74,967 62.8 $4,708,554 Drop Construction (C) $2,678 579 $1,550,532 **Total Construction $6,259,086**

*Details for construction costs above:*

(A) Aerial Cost Per Mile (B) Underground Cost Per Mile (C) Drop Cost Per Home

Plant Labor (inc. Make Ready) $5,632 Plant Labor $48,019 Plant Labor $2,438 Technical Labor $5,670 Technical Labor $5,670 Tech. Labor $54 Fiber $3,493 Fiber $3,493 Fiber $120 Aerial Materials $1,356 UG Materials $5,992 Materials $28 Technical Mat. $3,151 Technical Mat. $3,151 NID Enclosure $0 Design $1,507 Design $1,507 Design $38 Constr. Mgmt $7,136 Constr. Mgmt $7,136 Constr. Mgmt $0 Total Aerial $27,944 Total UG $74,967 Total Drop $2,678

**Ongoing Capital Costs at Launch**

Cost x Quantity = Total Pole Assessment $57 0 $0 Permits $1,200 30.0 $36,000 Simple PV of Pole Rent (20 yrs) $0 20 $0 Plant Maintenance Materials $0 0 $0 **$36,000**

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 21

DETAIL PROJECT COSTS – ISP CAPITAL BUDGET ASSUMPTIONS Capital costs to operate the network will be approximately $472,000. The following assumptions were made in the capital projections for the financial model:

• Network Equipment:

o An ISP will build a headend to house the GPON network gear and router. Pulse recommends using reliable, proven network equipment. The Calix E7 Series 10GE has been modeled and include 10GE transceivers and Ethernet cards. The router housed in the headend is assumed to be a Cisco ASR-1000 router or something equivalent. The total cost of the headend is $204,722. This cost is required at the beginning of the project.

• In-Home Installation:

o Inside the home installation/service calls will be handled by an internal technician, but won’t be able to install all customers initially. The ISP will need to hire 3rd party technicians to fulfill the excess demand at the time of launch. The 3rd party help is assumed at $125 per home. o The assumed Calix 700 Series ONT is installed inside the home and transmits a wireless signal to devices in the home. Each ONT costs $275 for the equipment. Only homes that sign up for service will have an ONT installed. o The $30 ONT enclosure is split in our model (total price of $275 + $30 = $305) installed at time of

drop.

• Equipment

o Trucks have been included in the budget for the inside the home technician. We have assumed a

cost of $35,000 per truck. o Fiber testing equipment will be required for troubleshooting after construction. We have assumed

of each of the three basic equipment for a total of $18,000. o Computers and iPads for the new staff are in the budget for $1,500.

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 22

CAPITAL BUDGET

**ISP PROJECT: SERVICE AREA: Unit Cost No. of Total FTTH Network Lyndon Township, MI Units Costs**

**NETWORK AND ACCESS EQUIPMENT**

Headend Room Build to Suit 65,000.00 $ 1 **65,000 $** Cisco ASR-1000 Routers 50,000.00 $ 1 **50,000 $** E7-2 Package Chassis 696.50 $ 2 **1,393 $** Battery String Kit, Heater and Connectors 2,239.00 $ 1 **2,239 $ Main Office** 10GE SFP+ Transceiver 20Km, 1310nm 2,096.50 $ 3 **6,290 $** GPON SFP OIM, Class B+ 1490/1310nm 1,200.00 $ 21 **24,814 $** E7-2 10GE-4 Ethernet Card 5,596.50 $ 1 **5,597 $** Fiber Management 5,000.00 $ 4 **20,000 $** E7-2 8 Card PON unit 9,796.50 $ 3 **29,390 $ Total 204,722 $ DROP TO THE HOME**

Contracted Installation Labor 125.00 $ 220 **27,506 $ Installation** Calix 700 Series ONT Electronics 275.00 $ 579 **159,225 $** Miscellaneous Materials 30.00 $ 579 **17,370 $** Miscellaneous Materials $15 579 **8,685 $ Total 212,786 $ EQUIPMENT**

Trimble Units 3,500 $ - **- $** Computers, iPads 500 $ 3 **1,500 $ Devices** OTDR 15,000 $ 1 **15,000 $** Power Meter 1,000 $ 1 **1,000 $** Light Source 2,000 $ 1 **2,000 $** Pickup Trucks 35,000 $ 1 **35,000 $** Bucket Trucks 40,000 $ - **- $** Trailer 10,000 $ - **- $ Vehicles** Trench Machine 75,000 $ - **- $** Bore Machine 125,000 $ - **- $** Wenches, tool boxes, etc. 10,000 $ - **- $** ATV's 5,000 $ - **- $ Plant Maintenance** Materials - $ - **- $**

**Total 54,500 $**

*Does not include operating resources or cash cushion* **GRAND TOTAL 472,008 $**

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 23

MODEL ASSUMPTIONS The below inputs drive the 20-year Pulse financial model created for Lyndon Township’s ISP partner.

