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STATE OF MICHIGAN

GRETCHEN WHITMER
GOVERNOR

DEPARTMENT OF TECHNOLOGY, MANAGEMENT & BUDGET
LANSING

TRICIA L. FOSTER
DIRECTOR

Connecting Michigan Communities Grant Application

Please read through the entire Connecting Michigan Communities Grant Information and Application – 2019 package before you begin to respond to the application questions. This will help ensure you understand the full scope of the application as well as the details you will need to provide to complete the application.

Application Deadline: All grant applications are due by 4:00PM EST, Friday, August 30, 2019.

Submission Guidelines: Completed application and supporting documentation must be received by the Department of Technology, Management, and Budget (DTMB), Center for Shared Solutions by 4:00 p.m. on Friday, August 30, 2019, to be considered for funding. Applicants should email their applications and all attachments in PDF format to DTMB-CMICGrant@michigan.gov. Applicants will receive an email confirmation of their submission within 48 business hours. Please fill out the entire application and clearly label any attachments with the question/statement number from the application form. Award decisions are estimated to be made in the fourth quarter of 2019.

Questions and Contact: If you have questions after reviewing the application and supporting documentation, please see the Frequently Asked Questions (FAQ) document available on the grant website at: www.michigan.gov/CMICGrant. The FAQ will be updated throughout the application process. Questions and comments can also be submitted via email to: DTMB-CMICGrant@michigan.gov.

GEORGE W. ROMNEY BUILDING ● 111 SOUTH CAPITOL AVENUE ● LANSING, MICHIGAN 48933
www.michigan.gov/dtmb ● 517-241-5545

Application Checklist

This checklist is part of your application and should be returned along with your completed application and attachments.

Application Submission Checklist:

- **X** Read the entire application package.
- **X** Public application is complete and file name meets the standards.
- **X** Non-Public application is complete and file name meets the standards.
- **X** Confidential Treatment Form is complete.
- **X** Attachments have been gathered and file names meet the standards.
  - **X** Attachment 1: Map of proposed service area in PDF format (including both last mile coverage and middle mile routes)
  - **X** Attachment 2: GIS-compatible file of the proposed service area (including both last mile coverage and middle mile routes)
  - **X** Attachment 3: Spreadsheet of census blocks that are part of the proposed service area
  - **X** Attachment 4: Match commitment letters or evidence
  - **X** Attachment 5: Applicant organizational chart
  - **X** Attachment 6: Resumes of key officers, management personnel, and proposed project management team
  - **X** Attachment 7: Audited financial statements.
  - **X** Attachment 8: Evidence of network scalability
  - **X** Attachment 9: Five year, stand-alone project financial plan/forecast
  - **X** Attachment 10: Affidavit of commitment to offer the proposed service and cost in the proposed service area for a minimum of five years after project completion
  - **X** Attachment 11: Budgetary engineering designs, diagrams, and maps that show the proposed project
  - **X** Attachment 12: Letters of support
  - **X** Attachment 13: Demonstration of customer interest in the proposed project
  - **X** Attachment 14: Statements of impact/support from CAIs (if applicable)
  - **N/A** Attachment 15: Evidence of application for a SPIN (if applicable)
  - **X** Attachment 16: Statements of impact/support from businesses (if applicable)

NOTE: Attachments must be submitted following the designated naming structure. Applicants are to use the name of their organization followed by the attachment number and file type (e.g. ABCTelecom_Attachment_1.xlsx).

Application

Applicant and Project Information, Contact Information, and Summary

1. Project Name: **Connecting Communities in Montmorency and Oscoda Counties**
2. Applicant Name: **Barger Creek LLC**

   DBA (if applicable): **Barger Creek Wireless**

   Mailing Address: **11336 Mouch Rd., Atlanta, MI 49709**

3. Primary Grant Contact: **Carl Cadwallader**

   Primary Contact Organization (if not part of the applicant's organization): **N/A**

   Primary Contact Phone Number: **612 385 4874**

   Primary Contact Email Address: **carlmg67@gmail.com**

4. Application Author Name: **Carl Cadwallader**

   Application Author Email: **carlmg67@gmail.com**

5. Eligibility Status: Please select the means by which the applicant is eligible to apply for the grant:
   - ☐ Licensed under the Michigan Telecommunications Act (1991 PA 179, MCL 484.2101 to 484.2603)
   - ☐ Franchise holder under the Uniform Video Services Local Franchise Act (2006 PA 480, MCL 484.3301 to 484.3315)
   - X Broadband service provider currently providing service in Michigan

6. Are you registered with the Michigan Public Service Commission's Intrastate Telecommunications Service Providers Registry (ITSP)?
   ☐Yes X No ☐Unsure

7. Have you provided broadband coverage data to Connect Michigan in the last five years?
   X Yes ☐No ☐Unsure

8. Applicant Identification Numbers: Please provide the following identification numbers for the applicant (if available):

   Federal Employer Identification Number (EIN): **82-3865158**

   Michigan Tax Identification Number: **82-3865158**

   Michigan Vendor Identification Number: **N/A**

   Federal Communications Commission Registration Number (FRN): **0028544229**

Service Provider Identification Number (SPIN): N/A

9. Project Summary (250 words max.): **Our project extends our current privately funded broadband wireless network to provide high-speed and broadband internet to the unserved areas of rural Montmorency and northern Oscoda counties.**

Locations Passed and Proposed Service:

Attachment 1: Map of proposed service area in PDF format (including both last mile coverage and middle mile routes)
Name of Attachment(s) 1:
BargerCreekWireless_Attachment_1_rev.pdf

Attachment 2: GIS-compatible file of the proposed service area (including both last mile coverage and middle mile routes)
Name of Attachment 2:
BargerCreekWireless_Attachment_2_rev.kmz

Attachment 3: Spreadsheet of census blocks that are part of the proposed service area.
Name of Attachment 3:
BargerCreekWireless_Attachment_3_rev.xlsx

10. Please provide a brief description of the proposed service area (250 words max.): **Our project is designed to provide wireless broadband internet services to (7) townships of Montmorency county including Briley, Albert, Avery, Rust, Vienna, Loud, and Montmorency. We also plan to serve Clinton Township in northern Oscoda county.**

11. Does the project include a middle mile component:
X Yes ☐No

12. Locations Passed: Please indicate the total number of locations by type that will be ableto receive improved broadband services as a result of the proposed project:

Households: 1241

Businesses: 172

Community Anchor Institutions: (21) consisting of (6) Primary /secondary schools, (14) government buildings/locations, (1) healthcare location

13. Are any vacant lots included in the total number of locations passed listed above?
X Yes ☐No

If yes, these vacant lots should be anticipated for growth in the next five years according to a local, county, or regional master plan or economic development plan. Please list the name of the relevant plan and the jurisdiction implementing the plan.

Plan Name: **Montmorency County Master Plan, Oscoda County Master Plan, Briley Township Strategic Plan**

Jurisdiction: **Montmorency and Oscoda counties, Briley Township**

14. Please list the jurisdictions impacted by the proposed service area:

    City(ies)/Village(s): **Atlanta, Lewiston, Comins**

    Township(s): **Albert, Avery, Briley, Clinton, Loud, Montmorency, Rust, Vienna**

    County(ies): **Montmorency & Oscoda**

    State House District(s): **105th**

    State Senate District(s): **36th**

15. Please provide a brief description of the broadband service to be provided including, but not limited to, the technology to be used, will bandwidth be dedicated or shared, etc. (250 words max.): **Our wireless project will provide unlimited broadband internet services to homes and businesses via Telrad LTE technologies. We will be leveraging the 3.65 GHz CBRS band to provide dedicated broadband service to each customer location. Our project is a mid and last mile extension of our privately funded wireless ISP that is currently serving approximately 100 customers.**

Project Costs and Budget

16. Total eligible project cost: **The total project cost is expected at $4,401,301. Barger Creek Wireless will provide an in-kind match of $1,167,683. The remaining project costs are $3,074,918 (BargerCreekWirless_Attachment_11) + $158,700 (BargerCreekWireless_Attachment_4) = $3,233,618**

17. Total grant request: $**3,233,618**

Attachment 4: Match commitment letters or evidence
Name of Attachment 4: **BargerCreekWireless_Attachment_4.pdf; BargerCreekWireless_Attachment_4a.xlsx**

18. Total matching funds: Please complete the table below summarizing the source, amount, and type of matching funds contributed to the project. Applicants should also indicate if the match is secured or not. Attach additional sheets if necessary.

Source	Amount	Type	Secured?
Barger Creek Est 2020-2022 Estimated Project Expense (BargerCreekWireless_Attachment_4a.xls)	$1,167,683	X In-Kind	X Yes ☐No
Total	**$1,167,683**		

19. If matching funds or in-kind contributions listed above are not yet secured, please describe the process remaining to secure the funds and the anticipated timeline to do so, (250 words max.): **N/A – All funds are privately secured from/by RQR LLC and Barger Creek LLC both of which are wholly owned by Carl and Kathy Cadwallader**

20. Project Budget: Please use the following table to provide a budget for the proposed project. Please use the recommended categories in the table where possible, creating other categories where anticipated expenses do not fall within one of the recommended categories.

Use of Funds	Match Amount (BCW Funded)	Grant Amount	Total
Buildings and Labor	0	0	0
Last Mile Construction & Labor	0	$1,308,735	$1,308,735
Middle Mile Construction & Labor	0	0	0
Professional Services and Engineering	0	$30,445	$30,445
Customer Premise Equipment **First 1,000 Units grant funded; remaining (1000) will be BCW self-funded**	$406,384	$406,384	$812,768
Customer Premise Installation **First (500) grant funded; remaining (1500) will be self-funded by BCW**	$404,100	$134,700	$538,800
Electronics	0	$1,021,779	$1,021,779
Permits	0	$96,600	$96,600
Misc. Materials	0	$66,000	$66,000
Contingency	0	$144,975	$144,975
BCW Funded Project Manager (2020-2023) $60K per year	$180,000	0	$180,000
Bucket Truck Lease (2020 - 2023) $10,000 per year (Required for Pole and some Customer Location installs)	$30,000	0	$30,000
Administrative Support/Materials	$45,200	0	$45,200
Network Operations Center (Start-up and run) (2020-2023)	$84,000	0	$84,000
Backhaul Upgrade to 1GBS	0	$18,000	$18,000
Marketing New Services	0	$6,000	$6,000
Tower land leases (3-year period)	$18,000	0	$18,000
Totals	$1,167,683	$3,233,618	$4,401,301

21. Please briefly describe why this project needs funding from the CMIC Grant program and why the project could not proceed without this funding, (250 words max.): **Our broadband grant proposal provides the required funding to extend our network to the areas that are sparsely populated and underserved in Montmorency and Oscoda counites. The funding provides mid and last mile infrastructure including the customer equipment costs for unserved residences and small business. Our proposal leverages existing Barger Creek privately funded infrastructure including a fiber optic backhaul network, climate-controlled data room and facility for community education. The areas that we have targeted are economically depressed and cannot afford internet costs that would provide investment dollars for these critical investments.**

Experience and Financial Wherewithal

Attachment 5: Applicant organizational chart
Name of Attachment 5: **BargerCreekWireless_Attachment_5.pdf**

Attachment 6: Resumes of key officers, management personnel, and proposed project management team

Name of Attachment 6:

BargerCreekWireless_Attachment_6.pdf

22. Please provide a brief history of your organization including experience relevantto the proposed project, (250 words max.): **Barger Creek Wireless (BCW) was founded in early 2018 by Carl and Kathy Cadwallader. Carl is a native of Atlanta, Michigan. Kathy and Carl have been investing in the local area for nearly 20 years and were interested in doing their part to help bridge the digital divide in this economically distressed area. Carl is an RF/electrical engineer and Kathy has significant experience in web development and website administration from the Library of Michigan and the Michigan Library Consortium. Kathy and Carl purchased land locally where they constructed a building that houses a climate-controlled data room, multiple purpose area for education plus areas for equipment storage and work areas. The location was chosen for its proximity to the Merit back-haul fiber which is across the highway. BCW also constructed a 120 foot tower on the site along with an underground fiber optic network. BCW has also worked locally with landowners and government to place (7) micro-pop sites consisting of 80 ft utility poles, wireless base-stations, and wireless and fiber backhaul to BCW site. All investment thus far has been 100% funded by Barger Creek Wireless (zero debt). We are currently serving (90) customers and expect to finish 2019 near (120) customers.**

Attachment 7: Audited financial statements
Name of Attachment 7**: Redacted – see CT Form**

23. Please provide a brief statement to accompany your attached audited financial statementsand documentation, (250 words max.): **BCW Tax Documents (1 year) reflect the capital invested in 2018. Barger Creek Wireless is debt-free and has low operating costs. Barger Creek Wireless reached positive cash flow in late 2018 and is profitable. We re-invest our earnings into meeting continued customer demand thru expansion.**

Long-Term Viability and Scalability

Attachment 8: Evidence of network scalability
Name of Attachment 8: **BargerCreek_Attachment_8.pdf**

24. Please provide a description and evidence that the proposed infrastructure is scalable to meet the anticipated future connectivity demands of the proposed service area. Please indicate the end-user connection speed to which the proposed network is designed to scale. This information must be certified by the equipment manufacturer or a professional engineer, (250 words max.):

Long-term Viability - We have continued to invest in the business during 2019 adding (3) additional micro-pop locations and expanding our offerings by adding new technologies (900 MHz, 2.4 GHz and 5 GHz). We ended 2018 with (60) customers and expect to close 2019 near (120) effectively doubling business. With this grant, we will add licensed 3.65 GHz LTE technologies to our system and further improve our ability to deliver true broadband speeds even in non-line-of-sight (NLOS) conditions.

Scalability – Our wireless ISP was professionally designed by PCS Technologies located St Paul, MN (https://www.pcs-tech.com/) and designed to be scalable to serve thousands of customers. We invested in a fiber optic network from the point where we attach our backhaul provider to our building and tower. Our current backhaul network switch is expandable to 10 GBs without hardware upgrade. Our tower installations are done professionally by Thumb Radio of Bad Axe, MI (https://www.manta.com/c/mm7xx4p/thumb-radio-inc). Key equipment selected/purchased include a commercial grade Dell server and commercial grade MicroTik network switch. Our server room has a stand-alone climate control system and is supported by a 25 KWA back-up generator driven by natural gas. We have added (7) micro-pop sites across Briley Township in 2018 and 2019, improving our ability to provide excellent speeds to our customers.

Attachment 9: Five-year, stand-alone project financial plan/forecast
Name of Attachment 9: **BargerCreekWireless_Attachment_9.xlsx**

Attachment 10: Affidavit of commitment to offer the proposed service and cost in the proposed service area for a minimum of five years after project completion.
Name of Attachment 10: **BargerCreekWireless_Attachment_10.pdf**

25. Please provide a brief narrative to accompany your attached five-year stand-alone project financial plan/forecast, (400 words max.): **We are currently serving (90) customers and are both cash flow positive and earning a small profit. Our operating costs are very low because we have no debt and the founders donate their time and travel costs. We have also been successfully negotiating low-cost land leases and electrical power arrangements for the (7) micro-pop / remote sites in operation. We have only recently added part time network engineer / install manpower due to demand. We finished 2018 with (60) customers and are on-track to double our revenue and customer count to (120) with the close of 2019. Our profitability continues to improve as we add customers to the existing network. We own a home and farm in community west of Atlanta and are invested at many levels in improving the living conditions of our area.**

Readiness

Attachment 11: Budgetary engineering designs, diagrams, and maps that show the proposed project. Design documents must clearly demonstrate the applicant's complete understanding of the project and ability to provide the proposed solution. This information must be certified by a Professional Engineer registered in Michigan.

Name of Attachment 11: **BargerCreekWireless_Attachment_11_rev.pdf**

26. Please provide a brief statement to accompany your attached engineering designs, diagrams, and maps indicating your readiness to build, manage, and operate the proposed network, (250 words max.): **Barger Creek Wireless has partnered with Finley Engineering (PE certified in Michigan) and PCS Technologies in St. Paul MN to develop a professional and credible plan. Our network is fully scalable, and we have demonstrated that we can build last mile infrastructure and deliver service quickly. We believe wireless broadband is the most cost-effective way to deliver broadband speeds in this rural environment. We have a very strong track record of success and received very good reviews from our existing customers. We are ready to take on this challenge.**

27. Please use the table below to complete a project schedule outlining individual tasks and their timing by quarter and year. All projects must be complete by September 30, 2023. **Please see attached file BargerCreekWireless Project Timing.pdf for the timing to build out everything in the project other than customer installs.**

Task	2020			2021				2022				2023		
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Project Award														
Site Selection														
Material Ordering														
Site Construction														
Network Turn-Up														
Turnover to BCW														
Customer Installs														
See Attached BargerCreekWireless Project Timing.pdf for details														

28. Please indicate the anticipated date upon which service to the last location in the proposed project area will be turned on: **December 30th, 2022**

29. Please list any factors that would change or delay the proposed schedule: **None**

30. Have all the required local/city/county/state approvals necessary for this project to proceed been obtained?
Yes **X** No

If not, what remains to be done and what is required for completing the process of obtaining approvals? Include this information in the project schedule. **We will be required to pull building permits for towers located at Hossler Rd (Briley Township), Comins (Clinton Township), NL1 (Hillman Township), Lewiston (Albert Township) and RT1 (Rust Township). We do not see this as a road-block as we have experience building towers and pole sites in the local area.**

31. Have state environmental review requirements been met, if applicable? **N/A**
Yes ☐No

If not, what remains to be done and what is required for completing the process of obtaining approvals? Include this information in the project schedule.

32. Does this project affect/is the project located in or near local, state, or federal historic or potentially historic, architectural, or archeological resources?
Yes **X** No

If not, what remains to be done and what is required for completing the process of obtaining approvals? Include this information in the project schedule.

33. Please briefly describe how the proposed project will leverage existing broadband networks, where practical, or be built in conjunction with other broadband infrastructure project(s), (250 words max.): **Our project leverages the existing Barger Creek broadband network at our farm location and our back-haul provider Everstream. We currently extend our fiber network via Everstream and will do the same to support the proposed towers at Camp 3, Lewiston, Hossler and RT1 locations.**

Community and Economic Development

Attachment 12: Community letters of support
Name of Attachment 12: **BargerCreekWireless-Attachment_12.pdf**

Montmorency County Community Development / EDC (Economic Development Council) Support Letter
Michigan House Rep Triston Cole Support Letter
Michigan Sen. Jim Stamas Support Letter
Rural Healthcare Support Letter (Wurtsmith)

Attachment 13: Demonstration of customer interest in the proposed project
Name of Attachment 13: **BargerCreekWireless_Attachment_13.pdf**

Patricia Crawford Support Letter (Request)
Gretchen and Steve Herold Support Letter (Service Request)
Mary Farley Support Letter (Service Request)
Kathy and Wayne Isbell Support Letter (Service Thank You)
Gail Kent Support Letter (Service Request)
Dave Locke Support Letter (Service Request)
Avery Lake Home Owners Group

34. Please provide a brief statement to accompanythe demonstration of customer interest you have attached to this application. This description should include the method used for gauging customer interest and the results, (250 words max.): **Barger Creek Wireless has seen a consistent stream of requests for our existing service. We will finish 2019 with approximately (120) customers and will have a backlog of an additional (30) that are in our existing coverage area. We currently have nearly (80) customers who are out-of-range that would be covered (see BargerCreekWireless_Attachment_13A). We expect to see similar strong demand for the townships that we would be able to cover if we secure this grant.**

Attachment 14: Statements of impact/support from CAIs (if applicable)

Name of Attachment 14: **BargerCreekWireless_Attachment_14.pdf**

Albert Township Board Support Letter
Avery Township Board Support Letter
Briley Township Board Support Letter
Clinton Township Board Support Letter
Loud Township Board Support Letter
Vienna Township Board Support Letter
MOA Landfill Support Letter
Atlanta / Hillman Community Schools
Alpena Community College Support Letter

35. In the table below, please list the specific community anchor institutions (CAIs) to be served by the proposed project, (attach additional sheets if necessary). Please also attach statements or evidence from these CAIs regarding the benefits of the proposed connectivity solution and how it will impact the organizations.

CAI Name	Address	Type (e.g. healthcare, library, school, etc.)
Albert Township Office	Albert Township Offices 4360 Hanson Ave. P.O. Box 153 Lewiston, MI 49756	Township Government
Avery Township Office	Avery Twp. PO Box 665 Atlanta, MI 497090665	Township Government
Briley Township Office	Briley Township 12423 Jerome St. PO Box 207 Atlanta, MI 49709	Township Government
Clinton Township Office	Clinton Twp. PO Box 168 Comins, MI 486190168	Township Government
Loud Township Office	Loud Twp. 3882 M-33 South Atlanta, MI 49709	Township Government

Montmorency Township	Montmorency Twp. PO Box 457 Hillman, MI 497460457	Township Government
Rust Township Office	Rust Twp. PO Box 456 Hillman, MI 497460456	Township Government
Vienna Township Office	Vienna Twp. PO Box 132 Johannesburg, MI 49751	Township Government
MOA Landfill Office	MOA Landfill 6751 Landfill, Atlanta, Michigan 49709	County Government

Attachment 15: Evidence of application for a SPIN (if applicable)
Name of Attachment 15: **N/A**

If the proposed project includes connections to schools or libraries, please provide your SPIN or evidence of application for a SPIN from the FCC/Universal Service Administrative Company (USAC) and demonstration of your knowledge of E-rate and working with the FCC/USAC, (250 words max.): **Most schools and libraries within the proposed service area currently have access to broadband internet through access to the Merit Network. We understand that schools and libraries are eligible for E-rate funding and will work with the FCC to get a SPIN, should that become necessary in the future.**

36. Please briefly summarize the proposed service will impact the following sectors in the community:

Public safety: Access to broadband internet in the unserved areas will make it possible for citizens to quickly access safety instructions in time of an emergency from local, state and federal agencies as well as news updates related to public safety such as construction updates and land management by the DNR. Many households in this area rely on cell phones for notification and communication in time of an emergency. Due to the geography and the remoteness of many homes in this area, cell coverage is often unreliable. Access to broadband will allow residents to have access to communication technology in an emergency setting.

Healthcare: The proposed service area is located at a considerable distance from medical facilities such as hospitals. Residents must often travel great distances at considerable expense to access medical care from specialists. In addition, the winter weather conditions make travel difficult, particularly for the elderly population. Telemedicine allows patients and doctors to meet real-time in an online environment for diagnosis and follow-up care. Broadband internet is required for telemedicine to work, particularly because of the video component involved in the service.

Education: While broadband internet is available to students in the proposed service area while at the school building, many do not have access to broadband at home. Much of the curriculum requires accessing homework and researching information through the internet and broadband access would allow these students to do their homework at home and come prepared for learning the following day. Post-secondary education and job training programs are often offered on-line. Access to broadband would allow residents to take advantage of these opportunities which would in turn allow them to have access to jobs providing a higher income.

Government entities: Most government agencies at all levels of government rely on the internet to conduct most business and provide important communication with constituents. Broadband is a requirement to do business with the government. In many cases, the internet is the only way to get access to forms and even customer service. This also impacts the business community which must interact with the government at some level for most aspects of running a successful business. Government agencies must

have the ability to work with other agencies on projects to improve services and communicate. For government agencies in remote geographic locations, the ability to meet via teleconferencing is vital. These services require broadband to work effectively.

Libraries: In rural underserved communities, often libraries are the only location for residents to get access to broadband internet. A robust connection to the internet is required for libraries to provide this service to residents regardless of their economic status or geographic location. Many libraries also offer remote access to resources such as databases of information or e-books. Some of these services are provided at the state-wide level. Access to broadband in the home allows residents to access these services paid for by taxpayers.

Attachment 16: Statements of impact/support from businesses (if applicable)
Name of Attachment 16: BargerCreekWireless_Attachment_16.pdf
Stan Hubbell Support Letter – Internet Enable Work from Home
Montmorency County Tribune Support Letter

37. Please provide a brief description of businesses needing improved broadband service in the proposed project area and the level of improvement needed. Please also attach statementsor evidence from any impacted businesses regarding the benefits of the proposed connectivity solution and how it will impact the business, (250 words max.): **Barger Creek Wireless has demonstrated that we are able to provide local businesses with both high-speed and broadband connections that enable their businesses. Our business customers include a 30-room local motel, a county title office, an art gallery, a hardware store as well as a number of work-from-home IT professionals that have moved from city locations elsewhere and have continued with their existing employers. The addition of technology professionals to the community is one of the key benefits that our business has brought to the community. It enriches not only the tax base but the pool of skilled people who support the community thru their community participation and engagement.**

38. If the proposed service area has a significant agricultural presence, please briefly describe how the proposed service will impact farmers and the agriculture community, (250 words max.): **Montmorency and Oscoda counties do have significant agricultural communities. Our broadband service supports farmers to keep track of commodity markets and any interaction they have with government support such as the State Department of Agriculture or the USDA. Our agricultural customers also now have access to continuing education either locally thru Alpena Community College or on a wider scale.**

39. Is broadband included in a local, county, or regional economic development plan, master plan, or similar up-to-date planning document, or does the community in which the proposed service is to be deployed have a specific broadband/technology plan in place?
X Yes ☐No

If yes, please list the name of the relevant plan and the jurisdiction implementing the plan. Plan Name:

Briley Township Master Plan
http://www.discovernortheastmichigan.org/downloads/briley_township_master_plan_2016.pdf
Montmorency County Master Plan
http://www.brileytownship.com/doc.montmorencycountymasterplan.pdf
Oscoda County Technology plan
http://www.connectpr.org/sites/default/files/connected-nation/Michigan/files/oscoda_county_mi_technology_action_plan_final.pdf

Jurisdiction: Briley Township, Montmorency County, Oscoda County

Affordability and Service Limitations

40. Using the table below, please indicate the download and upload speeds of the services tobe offered in the proposed service area offered over the initial five years of the project (attach additional sheets if necessary). The non-discounted/rack rate monthly pricing of unbundled internet-only service should be included for each service offered, as well as the monthly data allowance for customers (if applicable):

In addition, due to the cost of equipment currently installed at the customer residence, Barger Creek Wireless charges a one-time equipment use fee to recover part of the equipment cost. If we receive the grant, customer equipment is included in the grant request and this would allow us to drop this charge for new customers.

Download Speed (Mbps)	Upload Speed (Mbps)	Monthly Cost $	Monthly Data Allowance (GB)
50	30	149	Unlimited
30	20	99	Unlimited
15	3	79	Unlimited
10	2	59	Unlimited
5	1	29	Unlimited

41. Do you participate in the federal Lifeline program?
☐Yes **X** No

42. Do you plan to offer a lower-cost monthly subscription plan for low-income households inthe proposed service area?
X Yes ☐No

If yes, please briefly describe the program including the type of service to be offered, the monthly cost for qualifying household, and how you plan to determine household eligibility for such a program, (400 words max.): **We offer a $29 per month flat rate (all fees and taxes included) for our basic 5 MBS/1MBS package.**

43. Does any of the proposed service area include (wholly or partially) an eligible distressed area (a list of eligible distressed areas can be found here: https://www.michigan.gov/mshda/0,4641,7- 141-48987_75951-181277--,00.html)?
X Yes ☐No

If yes, please list the distressed community(ies) impacted by the proposed service area:

Village of Atlanta

Adoption Strategy

44. Please briefly describe any proposed digital literacy training events, materials, and/or resources that will be provided to residents or businesses impacted by the proposed connectivity. This description should include commitments from any partners included in the digital literacy training and the anticipated outcomes from related activities, (400 words max.): **While we do not have formal plans for specific events at this time, the Barger Creek Wireless building was constructed with a large meeting room which we anticipate being used for digital literacy classes. We are willing to partner with any of our CAIs to provide this essential service to our community. Kathy has work experience in internet training and will be available to assist in provision of training materials as requested. We have also found that digital literacy training often occurs with customers during the installation process and our staff are willing to provide technical assistance beyond the initial connection. We also offer on-going support services for those who wish to purchase the service month to month or by the service call.**

45. Please briefly describe the materials and method(s) to be used for providing residents and businesses with information promoting the use of an internet connection for improving quality of life, access to resources, economic opportunity, etc., in the proposed service area. Partnerships with local CAIs that build awareness for enriching online opportunities for residents and businesses are highly encouraged. Examples of these opportunities include, but are not limited to, telehealth applications, access to government services, e-learning, job and career readiness programs, public safety information, cybersecurity training, etc., (400 words max.): **We would enthusiastically support any of the CAIs in our service area by collaborating to provide materials and access to training. Basic printed material could be provided to any of our customers upon installation as well as by direct mail. Barger Creek Wireless also has a website that could serve as a point for distribution of materials. We reach all of our customers through our administrative server email and information could be provided with monthly invoicing. We have a presence on social media which has allowed us to provide information about the benefits that a broadband connection can allow residents to access including alternatives to traditional landline phone service and traditional satellite or cable TV access, particularly where this can provide some economic benefit.**

CONFIDENTIAL TREATMENT FORM (CT FORM)

INSTRUCTIONS: Complete either Section 1 or Section 2 of this CT Form and sign where indicated. This CT Form must be signed by the individual who signed the grant application. A completed CT Form must be submitted with your proposal, regardless of whether your proposal contains confidential information. Failure to submit a completed CT Form with your application is grounds for rejecting the proposal as non-responsive. See Section 4.1.5 of the CMIC Grant Overview for additional information.

Section 1. Confidential Treatment Is Not Requested

This section must be completed, signed, and submitted with the proposal if the Applicant does not request confidential treatment of any material contained in the proposal.

By signing below, the Applicant affirms that confidential treatment of material contained in the proposal is not requested.

_____

Project Name

_____ _____

Signature Date

_____

[Printed Name]

_____

[Title]

_____

[Company]

Section 2. Confidential Treatment Is Requested

The section must be completed, signed, and submitted with the proposal if bidder requests confidential treatment of any material contained in the proposal. Submission of a completed CT Form is required to request confidential treatment.

Provide the information in the table below. Applicant may add rows or additional pages using the same format shown in the table. Applicant must specifically identify the information to be protected as confidential and state the reasons why protection is necessary. The CT Form will not be considered fully complete unless, for each confidentiality request, the Applicant: (1) identifies whether the material is a trade secret (TS), financial information (FI), or proprietary information (PI); (2) explains the specific legal grounds that support treatment of the material as TS, FI, or PI; and (3) provides the contact information for the person at bidder's organization authorized to respond to inquiries by the State concerning the material. Applicants must not simply cite to an applicable act or case name; rather, bidders must provide a complete justification as to how the material falls within the scope of an applicable act or relevant case law.