**Plant Statistics:** Homes Passed 1,158 Small Bus Passed 0 Large Commercial 0 Total Miles 65

**Ongoing Capital Costs:** External Installation $125 per install ONT (plus $30 enclosure) $275 each Installation Materials $15 per internal install Plant Maintenance Materials $20 per mile

**Customer Metrics:** Res Customer Take Rate 50% Small Bus Customer Take Rate 30% Commercial Take Rate 50% Timeline to Launch Services 8 Months Customer Ramp 12 Months Data Only - Low Tier $46.46 Data Only - High Tier $56.46 Data Only Upsell to High Tier 25% VoIP Only $39.95 VoIP Federal Line Charge $3.95 Bundle Discount - Double Play $5.00 % order for Double Play - Data/VoIP 30% Installation revenue $0.00 Small Bus Pricing $69.95 Commercial Pricing $1,200.00 Cell Tower Opportunities 0 Cell Tower Pricing $2,250.00 FCC CAF or Other Revenue from Grants $0 Annual revenue Average Retail Price Increase 0.5% Future Community Dev. from Fiber 1.0% After Year 5

**Operating Costs:** Bandwidth $3,300 Monthly VoIP $13.00 Per Line Customer Care $10.00 Per Sub Network Management $4.00 Per Sub

Admin/Marketing Resource 1 Admin/Marketing Resource $50,000 Base salary Maintenance Technicians 0 Maintenance Technicians $50,000 Base salary Installation Technicians 1 Installation Technicians $40,000 Base salary Internal installs 4.0 Per day per tech Benefits 50.0%

Bad Debt Expense 1.0% Vehicle Repairs and Fuel $600 monthly Facilities Rent $0 Facilities Utilities $500 Property Tax Expense 1.0% as a percent of assets Marketing cost per connect $50 Other expenses 2.0% percent of revenue Average Expense Cost Increase 2.0%

**Balance Sheet Items:** Loan Term 8.3 years Interest Rate 3.8% Plant Depreciable Life 8.3 years

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 24

FINANCIAL HIGHLIGHTS The highlights below come from the Management Dashboard tab from the Pulse financial model. These were chosen as important indicators for Lyndon Township to share with interested parties. A few very important notes to show financial feasibility of the project include:

• $604,000 loan assumed for first year which includes $82,000 operating runway

• Positive monthly cash flow after debt service

• Simple payback period for the project of 4.5 years is better than 8-year loan term

**Balance Sheet Overview**

Total Per Per Year 1 Year 2 Year 3 Year 4 Year 5 ($ 000's) Passing Customer Total Miles constructed 0 0 0 0 0

Homes passed 1,158 1,158 1,158 1,158 1,158 Take Rate 50.0% 50.0% 50.0% 50.0% 50.0% Residential Customers 579 579 579 579 579

Network Equipment ($ 000's) $205 $0 $0 $0 $0 $205 $177 $354 In-Home Capital Expenditures ($ 000's) $250 $0 $0 $0 $0 $250 $216 $432 Op. Exp. and Cash Cushion ($000's) $149 $55 $0 $0 $0 $205 $177 $353 Total Capital Expenditures ($ 000's) $604 $55 $0 $0 $0 $659 $569 $1,139

Grants Received ($ 000's) $0 $0 $0 $0 $0 $0 $0 $0 Debt Incurred ($ 000's) $604 $55 $0 $0 $0 $1,081 $934 $1,868

**Income Statement Overview** *All financial drivers stated per customer at end of year*

Year 1 Year 2 Year 3 Year 4 Year 5 Revenue $60.63 $60.76 $61.06 $61.37 $61.67 Variable Costs $23.60 $23.80 $24.27 $24.74 $25.21 Customer Margin $37.03 $36.96 $36.79 $36.63 $36.46 Operating Costs $13.20 $23.49 $23.90 $24.33 $24.77 Total EBITDA $23.84 $13.48 $12.89 $12.29 $11.69

Debt Service $12.21 $13.33 $13.33 $13.33 $13.33

Monthly Cash Flow $11.63 $0.15 ($0.44) ($1.03) ($1.64)

**Key Project Viability Indicators**

Year 1 Year 2 Year 3 Year 4 Year 5 EBITDA per Customer $23.84 $13.48 $12.89 $12.29 $11.69 Equity to Assets % -15.1% -11.4% -9.2% -6.8% -3.9% TIER 5.37 1.91 1.98 2.09 2.28

Simple Payback 7.0 years Project IRR 0.0% Loan Term 8.3 years Loan Interest Rate 3.8%

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 25

10-YEAR FINANCIAL SCHEDULES **Lyndon Township, MI**

**Projected Income Statement**

Year 1 Year 2 Year 3 Year 4 Year 5 Year 6 Year 7 Year 8 Year 9 Year 10 ***Mileage and Homes Passed:***

Aerial Miles 0 0 0 0 0 0 0 0 0 0 UG Miles 0 0 0 0 0 0 0 0 0 0 Miles 0 0 0 0 0 0 0 0 0 0

Homes passed 1,158 1,158 1,158 1,158 1,158 1,158 1,158 1,170 1,181 1,193 Businesses passed 0 0 0 0 0 0 0 0 0 0 Large businesses passed 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

***Customer Statistics:***

Res customer take rate 50.0% 50.0% 50.0% 50.0% 50.0% 54.6% 54.6% 54.6% 54.6% 54.6% Bus customer take rate N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A Large Bus customer take rate N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A

Res customers 579 579 579 579 579 632 632 638 645 651 Bus customers 0 0 0 0 0 0 0 0 0 0 Large bus customers 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 New Installs 579 0 0 0 0 53 0 6 6 6

***Projected Income Statement:***

Revenue:

Data only $63,288 $238,261 $239,278 $240,469 $241,659 $257,528 $266,395 $269,150 $273,174 $277,251 Double Play - Data/VoIP $48,672 $183,237 $184,019 $184,935 $185,851 $198,055 $204,874 $206,993 $210,087 $213,223 Double Play - Data/Video $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Triple Play $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Small Business $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Large Commercial $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Installation Fees Collected $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Cell Towers $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 FCC or Other Grants $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 **Total revenue $111,960 $421,498 $423,297 $425,404 $427,510 $455,582 $471,269 $476,143 $483,261 $490,475**

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 26

**Lyndon Township, MI Projected Income Statement**

Year 1 Year 2 Year 3 Year 4 Year 5 Year 6 Year 7 Year 8 Year 9 Year 10 Bad debt $769 $4,214 $4,231 $4,252 $4,273 $4,521 $4,711 $4,756 $4,827 $4,899 Admin/marketing wages $25,000 $50,000 $51,000 $52,020 $53,060 $54,122 $55,204 $56,308 $57,434 $58,583 Maintenance tech wages $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Installation tech wages $20,000 $40,000 $40,800 $41,616 $42,448 $43,297 $44,163 $45,046 $45,947 $46,866 Capitalized portion of install wages ($28,488) $0 $0 $0 $0 ($4,556) $0 ($567) ($585) ($602) Payroll taxes and benefits $8,256 $45,000 $45,900 $46,818 $47,754 $46,431 $49,684 $50,394 $51,399 $52,423 Vehicle repairs and fuel $3,600 $7,344 $7,491 $7,641 $7,794 $7,949 $8,108 $8,271 $8,436 $8,605 Facilities rent $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Utilities $6,000 $6,120 $6,120 $6,120 $6,120 $6,120 $6,120 $6,120 $6,120 $6,120 Plant Maintenance Materials $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Property tax expense $0 $2,047 $2,047 $2,047 $2,047 $2,047 $2,047 $2,047 $2,559 $4,094 Pole rental $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Marketing sales $28,950 $0 $0 $0 $0 $2,652 $0 $317 $321 $324 Other operating expense $2,239 $8,430 $8,466 $8,508 $8,550 $9,112 $9,425 $9,523 $9,665 $9,809 **Total operating expenses $66,326 $163,155 $166,055 $169,022 $172,047 $171,695 $179,463 $182,214 $186,123 $191,122**