Application page #, paragraph #, and section #	State whether the material is a trade secret (TS), financial information (FI), or proprietary information (PI)	Explain the specific grounds in State or other applicable law which supports treatment of the material as TS, FI, or PI. Do not simply cite to the applicable act. Provide a complete justification as to how the material falls within the scope of the applicable act or relevant case law.	Provide the Applicant contact information
Page 7, sec 23, Attachment 7		Barger Creek Wireless is a privately owned LLC treated as a sole proprietorship for income tax purposes. It is filed under the social security numbers of the owners, Carl and Kathleen Cadwallader. Tax returns and tax return information are confidential records protected from disclosure under Michigan Compiled Law 205.28(1)(f).	Carl Cadwallader Carlmg67@gmail.com
Page 7, sec 23, Attachment 7		Exemption 4 of the FOIA protects "trade secrets and commercial or financial information obtained from a person [that is] privileged or confidential." From ***Freedom of Information Act Guide, May 2004***	Carl Cadwallader Carlmg67@gmail.com

By signing below, the Applicant affirms that confidential treatment of material contained in its proposal is requested and has attached to this form a redacted "Public Copy" of the Applicant's proposal.

Connecting Communities in Montmorency and Oscoda Counties
Project Name

Signature

March 19, 2020
Date

Kathleen M. Cadwallader
Co-owner, Barger Creek Wireless

STATE OF MICHIGAN

GRETCHEN WHITMER
GOVERNOR

DEPARTMENT OF TECHNOLOGY, MANAGEMENT & BUDGET
LANSING

TRICIA L. FOSTER
DIRECTOR

Connecting Michigan Communities Grant Application Request for Clarification

October 1, 2019

Company Name: Barger Creek Wireless
Application Proposal: Connecting Communities in Montmorency and Oscoda Counties
Application Contact: Mr. Carl Cadwallader

Dear Mr. Cadwallader,

Thank you for submitting your Connecting Michigan Communities grant application. During the initial review of your application the following issues, incomplete, and/or missing documentation have been identified that must be remedied in order for your application to move forward. Additional information may be requested at a later time throughout the grant review process.
.
Please make your corrections to the appropriate documents and identify the amendments you have made in the space provided below. Return those documents along with this completed Request for Clarification (RFC) via email to DTMB-CMICGrant@michigan.gov. Do not return this RFC explaining the amendments without also updating and returning the relevant documents.

Your completed RFC and amended documents must be submitted by Tuesday, October 8, 2019, at 4:00 p.m. EST. No extensions shall be granted. Failure to respond to this request may classify your application as non-responsive.

Attachment 7: Audited Financial Statements
• Applicants should demonstrate their financial viability by providing relevant financial information for the previous three years of business operations. Relevant financial information may include, but is not limited to, annual reports, balance sheets, Form 10-K, Form 10-Q, income statements, and/or audited financial statements. • 2018 financial information was provided.
Response: BargerCreekWireless_Attachment_7_amended has been provided as a replacement for the original attachment 7 and has added 2016-current financial information. The Confidential Treatment form has also been amended to account for the changes and signed again.

STATE OF MICHIGAN

GRETCHEN WHITMER
GOVERNOR

DEPARTMENT OF TECHNOLOGY, MANAGEMENT & BUDGET
LANSING

TRICIA L. FOSTER
DIRECTOR

Connecting Michigan Communities Grant Application Request for Clarification

December 3, 2019

Company Name: Barger Creek Wireless
Application Proposal: Connecting Communities in Montmorency and Oscoda Counties
Application Contact: Carl Cadwallader

Dear Mr. Cadwallader,

Thank you for submitting your Connecting Michigan Communities (CMIC) grant application. During the review of your application, it was found that some locations to be served in your proposed service area overlap census blocks that are designated for funding from the FCC's Connect America Fund. Public Act 618 of 2018, Sec. 806[1], the legislation that created the CMIC grant, states the CMIC Grant program cannot provide funding for locations in census blocks that have been selected to receive Connect America Funds:

> (8) The department shall not award a grant to an applicant if verifiable information is made available that shows any of the following: (d) The project includes an area that has been selected to receive, provisionally or otherwise, Connect America Funds from the Federal Communications Commission.

The following is an analysis of your proposed census block service areas and those included in the Connect America Fund[2]. The attached map shows the census blocks identified in your application that are proposed for service and the census blocks selected to receive Connect America Funds.

Total housing units in the census blocks in your proposed service area based on the 2010 Census:	8,689
Total locations to be served per your application (homes, businesses, and institutions):	2,193
Total housing units in CAF Funded Census Blocks in your proposed service area:	3,724
Estimated housing units in your proposed service area outside of Connect America Fund Census Blocks based on the 2010 Census:	4,965

Considering the CMIC grant cannot fund areas selected to receive Connect America Funds, the CMIC Steering Committee is offering the following options for applicants:

1) Submit revised application documents to reflect a proposed service area that does not include census blocks selected for Connect America Funds;
2) Validate there are no changes to your original application; or
3) Withdraw your application from consideration.

[1] http://www.legislature.mi.gov/documents/2017-2018/billenrolled/Senate/pdf/2017-SNB-0601.pdf)

[2] A list of all Connect America Fund census blocks can be found here: https://www.michigan.gov/documents/dtmb/Michigan_Census_Blocks_CAF_650783_7.xlsx).

If you choose to submit revised application documents that reflect a proposed service area which does not include census blocks selected for Connect America Funds, this completed Request for Clarification (RFC) document along with the identified attachments must be received via email to DTMB-CMICGrant@michigan.gov by Friday, December 13, 2019.

Revised Application Summary		
	Original Application	Revised Application
Households to be served	2172	1241
Businesses to be served	172	172
Community Anchor Institutions to be served	42	42
Total Project Cost	$4,401,301	$4,401,301
Total Grant Request	$3,233,618	$3,233,618
Total Matching Funds	$1,167,683	$1,167,683

Revised Attachment 1

Applicant must provide a map of proposed service area that excludes CAF funded census blocks in PDF format (including both last mile coverage and middle mile routes). Revised applications cannot include locations to be served that were not part of your original application.

Response:
We have submitted a revised map of the proposed service area that excludes CAF funded census blocks.

Revised Attachment 3

Applicant must provide a spreadsheet of census blocks in XLS or XLSX format identifying the locations served that are part of the non-CAF proposed service area using the following heading format. Revised applications cannot include locations to be served that were not part of your original application. If you feel there is a discrepancy between the figures as reported in the 2010 Census and actual number of housing units, please explain in the response field of this section in addition to completing the required spreadsheet.

Census Block ID	Total Number of Households to be Served	Is Service Provided to Whole or Part of Census Block? Y/N	Is Census Block Wholly Contained Within Service Area? Y/N

Response:
We have provided a revised XLS attachment.

Revised Attachment 9
Applicant must provide a revised five-year, stand-alone project financial plan/forecast that includes only locations within the proposed service area and does not include census blocks selected for CAF.
Response: Although we have removed the CAF funded census blocks, the infrastructure needed in our original grant request is still required to cover the remaining census blocks. The project budget and the project timeline remain the same as provided in our original proposal.

Revised Project Budget			
Applicant must complete this table to provide a revised project budget that includes only locations within the proposed service area and does not include census blocks selected for CAF.			
Use of Funds	Match Amount	Grant Amount	Total
Buildings and Labor			
Last Mile Construction Labor			
Middle Mile Construction Labor			
Construction Material			
Customer Premise Equipment			
Customer Premise Installation			
Electronics			
Permits			
Professional Services and Engineering			
Other:			
Other:			
Other:			
Other:			
Other:			
		Total	

This completed RFC and revised attachments must be received via email to DTMB-CMICGrant@michigan.gov. Do not return this document with your responses without also updating and returning the relevant attachments listed above. Any questions should be submitted via email to DTMB-CMICGrant@michigan.gov.

To validate there are no changes to your original application, you must send an email to DTMB-CMICGrant@michigan.gov with the phrase, "Validate No Changes to Application" followed by your company name and name of the project in the subject line.

To withdraw your application from consideration, you must send an email to DTMB-CMICGrant@michigan.gov with the phrase, "Withdraw Application" followed by your company name and name of the project in the subject line.

Your response, including Validation, Withdrawal, or completed RFC and amended Attachments must be received via email to DTMB-CMICGrant@michigan.gov by Friday, December 13, 2019, at 3:00 p.m. EST. No extensions shall be granted. You will receive an email confirmation of your submission. If you have not received a confirmation receipt by December 20, 2019, you must contact the CMIC Grant Program Office at (517) 335-3727. Failure to respond to this request may affect the scoring of your application, including up to elimination of further consideration

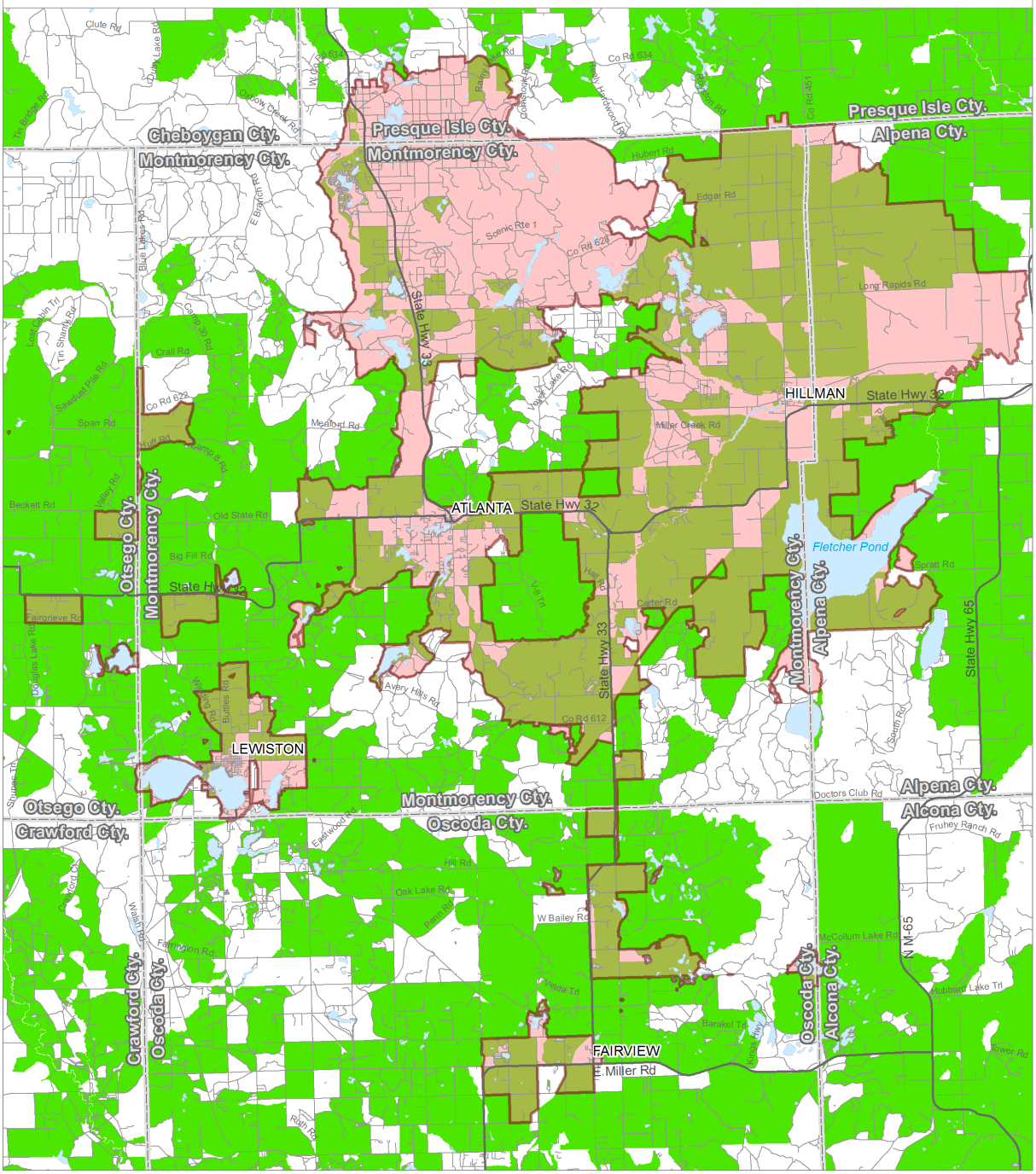
Connecting Michigan Communities (CMIC)

Provider: BCW
Project: Montmorency-Oscoda

Grant Application by Census Block
vs.
CAF Funded Block Area

DTMB Grant Program

CONNECTED NATION Michigan

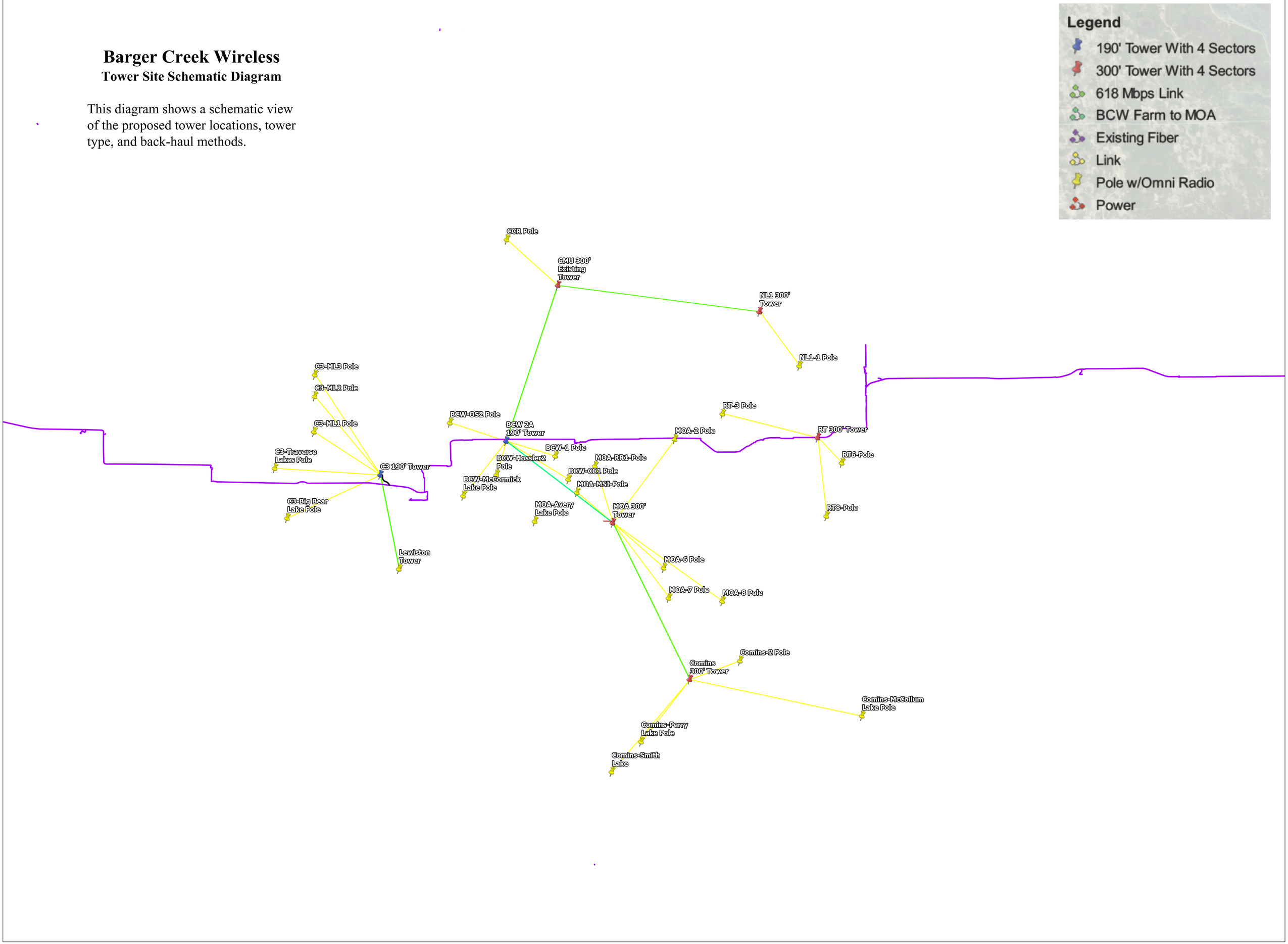


Application by Block CAF Funded Block

Barger Creek Wireless

Tower Site Schematic Diagram

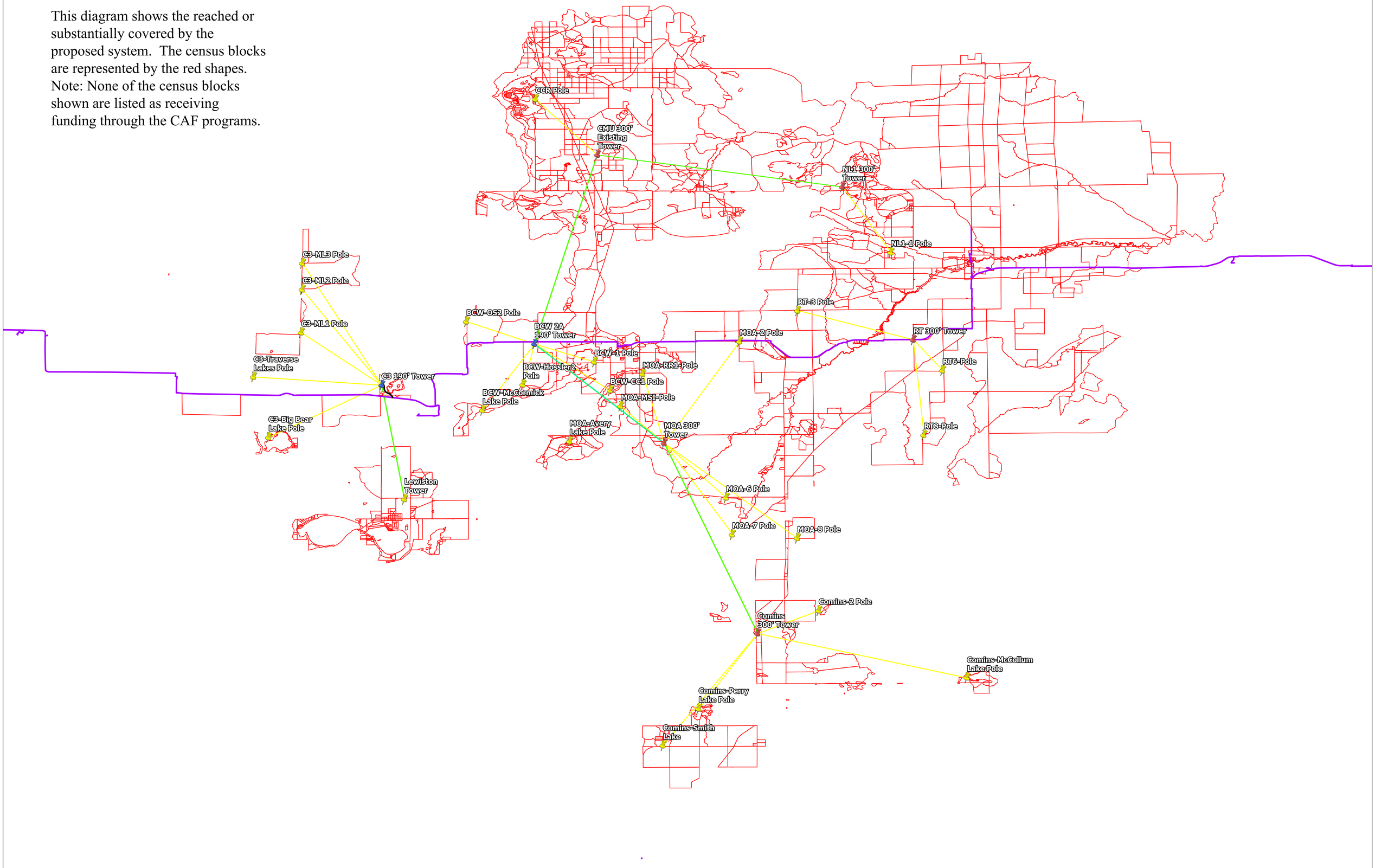
This diagram shows a schematic view of the proposed tower locations, tower type, and back-haul methods.

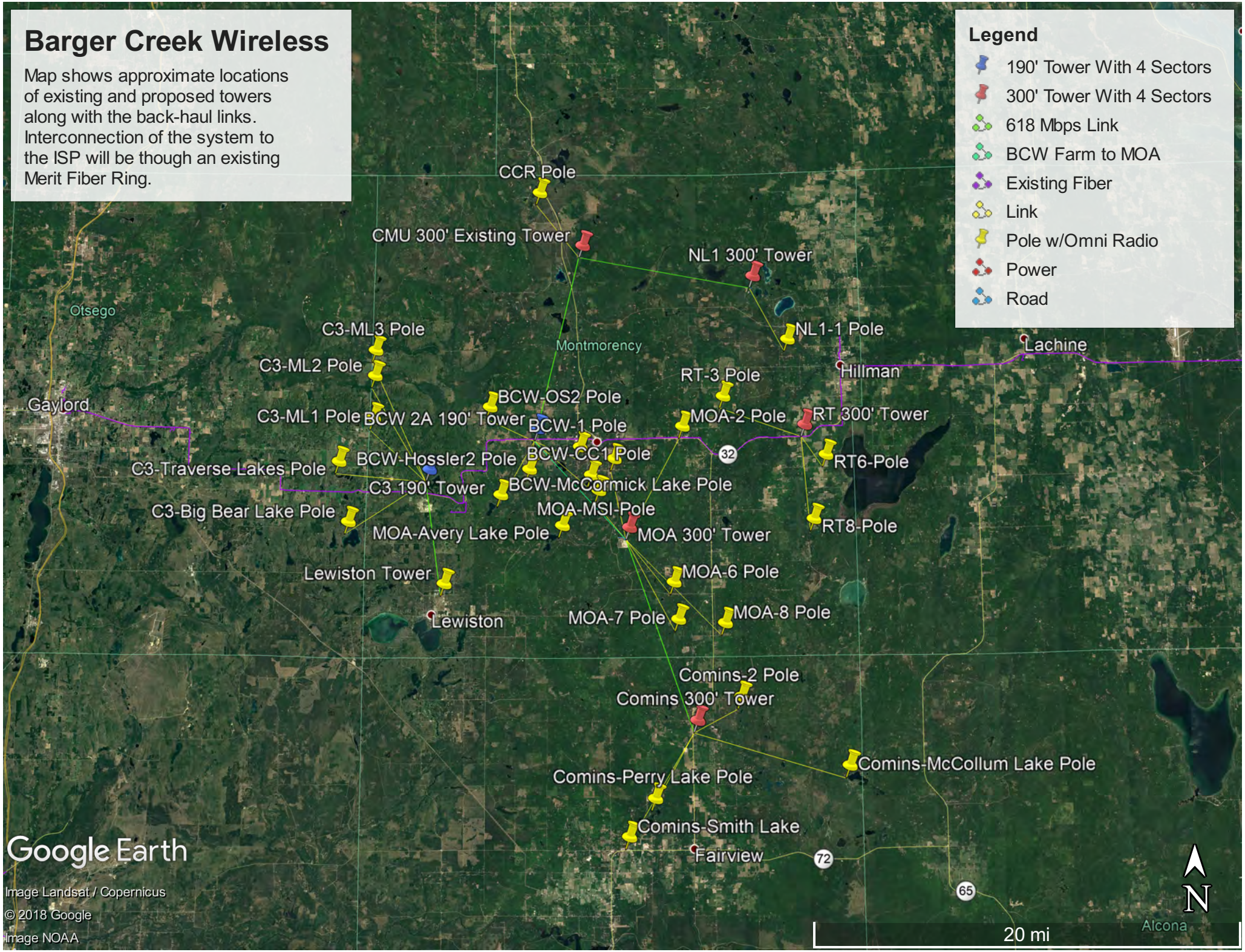


Barger Creek Wireless

Census Blocks Reached by Wireless Signal

This diagram shows the reached or substantially covered by the proposed system. The census blocks are represented by the red shapes. Note: None of the census blocks shown are listed as receiving funding through the CAF programs.




Barger Creek Wireless
Map shows approximate locations of existing and proposed towers along with the back-haul links. Interconnection of the system to the ISP will be though an existing Merit Fiber Ring.
Legend
190' Tower With 4 Sectors
300' Tower With 4 Sectors
618 Mbps Link
BCW Farm to MOA
Existing Fiber
Link
Pole w/Omni Radio
Power
Road
CCR Pole
CMU 300' Existing Tower
NL1 300' Tower
NL1-1 Pole
Otsego
Montmorency
Lachine
Hillman
C3-ML3 Pole
C3-ML2 Pole
C3-ML1 Pole
BCW 2A 190' Tower
BCW-OS2 Pole
BCW-1 Pole
RT-3 Pole
MOA-2 Pole
RT 300' Tower
Gaylord
BCW-Hossler2 Pole
BCW-CC1 Pole
RT6-Pole
C3-Traverse Lakes Pole
C3 190' Tower
BCW-McCormick Lake Pole
C3-Big Bear Lake Pole
MOA-MSI-Pole
RT8-Pole
MOA-Avery Lake Pole
MOA 300' Tower
Lewiston Tower
MOA-6 Pole
Lewiston
MOA-7 Pole
MOA-8 Pole
Comins-2 Pole
Comins 300' Tower
Comins-McCollum Lake Pole
Comins-Perry Lake Pole
Comins-Smith Lake
Fairview
Alcona
32
72
65
Google Earth
Image Landsat / Copernicus
© 2018 Google
Image NOAA
N
20 mi

Barger Creek Wireless

MATCHING FUNDS COMMITMENT LETTER

August 28, 2019

DEPARTMENT OF MANAGEMENT AND BUDGET
State of Michigan
320 S. Walnut Street
PO Box 30026
Lansing, MI 48909

Dear Director Foster:

This letter represents a commitment by Barger Creek Wireless to provide $1,167,683 in in-kind matching support for a rural broadband project entitled Connecting Michigan Communities Grant. The support is provided from April 2020 to September 2023 or the duration of the grant program.

We are providing other support valued at an additional $426,000 which includes use of our company building including our climate-controlled data room, service equipment, materials and other services devoted to the project as well as unpaid work hours contributed by the business ownership.

Sincerely,

Carl Cadwallader
Owner\Founder
Barger Creek Wireless

Description - Expense Category	Project / Operational Expense
BCW Funded Project Manager (2020-2023) $60K per year	Operational
RQR Bucket Truck Lease (2020 - 2023) $10,000 per year	Operational
Administrative - Support	Operational
Administrative - Material	Operational
Network Operating Center (NOC) Support	Operational
RQR Land Lease - Camp 3, Hossler & Lewiston Sites	Operational
BCW Funded CPEs and Supplies (1000 Pieces)	Operational
BCW Funded Customer Install Material and Labor	Operational
Customer Install Cost (Materials) - 500 Customer Installs	Project
Customer Install Cost (Labor) - 500 Customer Installs	Project
Marketing (Web & Print)	Project
Data - 1 GBS Service Upgrade (harware/data)	Project

Total - Project Expense (Grant Funded)
Total - Operational Expense (BCW Funded)

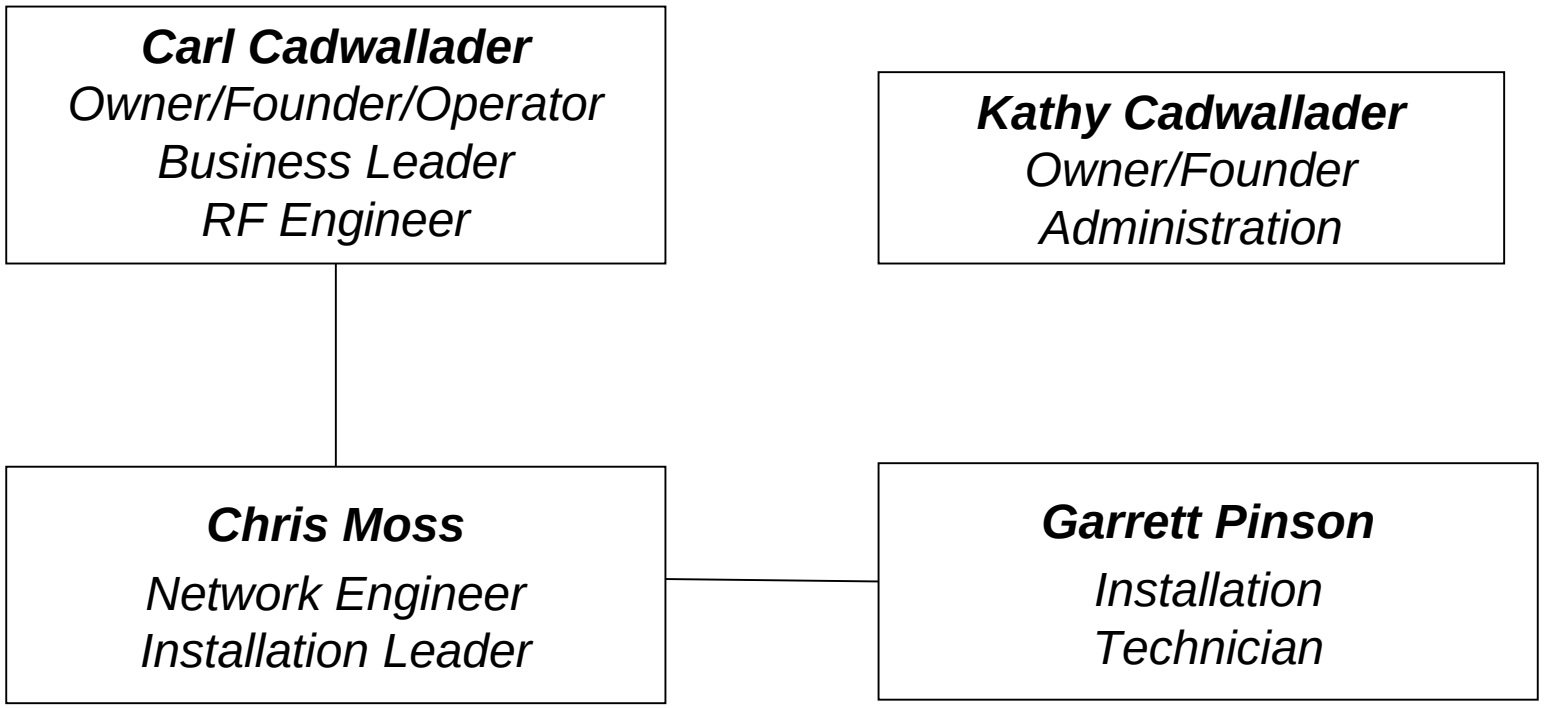
Total

2020 Spend $	2021 Spend $	2022 Spend	2023 Spend $	Total Spend $	Customer Install Estimator
30000	60000	60000	0	$180,000	Materials
4000	10000	10000	6000	$30,000	
6000	12000	12000	8000	$38,000	
1800	1800	1800	1800	$7,200	
18000	24000	24000	18000	$84,000	
4500	4500	4500	4500	$18,000	
0	0	200000	$206,383	$406,383	
0	0	200000	$204,100	$404,100	
23625	23625	23625	23625	$94,500	
10050	10050	10050	10050	$40,200	
1500	1500	1500	1500	$6,000	Labor per install
12000	2000	2000	2000	$18,000	
$47,175	**$37,175**	**$37,175**	**$37,175**	**$158,700**	
$64,300	**$112,300**	**$512,300**	**$448,783**	**$1,167,683**	
$111,475	**$149,475**	**$549,475**	**$485,958**	**$1,326,383**	

	Estimated Cost
Cable	$24
Router	$100
Bracket/bolts	$30
Mast	$20
Ground roud	$15
Total	$189

4 man hours	$80

Barger Creek Wireless



Barger Creek Wireless Organizational Chart

August 30th, 2019

Carl Cadwallader, MSEE, BSEE

Maple Grove, MN 55311

(612) 385 4874 carlmg67@gmail.com https://www.linkedin.com/in/carlcadwallader/

SUMMARY

Dynamic & results-oriented executive leader with a track-record of driving operational effectiveness and efficiency across multiple sites globally. Expert at business lean, operational excellence, quality, business transformation and leadership.