**EBITDA ($17,118) $94,032 $90,130 $85,990 $81,792 $98,810 $99,055 $96,842 $94,968 $92,027 *EBITDA Margin*** *-15.3% 22.3% 21.3% 20.2% 19.1% 21.7% 21.0% 20.3% 19.7% 18.8%*

Interest Expense $21,567 $21,128 $18,401 $15,570 $12,631 $9,580 $6,412 $10,822 $14,391 $12,082 Depreciation $35,085 $55,610 $55,610 $55,610 $55,610 $57,010 $57,733 $57,870 $58,126 $58,384

**Net income ($73,770) $17,295 $16,120 $14,811 $13,551 $32,221 $34,909 $28,149 $22,451 $21,561**

***Average Customer Statistics:***

Revenue Per Customer $38.67 $60.66 $60.92 $61.23 $61.53 $60.07 $62.14 $62.15 $62.46 $62.76 Direct Variable Cost $21.68 $23.65 $24.05 $24.52 $25.00 $24.40 $25.41 $25.73 $26.13 $26.53 Direct Margin Per Customer $17.00 $37.02 $36.87 $36.70 $36.53 $35.67 $36.72 $36.43 $36.33 $36.23 Indirect Operating Cost $22.91 $23.48 $23.90 $24.33 $24.76 $22.64 $23.66 $23.79 $24.05 $24.45 Total Margin per Customer ($5.91) $13.53 $12.97 $12.38 $11.77 $13.03 $13.06 $12.64 $12.27 $11.78

PULSE BROADBAND – FTTH FEASIBILITY STUDY FOR LYNDON TOWNSHIP 27

**Lyndon Township, MI Projected Statement of Cash Flows and Balance Sheet**

***Projected Statement of Cash Flows:***

Year 1 Year 2 Year 3 Year 4 Year 5 Year 6 Year 7 Year 8 Year 9 Year 10 Net income ($73,770) $17,295 $16,120 $14,811 $13,551 $32,221 $34,909 $28,149 $22,451 $21,561 Add: depreciation $35,085 $55,610 $55,610 $55,610 $55,610 $57,010 $57,733 $57,870 $58,126 $58,384 Change in receivables ($35,107) ($73) ($176) ($176) ($176) ($3,462) ($192) ($589) ($597) ($605) Change in payables $21,306 $6,070 $516 $521 $525 $1,662 $555 $655 $880 $721 **Cash flow to/from operations ($52,486) $78,901 $72,069 $70,765 $69,511 $87,430 $93,005 $86,086 $80,860 $80,062**

Capital expenditures ($454,638) $0 $0 $0 $0 ($15,381) $0 ($215,566) ($206,582) ($1,879) **Cash flows to investing ($454,638) $0 $0 $0 $0 ($15,381) $0 ($215,566) ($206,582) ($1,879)**

Proceeds from senior debt financing $603,918 $55,296 $0 $0 $0 $0 $0 $215,566 $206,582 $0 Principal payments on senior debt ($63,269) ($71,476) ($74,203) ($77,034) ($79,973) ($83,024) ($86,191) ($112,063) ($88,027) ($50,456) Non-FCC Grant contributions $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Equity contributions $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Equity distributions $0 $0 $0 $0 $0 $0 $0 $0 $0 $0

**Cash flows to/from financing $540,649 ($16,180) ($74,203) ($77,034) ($79,973) ($83,024) ($86,191) $103,503 $118,555 ($50,456)**

**Ending cash balance $33,525 $96,245 $94,112 $87,843 $77,381 $66,407 $73,221 $47,244 $40,077 $67,804**

***Projected Balance Sheet:***

Year 1 Year 2 Year 3 Year 4 Year 5 Year 6 Year 7 Year 8 Year 9 Year 10 Cash $33,525 $96,245 $94,112 $87,843 $77,381 $66,407 $73,221 $47,244 $40,077 $67,804 Receivables $35,107 $35,180 $35,355 $35,531 $35,706 $39,169 $39,360 $39,949 $40,546 $41,151 Total current assets $68,631 $131,425 $129,467 $123,374 $113,088 $105,576 $112,581 $87,193 $80,623 $108,955