SKILLS & EXPERTISE

- Operations Process Design
- Supply Chain Excellence
- Business-Wide Transformation
- Manufacturing Quality
- Team Building & Leadership
- Operations Management
- New Factory Start-up (3)
- ERP Systems Expertise
- Program Management
- Coaching & Mentoring
- M&A Due Diligence
- Business wide LEAN
- Global Experience
- Acquisition Integration
- Leadership

PROFESSIONAL EXPERIENCE

Principal / Owner Cadwallader Business Consulting, Maple Grove, MN **2017 to Present**

Business process and technology consultant specializing in helping small companies with complex cross-functional business challenges. Deep domain experience in order-to-cash business transformation, operations, business transformation, (ERP) project deployment, operational excellence, lean process deployment and quality system improvement.

- **Medical Device – Support Client M&A Due Diligence $100M IOT Target Company** – Support data mining efforts to validated or refute valuation assumptions of target company's product offerings with respect to new and disruptive technology offerings entering the medical device space.
- **Medical Device –$400M Field Inventory Management Process and System Redesign** – Led efforts to transform the supply of implantable devices and surgical instruments for a $2B orthopedics manufacturer. Led a cross-functional team to map the existing global field inventory management and to develop specifications for a new designed. Developed and executed the RFQ process, engaged three leading global suppliers to down-select to one. Completed project and turned over deployment to the client IT department. The duration of the project was 12 months.
- **Medical Device – Master Data Management – Led Business Wide Review of Master Data Management –** Evaluated and delivered a comprehensive review of data quality and the processes used to manage it in preparation for the redesign of client's $400M Field Inventory Management Processes and Systems – Provide CEO and C-Suite team recommendations and plan to create a step-function improvement in data quality
- **Industrial Automation and Control – $100M Business Inventory Reduction (Improve Working Capital)** – Created team and process to deploy Materials Requirements Planning (MRP) to help enable a 10% reduction in on-hand inventories. Deployed new software, cleansed critical lead-time master data, deployed software and trained planning teams.

VP Process and Infrastructure, St. Jude Medical, Plymouth, MN **2015 – 2017**

Responsible for Operations Process development and deployment across the global $5B business footprint. Led global team of (300) team with 8 direct reports in the areas of manufacturing engineering / process development for new product introduction, packaging, labeling, machining and automation, project management office (PMO), lean business transformation.

- **Medical Device – SJM Key $12M Project Deployment SAP/SNP Supply Network Planning –** Led efforts to lobally design and deploy Supply Network Planning. The SAP offering enabled global visibility of all inventory thus freeing up finished good inventory to be deployed where it was needed by customers
- **Medical Device – Product Rationalization / Reduction of $200M Inventory** – Led team's efforts to identify slow-moving and non-moving products and to restrict phase them out of the SJM portfolio. Required extensive data mining of sales and inventory data and close collaboration with Sales.
- **Medical Device – Implantable Device Battery In-Sourcing – $100M Cost Savings and Risk Reduction** – Participated with leadership team efforts to in-source battery manufacturing for implantable pacemakers, ICDs and neuromodulation devices. The project had many process complexities including the construction of a new facility.

VP Global Supply Chain (Interim) St. Jude Medical, Plymouth, MN **2016 - 2017**
Interim leader for (300) person supply chain and procurement activities in addition to my role as the VP of Process and Infrastructure. Led overall efforts for both direct and indirect purchasing across St Jude Medical global $5B businesses.

- **Medical Device – Led efforts to reduce 100M Inventory -** Reduced ~30 Days of Inventory On-Hand (DIOH) through business wide cross-functional review of data engagement of key stakeholders. The process took approximately 60 days and required engagement of global team in Sales, Operations, Procurement and Engineering.

Director Enterprise Lean Honeywell Sensing and Control, Golden Valley, MN **2014 to 2015**
Business process/ lean leader for $800M business directly reporting to the President. Responsible to lead the annual business strategy process (STRAT) and support deployment of projects across the business.

- **Strategy Development and Execution $800M business / 3 business units** – Led executive strategy process and sessions for (3) business units within the overall $800M business to develop growth and efficiency strategies for a 3-year horizon. Translate business strategy objectives to tactical projects and execute projects.

Director Business Transformation Honeywell Sensing and Control, Golden Valley, MN **2010 - 2014**
Develop and deploy business transformation strategy globally to enable business growth and cost reduction, enable advanced business tools and analytics base on common/global ERP (SAP), champion and own business-wide governance process to create and maintain executive leadership alignment, drive change and learning, data and business adoption across the enterprise, led global cross-functional business process team with representation in North America, Europe, Mexico, China and India

- **Business Transformation – Led successful transition of $400M of USA business** from multiple and disparate ERP systems to a global instance of SAP. Key actions include standardizing order entry, customer care, manufacturing, procurement, logistics and finance processes.

Director Process Excellence Honeywell Sensing & Control, Golden Valley, MN **2009 - 2010**
Led team efforts to rationalize global manufacturing footprint for $800M business reducing from 26 factories to 9 factories globally. Led efforts to guarantee supply and quality to global customer bases. Deployed standardized business processes and technology. Established Lean/Continuous Improvement culture (6 Sigma).

- **New Factory Start-Up Project Leader Nanjing, China** – Oversaw led project to site, build, staff and open new global 400,000 sq. ft. manufacturing site in China to accept manufacturing line transfers from North America and Western Europe. Successfully oversaw start-up and factory fill.

Director of Factory Quality Honeywell Sensing & Control, Golden Valley, MN **2007 - 2010**
Led global manufacturing quality team across 26 sites spanning North America, Europe and Asia. Responsible for factory quality, supplier quality and product design quality for a $800M sensor and switch manufacturer.

- **Large Reduction in Customer Quality Issues Globally –** Oversaw and led process to address key quality process and supplier issues. Improved annual PPM performance from 1200 PPM in 2006 to < 50 PPM in 2010**;** Reduced response time for rejected customer parts (RMAs) from > 60 days to < 12 days
- **Established Quality Certifications**: ISO 9001:2000, AS9100B, ISO 14001, ISO 13485 & TS16949 \
- **Developed People** - Developed and implemented cross-functional customer engagement teams
- **Furthered Skills** - Achieved Honeywell Six Sigma Greenbelt Certification

Quality Director General Motors Lansing Delta Township Assembly, Lansing Michigan **2004 to 2007**
Rejoined General Motors as the executive leader for quality for a new 2 million sq. ft. production facility serving the SUV market. Developed, implemented, taught and mentored Lean Quality Systems deployment across the site. Led 3 direct reports and 40 indirect reports along with 200 hourly personnel.

- **Launched New 2 Million Sq. Ft Vehicle Manufacturing Site –** Quality leader from concept to full-production. Responsible for all aspect of operations and supplier quality. Managed +300 suppliers; Successfully launched (3) new vehicles / achieved ISO 9001:2000 plant certification

Operations General Manager Webasto Roof Systems, **Rochester, Michigan** **2003 to 2004**
Led all manufacturing, planning, procurement and quality efforts for a $100M automotive Tier 1 supplier

- **Led Comprehensive Operations and Quality Turn-Around** including stabilizing key customer accounts with regular customer site visits and executive engagement, deployed business processes to maintain output, quality cost and profitability

Quality Engineering Manager General Motors Lansing Grand River, **Lansing, Michigan** **2000 to 2003**
Led quality engineering efforts for a new 700,000 sq. ft. production facility producing the Cadillac CTS, SRX STS vehicles. Developed, implemented, taught and mentored Lean Quality Systems deployment across the site. Led 3 direct reports and 25 indirect reports.

- **Led Engineering and Quality** - Manage +300 suppliers to the APQP/AIAG standard processes, taught General Motors Lean Manufacturing Principles (GMS), Achieved ISO 9001:2000 for the site by start of normal production, successfully launched (3) new vehicles / Achieved ISO 9001:2000 certification / JD Power recognition

Engineering, Operations and Quality - General Motors **1991 to 2000**
Various assignments in engineering, manufacturing and manufacturing engineering

EDUCATION / AFFILIATIONS/ PROFESSIONAL DEVELOPMENT

- **MS** Electrical Engineering, Michigan Technological University, Houghton, Michigan
- **BS** Electrical Engineering, Michigan Technological University, Houghton, Michigan

- Member, American Society for Quality (ASQ)
- Member, IEEE - Engineering Management Society
- Training in Six Sigma (Certified Greenbelt)

Kathleen M. Cadwallader

(612) 251-0525
cadwallkm@gmail.com

Experience

Barger Creek Wireless, Atlanta, MI - *Co-owner*

December 2017 - current

- Co-own and operate a start-up WISP that has grown to 90 active customers

Cooperating Libraries In Consortium (CLIC), St. Paul, MN - *Library Database Management Project*

September 2016 - May 2017

- Ran regular Millennium and OASIS updates, daily system checks on hung records and authority scoping, other systems-related updates, loads, and extracts as requested by CLIC on a short term contract

Michigan Library Consortium, Lansing, MI - *AccessMichigan Trainer and Training Coordinator*

October 1999 - June 2003

- Chaired committee for and led writing of the initial RFP for Michigan's first statewide ILS system MeLCat
- Led a team of trainers teaching Michigan's library staff to use a collection of databases provided for the state's library patrons through the AccessMichigan program
- Taught classes for a train-the-trainer program as well as created class materials covering AccessMichigan database introduction and instruction for library staff to be taught by these trainers
- Traveled to all types of libraries, schools, and library cooperatives throughout Michigan to conduct classes for librarians and media specialists in AccessMichigan database use
- Provided help desk technical support and registration assistance for libraries connecting to the AccessMichigan collection of databases

Library of Michigan, Lansing, MI - *Reference Librarian I*

June 1995 - October 1999

- Provided reference assistance for patrons using library collections including Michigan history and authors, federal and state documents, and a large collection of genealogy resources
- Conducted tours and training sessions for patrons
- Researched information for Michigan's state legislature
- Designed and maintained several of the library's first website pages including its GPO Access Gateway
- Wrote initial internet use policy and introduced internet workstations for library patrons
- Assisted staff and patrons with hardware and software issues for these workstations as well as the Library's OPAC

Howell Carnegie District Library, Howell, MI - *Library assistant*

1992 - 1995

- Technical services and circulation clerk
- Substitute reference librarian for youth and adult services

Education

The University of Michigan, Ann Arbor, MI

April 1995

MS in Information and Library Studies

Michigan Technological University, Houghton, MI

May 1990

BS in Scientific and Technical Communication

Technical option - Electrical Engineering Technology

CHRISTOPHER MOSS

989-341-3827 - cmos1005@gmail.com - Atlanta, MI

QUALIFICATIONS PROFILE

Skilled Full Stack Developer.NET C#, MVC, Core 2, JavaScript, CSS and HTML, using MS SQL.

Diverse experience in highly technical environments, coupled with current education in application design and support.

PROFESSIONAL EXPERIENCE

BARGER CREEK WIRELESS, ATLANTA, MI
Network Engineer/Installation Technician 07/25/2019 – Present

- Wireless radio installations, sales, inventory management and customer support.
- UNMS (Ubiquiti Network Management System) implementation.
- Network Consulting.

BISK EDUCATION, TAMPA, FL
Senior Software Development Engineer 02/03/2014 – 12/21/2018

- REST API's using .NET Core 2 technologies for the integration of critical business systems.
- Main developer of the Media Asset Warehouse (M.A.W.) used for educational asset cataloging, tracking, and media distribution. Architected, coded, and deployed the MAW System using diverse technologies including ASP.NET MVC 4/5 C#, Entity Framework 5/6 (both Database-First and Code-First methods), JavaScript, JSON, HTML5, jQuery, CSS 2/3, MS SQL Server, Handlebar Templating, and Visual Studio 2013/2015/2017/2019 Professional.
- Researched and made recommendations for Cloud migration of MAW critical systems. AWS and MS Azure were of scoped interest. Setup test builds on Microsoft Azure.
- Led in American Disabilities Act (ADA) Software Compliance Awareness and educational course updating for the Instructional Design Department.

AXELON SERVICES FOR CITIBANK, TAMPA, FL
WebSphere Application Support Specialist- Contract 04/2013 – 01/2014

- Install, upgrade, maintain, support, and administrated WebSphere Application Server for Enterprise clients.
- Microsoft Windows and UNIX/Linux server operating systems.
- Custom VBA scripting for Microsoft Office.

SYSTEMS IN MOTION ANN ARBOR, MI
.NET Developer, 9/2012 – 04/2013

- Developed .NET Desktop and Web Applications, through agile development methodology. Technologies used: VS 2012 Pro (IDE), WPF, ASP.NET MVC 4 framework, and other tools (ex. Unity Inversion of Control (IOC), ELMAH Logging), C#, jQuery and AJAX.
- Developed PHP based solution with the SIM Corporate Solutions Team. Utilizing NetBeans 7.3 (IDE), PHP 5.4, MySQL database, Code Igniter framework, Smarty Templating System, and JavaScript (jQuery libraries, AJAX, and standard JavaScript), CSS2, HTML.

C.M. COMPUTING, Atlanta, MI
Principal Consultant/Contractor 6/1998 – 9/2012

- Systems Administration: Led deployment of new Windows network infrastructure for local sheriff's department ($100K+ project). Oversaw hardware, OS, and custom software installation, for LEMS (Law Enforcement Management System) Database Solution. Trained users.
- Web Design: Created and modified custom website templates and e-commerce shopping cart systems (Zen-Cart, Joomla) using HTML, CSS, and PHP.
- Network Engineering: Installed Switches, Cat5e cabling (runs), Routers, Switch Panels, Jacks. Network software installation and configuration of Windows NT and Windows 2000 Server. Oversaw and assisted others with integration functions.

BREITBURN MANAGEMENT, **LLC** (*previously Quicksilver Resources*), Gaylord, MI
IT Specialist/Managed Eastern Region 11/2007 – 4/2008

- Technical service and support to corporate office and three geographically dispersed locations within the Michigan Eastern Region.
- Deployed computer systems (including servers); troubleshot and resolved Corporate User issues. Scheduled and prioritized issues. Created system documentation.
- Developed utility program in VB.NET and C# that parsed GPS SWD file pipeline mapping data into an importable format optimized for mission-critical Production Access Operations software and databases.

QUICKSILVER RESOURCES, INC, Gaylord, MI
IT Specialist/Managed Eastern Region 4/2004 – 11/2007

- Managed Eastern Region offices with a total of 160 computers and Window servers in combination.
- Researched Enterprise systems to be used for Enterprise Helpdesk management. Implemented and deployed Enterprise Helpdesk System - TrackIT!
- Played a role in the Helpdesk SOX (Sarbanes and Oxley) policy creation.

EDUCATION AND CREDENTIALS

Bachelor of B.S. Computer Science - Game Development, expected 2021
BAKER COLLEGE ONLINE, Flint, MI

- National Society of Collegiate Scholars

Associate of Arts Degree in PC Specialty (2000)
ALPENA COMMUNITY COLLEGE, Alpena, MI

CERTIFICATIONS

Microsoft Certified Solutions Developer - Web Applications (MCSD)
Certification Camp, Sarasota, Fl (2014)

Microsoft Certified Professional (MCP)
Certification Camp, Sarasota, Fl (2014)

Microsoft Specialist – HTML 5 with JavaScript and CSS3 Specialist
Certification Camp, Sarasota, Fl (2014)

MongoDB University M101N Course Completion Certificate
MongoDB University Online (2015)

Microsoft Certified Professional, Microsoft Certified Systems Administrator, Microsoft Certified System Engineer W2K
Mountain View Systems, Fort Collins, CO (2002)

A+ Certified Computer Technician
CompTIA (1998)

Barger Creek Wireless – Long-Term Viability and Scalability

Attachment: BargerCreekWireless_Attachment_8

LTE Base stations:

- Carrier Aggregation: is a technology to combine two or more carriers into one data channel to enhance the data capacity. It is possible to combine carriers in the same or different frequency bands. (20+20MHz) Contiguous / Non-Contiguous, increase peak rate (up to 2000Mbps per UE).
- MU-MIMO: is an enhanced form of multiple-input and multiple-output (MIMO) technology which exploits the maximum system capacity by scheduling multiple users to be able to simultaneously access the same channel up to 200Mbps / sector.
- Dual Sector / Dual Carrier: a 4x4 radios can be deployed in a 2 sector, 2x2 configuration, effectively doubling the single sector capacity.

Core EPC:

- Number of supported subscribers can be increased as the network grows, up to 10,000 connected subscribers per single entity.
- Centralized and distributed modes.
- Stackable and redundant configuration to optimize delivery and increase network capacity.

Microwave Backhaul:

- MultiCore Radio technology - Parallel radio processing engine to double performance / capacity
- High modulation, up to 2048 QAM

Proposed core networking routers / switches also support multiple 10Gbps ports and processing capacity / switching fabric to handle several millions of PPS (Packets Per Second)

Year	Site - Being Added	BCW Investment $	Customer Count
2018	BCW Core - Server (Equipment) Fiber, Tower, Tower Prep, Title Office (Equipment, Fiber, Pole, Everstream)		40
2018	Lake 15		20
2018	487 & Airport	$346,000	10
2019	Atlanta Area Fill	$10,000	20
2019	M-32 W	$10,000	10
2019	Haas	$12,000	20
2019	Hammond	$10,000	20
2020 - 2024	SOM Grant Project - Oscoda County (Comins)	$378,900	75
	SOM Grant Project - Montmorency County (Albert, Avery, Briley, Rust, Loud, Montmorency Twp, Vienna)		270

Revenue Per Month	Operational Cost Per Month $	Monthly EBIDA Sum	Baseline Monthly Expense Details	
$1,960	$4,413	-$2,453	Data (Everstream)	$1,250
$980	$35	-$1,508	Electric/Gas/Security	$135
$470	$35	-$1,073	Website	$35
$980	$35	-$128	Taxes	$342
$490	$35	$327	Powercode	$350
$980	$35	$1,272	Phone	$56
$980	$35	$2,217	Trash	$50
$3,675	$250	$5,642	Insurance	$346
$13,230	$3,700	$15,172	Software	$49
			Maintenance	$200
			Labor	$1,600
				$4,413

AFFIDAVIT OF
GRANT APPLICATION CERTIFICATION, FUNDING MATCH
AND PROJECT CONTINUATION

The individual listed below is certified to be an authorized signer for Barger Creek Wireless, an LLC located at 11336 Mouch Rd, Atlanta, MI, 49709, with the authority to sign documents related to grant requests.

Kathleen M. Cadwallader, co-owner

Signature

Personal Address: 16998 81st Ave N, Maple Grove MN 55311
Contact number: 612-251-0525
Date of Birth: 03/23/1968

AFFIDAVIT

i, the undersigned, state and affirm that all statements and information submitted with this grant application are true and correct.

Further, I affirm that Barger Creek Wireless will guarantee the financial and in-kind resources required as our local match for the grant funding.

I also affirm that should Barger Creek Wireless be awarded a Connecting Michigan Communities Grant, Barger Creek Wireless will commit to offering and maintaining the proposed service and costs for the proposed service area for five years after the project is completed.

Kathleen M. Cadwallader, co-owner

Signature

Notarization

I, the below signed Notary, in and for the State of Minnesota, County of Hennepin, do hereby acknowledge that Kathleen M. Cadwallader, the above signed Affiant, did sign and publish the above Affidavit before me this 27 day of August, 2019, affirming the correctness and validity of the statements made in the application to which the Affidavit is attached.

Notary

My Commission Expires: 31 day of January, 2022.

KATRINA RENEE TRUDEAU
NOTARY PUBLIC - MINNESOTA
My Commission Expires Jan. 31, 2022

FINLEY ENGINEERING
INTEGRITY INTO EVERYTHING

711 S. Hillcrest Parkway
Altoona, WI 54720
715-834-2605

Barger Creek Wireless
2019 Connecting Michigan Communities Grant
Attachment 11: Readiness

FINLEY ENGINEERING
INTEGRITY INTO EVERYTHING

711 S. Hillcrest Parkway
Altoona, WI 54720
715-834-2605

August 28, 2019

Revised December 6, 2019: Revision corrected Page 5 to remove the census blocks eligible for CAF funding from the census blocks Barger Creek Wireless is requesting grant assistance. Updated System Summary to show revised establishments passed and establishments that could take service.

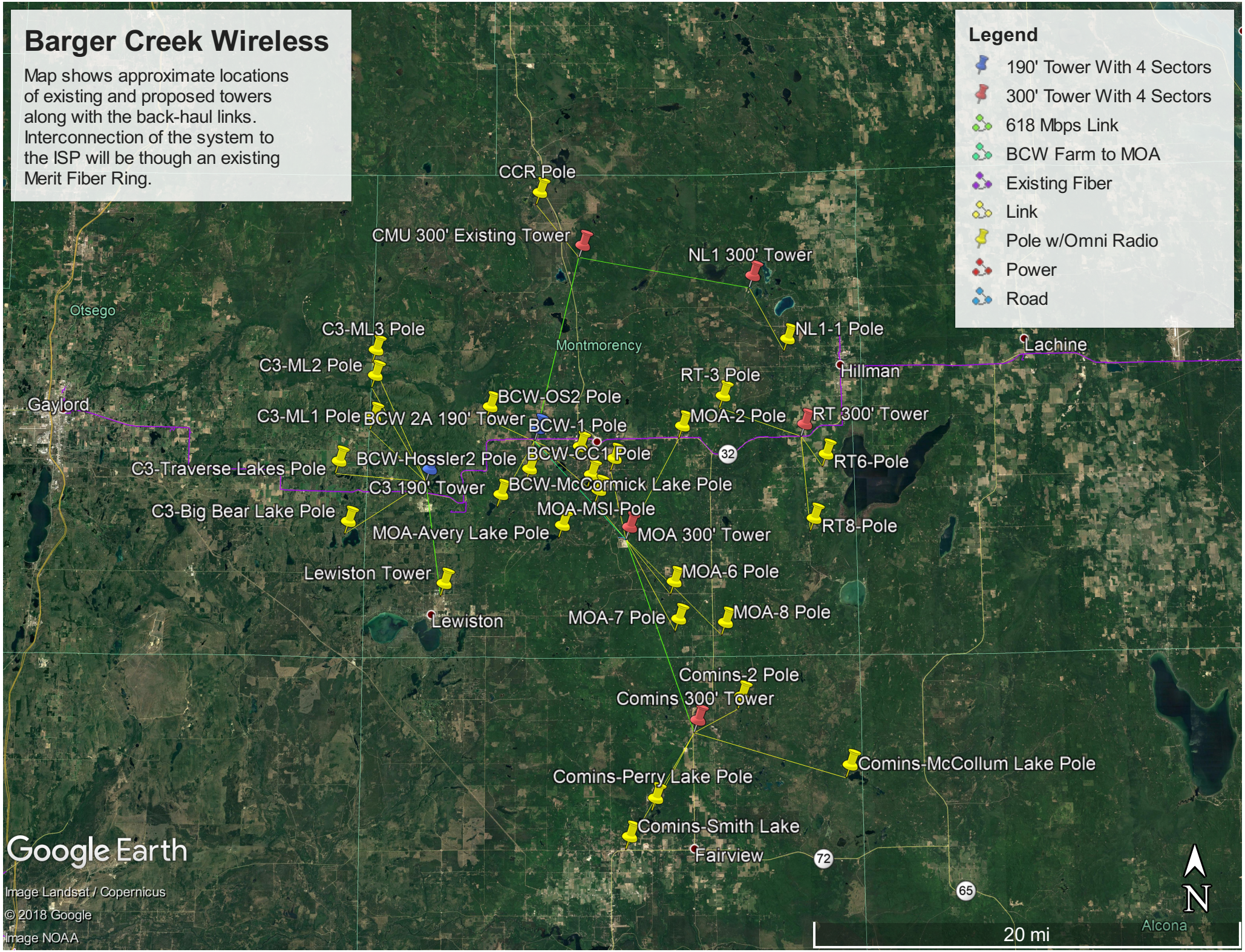
To: Michigan Department of Technology, Management, and Budget

Re: Professional Engineer Barger Creek Wireless
2019 Connecting Michigan Communities Grant

I have reviewed, and Finley Engineering Company assisted in the creation of Barger Creek Wireless' Connecting Michigan Communities Grant.

It is my opinion that the design and proposed equipment meets standard and well-engineered criteria for a project of this type and will meet or exceed the Michigan requirements for this application, including required scalable speed requirements. Barger Creek Wireless has included technical sheets for the primary equipment, in this application, as verification of its scalable speeds and I concur with those capabilities.

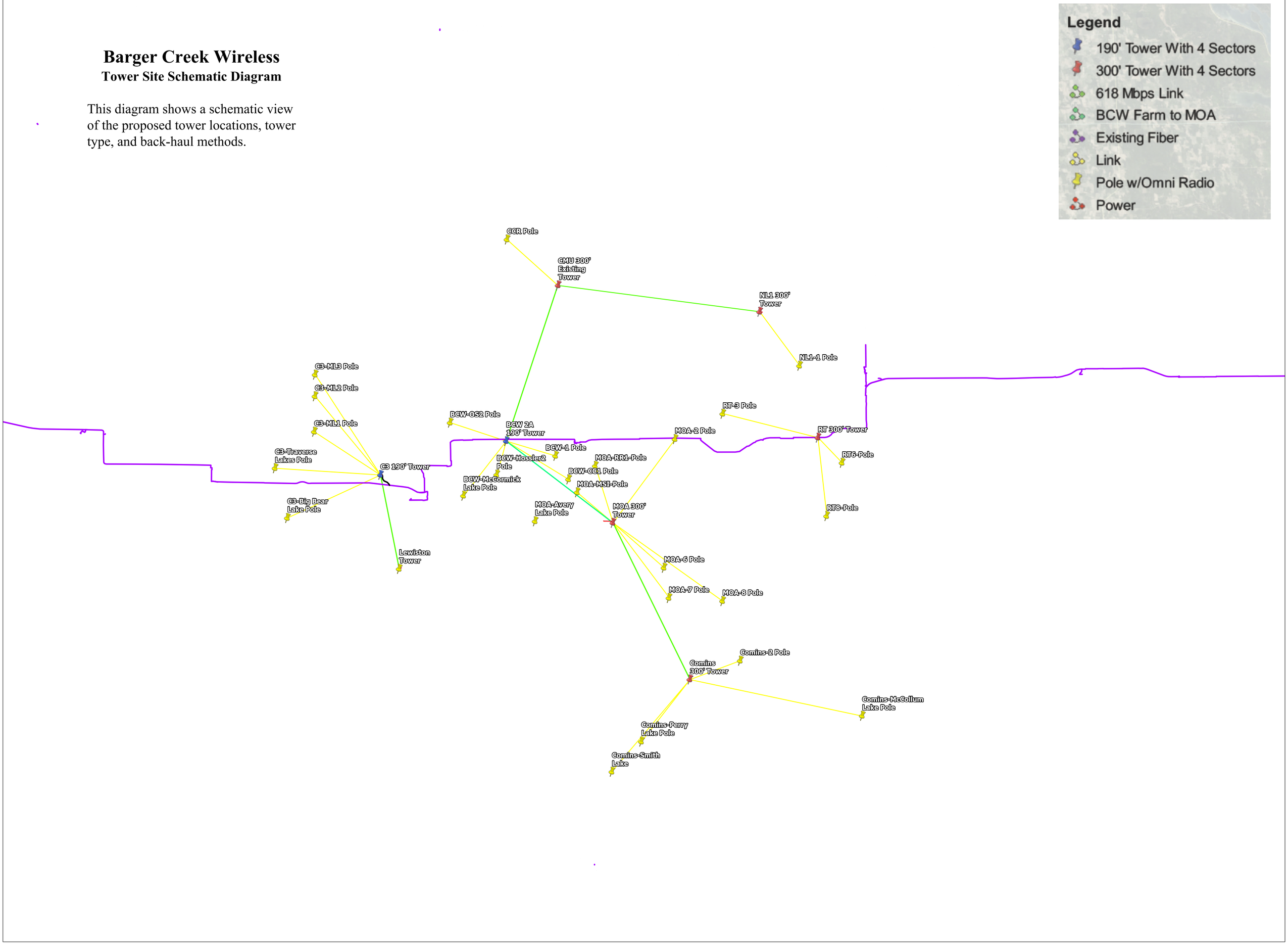
Dean L. Mischke, P.E. V.P.


Barger Creek Wireless
Map shows approximate locations of existing and proposed towers along with the back-haul links. Interconnection of the system to the ISP will be though an existing Merit Fiber Ring.
Legend
190' Tower With 4 Sectors
300' Tower With 4 Sectors
618 Mbps Link
BCW Farm to MOA
Existing Fiber
Link
Pole w/Omni Radio
Power
Road
CCR Pole
CMU 300' Existing Tower
NL1 300' Tower
NL1-1 Pole
Otsego
Montmorency
Lachine
Hillman
C3-ML3 Pole
C3-ML2 Pole
C3-ML1 Pole
BCW 2A 190' Tower
BCW-OS2 Pole
BCW-1 Pole
RT-3 Pole
MOA-2 Pole
RT 300' Tower
Gaylord
BCW-Hossler2 Pole
BCW-CC1 Pole
RT6-Pole
C3-Traverse Lakes Pole
C3 190' Tower
BCW-McCormick Lake Pole
C3-Big Bear Lake Pole
MOA-MSI-Pole
RT8-Pole
MOA-Avery Lake Pole
MOA 300' Tower
Lewiston Tower
MOA-6 Pole
Lewiston
MOA-7 Pole
MOA-8 Pole
Comins-2 Pole
Comins 300' Tower
Comins-McCollum Lake Pole
Comins-Perry Lake Pole
Comins-Smith Lake
Fairview
32
72
65
Alcona
Google Earth
Image Landsat / Copernicus
© 2018 Google
Image NOAA
20 mi
N

Barger Creek Wireless

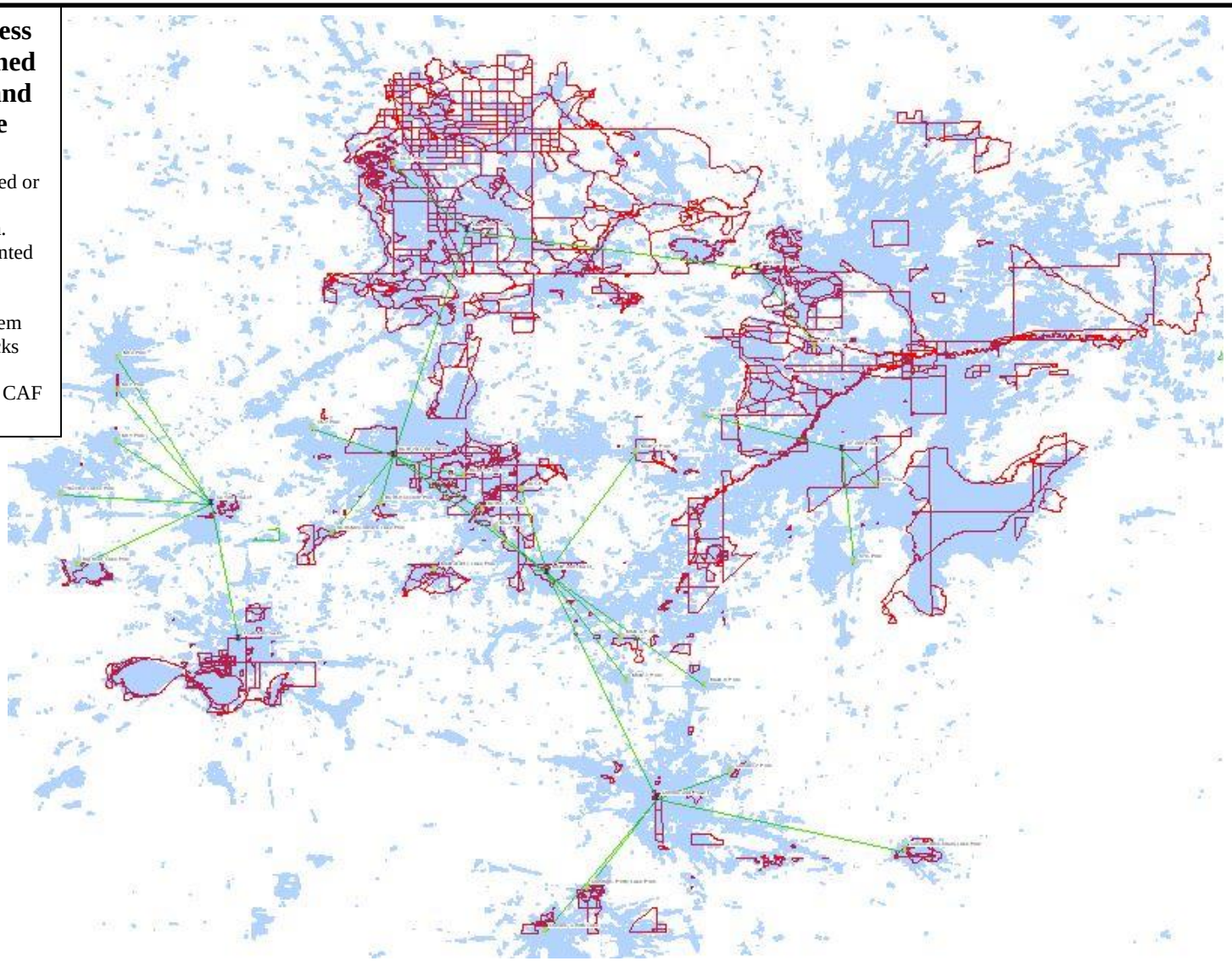
Tower Site Schematic Diagram

This diagram shows a schematic view of the proposed tower locations, tower type, and back-haul methods.



Barger Creek Wireless Census Blocks Reached by Wireless Signal and Wireless Coverage

This diagram shows the reached or substantially covered census blocks of the proposed system. The census blocks are represented by the red shapes. The blue represents the wireless signal coverage of the proposed system Note: None of the census blocks shown are listed as eligible to receiving funding through the CAF programs.



Barger Creek Wireless
2019 Michigan Grant Application
Tab Application Cost Model Summary
Finley Engineering Company, Inc.
8/27/2019 REV 12/06/2019

System Summary

Total Number of Towers	7
Total Number of Local Pole based Towers	26
Total Establishments in Census Blocks touched by Wireless Service	4965
Estimated Percentage That Could Receive Service	25%
Estimated Number of Establishments That Could Receive Service	1241
Projected Cost	$ 3,074,917.52

Barger Creek Wireless
2019 Michigan Grant Application
Tab Site Cost Summary
Finley Engineering Company, Inc.
8/27/2019

Project Total $ 3,074,917.52

Site Name	Lat	Long	Road	Power	190' Tower Site Prep	190' Tower	300' Tower Site Prep	300' Tower	Propane Tank	Tower Back-Haul	Local Radio/ Electronics Costs	Miscellaneous Materials	Regulatory Costs	Contingency	Engineering	Site Total
BCW 2A 190' Tower	-84.20604	45.00603	$ 6,500.00	$ 11,700.00	$ 17,970.00	$ 74,598.62			$ 250.00	$ 2,350.50	$ 149,230.20	$ 5,000.00	$ 6,600.00	$ 13,709.97	$ 2,879.09	**$ 290,788.38**
BCW-1 Pole	-84.16408	44.99348		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
BCW-CC1 Pole	-84.15309	44.97358		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
BCW-Hossler2 Pole	-84.21407	44.97762		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
BCW-McCormick Lake Pole	-84.24224	44.95971		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
BCW-OS2 Pole	-84.25357	45.02172		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
C3 190' Tower	-84.31276	44.9773	$ 3,800.00	$ 4,900.00	$ 17,970.00	$ 74,598.62			$ 800.00	$ 13,193.70	$ 81,381.20	$ 5,000.00	$ 6,600.00	$ 10,412.18	$ 2,186.56	**$ 220,842.25**
C3-Big Bear Lake Pole	-84.39174	44.94078		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
C3-ML1 Pole	-84.36891	45.01402		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
C3-ML2 Pole	-84.36831	45.04411		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
C3-ML3 Pole	-84.36809	45.06239		$ 3,100.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 924.69	$ 194.18	**$ 19,612.63**
C3-Traverse Lakes Pole	-84.40222	44.98307		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
CMU 300' ExistingTower	-84.16196	45.13809		$ 400.00						$ 51,476.75	$ 70,577.80	$ 5,000.00	$ 1,000.00	$ 6,422.73	$ 1,348.77	**$ 136,226.05**
CMU-CCR Pole	-84.20535	45.17703		$ 3,900.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 964.69	$ 202.58	**$ 20,461.03**
Comins 300' Tower	-84.05012	44.80382	$ 2,500.00	$ 400.00			$ 19,800.00	$ 122,853.98	$ -	$ 51,416.75	$ 83,670.80	$ 5,000.00	$ 6,600.00	$ 14,612.08	$ 3,068.54	**$ 309,922.14**
Comins-2 Pole	-84.00739	44.81985		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
Comins-McCollum Lake Pole	-83.90391	44.77307		$ 1,200.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 829.69	$ 174.23	**$ 17,597.68**
Comins-Perry Lake Pole	-84.09131	44.7512		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
Comins-Smith Lake	-84.1163	44.72558		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
Lewiston 300' Tower	-84.29687	44.89764	$ 2,750.00	$ 13,400.00			$ 19,800.00	$ 122,853.98	$ 250.00	$ 36,993.80	$ 83,670.80	$ 5,000.00	$ 6,600.00	$ 14,565.93	$ 3,058.85	**$ 308,943.35**
MOA 300' Tower	-84.11543	44.93669	$ 25,500.00	$ 50,400.00			$ 19,800.00	$ 122,853.98	$ 800.00	$ 37,371.80	$ 84,252.80	$ 5,000.00	$ 6,600.00	$ 17,628.93	$ 3,702.08	**$ 373,909.58**
MOA-2 Pole	-84.06279	45.00784		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
MOA-6 Pole	-84.07208	44.89864		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
MOA-7 Pole	-84.06789	44.87296		$ 1,200.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 829.69	$ 174.23	**$ 17,597.68**
MOA-8 Pole	-84.0224	44.87042		$ 1,200.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 829.69	$ 174.23	**$ 17,597.68**
MOA-Avery Lake Pole	-84.18146	44.93808		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
MOA-MSI-Pole	-84.14576	44.96257		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
MOA-RR1-Pole	-84.13043	44.98502		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
NL1 300' Tower	-83.99094	45.11578	$ 5,500.00	$ 9,400.00			$ 19,800.00	$ 122,853.98	$ 800.00	$ 51,524.00	$ 83,670.80	$ 5,000.00	$ 6,600.00	$ 15,257.44	$ 3,204.06	**$ 323,610.28**
NL1-1 Pole	-83.9571	45.06999		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
RT 300' Tower	-83.9415	45.00896	$ 1,200.00	$ 600.00			$ 19,800.00	$ 122,853.98	$ 800.00	$ 2,350.50	$ 83,670.80	$ 5,000.00	$ 6,600.00	$ 12,143.76	$ 2,550.19	**$ 257,569.23**
RT-3 Pole	-84.02221	45.02919		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
RT6-Pole	-83.92097	44.98763		$ 400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 789.69	$ 165.83	**$ 16,749.28**
RT8-Pole	-83.93404	44.94248		$ 2,400.00							$ 12,493.76	$ 1,000.00	$ 1,900.00	$ 889.69	$ 186.83	**$ 18,870.28**
Customer Radios	1000 Units										$ 383,200.00			$ 19,160.00	$ 4,023.60	**$ 406,383.60**
Totals			**$ 47,750.00**	**$ 112,200.00**	**$ 35,940.00**	**$ 149,197.24**	**$ 99,000.00**	**$ 614,269.90**	**$ 3,700.00**	**$ 246,677.80**	**$ 1,428,162.96**	**$ 66,000.00**	**$ 96,600.00**	**$ 144,974.90**	**$ 30,444.73**	**$ 3,074,917.52**

Barger Creek Wireless
2019 Michigan Grant Application
Tab Site Labor Mat Summary
Finley Engineering Company, Inc.
8/27/2019

Site Labor and Material Summary

Site Name	Lat	Long	Road Length	Power Length	190' Tower Site Prep	300' Tower Site Prep	Pole Site Prep	Existing Propane Tank	Back-Haul	Radio Type
BCW 2A 190' Tower	-84.20604	45.00603	650	715	1			Y	Existing Fiber	Sector 3.65 GHz CBRS LTE
BCW-1 Pole	-84.16408	44.99348		25			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
BCW-CC1 Pole	-84.15309	44.97358		100			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
BCW-Hossler2 Pole	-84.21407	44.97762		90			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
BCW-McCormick Lake Pole	-84.24224	44.95971		150			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
BCW-OS2 Pole	-84.25357	45.02172		100			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
C3 190' Tower	-84.31276	44.9773	380	375	1			N	New Fiber	Sector 3.65 GHz CBRS LTE
C3-Big Bear Lake Pole	-84.39174	44.94078		75			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
C3-ML1 Pole	-84.36891	45.01402		100			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
C3-ML2 Pole	-84.36831	45.04411		150			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
C3-ML3 Pole	-84.36809	45.06239		285			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
C3-Traverse Lakes Pole	-84.40222	44.98307		50			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
CMU 300' ExistingTower	-84.16196	45.13809		0		0		N	11 GHz Wireless	Sector 3.65 GHz CBRS LTE
CMU-CCR Pole	-84.20535	45.17703		325			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
Comins 300' Tower	-84.05012	44.80382	250	0		1		N	11 GHz Wireless	Omni 3.65 GHz CBRS LTE
Comins-2 Pole	-84.00739	44.81985		50			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
Comins-McCollum Lake Pole	-83.90391	44.77307		190			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
Comins-Perry Lake Pole	-84.09131	44.7512		80			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
Comins-Smith Lake	-84.1163	44.72558		85			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
Lewiston 300' Tower	-84.29687	44.89764	275	800		1		Y	11 GHz Wireless	Sector 3.65 GHz CBRS LTE
MOA 300' Tower	-84.11543	44.93669	2550	2650		1		N	11 GHz Wireless	Sector 3.65 GHz CBRS LTE
MOA-2 Pole	-84.06279	45.00784		25			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
MOA-6 Pole	-84.07208	44.89864		25			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
MOA-7 Pole	-84.06789	44.87296		190			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
MOA-8 Pole	-84.0224	44.87042		190			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
MOA-Avery Lake Pole	-84.18146	44.93808		80			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
MOA-MSI-Pole	-84.14576	44.96257		100			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
MOA-RR1-Pole	-84.13043	44.98502		150			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
NL1 300' Tower	-83.99094	45.11578	550	600		1		N	11 GHz Wireless	Sector 3.65 GHz CBRS LTE
NL1-1 Pole	-83.9571	45.06999		60			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
RT 300' Tower	-83.9415	45.00896	120	160		1		N	Existing Fiber	Sector 3.65 GHz CBRS LTE
RT-3 Pole	-84.02221	45.02919		150			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
RT6-Pole	-83.92097	44.98763		105			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE
RT8-Pole	-83.93404	44.94248		250			1		Wireless Note 1	Omni 3.65 GHz CBRS LTE

Note 1: Wireless Backhaul is included in the Local Wireless Equipment Costs

Barger Creek Wireless
2019 Michigan Grant Application
Tab Electronics Pricing
Finley Engineering Company, Inc.
8/27/2019

Barger Creek State of Michigan Proposals

8/20/2019

Quote#	Site names	Description of services	Qty.	Cost per.	Total
11376	Camp3 to Lewiston	11 GHz Link with 3' dishes	1	$36,993.80	$36,993.80
11377	BCW Twr. 2A to MOA Twr.	11 GHz Link with 3' & 4' dish	1	$37,371.80	$37,371.80
11378	WCMU Twr. To BCW Twr. 2A	11 GHz HP Link with 4' & 6' dish	1	$51,476.75	$51,476.75
11379	MOA Twr. To Comins Twr.	11 GHz HP Link with 4' & 6' dish	1	$51,416.75	$51,416.75
11381	WCMU Twr. To NL1 Twr.	11 GHz HP Link with 4' & 6' dish	1	$51,524.00	$51,524.00
11380	MOA, BCW Twr. 2A & WCMU	Outdoor Westell Cabinet with 24 port	3	$13,675.00	$41,025.00
		switch & 48V power system (installed)			
11382	Comins Twr. & NL1 Twr.	Outdoor Westell Cabinet with 12 port	4	$13,093.00	$52,372.00
		router & 48V power system (installed)			
11383	All Tower Sites	4 - 84" mast pipes with 12" stand-offs	8	$2,565.20	$20,521.60
		& horizontal spacer (installed)			
11385	190' Towers	4 x 90˚ Compacts installed @ 190'	2	$41,310.60	$82,621.20
11386	190' Towers	4 x 90˚ Radwin Jets installed @ 190'	2	$23,830.40	$47,660.80
11387	300' Towers	4 x 90˚ Compacts installed @ 300'	6	$43,030.20	$258,181.20
11388	300' Towers	4 x 90˚ Radwin Jets installed @ 300'	6	$24,982.40	$149,894.40
11389	LTE CORE	LTE CORE for 500 subs (redundant)	1	$67,849.00	$67,849.00
11384	Wood Pole Sites	Single Compact with Dual Omni's &	26	$12,493.76	$324,837.76
		Radwin HSU. Mounting Hardware incl.			
		(cabling, install & misc. not included)			
11390	CPE Gear	500 - CPE12000's, 100 - SU PRO 100's	1	$191,600.00	$191,600.00
		with high gain int. ant., CAT5, satellite mnts.			
				Total	$1,465,346.06

Barger Creek Wireless
2019 Michigan Grant Application
Tab Supporting Pricing
Finley Engineering Company, Inc.
8/27/2019

Guyed Tower Costs

	190' Tower	300' Tower
	Sabre Industries	Sabre Industries
	Quote 20-2338-TJH-R1	Quote 20-2339-TJH-R1
	Model 3600SRWD	Model 3600SRWD
Tower Materials	$ 21,323.00	$ 32,353.00
Lighting System		$ 9,686.00
Tower Freight	$ 2,858.00	$ 5,798.00
Anchor Freight	$ 346.00	$ 346.00
Grounding	$ 6,000.00	$ 9,000.00
Ice Shield and Wave Guide Bridge	$ 4,000.00	$ 4,000.00
Material Total	$ 34,527.00	$ 61,183.00
Sales Tax	$ 2,071.62	$ 3,670.98
Foundation	$ 18,000.00	$ 28,000.00
Mobilization and Erection	$ 20,000.00	$ 30,000.00
Tower Totals	**$ 74,598.62**	**$ 122,853.98**

Sales Tax	6%

Local Distribution Pole

Pole Material 70' Utility Pole	$ 1,500.00
Top Hat	$ 1,500.00
Pole Installation	$ 2,000.00
Pole Total	$ 5,000.00

Regulatory Filing

FAA Filing	$ 1,000.00	Per Site
Tribal Review Full Tower	$ 1,600.00	Per Site
106 Review Full Tower	$ 4,000.00	Per Site
Tribal Review Wood Pole	$ 400.00	Per Site
106 Review Wood Pole	$ 1,500.00	Per Site

Site Preparation

Access Road			
Short Road <30'	$ 8.00	Per Lineal Foot	
Long Road >30'	$ 10.00	Per Lineal Foot	
Site Fencing			
Site Fencing Cost Per Foot	$ 30.00		
Site Fenced Area	10	16	
Guy Fence length 190' Tower	25		
Guy Fence length 300' Tower	40		
Fencing Cost 190' Tower	$ 3,810.00		
Fencing Cost 300' Tower	$ 5,160.00		
Site Dirt Work			
Site Preparation and rock within fence	$ 20.00	Sq. Feet	Level, place weed mesh, rock

Barger Creek Wireless
2019 Michigan Grant Application
Tab Supporting Pricing
Finley Engineering Company, Inc.
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Square Feet per Site		160	Sq. Feet	
Prep within Fence	$	3,200.00		
Reseeding Tower Sites	$	1,000.00	Per Acre	
Reseed Area for 190' Tower		1.06	Acres	
Total seeding 190' Tower	$	1,060.00		
Reseed Area for 300' Tower		1.54	Acres	
Total seeding 300' Tower	$	1,540.00		
Soil Testing and Base/Anchor Report	$	3,500.00		
Site Electrical Work	$	2,500.00		
Access Gate	$	1,500.00		Hoover Fence Co. 14' Gal. Steel
Generator (5kw Propane)	$	2,400.00		Generac Model #6998 PowerPC Se
Total 190' Tower	**$**	**17,970.00**		
Total 300' Tower	**$**	**19,800.00**		

Miscellaneous Materials

Full Tower	$	5,000.00	Items too small to be listed
Wood Pole Installation	$	1,000.00	

Commercial Power

Electrical Service	$	400.00	
For the first		150	Feet
For each additional foot	$	20.00	

Propane Tank

Propane Tank Delivery	$	550.00	Per Site
Connect Generator and Test	$	250.00	Per Site

Fiber Access Costs

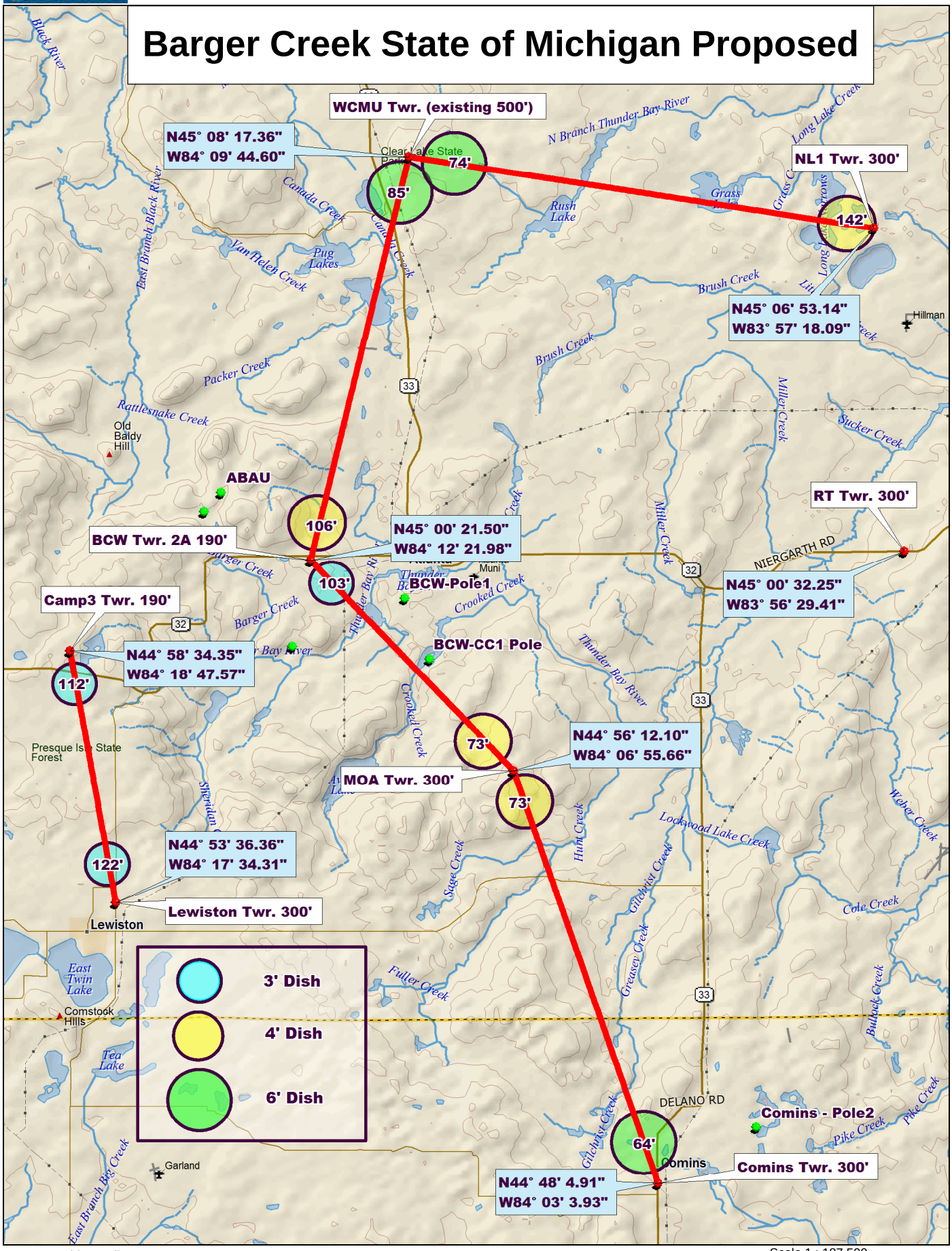
Access Existing Cable		
WBHF=1	$	250.00
WHBFO=1	$	320.00
HO-1=4	$	128.00
SEO12=250'	$	712.50
BM53 Locate	$	140.00
BHF(24x36x24)	$	800.00
Total	$	2,350.50

Fiber Feeder Costs

BFO24	2.45	Per Foot
BM60(1-1.25)	0.06	1 foot of bore per 200 feet of plowing
Total	2.51	

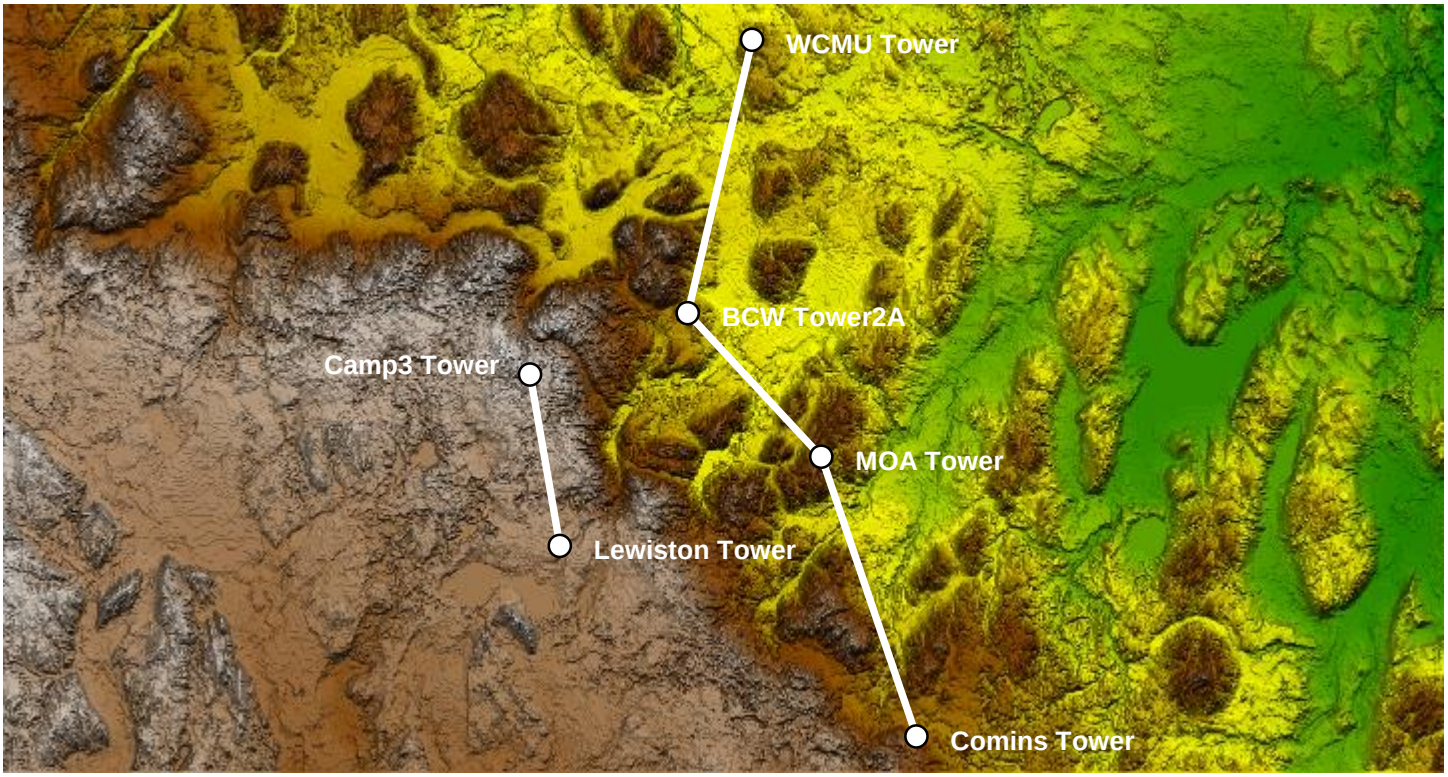
Engineering	1%
Contingency	5%

Barger Creek State of Michigan Proposed

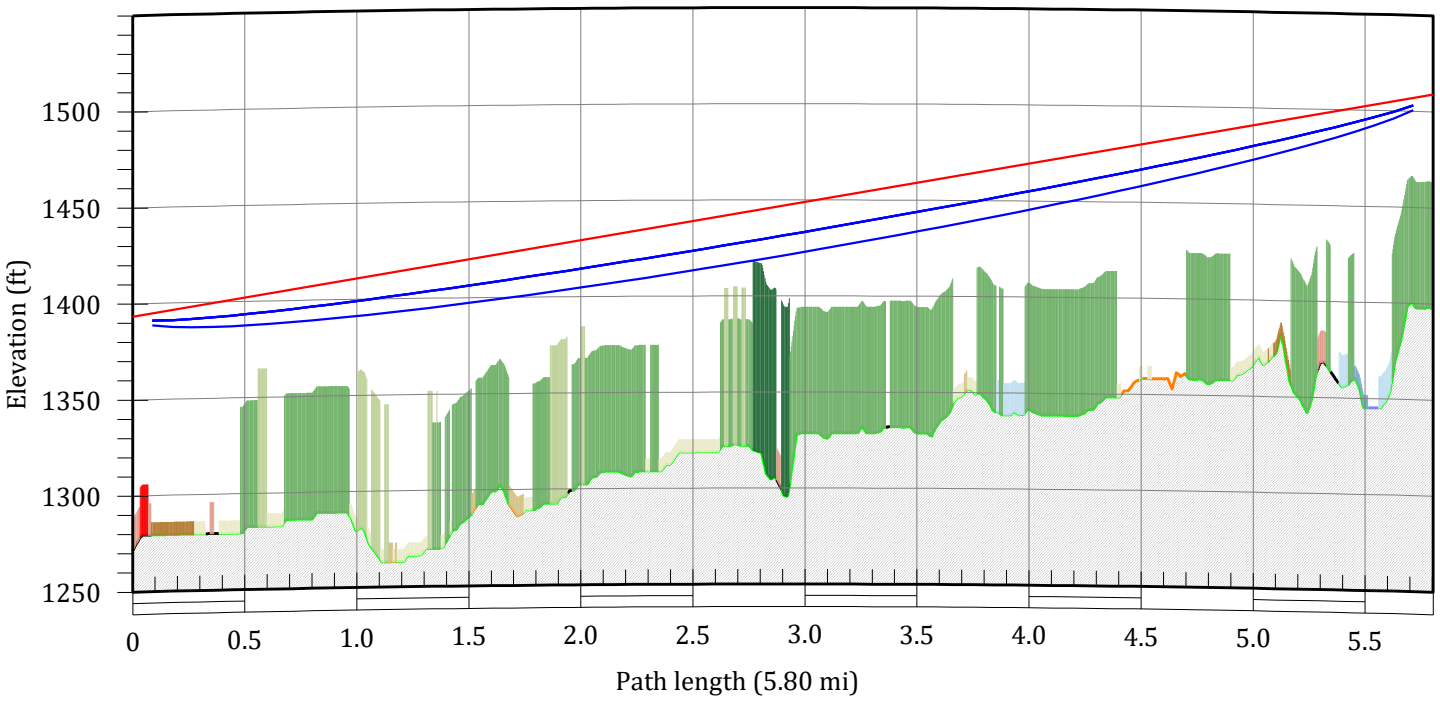


TN
MN (7.5°W)

Scale 1 : 187,500
1" = 2.96 mi
Data Zoom 10-1


WCMU Tower
BCW Tower2A
Camp3 Tower
MOA Tower
Lewiston Tower
Comins Tower

Transmission summary (Lewiston Tower-Camp3 Tower.pl5)



Path Summary

Path Name	Availability	Options to Increase Availability
Lewiston Tower to Camp3 Tower	99.9958%	-Increase Antenna Size -Reduce Modulation / Capacity

- Low Availability

Ceragon IP-20C 11GHz - 2 x 80MHz Channel - 256QAM 2 x 505Mbps (1,010Mbps-1,236Mbps)
3ft Dishes (Recommended for 99.995% Availability)
2dB of Field loss added to simulate XPIC losses