Property $454,638 $454,638 $454,638 $454,638 $454,638 $470,019 $470,019 $685,585 $892,167 $894,045 Depreciation ($35,085) ($90,694) ($146,304) ($201,913) ($257,523) ($314,533) ($372,266) ($430,136) ($488,262) ($546,646)

**Total assets** $488,185 $495,369 $437,801 $376,099 $310,203 $261,062 $210,334 $342,642 $484,528 $456,354

Payables and deferred revenue $21,306 $27,376 $27,892 $28,412 $28,938 $30,600 $31,154 $31,810 $32,690 $33,411 Bank debt $540,649 $524,469 $450,266 $373,232 $293,259 $210,235 $124,044 $227,547 $346,102 $295,645 Total liabilities $561,955 $551,844 $478,157 $401,644 $322,197 $240,835 $155,198 $259,356 $378,791 $329,056

Contributed equity $0 $0 $0 $0 $0 $0 $0 $0 $0 $0 Accumulated income/loss ($73,770) ($56,475) ($40,356) ($25,545) ($11,994) $20,227 $55,136 $83,286 $105,737 $127,298 Total Equity ($73,770) ($56,475) ($40,356) ($25,545) ($11,994) $20,227 $55,136 $83,286 $105,737 $127,298

**Total Liabilities and Equity** $488,185 $495,369 $437,801 $376,099 $310,203 $261,062 $210,334 $342,642 $484,528 $456,354

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NEXT STEPS AND CONSIDERATIONS Based on the results of our on-site visit, cost and business structure breakdown, and financial analysis we have identified additional considerations for the township. The following list for the township should be discussed:

1. **Network Maintenance.** We have identified the potential hard construction costs of the network, but there will also be on-going maintenance costs. We have outlined these projected costs and expressed them in the ISP model. There will be a need to either hire technical staff or contract these services through a third party. It will be important to think through how this aspect of the network will function and how the relationship between the ISP function and Township owned network will operate. 2. **Fiber Drop Costs and Assumptions.** In the model we have assumed that 50% of Lyndon Township residents and businesses will take fiber service. This is consistent with national averages, but is an unknown at this point. The model accounts for 50% of homes and businesses requiring drop construction at an average cost of $1,565 - $2,678 per drop depending on the construction method chosen. If the drop count increases beyond 50% in the future, those drops and their associated costs would be incremental to the model. In other words, they would need to be paid for either by the entity requesting drop installation (residents), additional millage or paid for through the on-going revenues generated by the ISP. In any case, this should be considered as the current model is reviewed. The model can be changed to reflect any number of drops desired (including 100%), but cost estimates for the network would need to be increased accordingly. 3. **ISP Services Provider.** A challenge in presenting this model is that an ISP provider has not yet been identified and there is no way to know what level of interest might exist from 3rd parties, or if Lyndon Township will have the ability to partner with other communities to provide these kinds of services. The ISP model presented in the Feasibility Study assumes a “stand alone” scenario. This is the least efficient version, due to the small size of the network (600 projected subscribers) and the associated inability to gain any economy of scale. Given that there are on-going costs to maintain the network, provide service and generate reserves for future capital improvements, the efficiency of the ISP and its ability to generate positive cash flow will be critical not only in providing needed monies for on-going costs, but also to help keep monthly subscription fees reasonable for subscribers to the network. Once the details of the ISP relationship can be determined a more accurate long term financial model can be developed. 4. **Key Unknowns in the Model.** Given the short time frame of the study and the difficulty in obtaining quality data from Consumers Power Company the aerial model contains significant unknowns that can only be resolved with Consumers Power Company information. The maps provided by Consumers lacked critical information (span lengths etc.) and our discussion with Consumers Power regarding “Make Ready” costs provided extremely general information (which we have used in our preliminary Make Ready cost calculation). This information is not precise and could vary considerably. The only way to obtain accurate information is to pay consumers power their required $57.25 per pole analysis fee. Given that we estimate that there are approximately 1,900 poles in Lyndon Township this fee could easily exceed $100K or more. If Lyndon Twp. were to consider a primarily aerial construction approach utilizing pole attachments to Consumers Power infrastructure, we would strongly advise that the first step in such a process would be to identify the precise Consumers Power Make Ready cost. *DISCLAIMER These forward-looking statements reflect Pulse's best professional judgment based on currently known factors but involve significant risks and uncertainties. We are confident in our abilities to project the fiber and telecommunications industries, but actual results could vary materially dependent on changes in the market conditions.*

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