F = 11200.00 MHz K = 1.33 %F1 = 60.0, 100.0, 60.0, 60.0

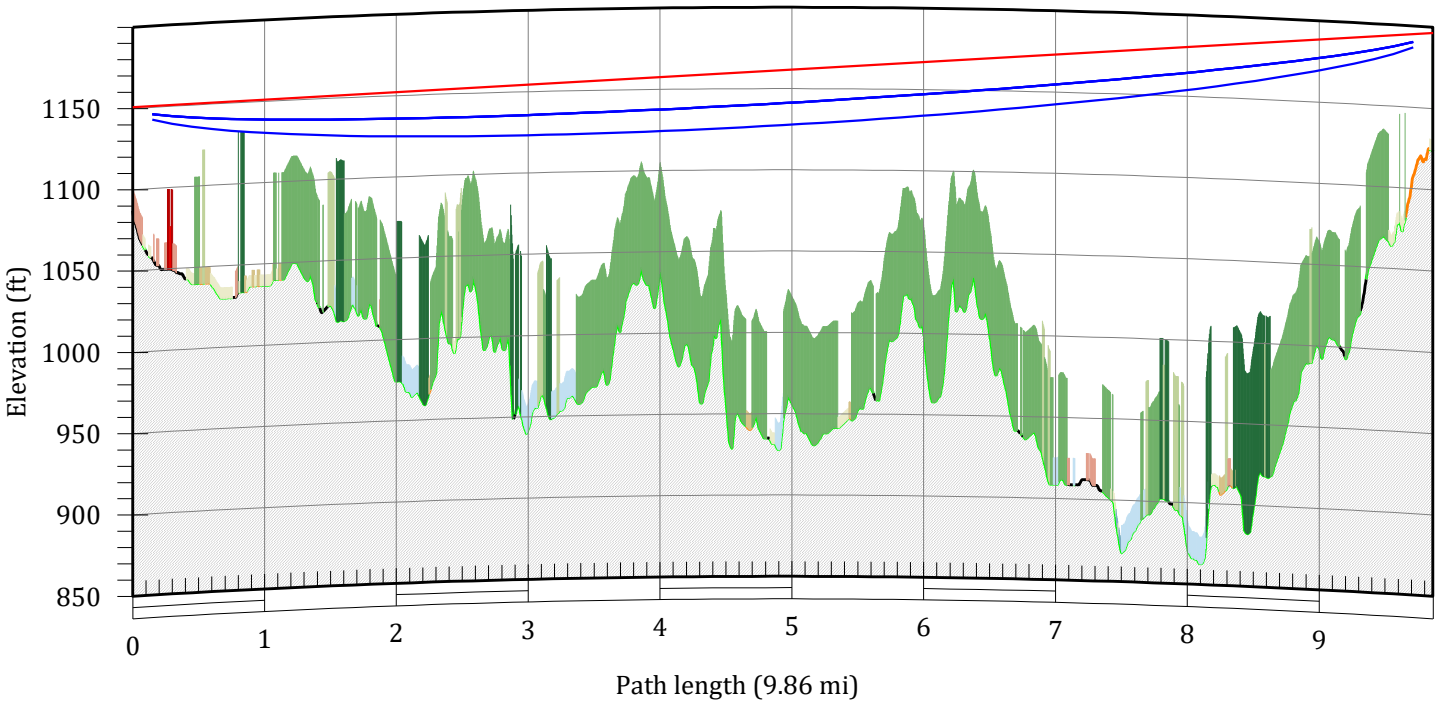
	Lewiston Tower	Camp3 Tower
Latitude	44 53 36.32 N	44 58 34.35 N
Longitude	084 17 34.24 W	084 18 47.57 W
True azimuth (°)	350.09	170.08
Vertical angle (°)	0.18	-0.25
Elevation (ft)	1271.67	1397.90
Antenna model	SC 3 - W100A (TR)	SC 3 - W100A (TR)
Antenna gain (dBi)	38.30	38.30
Antenna height (ft)	121.72	111.02
TX loss (dB)	0.55	0.55
RX loss (dB)	0.55	0.55
Frequency (MHz)	11200.00	
Polarization	Horizontal	
Path length (mi)	5.80	
Free space loss (dB)	132.86	
Atmospheric absorption loss (dB)	0.15	
Field margin (dB)	2.00	
Configuration	2+0	2+0
Radio model	IP20C-11-80X-A_1501	IP20C-11-80X-A_1501
Emission designator	80M0D7W	80M0D7W

	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		Thermal fade margin (dB)		Flat fade margin - multipath (dB)	
1KHQAM 641-784Mbps	23.00	23.00	-52.25	-52.25	60.75	60.75	-36.51	-36.51	15.74	15.74	15.74	15.74
1KLQAM 604-738Mbps	23.00	23.00	-52.75	-52.75	60.75	60.75	-36.51	-36.51	16.24	16.24	16.24	16.24
512QAM 555-679Mbps	24.00	24.00	-55.75	-55.75	61.75	61.75	-35.51	-35.51	20.24	20.24	20.24	20.24
256QAM 505-618Mbps	**25.00**	**25.00**	**-58.75**	**-58.75**	**62.75**	**62.75**	**-34.51**	**-34.51**	**24.24**	**24.24**	**24.24**	**24.24**
128QAM 439-536Mbps	25.00	25.00	-61.25	-61.25	62.75	62.75	-34.51	-34.51	26.74	26.74	26.74	26.74
64QAM 371-454Mbps	25.00	25.00	-64.25	-64.25	62.75	62.75	-34.51	-34.51	29.74	29.74	29.74	29.74
32QAM 304-371Mbps	25.00	25.00	-67.25	-67.25	62.75	62.75	-34.51	-34.51	32.74	32.74	32.74	32.74
16QAM 231-283Mbps	26.00	26.00	-70.75	-70.75	63.75	63.75	-33.51	-33.51	37.24	37.24	37.24	37.24
8PSK 162-198Mbps	26.00	26.00	-72.25	-72.25	63.75	63.75	-33.51	-33.51	38.74	38.74	38.74	38.74
QPSK 114-140Mbps	26.00	26.00	-82.00	-82.00	63.75	63.75	-33.51	-33.51	48.49	48.49	48.49	48.49

	Worst month multipath		Annual multipath		Annual rain		Total annual (2 way)	Time in mode (2 way)
1KHQAM 641-784Mbps	99.9566	99.9566	99.9905	99.9905	99.9927	99.9927	99.9737	99.9737
1KLQAM 604-738Mbps	99.9614	99.9614	99.9916	99.9916	99.9934	99.9934	99.9766	0.0028
512QAM 555-679Mbps	99.9846	99.9846	99.9966	99.9966	99.9970	99.9970	99.9903	0.0137
256QAM 505-618Mbps	**99.9938**	**99.9938**	**99.9986**	**99.9986**	**99.9985**	**99.9985**	**99.9958**	**0.0056**
128QAM 439-536Mbps	99.9965	99.9965	99.9992	99.9992	99.9990	99.9990	99.9975	0.0017
64QAM 371-454Mbps	99.9983	99.9983	99.9996	99.9996	99.9994	99.9994	99.9987	0.0011
32QAM 304-371Mbps	99.9991	99.9991	99.9998	99.9998	99.9996	99.9996	99.9993	0.0006
16QAM 231-283Mbps	99.9997	99.9997	99.9999	99.9999	99.9998	99.9998	99.9997	0.0004
8PSK 162-198Mbps	99.9998	99.9998	99.9999	99.9999	99.9999	99.9999	99.9998	0.0001
QPSK 114-140Mbps	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	0.0002

Multipath fading method - Vigants - Barnett
Rain fading method - Crane

Transmission summary (Comins Tower-MOA Tower.pl5)



Path Summary

Path Name	Availability	Options to Increase Availability
Comins Tower to MOA Tower	99.9972%	-Increase Antenna Size -Reduce Modulation / Capacity

- Low Availability

Ceragon IP-20C-HP-R2 11GHz - 2 x 80MHz Channel - 256QAM 2 x 505Mbps (1,010Mbps-1,236Mbps)
4, 6ft Dishes (Recommended for 99.995% Availability)
2dB of Field loss added to simulate XPIC losses

F = 11200.00 MHz K = 1.33 %F1 = 60.0, 100.0, 60.0, 60.0

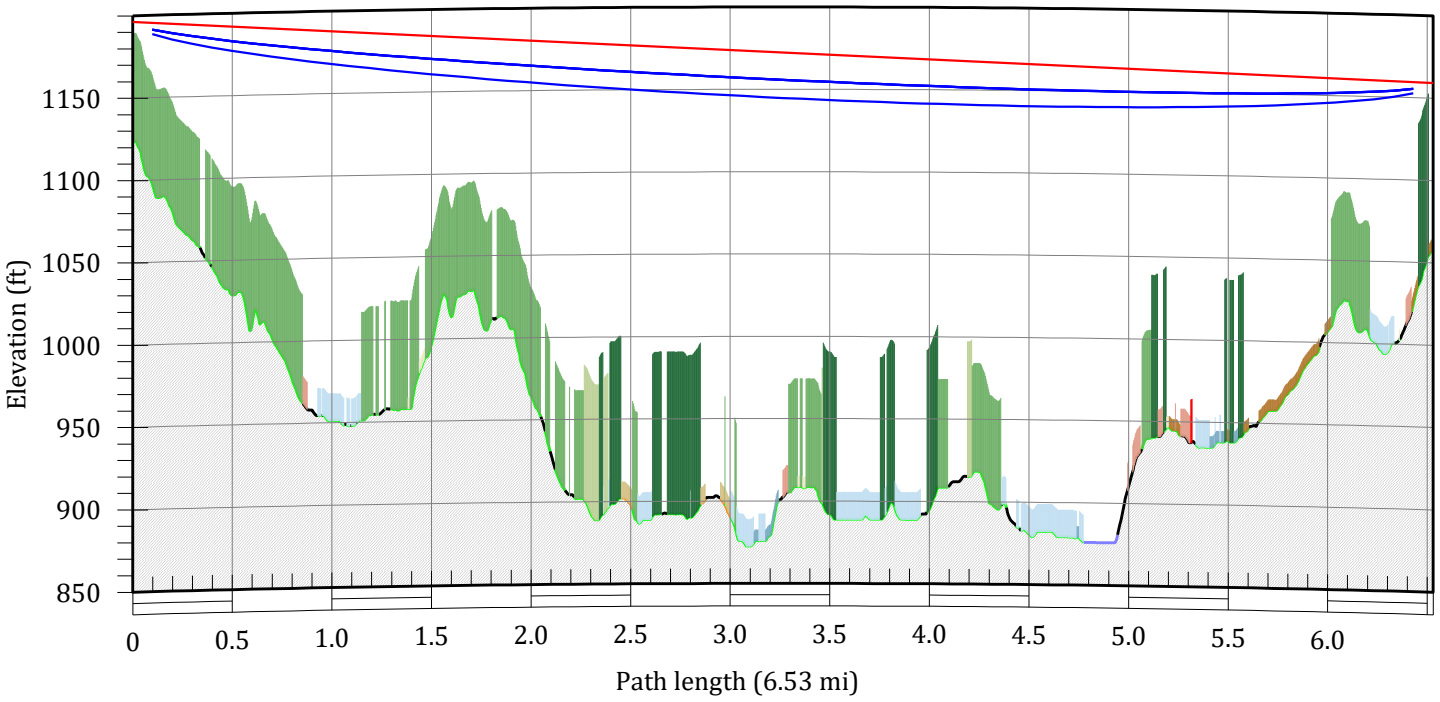
	Comins Tower	MOA Tower
Latitude	44 48 04.91 N	44 56 12.08 N
Longitude	084 03 03.83 W	084 06 55.54 W
True azimuth (°)	341.34	161.29
Vertical angle (°)	-0.00	-0.10
Elevation (ft)	1086.94	1123.50
Antenna model	SB 6 - W100C (TR)	SB 4 - W100C (TR)
Antenna gain (dBi)	43.40	39.90
Antenna height (ft)	63.80	72.91
TX loss (dB)	1.25	1.25
RX loss (dB)	1.25	1.25
Frequency (MHz)	11200.00	
Polarization	Horizontal	
Path length (mi)	9.87	
Free space loss (dB)	137.47	
Atmospheric absorption loss (dB)	0.25	
Field margin (dB)	2.00	
Configuration	2+0	2+0
Radio model	IP20C-HP11-80X-A_1501	IP20C-HP11-80X-A_1501
Emission designator	80M0D7W	80M0D7W

	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		Thermal fade margin (dB)		Flat fade margin - multipath (dB)	
1KHQAM 641-784Mbps	30.00	30.00	-52.75	-52.75	72.15	68.65	-28.92	-28.92	23.83	23.83	23.83	23.83
1KLQAM 604-738Mbps	30.00	30.00	-53.75	-53.75	72.15	68.65	-28.92	-28.92	24.83	24.83	24.83	24.83
512QAM 555-679Mbps	31.00	31.00	-56.75	-56.75	73.15	69.65	-27.92	-27.92	28.83	28.83	28.83	28.83
256QAM 505-618Mbps	**31.00**	**31.00**	**-59.25**	**-59.25**	**73.15**	**69.65**	**-27.92**	**-27.92**	**31.33**	**31.33**	**31.33**	**31.33**
128QAM 439-536Mbps	32.00	32.00	-62.25	-62.25	74.15	70.65	-26.92	-26.92	35.33	35.33	35.33	35.33
64QAM 371-454Mbps	32.00	32.00	-65.25	-65.25	74.15	70.65	-26.92	-26.92	38.33	38.33	38.33	38.33
32QAM 304-371Mbps	33.00	33.00	-68.25	-68.25	75.15	71.65	-25.92	-25.92	42.33	42.33	42.33	42.33
16QAM 231-283Mbps	33.00	33.00	-71.75	-71.75	75.15	71.65	-25.92	-25.92	45.83	45.83	45.83	45.83
8PSK 162-198Mbps	34.00	34.00	-73.25	-73.25	76.15	72.65	-24.92	-24.92	48.33	48.33	48.33	48.33
QPSK 114-140Mbps	34.00	34.00	-82.50	-82.50	76.15	72.65	-24.92	-24.92	57.58	57.58	57.58	57.58

	Worst month multipath		Annual multipath		Annual rain		Total annual (2 way)	Time in mode (2 way)
1KHQAM 641-784Mbps	99.9806	99.9806	99.9958	99.9958	99.9960	99.9960	99.9876	99.9876
1KLQAM 604-738Mbps	99.9847	99.9847	99.9966	99.9966	99.9966	99.9966	99.9899	0.0024
512QAM 555-679Mbps	99.9938	99.9938	99.9986	99.9986	99.9982	99.9982	99.9955	0.0055
256QAM 505-618Mbps	**99.9964**	**99.9964**	**99.9992**	**99.9992**	**99.9988**	**99.9988**	**99.9972**	**0.0017**
128QAM 439-536Mbps	99.9985	99.9985	99.9997	99.9997	99.9993	99.9993	99.9987	0.0015
64QAM 371-454Mbps	99.9993	99.9993	99.9998	99.9998	99.9996	99.9996	99.9992	0.0006
32QAM 304-371Mbps	99.9997	99.9997	99.9999	99.9999	99.9997	99.9997	99.9996	0.0004
16QAM 231-283Mbps	99.9999	99.9999	99.9999	99.9999	99.9998	99.9998	99.9998	0.0002
8PSK 162-198Mbps	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	0.0001
QPSK 114-140Mbps	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	0.0001

Multipath fading method - Vigants - Barnett
Rain fading method - Crane

Transmission summary (MOA Tower-BCW Tower2A.pl5)



Path Summary

Path Name	Availability	Options to Increase Availability
MOA Tower to BCW Tower2A	99.9962%	-Increase Antenna Size -Reduce Modulation / Capacity

- Low Availability

Ceragon IP-20C 11GHz - 2 x 80MHz Channel - 256QAM 2 x 505Mbps (1,010Mbps-1,236Mbps)
3, 4ft Dishes (Recommended for 99.995% Availability)
2dB of Field loss added to simulate XPIC losses

F = 11200.00 MHz K = 1.33 %F1 = 60.0, 100.0, 60.0, 60.0

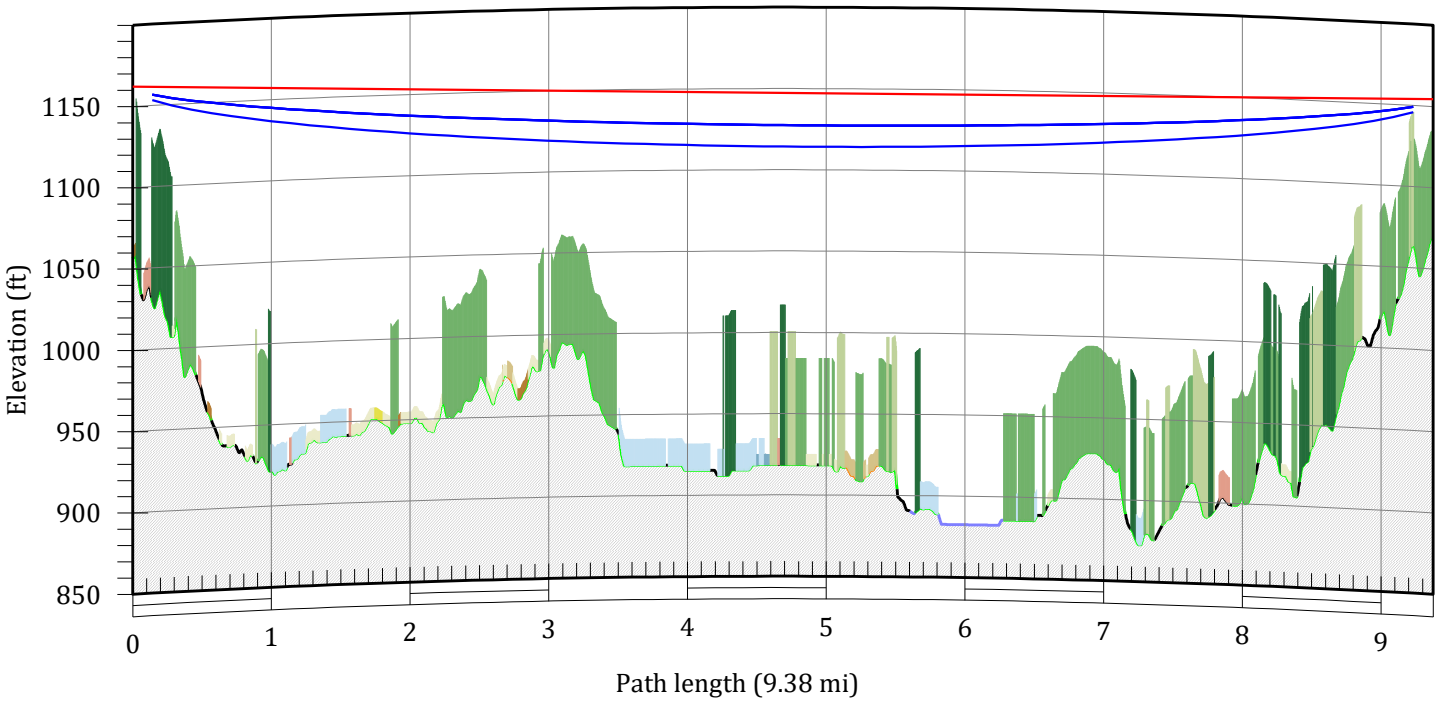
	MOA Tower	BCW Tower2A
Latitude	44 56 12.08 N	45 00 21.49 N
Longitude	084 06 55.54 W	084 12 21.89 W
True azimuth (°)	317.15	137.08
Vertical angle (°)	-0.10	0.03
Elevation (ft)	1123.50	1056.44
Antenna model	SB 4 - W100C (TR)	SC 3 - W100A (TR)
Antenna gain (dBi)	39.90	38.30
Antenna height (ft)	72.66	102.65
TX loss (dB)	0.55	0.55
RX loss (dB)	0.55	0.55
Frequency (MHz)	11200.00	
Polarization	Horizontal	
Path length (mi)	6.53	
Free space loss (dB)	133.88	
Atmospheric absorption loss (dB)	0.17	
Field margin (dB)	2.00	
Configuration	2+0	2+0
Radio model	IP20C-11-80X-A_1501	IP20C-11-80X-A_1501
Emission designator	80M0D7W	80M0D7W

	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		Thermal fade margin (dB)		Flat fade margin - multipath (dB)	
1KHQAM 641-784Mbps	23.00	23.00	-52.25	-52.25	62.35	60.75	-35.95	-35.95	16.30	16.30	16.30	16.30
1KLQAM 604-738Mbps	23.00	23.00	-52.75	-52.75	62.35	60.75	-35.95	-35.95	16.80	16.80	16.80	16.80
512QAM 555-679Mbps	24.00	24.00	-55.75	-55.75	63.35	61.75	-34.95	-34.95	20.80	20.80	20.80	20.80
256QAM 505-618Mbps	**25.00**	**25.00**	**-58.75**	**-58.75**	**64.35**	**62.75**	**-33.95**	**-33.95**	**24.80**	**24.80**	**24.80**	**24.80**
128QAM 439-536Mbps	25.00	25.00	-61.25	-61.25	64.35	62.75	-33.95	-33.95	27.30	27.30	27.30	27.30
64QAM 371-454Mbps	25.00	25.00	-64.25	-64.25	64.35	62.75	-33.95	-33.95	30.30	30.30	30.30	30.30
32QAM 304-371Mbps	25.00	25.00	-67.25	-67.25	64.35	62.75	-33.95	-33.95	33.30	33.30	33.30	33.30
16QAM 231-283Mbps	26.00	26.00	-70.75	-70.75	65.35	63.75	-32.95	-32.95	37.80	37.80	37.80	37.80
8PSK 162-198Mbps	26.00	26.00	-72.25	-72.25	65.35	63.75	-32.95	-32.95	39.30	39.30	39.30	39.30
QPSK 114-140Mbps	26.00	26.00	-82.00	-82.00	65.35	63.75	-32.95	-32.95	49.05	49.05	49.05	49.05

	Worst month multipath		Annual multipath		Annual rain		Total annual (2 way)	Time in mode (2 way)
1KHQAM 641-784Mbps	99.9665	99.9665	99.9927	99.9927	99.9919	99.9919	99.9773	99.9773
1KLQAM 604-738Mbps	99.9702	99.9702	99.9935	99.9935	99.9927	99.9927	99.9797	0.0024
512QAM 555-679Mbps	99.9881	99.9881	99.9974	99.9974	99.9966	99.9966	99.9914	0.0117
256QAM 505-618Mbps	**99.9952**	**99.9952**	**99.9990**	**99.9990**	**99.9983**	**99.9983**	**99.9962**	**0.0048**
128QAM 439-536Mbps	99.9973	99.9973	99.9994	99.9994	99.9989	99.9989	99.9977	0.0015
64QAM 371-454Mbps	99.9987	99.9987	99.9997	99.9997	99.9993	99.9993	99.9987	0.0010
32QAM 304-371Mbps	99.9993	99.9993	99.9999	99.9999	99.9996	99.9996	99.9993	0.0006
16QAM 231-283Mbps	99.9998	99.9998	99.9999	99.9999	99.9998	99.9998	99.9997	0.0004
8PSK 162-198Mbps	99.9998	99.9998	99.9999	99.9999	99.9998	99.9998	99.9998	0.0001
QPSK 114-140Mbps	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	0.0002

Multipath fading method - Vigants - Barnett
Rain fading method - Crane

Transmission summary (BCW Tower2A-WCMU Tower.pl5)



Path Summary

Path Name	Availability	Options to Increase Availability
BCW Tower2A to WCMU Tower	99.9966%	-Increase Antenna Size -Reduce Modulation / Capacity

- Low Availability

Ceragon IP-20C-HP-R2 11GHz - 2 x 80MHz Channel - 256QAM 2 x 505Mbps (1,010Mbps-1,236Mbps)
4, 6ft Dishes (Recommended for 99.995% Availability)
2dB of Field loss added to simulate XPIC losses

F = 11200.00 MHz K = 1.33 %F1 = 60.0, 100.0, 60.0, 60.0

	BCW Tower2A	WCMU Tower
Latitude	45 00 21.49 N	45 08 17.36 N
Longitude	084 12 21.89 W	084 09 44.50 W
True azimuth (°)	13.17	193.21
Vertical angle (°)	-0.06	-0.04
Elevation (ft)	1056.44	1069.56
Antenna model	SB 4 - W100C (TR)	SB 6 - W100C (TR)
Antenna gain (dBi)	39.90	43.40
Antenna height (ft)	105.69	84.89
TX loss (dB)	1.25	1.25
RX loss (dB)	1.25	1.25
Frequency (MHz)	11200.00	
Polarization	Horizontal	
Path length (mi)	9.38	
Free space loss (dB)	137.02	
Atmospheric absorption loss (dB)	0.24	
Field margin (dB)	2.00	
Configuration	2+0	2+0
Radio model	IP20C-HP11-80X-A_1501	IP20C-HP11-80X-A_1501
Emission designator	80M0D7W	80M0D7W

	TX power (dBm)		RX threshold level (dBm)		EIRP (dBm)		Receive signal (dBm)		Thermal fade margin (dB)		Flat fade margin - multipath (dB)	
1KHQAM 641-784Mbps	30.00	30.00	-52.75	-52.75	68.65	72.15	-28.46	-28.46	24.29	24.29	24.29	24.29
1KLQAM 604-738Mbps	30.00	30.00	-53.75	-53.75	68.65	72.15	-28.46	-28.46	25.29	25.29	25.29	25.29
512QAM 555-679Mbps	31.00	31.00	-56.75	-56.75	69.65	73.15	-27.46	-27.46	29.29	29.29	29.29	29.29
256QAM 505-618Mbps	**31.00**	**31.00**	**-59.25**	**-59.25**	**69.65**	**73.15**	**-27.46**	**-27.46**	**31.79**	**31.79**	**31.79**	**31.79**
128QAM 439-536Mbps	32.00	32.00	-62.25	-62.25	70.65	74.15	-26.46	-26.46	35.79	35.79	35.79	35.79
64QAM 371-454Mbps	32.00	32.00	-65.25	-65.25	70.65	74.15	-26.46	-26.46	38.79	38.79	38.79	38.79
32QAM 304-371Mbps	33.00	33.00	-68.25	-68.25	71.65	75.15	-25.46	-25.46	42.79	42.79	42.79	42.79
16QAM 231-283Mbps	33.00	33.00	-71.75	-71.75	71.65	75.15	-25.46	-25.46	46.29	46.29	46.29	46.29
8PSK 162-198Mbps	34.00	34.00	-73.25	-73.25	72.65	76.15	-24.46	-24.46	48.79	48.79	48.79	48.79
QPSK 114-140Mbps	34.00	34.00	-82.50	-82.50	72.65	76.15	-24.46	-24.46	58.04	58.04	58.04	58.04

	Worst month multipath		Annual multipath		Annual rain		Total annual (2 way)	Time in mode (2 way)
1KHQAM 641-784Mbps	99.9712	99.9712	99.9938	99.9938	99.9966	99.9966	99.9841	99.9841
1KLQAM 604-738Mbps	99.9772	99.9772	99.9951	99.9951	99.9971	99.9971	99.9872	0.0031
512QAM 555-679Mbps	99.9907	99.9907	99.9980	99.9980	99.9984	99.9984	99.9944	0.0072
256QAM 505-618Mbps	**99.9946**	**99.9946**	**99.9988**	**99.9988**	**99.9989**	**99.9989**	**99.9966**	**0.0022**
128QAM 439-536Mbps	99.9978	99.9978	99.9995	99.9995	99.9994	99.9994	99.9985	0.0019
64QAM 371-454Mbps	99.9989	99.9989	99.9998	99.9998	99.9996	99.9996	99.9991	0.0007
32QAM 304-371Mbps	99.9996	99.9996	99.9999	99.9999	99.9998	99.9998	99.9996	0.0005
16QAM 231-283Mbps	99.9998	99.9998	99.9999	99.9999	99.9999	99.9999	99.9998	0.0002
8PSK 162-198Mbps	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	0.0001
QPSK 114-140Mbps	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	99.9999	0.0001

Multipath fading method - Vigants - Barnett
Rain fading method - Crane

RADWIN

RADWIN JET Point-to-MultiPoint for Service Providers Product Brochure

PtMP solution with PtP performance

750 Mbps

RADWIN JET PtMP

Beamforming solution delivers fiber-like connectivity for residential and enterprise

RADWIN JET is a disruptive Point-to-MultiPoint smart beamforming solution, excellent for operation in heavily congested unlicensed and licensed bands where spectrum resources are scarce. Offering up to 750 Mbps per sector, RADWIN JET ensures revenue growth for residential and enterprise service providers by delivering fiber-like connectivity with incomparable resiliency.

Watch Clip

JET highlights

Market-leading PtMP beamforming base station series for triple-play services

- Base Station with smart beamforming antenna
- Up to 750 Mbps per sector, 3 Gbps per cell
- Guaranteed SLA for enterprises & best-effort for residential
- Low latency and jitter
- Long range – up to 40 km / 25 miles
- Radio synchronization for greater network capacity with built-in GPS
- Dynamic channel bandwidth selection - 80/40/20 MHz

Powerful Subscriber Units (SUs)

- High-capacity SUs – up to 250 Mbps
- Pay-as-you-grow capacity
- Multiple antenna configuration (internal/external)
- Small form factor for low visual impact
- Innovative operational simplicity for mass deployment

Multi-band radio

- 3.3-3.8 / 3.65 GHz or 4.9-5.9 GHz in the same unit

Bi-Beam™ beamforming solution

RADWIN Bi-Beam highlights

- Active beamforming antenna in both uplink and downlink directions
- Antenna steering for best link performance over a 90° sector
- Effective narrow beam of 8° @ 5.x GHz, 15° @ 3.x GHz
- OFDM & MIMO 2x2 / diversity

RADWIN Bi-Beam benefits

- High interference immunity similar to Point-to-Point
- Industry's highest throughput and range
- Optimized frequency reuse -2
- Robust operation in nLOS / NLOS
- Simplified network planning

Fixed IP traffic doubles in volume every 5 years, generating greater demand for more capacity on the subscriber side. RADWIN JET offers a future-proof solution that enables Service Providers to keep pace with the ever-growing demand, and increase revenue through fiber-like wireless access in licensed and unlicensed sub-6GHz bands.

JET applications for service providers

Wireless Internet Service Providers (ISPs)

» Last mile connectivity

Fixed / Incumbent Service Providers

» xDSL replacement
» Sub-urban and rural FTTH alternative
» FTTH backup
» WiMAX access network replacement
» DSLAMs backhaul

Cellular Operators

» Small Cell Backhaul - RADWIN JET NLOS solution is available to support complex urban NLOS backhaul scenarios

JET benefits for service providers

Grow your ARPU

» Deliver higher capacity packages to residential subscribers
» Expand services to lucrative enterprise subscribers

Lower TCO

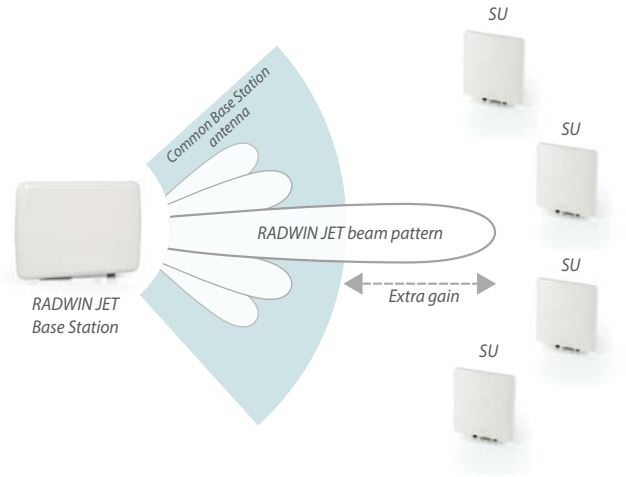
» Single PtMP series providing multiple services
» Save on tower and backhaul costs

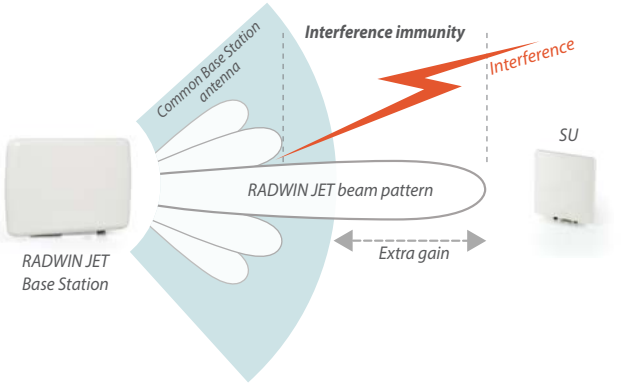
Bi-Beam™ technology

RADWIN JET incorporates unique Bi-Beam™ technology: A disruptive beamforming MIMO antenna at the Base Station, together with an intelligent air interface that redefines the performance of Broadband Wireless Access. RADWIN JET beamforming antenna is formed from an array of antenna elements which are combined to generate a narrow and steerable beam. The beamforming antenna is utilized both for uplink and downlink directions to deliver the following unique advantages:

» **Increase antenna and system gain in uplink & downlink directions**
Boost capacity, range and link robustness

» **Improve interference immunity, similar to PtP**
A result of the narrow beam replacing the wide beam of common sector antennas.





» **Greater frequency reuse**
The narrow beam created by the Bi-Beam antenna reduces the level of mutual interference between adjacent sectors and sites. Less spectrum is required and network planning is simplified.

» **Excellent operation in nLOS / NLOS conditions**
The Bi-Beam antenna can be steered to an optimal reflection point to obtain the best possible link.

RADWIN JET base stations with Bi-Beam technology

» JET *AIR* (5.x GHz):

› Designed for residential networks and service providers with a limited budget.

» JET *PRO* (5.x GHz) / JET (3.xGHz):

› Designed for mixed enterprise and residential networks. The Base Station enables service providers to offer SLA for bandwidth-demanding applications based on CIR (Committed Information Rate).

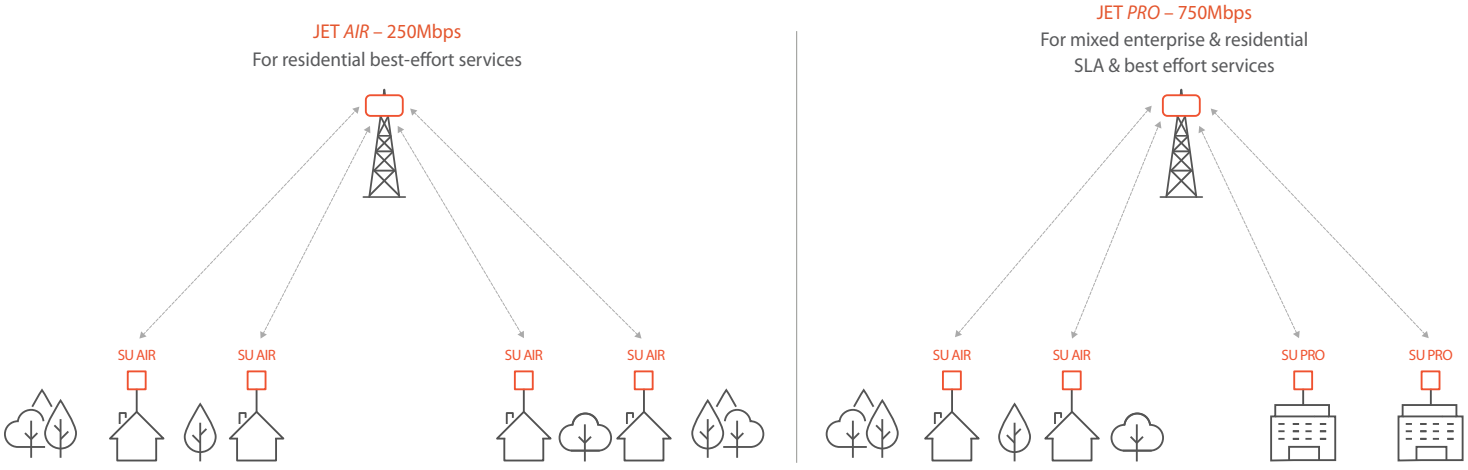
All JET solutions fully support QoS.

Laptop 13"

RADWIN JET:
Light, compact & IP 67 compliant

Attributes	JET *PRO* (5.x GHz)	JET *AIR* (5.x GHz)	JET (3.5 GHz)
Capacity (up to)	750Mbps	250Mbps	250Mbps
Service type per SU	CIR or Best Effort	Best Effort	CIR or Best Effort

Easily mix-and-match between Base Station models to deliver the best possible service with the lowest TCO.



Powerful, carrier-grade subscriber units

RADWIN's powerful Subscriber Units (SUs) deliver fiber-like connectivity with high Packet-Per-Second (PPS) processing power to maintain the highest capacity even in small packet applications.

Designed for low visual impact, RADWIN's ruggedized SUs assure long-lasting operation even in the harshest conditions. Innovative operational simplicity concepts and cuting-edge technology streamline operations and maintenance procedures.

High-capacity subscriber units (4.9-5.9 GHz)

- Pay-as-you-grow (up to 250Mbps)
- 22dBi integrated antenna or 16dBi embedded antenna (connectorized)
- High durability – IP66/IP67 enclosure
- Compatible with all RADWIN base stations
- Available versions:
  - SU *AIR*: Designed for residential subscribers (best effort)
  - SU *PRO*: Offers SLA for enterprise and bandwidth-demanding applications, based on CIR

SU Embedded (16dBi) *SU Integrated (22dBi)*

High-capacity subscriber units (3.3-3.8 GHz / 3.65 GHz)

- Pay-as-you-grow (up to 100Mbps)
- Available as connectorized unit or with integrated antenna
- High durability – IP67 enclosure
- Available versions:
  - HSU-R: Designed for residential subscribers
  - HSU: Offers SLA for enterprise and bandwidth-demanding applications, based on CIR

Innovative operational simplicity

Smartphone installation application

RADWIN SU series includes a smartphone app designed to speed up and simplify installation

WINTouch App

Enables automated installation, alignment & commissioning

Simple, fast and precise installation

Android & iOS

Multiple antenna configurations

RADWIN SU series includes an embedded antenna and is compatible with RADWIN's new and innovative slide-on antenna to achieve greater range. An option for third-party external antennas is also available.

TurboGain™ antenna

Slide-on antenna

Doubles the service range

Key product benefits

More capacity, less infrastructure

RADWIN JET uniquely delivers fixed and high transmission power across all modulations. When combined with increased gain and an interference-immune Bi-Beam antenna, RADWIN JET delivers greater downlink and uplink capacity and a longer range than conventional PtMP solutions or PtMP with beamforming in an uplink-only direction.

Greater network capacity per given spectrum

Only two frequency channels are required to deploy a multiple JET cell network - with each cell comprising 4 sectors. As a result, two channels of 80 MHz can yield tremendous cell capacity of up to 3 Gbps!

Unique air interface for highly robust link performance

RADWIN JET Bi-Beam technology ensures best link performance by managing the individual transmission scheme of each SU: Channel bandwidth (80, 40 or 20MHz) and antenna configuration (MIMO or diversity mode) are dynamically selected per SU to achieve the highest possible capacity. Fast ARQ (Automatic Repeat upon reQuest) is used to guarantee error-free transmission, even in adverse spectrum conditions.

Full span of asymmetric traffic

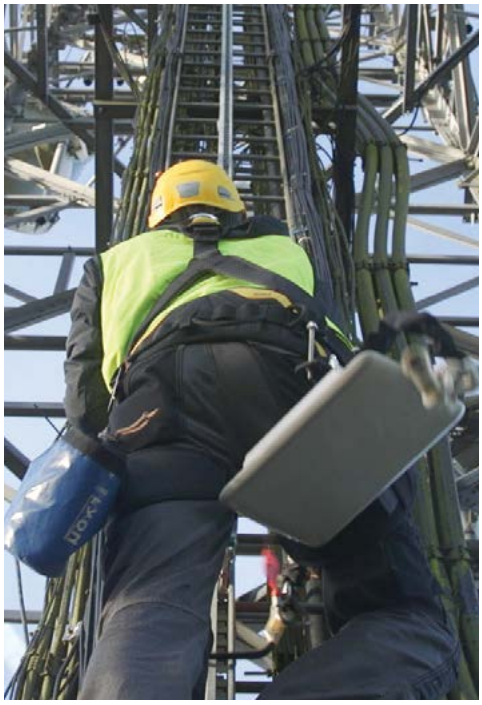
RADWIN JET can be configured to deliver more than 90% of traffic in either an uplink or downlink direction.

Secured service level agreement (SLA) for bandwidth demanding applications

RADWIN's Dynamic Bandwidth Allocation (DBA) optimally maximizes throughput for active users demanding various service levels, e.g. Committed Information Rate (CIR) or Best Effort.

TDD synchronization enables dense deployments with maximum performance

RADWIN JET features TDD synchronization between sectors and sites, using a built-in GPS. This synchronization prevents mutual interference and increases network capacity and range.



Product specifications (See individual Product Data Sheets for detailed spec.)

Maximum Net Aggregate Capacity

	Base Station			High-Capacity Subscriber Units
	JET *PRO*	JET *AIR*	JET	
4.9 - 5.9 GHz	750 Mbps	250 Mbps	-	SU *AIR* – Up 100 Mbps, SU *PRO* – Up to 250Mbps
3.3 - 3.8 GHz, 3.65 GHz	-	-	250 Mbps	10, 25, 50 Mbps, upgradable to 100Mbps

Antenna Configurations

4.9 - 5.9 GHz	Beamforming antenna: 20 dBi (5.1 - 5.9 GHz), 17 dBi (4.9 GHz)	22dBi (integrated), 16dBi (embedded) and connectors for external antenna (eg. TurboGain)
3.3 - 3.8 GHz, 3.65 GHz	Beamforming antenna 17dBi	13dBi, 20dBi, Connectorized

Radio

Number of SUs / HBS	Up to 64 SUs simultaneously
Range	Up to 40 km / 25 miles
Frequency Bands	Multiband radio supporting 4.9 - 5.9 GHz or 3.3-3.8 / 3.65 GHz
Channel Bandwidth	5.x GHz- Configurable: 10, 20, 40, 80 MHz, Dynamic Channel BW selection: 20/40/80 MHz 3.x GHz: 5, 7, 10, 14, 20, 40MHz
Radio Access scheme	OFDM, Auto MIMO 2x2 or Diversity per SU
Adaptive Modulation & Coding	BPSK /QPSK / QAM16 / QAM64 / QAM256[1]
SLA management	CIR, MIR, Best-Effort
End to End Latency	Typical: 3.5msec
Duplex Technology	TDD, Configurable Uplink / Downlink ratio
Max Tx Power	HBS : 25dBm @ 5.x GHz, 23dBm@ 3.x GHz (in all modulation schemes) HSU: 25dBm, SU (embedded): 24dBm, SU (integrated): 26dBm
DFS (FCC & ETSI)	Supported
Spectrum Viewer	Supported at HBS & SU/ HSU
TDD Synchronization	Inter & Intra site synchronization, Embedded GPS receiver and antenna
Encryption	AES 128

Interfaces

Ethernet Interface	HBS: Single port for Data & management, 10/100/1000BaseT, SU: 10/100/1000BaseT

Networking

Sub convergence layer	Layer 2
QoS	Packet classification to 4 queues according to 802.1p and Diffserv, Strict Priority, TTL
VLAN	802.1Q, QinQ, 4094 VLANs

Management

Management Application	HBS: RADWIN Manager & Web based management, SU: Smartphone App.
Protocol	SNMPv1, SNMPv3, Telnet, HTTP, IPv4 & IPv6, RADIUS for AAA Server
NMS Application	RADWIN NMS (WINManage) or integration with 3rd party NMS system via standard MIBs

Power

Power Feeding	Provided over PoE interface
Power Consumption	HBS < 25W, SU (embedded) & HSU < 12W, SU (integrated) < 9W

Environmental

Operating Temperatures	-35°C to 60°C / -31°F to 140°F
Humidity	100% condensing | HBS, HSU & SU (integrated): IP67, SU (embedded): IP66
Radio Regulations	FCC, IC, ETSI, WPC, MII, Universal
Safety	FCC/IC (cTUVus), ETSI
EMC	FCC, ETSI, CAN/CSA, AS/NZS

[1] QAM 256 only in 5.x band

RADWIN

Sabre Industries™
Towers and Poles

August 19, 2019

PCS TECHNOLOGIES INC
30 West Water Street
St. Paul, MN 55107

Attn: Dick Lindorfer
(651) 228-2657

Dear Mr. Lindorfer:

Per your recent request, please find following our quotation for a 190' Sabre Model 3600SRWD guyed tower.

If you have any questions or require further information, please feel free to contact me at (800) 369-6690, ext. 11606.

Sincerely,
SABRE COMMUNICATIONS

Tim Hornbeck
North Region Sales Manager

Enclosure: Per Above

TJH: cj

Sabre Industries™
Towers and Poles

PROPOSAL

Prepared for: **PCS TECHNOLOGIES INC**
30 West Water Street
St. Paul, MN 55107
Attn: Mr. Dick Lindorfer

Proposal No.: **20-2338-TJH**
Date: **08/19/19** **Page 1 of 3**
Reference: **190' 3600SRWD/Montmorency County, MI**
Freight: **Origin**

SABRE MODEL 3600SRWD GUYED TOWER

Quantity of one (1) 190' Sabre Model 3600SRWD guyed tower.

The tower will be triangular in design 3' - 0" on a face and consisting of all solid welded 20' sections.

Tower will have one (1) anchor in each direction, at 0º, 120º and 240º, with an 80% level guy radius.

See the tower profile included in this proposal for the design parameters.

The tower will be designed to support the following equipment:

	ANTENNA MODEL NUMBER (QTY)	RADOME YES	RADOME NO	ELEVATION C.O.R.	TX. LINE SIZE & TYPE	FREQUENCY	AZIMUTH TO NORTH	ANTENNA MOUNT	MOUNT PROVIDED YES	MOUNT PROVIDED NO
1	(4) 14in x 14in		X	188'	(8) Cat 5	N/A	Unknown	Four (4) 3' Sidearms		X
2	(4) JET		X	184'	(4) 3/8"	N/A	Unknown	No mount		X
3	(12) 5' x 1' x 3in Panel		X	160'	(12) 1 1/4"	N/A	Unknown	Three (3) 12' V-Boom Sector Mounts with 3' Standoff		X
4	(2) 6' Solid Dish W/ Radome	X		150'	(4) Cat 5	11 GHz	0º, 180º	Two (2) 4-1/2" O.D. Leg-type Dish Mounts		X

ITEM I ***TOWER MATERIALS*** **$21,323.00**

Materials to be provided include:

Complete tower steel and hardware
Complete guying system
Base material and standard deadman anchor arms (see notes)
Climbing ladder incorporated into one (1) face
Waveguide support ladder incorporated into three (3) faces (to support up to thirty-six (36) lines)
Safety cable kit without harness (200')
One (1) 4' x 5/8" lightning rod copper clad
EIA standard grounding kit
P.E. certified tower profile and foundation drawings
Final erection drawings

TOWER FREIGHT TO MONTMORENCY COUNTY, MI ..... **$ 2,858.00**

ANCHOR FREIGHT TO MONTMORENCY COUNTY, MI ..... **$ 346.00**

Sabre Industries™
Towers and Poles

PROPOSAL

Prepared for:	**PCS TECHNOLOGIES INC**	**Proposal No.:**	**20-2338-TJH**
	30 West Water Street	**Date:**	**08/19/19**
	St. Paul, MN 55107	**Reference:**	**190' 3600SRWD/Montmorency County, MI**
	Attn: Mr. Dick Lindorfer	**Freight:**	**Origin**

NOTES: **Terms will be reviewed upon receipt of order.**

Wind induced vibrations, such as vortex shedding and harmonic oscillation/resonance, of structures of all types due to unpredictable interaction with wind and surrounding structures, exposure and terrain rarely occur. The owner's maintenance program should include observations for vibration and any resulting loosening of connecting hardware or damage to the structure. The Sabre warranty specifically excludes failure due to fatigue or similar phenomena as a result of the aforementioned behavior.

The permit package includes a profile drawing of the structure with member sizes; anchor details; descriptive notes; structural calculations; a table of supported antennas, mounts and feedlines; and a foundation sketch and calculations (if applicable).

This quotation is based on ANSI/TIA-222-G and Customer provided specifications. Any information not provided by ANSI/TIA-222-G or the Customer has not been considered.

Foundation and anchor designs are based strictly on ANSI/TIA-222-G. Any additional requirements may result in increased foundation size and price.

Dimensional information is preliminary only; it may change based on final engineering.

All Sabre mounts are quoted with support pipes of appropriate length for most applications if not otherwise specified. If different support pipe lengths are required at the time of the order, additional costs may be incurred.

Cable type safety climbing device provided does not include harness.

If anchors other than our standard deadman anchor arms are required, additional charges will be incurred.

Freight charges quoted are for provided materials only. Additional freight charges may be incurred with the order of additional items.

All antennas, transmission lines, jumpers, ground kits, hangers, and hardware are to be provided and installed by others.

All tower materials will be hot dip galvanized as outlined in ASTM A-123.

This proposal does not include any sales, use, excise, contractors or any other taxes not specifically detailed in this proposal.

If a Customer requests to pick up a tower, a $300.00 per truck charge may apply for dunage and loading.

Storage charges of $350.00 per month may apply starting sixty (60) days after original scheduled ship date.

Sabre Industries™
Towers and Poles

PROPOSAL

Prepared for:	**PCS TECHNOLOGIES INC**	**Proposal No.:**	**20-2338-TJH**
	30 West Water Street	**Date:**	**08/19/19** **Page 3 of 3**
	St. Paul, MN 55107	**Reference:**	**190' 3600SRWD/Montmorency County, MI**
	Attn: Mr. Dick Lindorfer	**Freight:**	**Origin**

Due to material price fluctuations, Sabre reserves the right to review all material pricing prior to accepting any order. Any structure order placed on hold is subject to a price review at the time of its release from hold status.

Due to freight price fluctuations, Sabre reserves the right to review all freight pricing prior to accepting any order.

Title, ownership, risk of loss, risk of material obsolescence and risk of material market value decline shall pass to the Customer upon invoicing or shipment to Customer, whichever occurs earlier in time.

Delivery will be approximately 16 weeks after receipt of required information and contingent upon backlog at the time of order.

==========

This proposal is based on the terms and conditions proposed above including the attached standard terms and conditions and is subject to our review and final acceptance of your order. No other terms are valid unless signed by an authorized officer of Sabre Communications.

==========

Submitted By: Sabre Communications Corporation

Tim Hornbeck
North Region Sales Manager

Acceptance of Customer:

Please enter our order for the above items
in accordance with this proposal.

Signature _____

Name (print)_____

Title _____ Date _____

Purchase Order No. _____

Designed Appurtenance Loading

Elev	Description	Tx-Line
188	(4) 3ft Sidearms	
188	(4) 14in x 14in	(8) Cat 5
184	(4) JET	(4) 3/8"
160	3V-Boom - 12ft Face - 3ft Standoff	
160	(12) 5' x 1' x 3in Panel	(12) 1 1/4"
150	(2) Leg Dish Mount	
150	(2) 6' Solid Dish W/ Radome	(4) Cat 5

Design Criteria - ANSI/TIA-222-G

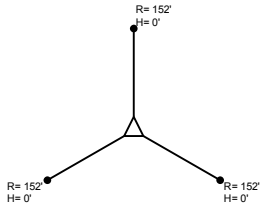
ASCE 7-16 Ultimate Wind Speed (No Ice)	105 mph
Wind Speed (Ice)	50 mph
Design Ice Thickness	1.50 in
Structure Class	II
Risk Category	II
Exposure Category	C
Topographic Category	1

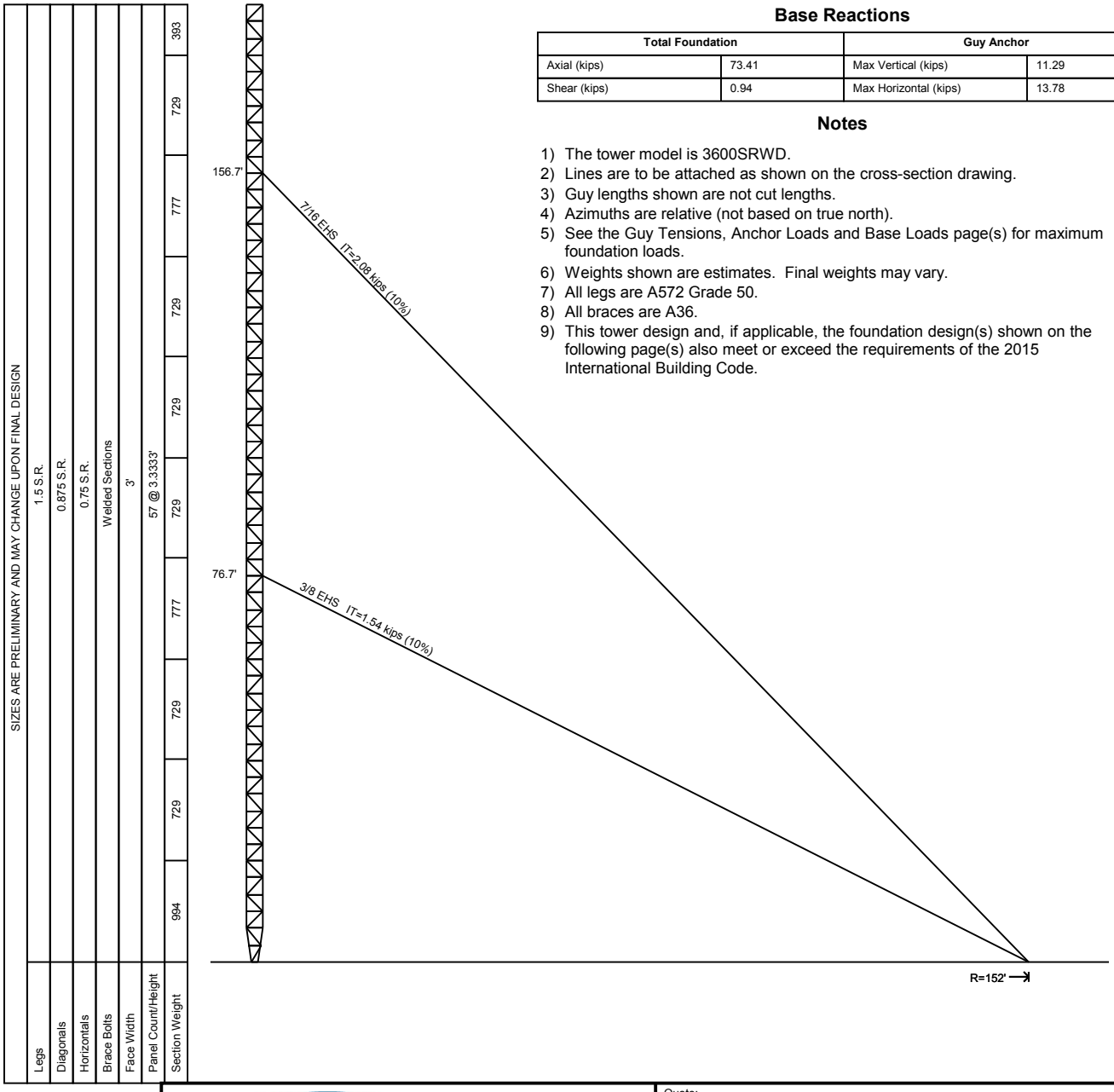
Base Reactions

Total Foundation		Guy Anchor	
Axial (kips)	73.41	Max Vertical (kips)	11.29
Shear (kips)	0.94	Max Horizontal (kips)	13.78

Notes

1) The tower model is 3600SRWD.
2) Lines are to be attached as shown on the cross-section drawing.
3) Guy lengths shown are not cut lengths.
4) Azimuths are relative (not based on true north).
5) See the Guy Tensions, Anchor Loads and Base Loads page(s) for maximum foundation loads.
6) Weights shown are estimates. Final weights may vary.
7) All legs are A572 Grade 50.
8) All braces are A36.
9) This tower design and, if applicable, the foundation design(s) shown on the following page(s) also meet or exceed the requirements of the 2015 International Building Code.





Sabre Industries™ Towers and Poles

Sabre Communications Corporation
7101 Southbridge Drive
P.O. Box 658
Sioux City, IA 51102-0658
Phone: (712) 258-6690
Fax: (712) 279-0814

Quote:	**20-2338-TJH**
Customer:	PCS TECHNOLOGIES INC
Site Name:	Montmorency County, MI
Description:	190' 3600SRWD
Date:	8/19/2019 By: CJ

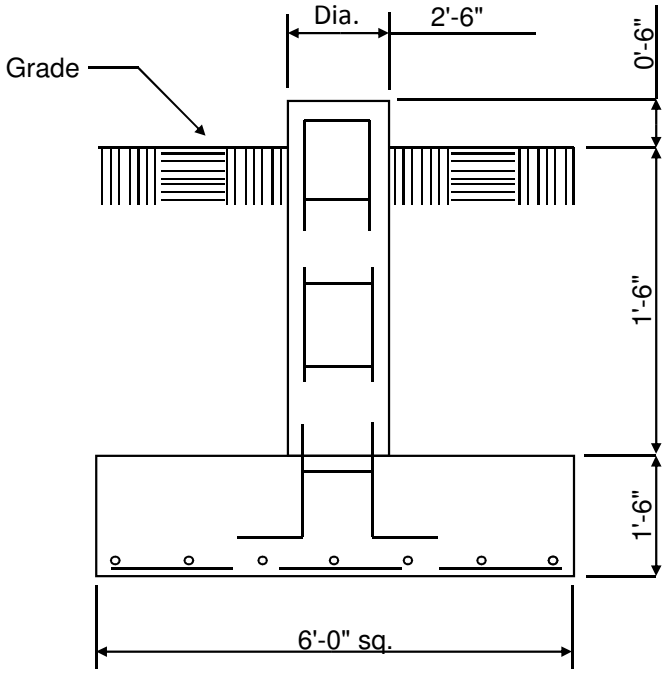
Sabre Industries™
Towers and Poles

No.: 20-2338

Date: 08/19/2019
By:

Customer: PCS TECHNOLOGIES INC
Site: Montmorency County, MI
190' model 3600 SRWD Guyed Tower (36" face)

PRELIMINARY -NOT FOR CONSTRUCTION-



TOWER BASE
(2.36 Cu. Yds.)
(NOT TO SCALE)

Rebar Schedule	
Pier	(6) #7 vertical rebar w/ #3 ties @12" spacing
Pad	(7) #7 horizontal rebar each way, evenly spaced, bottom only

Notes

1) Concrete shall have a minimum 28-day compressive strength of 4,500 psi, in accordance with ACI 318-11.
2) Rebar to conform to ASTM specification A615 Grade 60.
3) All rebar to have a minimum of 3" concrete cover.
4) All exposed concrete corners to be chamfered 3/4".
5) The foundation design is based on presumptive clay soil as defined in ANSI/TIA-222-G-2005. It is recommended that a soil analysis of the site be performed to verify the soil parameters used in the design.
6) The foundation is based on the following factored loads:
   Factored Axial load (kips) = 73.41
   Factored Shear load (kips) = 0.94

7101 Southbridge Drive - P.O. Box 658 - Sioux City, IA 51102-0658 - Phone 712.258.6690 - Fax 712.279.0814

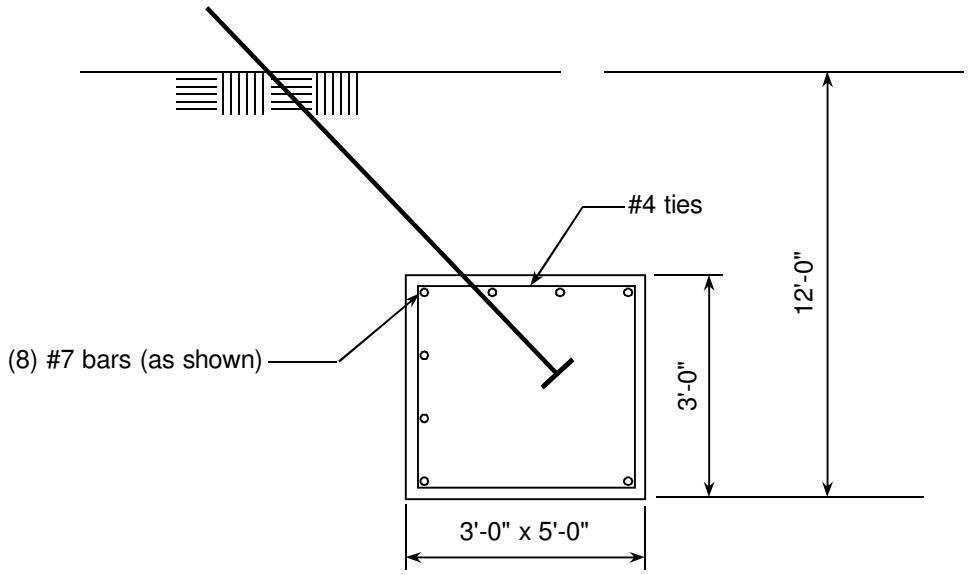
Sabre Industries™
Towers and Poles

No.: 20-2338

Date: 08/19/2019
By:

Customer: PCS TECHNOLOGIES INC
Site: Montmorency County, MI
190' model 3600 SRWD Guyed Tower (36" face)

PRELIMINARY -NOT FOR CONSTRUCTION-



GUY ANCHOR
(1.67 Cu. Yds. Each)
(3 REQUIRED; NOT TO SCALE)

Rebar Schedule Per Anchor	
Guy Anchor	(8) #7 horizontal rebar x 4'-6"
	(6) #4 ties evenly spaced

Notes

1) Concrete shall have a minimum 28-day compressive strength of 4,500 psi, in accordance with ACI 318-11.
2) Rebar to conform to ASTM specification A615 Grade 60.
3) All rebar to have a minimum of 3" concrete cover.
4) The foundation design is based on presumptive clay soil as defined in ANSI/TIA-222-G-2005. It is recommended that a soil analysis of the site be performed to verify the soil parameters used in the design.
5) The foundation is based on the following factored loads:
   Uplift (kips) = 11.29
   Horizontal force (kips) = 13.78
6) When the soil electrical resistivity is less than 50 ohm-m and/or the measured soil pH values are below 3 or greater than 9, additional corrosion control is required. See the geotechnical report for these parameters and compaction requirements, if specified.

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Sabre Industries™
Towers and Poles

August 20, 2019

PCS TECHNOLOGIES INC
30 West Water Street
St. Paul, MN 55107

Attn: Dick Lindorfer
(651) 228-2657

Dear Mr. Lindorfer:

Per your recent request, please find following our revised quotation for a 300' Sabre Model 3600SRWD guyed tower.

If you have any questions or require further information, please feel free to contact me at (800) 369-6690, ext. 11606.

Sincerely,
SABRE COMMUNICATIONS

Tim Hornbeck
North Region Sales Manager

Enclosure: Per Above

TJH: cj

Sabre Industries™
Towers and Poles

PROPOSAL

Prepared for: **PCS TECHNOLOGIES INC**
30 West Water Street
St. Paul, MN 55107
Attn: Mr. Dick Lindorfer

Proposal No.: **20-2339-TJH-R1**
Date: **08/20/19** **Page 1 of 3**
Reference: **300' 3600SRWD/Montmorency County, MI**
Freight: **Origin**

SABRE MODEL 3600SRWD GUYED TOWER

Quantity of one (1) 300' Sabre Model 3600SRWD guyed tower.

The tower will be triangular in design 3' - 0" on a face and consisting of all solid welded 20' sections.

Tower will have one (1) anchor in each direction, at 0º, 120º and 240º, with an 80% level guy radius.

See the tower profile included in this proposal for the design parameters.

The tower will be designed to support the following equipment:

	ANTENNA MODEL NUMBER (QTY)	RADOME YES	RADOME NO	ELEVATION C.O.R.	TX. LINE SIZE & TYPE	FREQUENCY	AZIMUTH TO NORTH	ANTENNA MOUNT	MOUNT PROVIDED YES	MOUNT PROVIDED NO
1	(4) 14in x 14in		X	298'	(8) Cat 5	N/A	Unknown	Four (4) 3' Sidearms		X
2	(4) Radwin JET		X	294'	(4) 3/8"	N/A	Unknown	No mount		X
4	(3) 21' Omni		X	250' @ Base	(3) 1 5/8"	N/A	N/A	Three (3) 3' Sidearms		X
5	(12) 5' x 1' x 3in Panel		X	175'	(12) 1 1/4"	N/A	Unknown	Three (3) 12' V-Boom Sector Mounts with 3' Standoff		X
6	(2) 6' Solid Dish W/ Radome	X		150'	(4) Cat 5	11 GHz	0º, 180º	Two (2) 4-1/2" O.D. Leg-type Dish Mounts		X
7	(12) 5' x 1' x 3in Panel		X	140'	(12) 1 1/4"	N/A	Unknown	Three (3) 12' V-Boom Sector Mounts with 3' Standoff		X

ITEM I ***TOWER MATERIALS*** **$32,353.00**

Materials to be provided include:

Complete tower steel and hardware
Complete guying system
Base material and standard deadman anchor arms (see notes)
Climbing ladder incorporated into one (1) face
Waveguide support ladder incorporated into three (3) faces (to support up to thirty-six (36) lines)
Required lighting mounts
Safety cable kit without harness (300')
One (1) 4' x 5/8" lightning rod copper clad
EIA standard grounding kit
P.E. certified tower profile and foundation drawings
Final erection drawings

ITEM II ***LIGHTING SYSTEM*** ..... **$ 9,686.00**

One (1) Flash (E1) DUAL LED VANGUARD II (Avian Compliant) - FTS 370d - Lighting System 200'-350' DRY CONTACT (C30047002) designed in accordance with FAA and FCC specifications.

Sabre Industries™
Towers and Poles

PROPOSAL

Prepared for:	**PCS TECHNOLOGIES INC**	**Proposal No.:**	**20-2339-TJH-R1**
	30 West Water Street	**Date:**	**08/20/19** **Page 2 of 3**
	St. Paul, MN 55107	**Reference:**	**300' 3600SRWD/Montmorency County, MI**
	Attn: Mr. Dick Lindorfer	**Freight:**	**Origin**

TOWER FREIGHT TO MONTMORENCY COUNTY, MI ..... **$ 5,798.00**

ANCHOR FREIGHT TO MONTMORENCY COUNTY, MI ..... **$ 346.00**

NOTES: **Terms will be reviewed upon receipt of order.**

Wind induced vibrations, such as vortex shedding and harmonic oscillation/resonance, of structures of all types due to unpredictable interaction with wind and surrounding structures, exposure and terrain rarely occur. The owner's maintenance program should include observations for vibration and any resulting loosening of connecting hardware or damage to the structure. The Sabre warranty specifically excludes failure due to fatigue or similar phenomena as a result of the aforementioned behavior.

The permit package includes a profile drawing of the structure with member sizes; anchor details; descriptive notes; structural calculations; a table of supported antennas, mounts and feedlines; and a foundation sketch and calculations (if applicable).

This quotation is based on ANSI/TIA-222-G and Customer provided specifications. Any information not provided by ANSI/TIA-222-G or the Customer has not been considered.

Foundation and anchor designs are based strictly on ANSI/TIA-222-G. Any additional requirements may result in increased foundation size and price.

Dimensional information is preliminary only; it may change based on final engineering.

All Sabre mounts are quoted with support pipes of appropriate length for most applications if not otherwise specified. If different support pipe lengths are required at the time of the order, additional costs may be incurred.

Cable type safety climbing device provided does not include harness.

If anchors other than our standard deadman anchor arms are required, additional charges will be incurred.

Freight charges quoted are for provided materials only. Additional freight charges may be incurred with the order of additional items.

All antennas, transmission lines, jumpers, ground kits, hangers, and hardware are to be provided and installed by others.

All tower materials will be hot dip galvanized as outlined in ASTM A-123.

This proposal does not include any sales, use, excise, contractors or any other taxes not specifically detailed in this proposal.

Sabre Industries™
Towers and Poles

PROPOSAL

Prepared for: **PCS TECHNOLOGIES INC**
30 West Water Street
St. Paul, MN 55107
Attn: Mr. Dick Lindorfer

Proposal No.: **20-2339-TJH-R1**
Date: **08/20/19**
Reference: **300' 3600SRWD/Montmorency County, MI**
Freight: **Origin**

If a Customer requests to pick up a tower, a $300.00 per truck charge may apply for dunage and loading.

Storage charges of $350.00 per month may apply starting sixty (60) days after original scheduled ship date.

Due to material price fluctuations, Sabre reserves the right to review all material pricing prior to accepting any order. Any structure order placed on hold is subject to a price review at the time of its release from hold status.

Due to freight price fluctuations, Sabre reserves the right to review all freight pricing prior to accepting any order.

The lighting system quoted assumes that there will be an unobstructed view of the beacons in all directions. It is the Customer's responsibility to ensure that the lighting kit quoted meets all Federal, State, and Local ordinances for tower height and lighting type.

Title, ownership, risk of loss, risk of material obsolescence and risk of material market value decline shall pass to the Customer upon invoicing or shipment to Customer, whichever occurs earlier in time.

Delivery will be approximately 16 weeks after receipt of required information and contingent upon backlog at the time of order.

==========

This proposal is based on the terms and conditions proposed above including the attached standard terms and conditions and is subject to our review and final acceptance of your order. No other terms are valid unless signed by an authorized officer of Sabre Communications.

==========

Submitted By: Sabre Communications Corporation

Tim Hornbeck
North Region Sales Manager

Acceptance of Customer:

Please enter our order for the above items
in accordance with this proposal.

Signature _____

Name (print) _____

Title _____ Date _____

Purchase Order No. _____

Designed Appurtenance Loading

Elev	Description	Tx-Line
298	(4) 3ft Sidearms	
298	(4) 14in x 14in	(8) Cat 5
294	(4) JET	(4) 3/8"
260.5	(3) 21' Omni	
250	(3) 3ft Sidearms	
250		(3) 1 5/8"
175	3V-Boom - 12ft Face - 3ft Standoff	
175	(12) 5' x 1' x 3in Panel	(12) 1 1/4"
150	(2) Leg Dish Mount	
150	(2) 6' Solid Dish W/ Radome	(4) Cat 5
140	3V-Boom - 12ft Face - 3ft Standoff	
140	(12) 5' x 1' x 3in Panel	(12) 1 1/4"

Design Criteria - ANSI/TIA-222-G

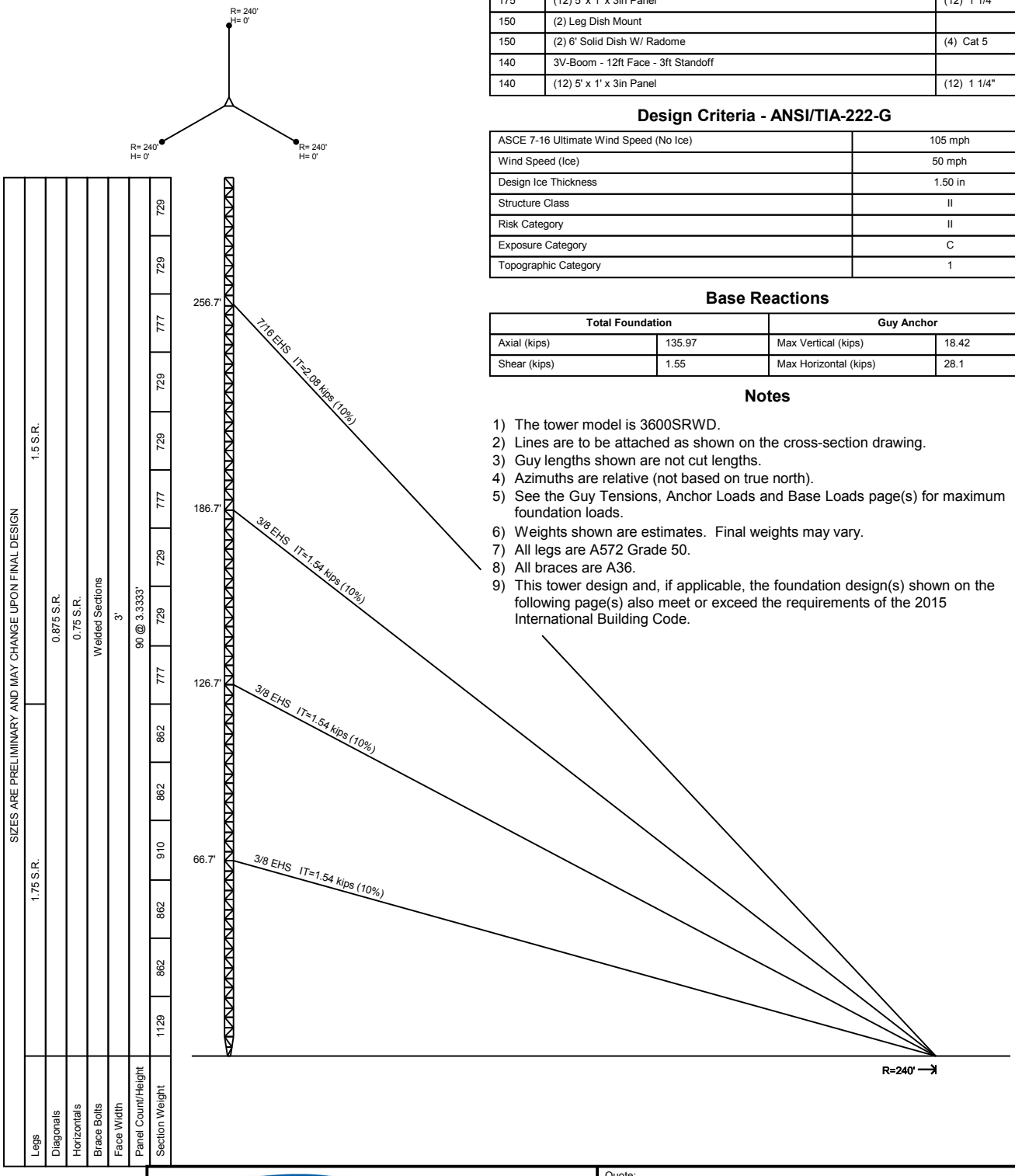
ASCE 7-16 Ultimate Wind Speed (No Ice)	105 mph
Wind Speed (Ice)	50 mph
Design Ice Thickness	1.50 in
Structure Class	II
Risk Category	II
Exposure Category	C
Topographic Category	1

Base Reactions

Total Foundation		Guy Anchor	
Axial (kips)	135.97	Max Vertical (kips)	18.42
Shear (kips)	1.55	Max Horizontal (kips)	28.1

Notes

1) The tower model is 3600SRWD.
2) Lines are to be attached as shown on the cross-section drawing.
3) Guy lengths shown are not cut lengths.
4) Azimuths are relative (not based on true north).
5) See the Guy Tensions, Anchor Loads and Base Loads page(s) for maximum foundation loads.
6) Weights shown are estimates. Final weights may vary.
7) All legs are A572 Grade 50.
8) All braces are A36.
9) This tower design and, if applicable, the foundation design(s) shown on the following page(s) also meet or exceed the requirements of the 2015 International Building Code.



Sabre Industries™ Towers and Poles

Sabre Communications Corporation
7101 Southbridge Drive
P.O. Box 658
Sioux City, IA 51102-0658
Phone: (712) 258-6690
Fax: (712) 279-0814

Quote:	**20-2339-TJH-R1**
Customer:	PCS TECHNOLOGIES INC
Site Name:	Montmorency County, MI
Description:	300' 3600SRWD
Date:	8/20/2019 By: CJ

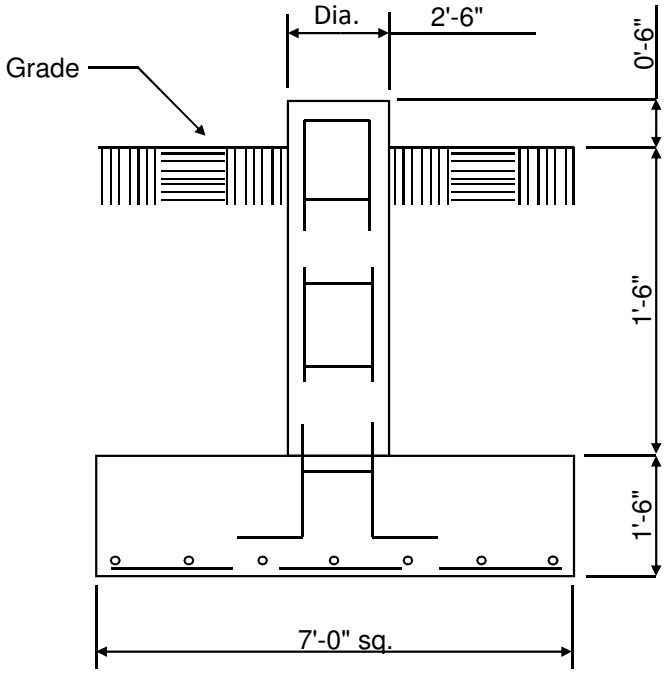
Sabre Industries™
Towers and Poles

No.: 20-2339

Date: 08/19/2019
By:

Customer: PCS TECHNOLOGIES INC
Site: Montmorency County, MI
300' model 3600 SRWD Guyed Tower (36" face)

PRELIMINARY -NOT FOR CONSTRUCTION-



TOWER BASE
(3.09 Cu. Yds.)
(NOT TO SCALE)

Rebar Schedule	
Pier	(6) #7 vertical rebar w/ #3 ties @12" spacing
Pad	(8) #7 horizontal rebar each way, evenly spaced, bottom only

Notes

1) Concrete shall have a minimum 28-day compressive strength of 4,500 psi, in accordance with ACI 318-11.
2) Rebar to conform to ASTM specification A615 Grade 60.
3) All rebar to have a minimum of 3" concrete cover.
4) All exposed concrete corners to be chamfered 3/4".
5) The foundation design is based on presumptive clay soil as defined in ANSI/TIA-222-G-2005. It is recommended that a soil analysis of the site be performed to verify the soil parameters used in the design.
6) The foundation is based on the following factored loads:
   Factored Axial load (kips) = 135.97
   Factored Shear load (kips) = 1.55

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Sabre Industries™
Towers and Poles

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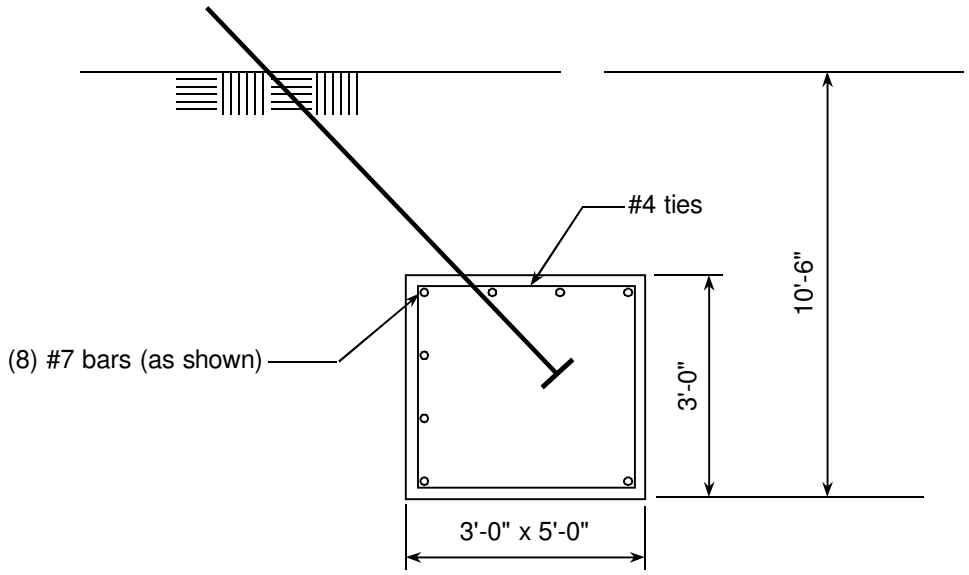

GUY ANCHOR
(1.67 Cu. Yds. Each)
(3 REQUIRED; NOT TO SCALE)

Rebar Schedule Per Anchor	
Guy Anchor	(8) #7 horizontal rebar x 4'-6"
	(6) #4 ties evenly spaced

Notes

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5) The foundation is based on the following factored loads:
   Uplift (kips) = 18.42
   Horizontal force (kips) = 28.10
6) When the soil electrical resistivity is less than 50 ohm-m and/or the measured soil pH values are below 3 or greater than 9, additional corrosion control is required. See the geotechnical report for these parameters and compaction requirements, if specified.

7101 Southbridge Drive - P.O. Box 658 - Sioux City, IA 51102-0658 - Phone 712.258.6690 - Fax 712.279.0814

MONTMORENCY COUNTY
COMMUNITY DEVELOPMENT
Economic Development Corporation & Housing
P O Box 789
Atlanta, Michigan 49709
989.785.8044 ph - 989.785.8001 fax
communitydevelopment@montcounty.org

August 26, 2019

Governor Gretchen Whitmer
P.O. Box 30013
Lansing, Michigan 48909

Dear Governor Whitmer:

Re: Connecting Michigan Communities (CMIC)

The Economic Development Corporation of Montmorency County is writing this letter in support of Barger Creek Wireless application for the Connecting Michigan Communities Grant.

High speed, broadband internet is practically non-existent in Montmorency County and surrounding areas. The telecom, cable and satellite providers offer very unreliable service at best, but also charge excessive rates and install fees. Their download and upload speeds are certainly not acceptable to the existing businesses, home businesses, schools or local residents, all wanting to better their education and effectiveness in today's competitive environment.

Barger Creek Wireless has set up local offices in Atlanta, MI because they believe reliable rural broadband should be available to everyone at an affordable cost. They have proved this to be true by successfully penetrating very rural areas of the county. A new home based business attempted to use several telecom services to no avail. He is now utilizing Barger Creek Wireless with phenomenal success allowing him VOIP technology and ability to provide international support with ease and confidence. Barger Creek Wireless cost per month is far lower than downstate or local providers with far greater signal strength and reliability. Barger Creek Technicians solve any problems and provide a high quality product starting at only $19.95 per month.

We truly believe Barger Creek Wireless to be the up and coming rural broadband internet provider in North East Michigan. Their commitment, support and passion is outstanding. Barger Creek Wireless has earned a great reputation within its existing customer base and deserves the funding to support broader penetration and provide more local employment.

Please, highly consider Barger Creek Wireless as the recipient of this CMIC Grant.

Respectfully,

David Wagner, President
Montmorency County Economic Development Corporation

105TH DISTRICT
STATE CAPITOL
P.O. BOX 30014
LANSING, MI 48909-7514

MICHIGAN HOUSE OF REPRESENTATIVES

TRISTON COLE

MAJORITY FLOOR LEADER

PHONE: (517) 373-0829
FAX: (517) 373-1841
TristonCole@house.mi.gov
www.RepTristonCole.com

August 21, 2019

Governor Gretchen Whitmer
P.O. Box 30013
Lansing, MI 48909

Dear Governor Whitmer:

Re: Connecting Michigan Communities (CMIC)

I am writing to offer my support of Barger Creek Wireless' application for the Connecting Michigan Communities grant.

My 105th house district has many communities where high-speed internet is very limited. High-speed opportunities are often expensive and unreliable. This makes it very challenging for students to take online classes and for adults to work from home on occasion. Increasing access to high-speed internet in rural Northern Michigan will encourage growth and competitiveness throughout the region. This grant would help Northern Michigan communities connect with one another, as well as connect different communities from across the state.

Please consider Barger Creek Wireless for the Connecting Michigan Communities grant. As always, please feel free to contact my office at (517) 373-0829 or TristonCole@house.mi.gov if you have any questions or concerns.

Respectfully,

Triston Cole
Majority Floor Leader
State Representative-105th District

MICHIGAN SENATE

JIM STAMAS

APPROPRIATIONS CHAIRMAN

August 27, 2019

Governor Gretchen Witmer
P.O. Box 30013
Lansing, Michigan 48909

Dear Governor Witmer,

I am writing in support of the Barger Creek Wireless grant application to the State of Michigan's Connecting Michigan Communities Grant program. The Barger Creek proposal is a comprehensive plan to provide high-speed and broadband internet to the unserved citizens and businesses across Montmorency county and the northern portion of Oscoda county. Barger Creek Wireless was founded in March of 2018 and is currently serving nearly 100 customers around the town of Atlanta. They have received strong support and excellent feedback from the community that they are serving and are looking to expand their service to more of the rural community in these two counties.

Barger Creek Wireless's proposal is designed to provide wireless broadband service options to many of the over 650 homes in Montmorency County and approximately 150 homes in northern Oscoda county that are currently unserved. Their proposal leverages existing infrastructure and data center, which were both self-funded. Barger Creek has gathered many community support letters from local leaders in education including Alpena Community College and the Atlanta/Hillman School District. They have also secured support from the local health services organization and seven townships across Montmorency and Oscoda counties. From a business perspective, Barger Creek is providing low cost broadband for businesses in the community.

Again, I support the Barger Creek Wireless for the Connecting Michigan Communities Grant Program. Please do not hesitate to contact me at (855)347-8036 or at senjstamas@senate.michigan.gov.

Sincerely,

Jim Stamas
State Senator
36th District

JS/kw

STATE CAPITOL P.O. BOX 30036 LANSING, MI 48909-7536

PHONE: (517) 373-7946 | TOLL-FREE: (855) 347-8036 | FAX: (517) 373-2678 | E-MAIL: senjstamas@senate.michigan.gov | ONLINE: www.SenatorJimStamas.com

Governor Gretchen Witmer
P.O. Box 30013
Lansing, Michigan 48909

Dear Governor Witmer

I am writing in support of the Barger Creek Wireless grant application to the State of Michigan's Connecting Michigan Communities Grant program. The Barger Creek proposal is a comprehensive plan to provide high-speed and broadband internet to the unserved citizens and businesses across Montmorency county and the northern portion of Oscoda county. Barger Creek Wireless was found in March of 2018 and is currently serving nearly (100) customers around the town of Atlanta. They have received strong support and excellent feedback from the community that they are serving and are looking to expand their service to more of the rural community in these two counties.

The Barger Creek Wireless grant proposal is also important to our efforts to extend telemedicine to our rural community which has a large senior citizen population. I have been a board member of Thunder Bay Community Health Center a FQHC since 1992. I have helped lead the program from a small struggling program in Hillman Michigan to a very strong program with 6 sites offering primary care, dental, optical, mental health and three of our own pharmacy's. One of the things we have struggled with is finding providers in many of our specialty programs. We have worked with the MPCA with the Medicaid program and NACHC with CMS to change the rules on Telemedicine allowing Health centers to be paid for Telehealth visits. Many of those changes have taken place or are being worked on currently. Our problem in Northern Rural Michigan is no High-speed internet. Without this we will not be able to take advantage of the new rules and expand services to our clients. We are very fortunate to have Barger Creek in our area looking to develop high-speed services for our area. Awarding the Connecting Michigan Communities Grant to Barger Creek would allow them to quickly develop the high-speed internet service we need and allow us to expand the needed services to our clients.

Again, I support the Barger Creek Wireless for the Connecting Michigan Communities Grant Program. Please do not hesitate to contact me regarding this letter our efforts to improve healthcare in the rural communities of northern Michigan.

Sincerely,

Mike Wurtsmith
mikewurtsmith@gmail.com
(989)306-0056

August 22, 2019

Cmic. Connecting Michigan Communities Grant

To whom it may concern:

This letter is written to support Barger Creek Wireless in their effort to secure a grant for Michigan rural communities. Our area is a very difficult area for internet ..... impossible for many as it is now. I am one of the fortunate people as I live right in the town of Atlanta and have Barger Creek Wireless Internet. It is wonderful! Good speeds at a very low cost. But most others live outside of the town and have to drive many miles to a restaurant or library to obtain service. My daughter lives 11 miles from me and makes the trip often .... her home is surrounded by forest. With this grant, Barger Creek Wireless could provide her the much-needed service. She is only one of many in the same situation.

Our world runs on technology now, but not for all. The rural areas are sadly shut out because the big internet companies won't serve them .... We are not worth their bother!

I URGE you to please consider Barger Creek Wireless as a recipient of this grant to make a huge difference in rural Michigan.

Thank you.

Patricia Crawford

Patricia Crawford

12269 Rose Lane

Atlanta, MI 49709

Steve and Gretchen Herold
6540, M-33
Atlanta, MI 49709
August 24, 2019

Governor Gretchen Whitmer
P.O. Box 30013
Lansing, Michigan 48909

Governor Whitmer:

We are writing this letter to strongly support the expansion of Barger Creek Wireless as they endeavor to expand services to rural communities in Northern Michigan. A grant would greatly help rural communities connect to essential services which is very difficult or impossible for most people living outside small cities located throughout Northern Lower Michigan. Many people living in the area must drive to towns and cities to connect to the internet at local libraries or a coffee shop to take care of business, or connect to a school or university for classes.

Northeast Lower Michigan is a beautiful place to live and experience the beauty of nature, but it also has challenges including a lack of internet services essential for thriving and surviving in life. Barger Creek Wireless has already taken the initiative to begin bringing wireless service in the Atlanta area, and residents living in and near the town of Atlanta are already experiencing reliable internet connection at reasonable prices. Residents living outside the town are still awaiting the expansion of internet to their property, and a grant from the State of Michigan to assist Barger Creek Wireless would greatly help this effort.

Connecting rural communities and residents living throughout Northeast Lower Michigan is essential in maintaining and attracting residents who desire to live and conduct business in this area, and also essential for both children and adults seeking continued education. This geographic area is in need of reliable internet coverage outside the limits of towns and small cities, and Barger Creek Wireless has already demonstrated that they are capable of providing these essential services. A grant will go a long way in helping the expansion of internet services ~~into our area~~.

We ask you to help the residents of Northeast Lower Michigan, and select Barger Creek Wireless as a recipient of the State of Michigan grant to expand essential internes services throughout rural communities. Thank you in advance for your consideration and support.

Respectfully,

Gretchen Herold
COL, USA, Retired

Steve Herold
LTC, USA, Retired

7-11-2019

To Badger Creek Wireless

I recently had a signal test performed by your technician & it showed that my home has a very poor signal strength.
I am writing hoping to find out when an upgrade is scheduled for the Lake 15 Rd Tower.
I have one choice for internet service which is Frontier and I have had them for over 3 years and recently cancelled the crappy service because I was paying monthly for service that I couldn't even stream a movie on Netflix to watch, maybe I would have service & 10 mins later nothing. Just because I live in the country should not mean I have to go without service.
I have missed out on 2 separate work from home jobs in the last year & a half due to my internet service is not sufficient to handle the requirements of the jobs, that is very sad to me.
I just wanted to see if there are any hopes of internet service being available from Badger Creek in the near future.

Respectfully
Mary Farley
Atlanta

July 11, 2019

Wayne and Cathy Isbell

8400 M-32

Atlanta, MI 49709

Barger Creek Wireless

11336 Mouch Road

Atlanta, MI 49709

Dear Carl and Kathy,

The internet service and customer service that you have provided for us since connecting us to the internet has been refreshing. Now, the customer is not "always right" as was said in days gone by, but with your company, the customer is still primary.

If there was ever a problem with connectivity, one quick email brought your instant response and the problem was fixed very quickly, whether it was a problem on our end or yours.

Thanks to your providing internet service to us, Cathy has been able to continue her education online. Wayne has been able to conduct business on eBay and Craigslist. We both stay connected with our family via email (no, not Facebook, but it is nice to have access to that, also, should we ever want to.) Using search engines and accessing news media is also possible now, thanks to our access to the internet. Our home was situated in a valley where other providers could not be accessed.

Thank you very much for being a great internet provider to our community. We hope that more people will be able to access this valuable service through Barger Creek Wireless.

Sincerely,

Wayne + Cathy

August 2, 2019

Barger Creek Wireless
11336 Mouch Rd.
Atlanta, MI 49709

RE: SOM Grant - Support Letter

To whom it may concern-

I'm writing on behalf of Barger Creek's extension of wireless service in the Atlanta & surrounding areas.

I had use of their service for a short time until I moved to a new address. Their services were long needed in our area due to remote location here. I'm not able to get their signal now at our new residence. And I'm devastated by that. !!

Barger Creek provides much needed internet access in our area. Other companies are not able to provide the excellent signal & access to the web, like their technology.

Please consider their Grant Request to continue with providing excellent service to our area.

Thank You. Lori M Kent

July 22, 17

To Whom it May Concern,
My name is Dave Lobe.
I live on Mellen Rd.
near Reese Rd.
I have been watching Carl's
progress on facebook and
am very interested in
his Internet Service.
We are currently on
Hughs net Internet.
It is getting very un-
affordable. We would
love to see an affordable
Internet as Seamons can
afford. Carl is working
very hard to see that happen.

Thank You
Dave Lobe

Bart Mol
President, Avery Lake Property Owners Association (ALPOA)
7065 Overlook Trl
Atlanta, MI 49709

July 22, 2019

Barger Creek Wireless
11336 Mouch Rd
Atlanta, MI 49709

Hello Carl,

I am writing on behalf of the property owners on Avery Lake near Atlanta, Michigan. We live in a very rural area with limited to no access to reliable high speed internet. This is a service we desperately need in this area for the following reasons:

- It would help the year around residents who have children in school and need reliable internet access.
- Provide the ability to access emergency services via VOIP phone.
- Remove a current barrier for additional residents to move to the area.
- Remove a barrier for new business opportunities or expansion of current business ventures.
- Provide the ability for communication with friends and family.

We fully support Barger Creek's petition for grant funding to expand their service area.
I have enclosed a petition from early 2018 that shows the support of the community. I have also reconfirmed this support with the home owners.

As the president of the Avery Lake Property Owners Association, I ask that you submit this letter and petition with the grant application for our full support of its approval.

Sincerely Yours,

Bart Mol
President
ALPOA

Approval for Barger Creek Wireless Tower at MOA

https://www.thepetitionsite.com/379/558/754/approval-for-badger-creek-wireless-tower-at-moa/

Author: Bart Mol
Recipient:

Petition:

Barger Creek Wireless is working with the MOA Landfill to place a tower on their site to service Avery Lake and surrounding area. This will provide reliable high-speed internet with the following benefits:
- Provide a way to use voice over IP for phone service. For those that do not have phone service, you can use the high speed internet connection to enable voice over IP. This also allows for access to emergency services in case someone gets hurt.
- Provide an alternative to cable for services that provide video streaming like Netflix and Amazon
- Provide a way to communicate over the internet with friends and family

Please sign this petition to show our support to MOA and Barger Creek.
This DOES NOT COMMIT you to purchase the Barger Creek Service

	Name	From	Comments
1.	Bart Mol	Atlanta,, MI	Provide reliable high speed internet so that I can work from home
2.	ellie mol	Peoria, IL	
3.	Jack Long	Atlanta, MI	Better internet access would allow me to work from home and spend more time up north. I would also be able to more easily stay in touch wih family and friends.
4.	Thomas Long	Atlanta, MI	Need high speed internet for communication
5.	Patricia Stoddard	Atlanta, MI	Service at Avery Lake is marginal at best. Usually there is no service at all!
6.	Andrea Logan	Atlanta, MI	this is our summer home however I can work remotely and the current Frontier Service is not reliable and very costly for what services you receive.
7.	Nsmcy Hunley	Atlanta, MI	The internet we have is just about unusable! Very frustrating that we just turn off!
8.	Lyle Dodson	Atlanta, MI	
9.	LIsa Stoddard Wilhelm	oak Harbor, OH	we're property owners on Sunset drive on Avery Lake and it would be nice to access to the internet when we're at our lake house we have a hard time getting cell service and internet now!!!
10.	Cheryl McCormick	Atlanta, MI	This service will improve our self-employed business communications, our knowledge stream, and our entertainment options.
11.	Sharon Szcodronski	Atlanta, MI	Better service
12.	Laurie Yorke	Detroit, MI	
13.	Georgia Long	Dunlap, IL	Our vacation house could really benefit from this!
14.	Lillian Gwizdala	Atlanta, MI	Accessing the Internet would be so much faster! The time I spend researching for papers would be significantly reduced.
15.	Edward Szcodronski	Atlanta, MI	We need it.
16.	Marva LaMore	Atlanta, MI	
17.	Katina Long	Atlanta, MI	I'm frustrated with the current service for phone and internet
18.	Joyce Dodson	Atlanta, MI	
19.	Patricia Crawford	Atlanta, MI	We need broadband service
20.	Tom Oberhausen	Atlanta, MI	Hopefully someone else will rent tower space so that our cell phones will work better than they do now.
21.	Mackenzie Logan	Northville, MI	
22.	Hubert Hunley	Atlanta, MI	

	Name	From	Comments
23.	Molly H	Atlanta, MI	It would give a better piece of mind to have better cell service or internet access incase of an emergency.
24.	Blake Long	Alanta, MI	This is important to me while I am in such a wonderful place to still be in contact with others and be able to notify people if something is wrong.
25.	Christina Mol	Atlanta, MI	Although some may see a short stay at a house on a lake in northern Michigan as the perfect escape from the invasive nature of technology, there are many people who make those houses their full-time residences. Whether lakeside occasionally or always, we live in a world which requires reliable connectivity for work or income, social or professional communication, entertainment, financial responsibility (online bill paying)— even safety. To ask why this is important to me seems as ridiculous as asking why indoor plumbing or electricity or having a vehicle is important to me— it's not an absolutely necessity, but it sure makes life today easier.
26.	Jodi Stoddard	Taylor, MI	I have a second home at Avery lake which I rent out as a vacation home. Having this service would be a wonderful boon.
27.	Rob Chloe Sam Neeson	Highgate, United Kingdom	
28.	Tim Logan	Atlanta, MI	It would be nice to have more reliable service.
29.	Roseann LaForest	Atlanta, MI	
30.	Matt Farkas	Atlanta, MI	
31.	Jon Heers	Atlanta, MI	The more options for any service is a good thing
32.	Craig Luckey	Thornton, CO	This is necessary for when we go up to visit the in-laws. No internet speed= no work= no money
33.	Monica Bockman	Fort collins, CO	When visiting my parents and maybe a future home would be nice have all those options!
34.	Christina Felt	Fruita, CO	I spend one month each summer with my parents and generally work remotely for three weeks. This increased internet speed would be so valuable and greatly relieve barriers to productivity. My parents live on Avery Lake, at 10565 Skyline Dr, Atlanta MI.
35.	Ann Seymour	Atlanta, MI	better internet service, phone service.
36.	Heather Luckey	Thornton, CO	I'd like the ability to work remotely from my parents house on Lake Avery so I can visit more often. Right now, the internet prohibits this.
37.	Thom Seymour	Atlanta, MI	
38.	Kimberlee A Engel	Atlanta, MI	Work from home.
39.	Remi Charette	Atlanta, MI	My satellite provider charges too much and we need cell phone service here at Avery Lake .

	Name	From	Comments
40.	Shonna Riepe	San Bernardino, CA	This would be a personal value to me so I can work remotely when I visit my parents
41.	Melissa Young	broomfield, CO	I visit my parents who live on Avery Lake. There are times that I need to work and use my computer when I visit. Having wifi would help improve the functionality of completing tasks for my job
42.	DeLisa Foltz	Atlanta, MI	
43.	Kelly C	Atlanta, MI	
44.	Walt Carothers	Atlanta, MI	
45.	BEAU WILLIAMS	Atlanta, MI	I am the Supervisor of Loud Township and I feel the citizens are in serious need of usable internet services.
46.	Lynne Carothers	Atlanta, MI	Seasonal and full time folks on Avery Lake would all benefit from having wifi that was adequate for all diverse needs. What we have now is useless.
47.	TRACY TEB0	Atlanta, MI	
48.	Margaret Yon	Atlanta, MI	Reliable internet would be an asset to Avery Lake. With our jobs and school commitments, having higher speed internet would make it possible to stay up to date without having to go into town to connect to wifi.
49.	Paul Streber	Atlanta, MI	
50.	Kristin Mayville	Atlanta, MI	As a local teacher, so much of our instruction and materials are moving to internet - based. When students can't connect, they are at a disadvantage. In this day and age, not having reliable internet connectivity is just not acceptable.
51.	Brenda Hibner	Atlanta, MI	
52.	Andrew Tebedo	Atlanta, MI	
53.	Lauren Woodworth	Atlanta, MI	With the wealth of information available online, everyone should have access. Having internet accessible will help our youth stay ahead in the increasingly technologically dependent world. Without access, our young people, especially, suffer. We must do better to ensure our children have access to resources and technology that allows them to prosper and grow in today's world.
54.	Tammy Fish	Atlanta, MI	
55.	Lisa Force	Comins, MI	
56.	Danelle B	Atlanta, MI	The community needs this asset, for education, emplyment and businesses.
57.	Dustin Dobbyn	Atlanta, MI	
58.	Kaitlin Corbin	Atlanta, MI	
59.	Chase Faircloth	Atlanta, MI	
60.	Lacy Ferguson	Atlanta, MI	
61.	Breanna Webster	Atlanta, MI	I'm tired of the horrible internet services offered in our town!

	Name	From	Comments
62.	Heidi Cadwallader	Atlanta, MI	
63.	Anna Arnold	Atlanta, MI	
64.	Brittney Baker	Atlanta, MI	I need faster WiFi. Something better than frontier.
65.	mary dugas	Atlanta, MI	Thank you Carl Cadwallader for doing this for the people of Atlanta!!
66.	Elizabeth Culham	Atlanta, MI	
67.	Barbara Moran	Traverse City, MI	Small town America, this is a perfect internet system for us and very affordable!
68.	Susan Reed	Atlanta, MI	
69.	Kristen Dobbyn	Atlanta, MI	Because we don't have any other internet service worth paying for!
70.	angie weaver	atlanta, MI	
71.	Chrissy Prince	Atlanta, MI	
72.	Cheryl Schroeder	Atlanta, MI	
73.	christine Armock	Atlanta, MI	
74.	Kimberley Werner	Atlanta, MI	I would like my family and friends to have affordable internet service in the area they live.
75.	Darcie Brown	Atlanta, MI	
76.	Deb Van coillie	Lewiston, MI	
77.	Antonio Racz-Reene	Big Rapids, MI	
78.	Becky Hooper	Atlanta, MI	
79.	Karen Boice	Atlanta, MI	
80.	Davin Thompson	Atlanta, MI	
81.	Kelly Zwierzchowski	Troy, OH	It would help with my service when we are visiting Avery Lake. We would be able to use are phones for personal and business matters, with out driving into town.
82.	AJ Pesonen	Hillman, MI	
83.	Jamie LaPointe	Atlanta, MI	I have school age children who are unabke to do homework at home with our current internet service. This is much needed as all the parents in the area have the same frustration
84.	David Ettinger	Atlanta, MI	Lack of choices.
85.	Debbie Wilson	Atlanta, MI	
86.	Rick Wolf	Atlanta, MI	Need more choices in area for internet.
87.	Pauline Hancock	Atlanta, MI	
88.	Jim Young	Alpena, MI	I've done IT in Montmorency county for over 20 years. There are many areas of the county that lack access to high-speed internet entirely, and other areas that are serviced by a single large company with an effective monopoly. Barger

(continues on next page)

ALBERT TOWNSHIP

Supervisor

Mike Dombrowski

P.O. Box 153
Lewiston, MI 49756

989-786-2513
supervisor@alberttownship.com

Governor Gretchen Whitmer
PO Box 30013
Lansing, Michigan 48909

August 23, 2019

Dear Governor Whitmer:

Re: Connecting Michigan Communitites (CMIC)

The Albert Township Board and community supports the application grant for Barger Creek Wireless for providing broadband services for our unserved Montmorency County Township. The Township has done some preliminary work with BCW and feel they are very capable of expanding their services to provide for our unmet needs. We serve an area that includes the town of Lewiston that is so needy for broadband. Please help Northeast Michigan provide much needed broadband services.

Respectfully yours,

Mike Dombrowski
Supervisor

Avery Township

Established in 1903

Montmorency County, Atlanta, Michigan 49709

MAILING
ADDRESS:
P.O. Box 665
11010 McMurphy Rd.
Atlanta, MI 49709-0665
(989) 785-3278

August 13, 2019

Governor Gretchen Whitmer

PO Box 30013

Lansing, Michigan 48909

RE: Connecting Michigan Communities (CMIC)

Dear Governor Whitmer;

We are writing this letter of support for Barger Creek Wireless's application for a Connecting Michigan Communities grant.

Avery Township, in Montmorency County is a very small sparsely populated area of Northeast Michigan with approximately 643 residents.

We do have internet through our local phone company, but service is not available everywhere in our township. Many of our small businesses do not have access to internet as a cost friendly expense. Most of our residents are retired and cannot afford the high cost of internet at their residence. Many use the local library, which has limited number of computers available for public use.

Most of our businesses who have internet have I either installed expensive satellite dishes or subscribed to high cost online services that are not reliable in the majority of our rural areas.

Avery Township students attend Atlanta Community Schools and many are unable to complete their homework and assignments during regular school hours.

Avery Township Offices rely on our internet service via our phone company, which charges us for "high speed" service, which it is far from high speed when we have to work on line with Bureau of Elections, Secretary of State and other Michigan Governmental agencies. As a Township we should be able to have much faster internet service to maintain accurate records, not have to wait for anywhere from ½ to 2 hours for our service to become available or to shut down our computers, so that we can accommodate our citizens on a timely manner.

I am sure you are very aware of all of the new Election procedures, with our computers at the voting polls and offices. The current situation on

Election days will cause nothing but frustration with our dedicated election workers and voters.

We agree whole heartedly with Governor Whitmer that high speed internet is a must to compete in today's society. High speed internet levels the playing field for every school aged child, citizen and business in Michigan.

Avery Township supports Barger Creek Wireless Communication's help to bring not only Avery Township, but Montmorency County into the Twenty-First Century.

Respectfully submitted,

Thomas F. Seymour, Supervisor

Ann M. Seymour, Township Clerk

BRILEY TOWNSHIP
HOME OF MICHIGAN'S ELK CAPITAL

August 28, 2019

Governor Gretchen Whitmer
P.O. Box 30013
Lansing, MI 48909

Dear Governor Whitmer:

Re: Connecting Michigan Communities (CMIC)

We are writing to offer our support to Barger Creek Wireless' application for the Connecting Michigan Communities grant.

Increasing the availability of high-speed internet in Northern Michigan will encourage more growth throughout our rural community.

Providing additional high speed internet access would allow for students to take online classes, and also help make our economy sustainable into the future. Businesses of all sizes rely upon connectivity to function at full capacity. Please help add viability and value to our area with your support of this grant application.

Please consider Barger Creek Wireless for the Connecting Michigan Communities grant.

Sincerely,

Bruno Wojcik, Supervisor of Briley Township
Atlanta, Michigan

P. O. BOX 207 • 11331 WEST STREET • ATLANTA, MI 49709 • Phone: 989-785-4050 • Fax: 989-785-4186

Township Board

Clinton Township

Oscoda County
Comins, MI 48619

GOVERNOR GRETCHEN WHITMER

PO Box 30013

Lansing, Michigan 48909

Re: Connecting Michigan Communities (CMIC)

Dear Governor Whitmer:

We are writing this letter in support of Barger Creek Wireless application for the Connecting Michigan Communities grant.

Clinton Township, Oscoda County has none or very limited high speed internet. And most of the high speed internet is because homeowners have installed expensive satellite dishes or utilize their limited cell phone data.

This lack of high speed internet puts our Township at a distinct disadvantage in today's competitive society.

While we have no school in Clinton Township, our students, who attend school in the neighboring township, are unable to complete homework or advanced assignments, because there is no high speed internet. Adults who want to take advanced learning classes are at a disadvantage, because what limited access is available (in dial-up) makes it difficult to take long distance classes, unless they utilize expensive satellite or cell service.

And although we have no health facilities, having high speed internet could save a trip to a doctor by being able to communicate with a doctor or nurse about symptoms and possible remedies.

There are three businesses in Clinton Township who utilize satellite for their internet service, in order to promote their businesses. There are also several independent contractors who work from home and have no high speed internet and must utilize cell phones to access information necessary to providing services to their clients. The US Post Office has high speed internet thru expensive satellite service.

In addition, our Town Hall, without high speed internet, is unable to fulfill election night responses without having to travel to the County seat to report results. And, Board meetings many times require continuation so that pertain information to an issue can be accessed from another location.

As Governor Whitmer has said, "Access to high speed internet is a must to compete in today's society. High speed internet levels the playing field for every child and small business." It is, as if she was at one of our Board meetings.

With Barger Creek's successful CMIC grant, Clinton Township, Oscoda County will finally be in the 21st Century.

Very truly yours,

CHRISTOPHER NEFF, Supervisor

SHERI SANDERSON, Clerk

DAWN LARRISON, Treasurer

DALE HENIG, Trustee

VIOLET KALBFELISH, Trustee

Loud Township

Montmorency County, Michigan

August 24, 2019

Connecting Michigan Communities Grant

The Loud Township Board fully supports Barger Creek Wireless efforts to supply broadband internet service to our very small (in population) and very rural township.

We have 293 residents (2010 census) and broadband internet service will benefit everyone. From children doing homework, home businesses, the township conducting business, connections to medical care and life alert systems and entertainment.

Today the internet is a necessity and it would be a tremendous advantage for our residents to be able to connect to broadband.

Sincerely,

Beau Williams, Supervisor

Robin Chinavare, Clerk

Mary Hubbard, Treasurer

Elva Duncan, Trustee

Robert Hosmer, Trustee

3882 M-33, Atlanta, MI 49709 • Ofice: 989-785-3263 • Fax: 989-785-3261 • www.loudtownship.org

VIENNA TOWNSHIP

Cheryl Klein, Supervisor
8556 Mathews Rd
Atlanta, MI 49709
(989) 786-5729

August 27, 2019

Governor Gretchen Whitmer
PO Box 30013
Lansing, MI 48909

Letter of Support for Barger Creek Grant for Connecting Michigan Communities

Dear Governor Whitmer,

We are a rural township in northern Michigan with very limited sources for high speed internet. There is limited fiber optic available, but only along the main highway that goes through the township, that leaves the majority of the residents to invest in satellite dishes or cell phone "hot spots", both are expensive and do not provide very reliable service, so many go without.

People living here deserve to have the opportunity to do homework, take online classes, shop online and stay connected to family and friends, the same as people living in more populated areas

We hear from people all the time who want to start up a home-based business, but cannot because they need dependable highspeed internet. Some have moved here and tried, but ended up going back downstate because it just didn't work out.

The few business's we have in our community need the internet to accept credit cards, sell lottery tickets and hunting/fishing licenses. Sometimes, like the day before deer hunting season, the internet will go down and people wanting a hunting license have to travel in bad weather conditions (which is probably why the internet went down), to another town to get what they need.

Because of these and many more reasons, we need reliable high speed internet available in our area.

On behalf of the Vienna Township Board, I ask that you help fund Barger Creek Wireless so they can provide high speed internet to Vienna Township.

Sincerely,

Cheryl Klein

Cheryl Klein, Supervisor

6751 Landfill Road
P.O. BOX 13
Atlanta, MI 49709
(989) 785-6500 Office
(989) 785-6529 Fax
Email: MOALandfill@Frontier.com
Website: MOALandfill.com

August 20, 2019

Governor Gretchen Whitmer
P.O. Box 30013
Lansing, Michigan 48909

Dear Governor Whitmer:

Re: Connecting Michigan Communities (CMIC)

Montmorency-Oscoda-Alpena Solid Waste Management Authority Board (MOA Landfill) is writing this letter in support of Barger Creek Wireless application for the Connecting Michigan Communities grant.

The MOA Landfill is located in Loud Township of Montmorency County where as high speed internet is limited. Not only are existing options expense, they are not dependable. Through dial-up, the current lines are old and will randomly cut out your connection. Satellite is only as good as its signal and in our area the speed is slow. Downloading and uploading updates for programs, QuickBooks for example, could take up most of the day. The staff of MOA Landfill is looking forward to having a more efficient working environment with this additional option for internet proposed by Barger Creek Wireless.

The lack of quality internet access puts the surrounding area at a disadvantage also. On-line classes for students and adults are a challenge, if not impossible. Many times employment is only obtained by on-line applications which can prevent those needing a job to miss out on greater opportunities. Banking and bill payment on-line has become very popular but without a quality internet product, a daunting task.

Our business is surrounded by health clinics, schools, community airports, small retail businesses and restaurants that are a great benefit to our rural area. Unfortunately, to be able draw in more Doctors, Teachers, Entrepreneurs, Businesses, and Jobs the area needs an efficient way to communicate with the outside world to make us competitive.

MOA Landfill is located at one of the highest points in Loud Township, Montmorency County. The Montmorency-Oscoda-Alpena Solid Waste Management Authority Board is looking forward to working with Barger Creek Wireless; by providing them an area on MOA Landfill property, to possibly place a small tower. This in conjunction with Barger Creek's successful CMIC grant, will greatly assist with expanding high speed internet to the surrounding areas.

Please highly consider Barger Creek Wireless this all important CMIC Grant for the improvement of our community.

Respectfully,

Connie Gerrie
Administrator
MOA SWMA

Cc: MOA Solid Waste Management Authority Board

Atlanta Community Schools

10500 County Road 489
Atlanta, Michigan 49709

Superintendent's Office
Telephone - 989.785.4877
Fax – 989.785.2611

K-12 Offices
Telephone - 989.785.4842 or 989.785.4785
Fax – 989.785.2588

RE: Support for the Barger Creek Wireless Project

State of Michigan,

Both Atlanta Community Schools and Hillman Community Schools are writing this letter of support for the Barger Creek Wireless application for the Connecting Michigan Communities grant.

Montmorency County, located in the very rural area of NE Lower Michigan, is extremely limited in the access to high speed internet.

From a school district's perspective, our students are put in an extremely difficult and unequal educational position when it comes to their education. In today's world of education, our student's ability to learn depends a great deal on access to the internet. While at school, the students are connected very well due to our technology infrastructure. The district buildings are supplying internet that is very capable of maintaining connectivity for the students. The difficulty is when students leave school for home. District teachers refrain from any homework assignments that require connectivity at home. Although some students are able to connect at home, many are not. These students are forced to stay after school if assignments require access to the internet. The districts utilize multiple curriculums, such as Math and English Language Arts, that are heavily loaded with online components. Teachers are forced to modify assignments due to so many students without access to high speed internet at home. For the last two years, the districts have opened our computer labs until 5:00p.m. each day to allow for these students to stay and complete assignments.

In much of this rural area, our families rely solely on cell phones as their only means of access. Cell phones are not conducive to completing any advanced assignments. With cell service also being unreliable, even this means of access is hit or miss.

With a successful CMIC grant, my school districts of Atlanta and Hillman Community Schools will be able to greatly improve student learning. All students deserve an equal opportunity for a complete, 21st Century learning experience.

Respectfully,

Carl Seiter, Superintendent
Atlanta Community Schools
Hillman Community Schools

ALPENA
COMMUNITY COLLEGE

Office of the President
665 Johnson Street
Alpena, MI 49707-1495
(989) 358-7246
FAX (989) 358-7553
Website: www.alpenacc.edu

August 26, 2019

Governor Gretchen Whitmer
P.O. Box 30013
Lansing, MI 48909

Dear Governor Whitmer,

This letter is written in support of Barger Creek Wireless' application for the Connecting Michigan Communities grant.

Alpena Community College provides dual enrollment to the K-12s in Montmorency County, plus post-secondary education and training to Montmorency County citizens at ACC's main campus in Alpena. The Barger Creek Wireless proposal will bring much-needed high-speed bandwidth to NE Michigan, offering rural students access to learning opportunities that will make the region more competitive. We support Barger Creek Wireless and the efforts of Carl Cadwallader, the leader behind the scenes working to extend this benefit to his community.

Connecting Michigan Communities grant funding will enhance the lives of NE Michigan students and help ACC bring 21st century learning opportunities to all our students. Please consider Barger Creek Wireless for Connecting Michigan Communities grant funding. Please feel free to reach out at macmastd@alpenacc.edu if you have questions or would like additional information.

Regards,

Don MacMaster

Dr. Don MacMaster
President
Alpena Community College
(989) 358-7246
(989) 464-5396

August 26, 2019

Governor Gretchen Whitmer

P.O. Box 30013

Lansing, Michigan 48909

RE: Connecting Michigan Communities (CMIC)

Dear Governor, Whitmer

I am writing to you today to let you know how Broadband Wireless Service coming to Atlanta Michigan has changed our lives. Our dream since purchasing 5 acres there in 2000 was to build a small home and hopefully one day be able to live and work from there.

I work from home providing live tech support for the Automatic Door Industry. We currently live in White Lake Michigan. The company I work for provides me with a VOIP phone system that requires a cable internet connection so the VOIP phone works clearly. It is the upload speed that is critical, so the caller hears clear instructions and not choppy every other word from slow upload speeds.

In 2014 we tried a satellite service provider that was confident their system would work, it didn't!

Barger Creek Wireless came to town in late 2017, we tried their system in February 2018 and the results were staggering. I took calls all day and the calls were clear and many folks that I speak to regularly said it sounded better than the cable connection.

This was great news, we applied for a construction loan and we are close to the final inspection and looking forward to moving to Atlanta within the next month.

Please help Barger Creek Wireless provide a better solution for this underserved part of North East Michigan.

Thank You,

Stan and Theresa Hubbell

July 21, 2019

To whom it may concern,

I would like to take a moment to comment on Barger Creek Wireless internet service.

We are located in Atlanta, which is a rural area in Montmorency County, Michigan. Internet services here, and in many of the surrounding counties are very few and far between, and for many people who live outside the areas that DSL or cable or do not reach, their only option for years has been satellite internet, which is slow and very costly, so most can not afford it. For those who need fast, reliable, internet, with no data limit, the choices were almost non-existent, until Barger Creek Wireless became available.

We own the Montmorency County Tribune, which is a county newspaper and full-service print shop. In our business, it is vital to us to have the ability to upload and download large files between ourselves and our customers. We also rely heavily on email to stay in contact with our customers, sending job proofs, etc., so it is important for us to have good, stable, fast, reliable internet with no data caps, and is affordable. Barger Creek Wireless has provided us with this service. We are able to conduct the internet-use portion of our business without encountering issues due to the size of the files, etc.

Schools in this area are smaller with limited resources, so they offer a variety of classes that can only be taken online. Also, many college students here take all or some of their classes online instead of commuting an hour or more one-way. Households in these situations need to have internet service available to them in order to do their classes.

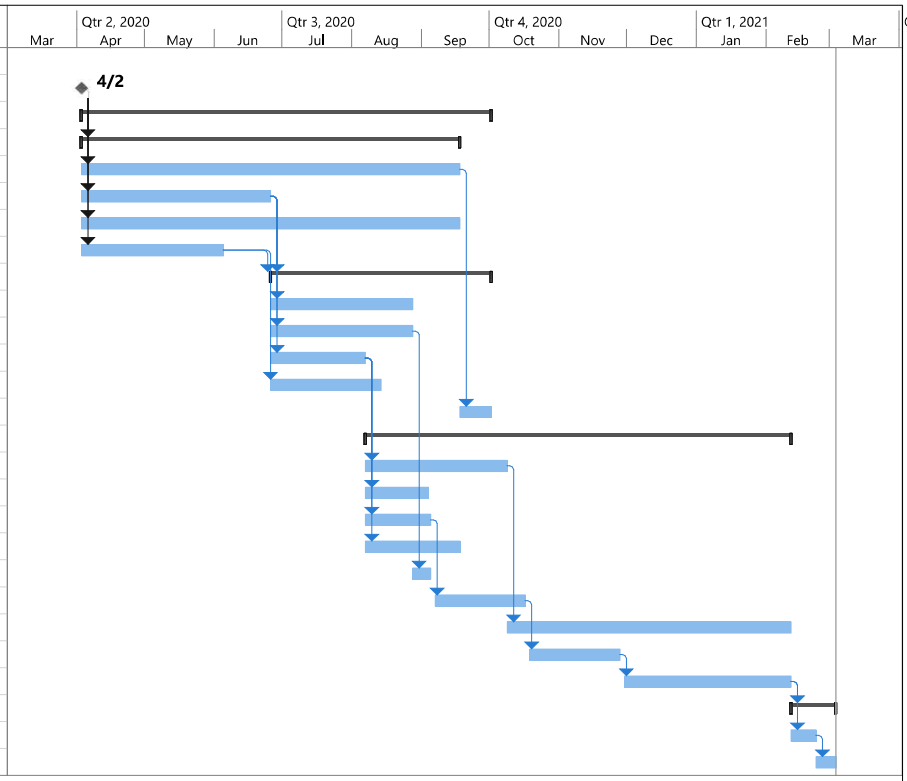
Being the local newspaper, residents of our area contact our office frequently, looking for information on internet services that are available to them. Prior to Barger Creek Wireless providing a much-needed service to our area, many could not get internet at their homes because of location issues. If they could get it, it was very slow speeds. Most people looking for internet service want the ability to use services like Netflix, VOIP, and others, or need faster service because they work online from home. People who contact us looking for information on internet services are very happy to hear that the service Barger Creek Wireless provides is an option.

In our opinion, it is vital for this company to have the financial resources that this grant would provide, to continue to grow their technology, enabling them to reach further into the outlying areas of our county, where currently many people have poor internet service, or no internet service at all.

Sincerely,

Bill and Michelle Pinson
Montmorency County Tribune

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		RFP Response Due	1 day	Fri 8/30/19	Fri 8/30/19	
2		Project Award	1 day	Thu 4/2/20	Thu 4/2/20	
3		**Project Planning & Engineering**	**130 days**	**Fri 4/3/20**	**Thu 10/1/20**	
4		**Site Seleccion**	**120 days**	**Fri 4/3/20**	**Thu 9/17/20**	**2**
5		FAA Filing	120 days	Fri 4/3/20	Thu 9/17/20	2
6		Soils boring and reports	60 days	Fri 4/3/20	Thu 6/25/20	2
7		Fiber Engineering and Eastmans	120 days	Fri 4/3/20	Thu 9/17/20	2
8		FCC Microwave Radio Licensing	45 days	Fri 4/3/20	Thu 6/4/20	2
9		**Material Ordering**	**70 days**	**Fri 6/26/20**	**Thu 10/1/20**	**6,8**
10		Tower Steel Ordering	45 days	Fri 6/26/20	Thu 8/27/20	6
11		Civil Engineering work orders	45 days	Fri 6/26/20	Thu 8/27/20	6
12		Tower footing designs	30 days	Fri 6/26/20	Thu 8/6/20	6
14		Radio and Network materials ordering	35 days	Fri 6/26/20	Thu 8/13/20	8
13		Tower lighting requirements	10 days	Fri 9/18/20	Thu 10/1/20	5
15		**Site Construction - All Sites**	**135 days**	**Fri 8/7/20**	**Thu 2/11/21**	
17		Footing and guy anchor construction	45 days	Fri 8/7/20	Thu 10/8/20	12
18		Tower site grounding	20 days	Fri 8/7/20	Thu 9/3/20	12
19		Concrete curing	21 days	Fri 8/7/20	Fri 9/4/20	12
21		Electrical service construction	30 days	Fri 8/7/20	Thu 9/17/20	12
16		Civil engineering site preparation	6 days	Fri 8/28/20	Fri 9/4/20	11
22		Tower steel erection	30 days	Mon 9/7/20	Fri 10/16/20	19
20		Fiber construction	90 days	Fri 10/9/20	Thu 2/11/21	17
23		Tower radio installation	30 days	Mon 10/19/20	Fri 11/27/20	22
24		Network installation	54 days	Mon 11/30/20	Thu 2/11/21	23
25		**Network Turn-Up and Handover**	**14 days**	**Fri 2/12/21**	**Wed 3/3/21**	**24**
26		Acceptance Test	7 days	Fri 2/12/21	Mon 2/22/21	24
27		Documentation deliverables	7 days	Tue 2/23/21	Wed 3/3/21	26



Project: Michigan Grant Project
Date: Mon 8/26/19

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress