

Fiber would focus on schools in Luxemburg, Casco, Algoma and Kewaunee, to leverage eRate funding. If we created a not for profit, the fiber could be leased back to business such as Prevea in Luxemburg. We could also go all the way to providing WiFi Mesh Internet service.

WiFi Mesh Details: The max range of a MERAKI MR84 is about 7 miles. This would be silo to silo or tower to tower, then distributing to MR70s from there. The MR84s are approx \$1800 each including high gain antenna. Limiting support only to 5ghz to avoid 2.4 interference on the long runs. If we provided higher density at fairgrounds or other high density locations (ie shoreline) a stadium antenna is \$1499. Max of 2.5gbps repeated so about 100 households per 10gb.

The "local" AP would MERAKI MR70 at about \$700 each. And would support 5ghz for backhaul and 2.4/5ghz for local traffic (into the home) supporting max of 1.3gbps up/down and repeated. Each \$1600/link would service about 100 homes at 100/100 full (peak to 1.2gbps) – ie QOS lower limit 100/100 and no upper threshold (that way everyone keeps 100mbps).

Possible Kewaunee Fiber and WiFi mesh investments

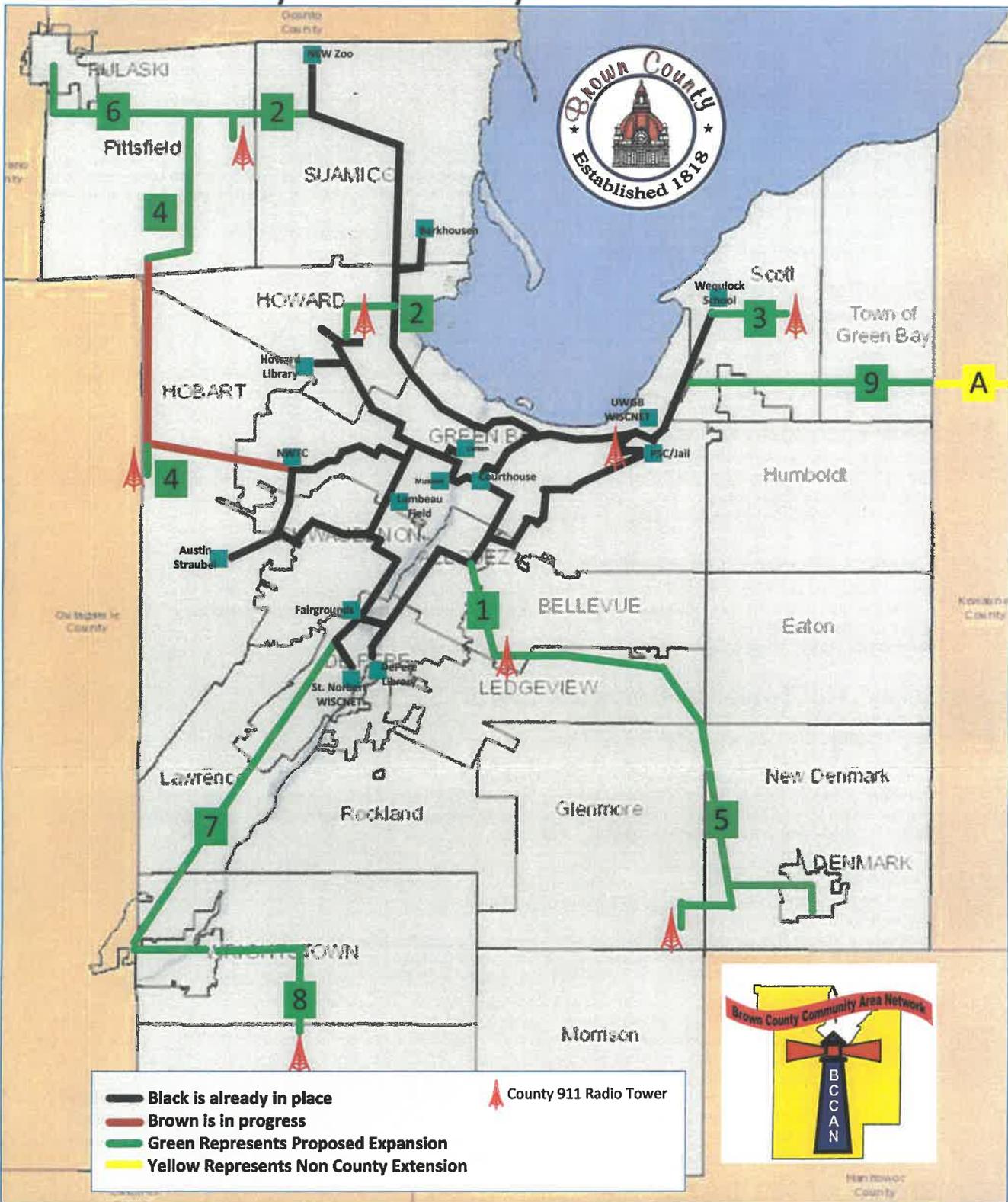
- 1 **UWGB to Luxemburg HS** \$1.4mil (432 strand) allows up to 216 - 10gb fiber connections into Luxemburg. First customers would be Lux school using erate, Prevea lease.
- 2 **Casco** \$900k (432 strand). 6miles From high school to old middle school. First customers would be old middle school using erate.
- 3 **Dyckesville** \$1.875mil (432 strand). 12.5miles From Middle school up C down Lincoln. First customers would likely be CAFOs
- 4 **Kewaunee** \$1.5mil (432 strand). 10miles From Middle school to Kewaunee. First customers would likely be Kewaunee County and City of Kewaunee and likely CAFOs
- 5 **Algoma** \$1.65mil (432 strand). 11miles From Middle school to Algoma. First customers would likely be Algoma School District
- 6 **North Rural** \$ MESH?
- 7 **Algoma-Kewaunee 42.** \$1.936mil (432 strand). 12.1miles From Algoma to Kewaunee Schools. First customers would likely be houses and businesses along 42
- 8 **South Lakeshore 42.** \$1.936mil (432 strand). 12.1miles From Algoma to Kewaunee Schools. First customers would likely be houses and businesses along 42
- 9 **South Rural.** \$
- 10 **St. Norberts.** \$6.15mil 41 miles 432 strand from Kewaunee Schools to St. Norbert's College POP
- 11 **Lux to 29** \$6.15mil 41 miles Loop



1 Luxemburg to UWGB \$1.4mil (432 strand) allows up to 216 - \$ 10gb fiber connections into Luxemburg (Lux schools erate, Prevea lease, fairgrounds high speed internet)

Business Corridors – zone business development areas and along fiber development

BROWN COUNTY COMMUNITY AREA NETWORK



BCCAN Partnerships

Educational Institutions:

Green Bay Area Public School District
 Ashwaubenon School District
 Howard-Suamico School District
 UW Green Bay
 St. Norbert College
 NWTC
 MERIT (Michigan shared cost only)
 Denmark School District

Healthcare Institutions:

St. Vincent Hospital
 Prevea Health

Economic Development:

T2 Accelerator
 Airport Development Zone
 Papermaking Corridor

BCCAN Connected County Locations:

Airport, Museum, Courthouse Complex,
 Northern Building, Sophie Beaumont, CTC,
 Zoo, Jail, Sheriff, Ashwaubenon Library,
 Southwest Library, De Pere Library, Central
 Library, and Howard Library.

Telecoms:

Nsight

Organizations and Agencies:

Wisconsin Department of Transportation
 fiber sharing

Municipalities:

City of Green Bay
 City of De Pere
 Village of Allouez
 Village of Ashwaubenon
 Village of Howard
 Village of Bellevue
 Village of Suamico

Brown County Community Area Network (BCCAN) Expansion Proposals

1

Scrays Hill: \$1,403,600

Route: Beginning at Libal Street and Hoffman Road to Scrays Hill PSC 911 Radio Tower.

Brown County: This expansion will resolve performance and reliability (weather related) issues at this tower site. It will also eliminate some future microwave upgrades and pending removal of Mount Mary Water Tower which is a repeater station in PSC Radio Network.

Community Value: Could have revenue generating opportunities along the way including medical clinics in the area. This expansion could also support a rural broadband initiative.

2

Flintville: \$768,200

Route: Beginning at Public Works Building in Howard to Flintville PSC 911 Radio Tower.

Brown County: This expansion will enhance performance and reliability at this tower site. It will also eliminate some future microwave upgrades.

Community Value: Could have revenue generating opportunities along the way including medical clinics, business incubators, etc. in the area. This expansion could also support a rural broadband initiative.

3

New Franken (Wequiock): \$274,560

Route: Beginning at Bay Settlement Drive and Champion Road to New Franken PSC 911 Radio Tower.

Brown County: This expansion will enhance performance and reliability at this tower site. It will also eliminate some future microwave upgrades.

Community Value: This expansion could also support a rural broadband initiative.

4

Oneida tower to Flintville tower: \$862,500

Route: Beginning at PSC 911 Radio Tower in Flintville to Oneida PSC 911 Radio Tower.

Brown County: This expansion will enhance performance and reliability at this tower site. It will also eliminate some future microwave upgrades.

Community Value: This expansion could also support a rural broadband initiative.

5

Scrays Hill Tower to Denmark tower: \$1,701,600

Route: Beginning at Scrays Hill PSC Radio Tower to Denmark PSC Radio Tower.

Brown County: This expansion will enhance performance and reliability at this tower site. It will also eliminate some future microwave upgrades. Brown County's Highway shop at Langes Corner, Brown County Sheriff in Denmark and Denmark Library would all receive service from this expansion.

Community Value: We will have revenue generating opportunities along the way including: various medical clinics, Denmark High School, Denmark municipal government, potential business incubators in the Denmark area, etc. This expansion could also support a rural broadband initiative.

6

Pulaski: \$619,500

Route: Beginning at the intersection of CTH B and CTH C to Pulaski.

Brown County: Link to Pulaski Library

Community Value: This expansion will have revenue generating opportunities along the way including Pulaski School District internet and WAN connection opportunities, medical clinics, potential business incubators in the Pulaski area, Pulaski municipal offices, Pulaski law enforcement, etc. This expansion could also support a rural broadband initiative.

7

Wrightstown: \$1,566,400

Route: Beginning at I-41 and Glory Road to Wrightstown.

Brown County: Link to Wrightstown Library and gets us closer to the Greenleaf Tower see #8

Community Value: This expansion will have revenue generating opportunities along the way including Wrightstown School District internet connection opportunities, medical clinics, potential business incubators in the Wrightstown area, Wrightstown municipal offices, Wrightstown law enforcement, etc. This expansion could also support a rural broadband initiative.

8

Greenleaf 911 Tower: \$684,200

Route: Beginning at Wrightstown to Greenleaf PSC 911 Radio Tower.

Brown County: This expansion will enhance performance and reliability at this 911 tower site. It will also eliminate some future microwave upgrades. This would also provide connection to the Public Works Greenleaf Shop.

Community Value: This expansion could also support a rural broadband initiative.

9

Kewaunee Extension: \$979,800

Route: Beginning at UWGB Northeast Entrance (Scottwood Drive) to Kewaunee County Line (State Highway 54).

Brown County: Public Works New Franken Shop.

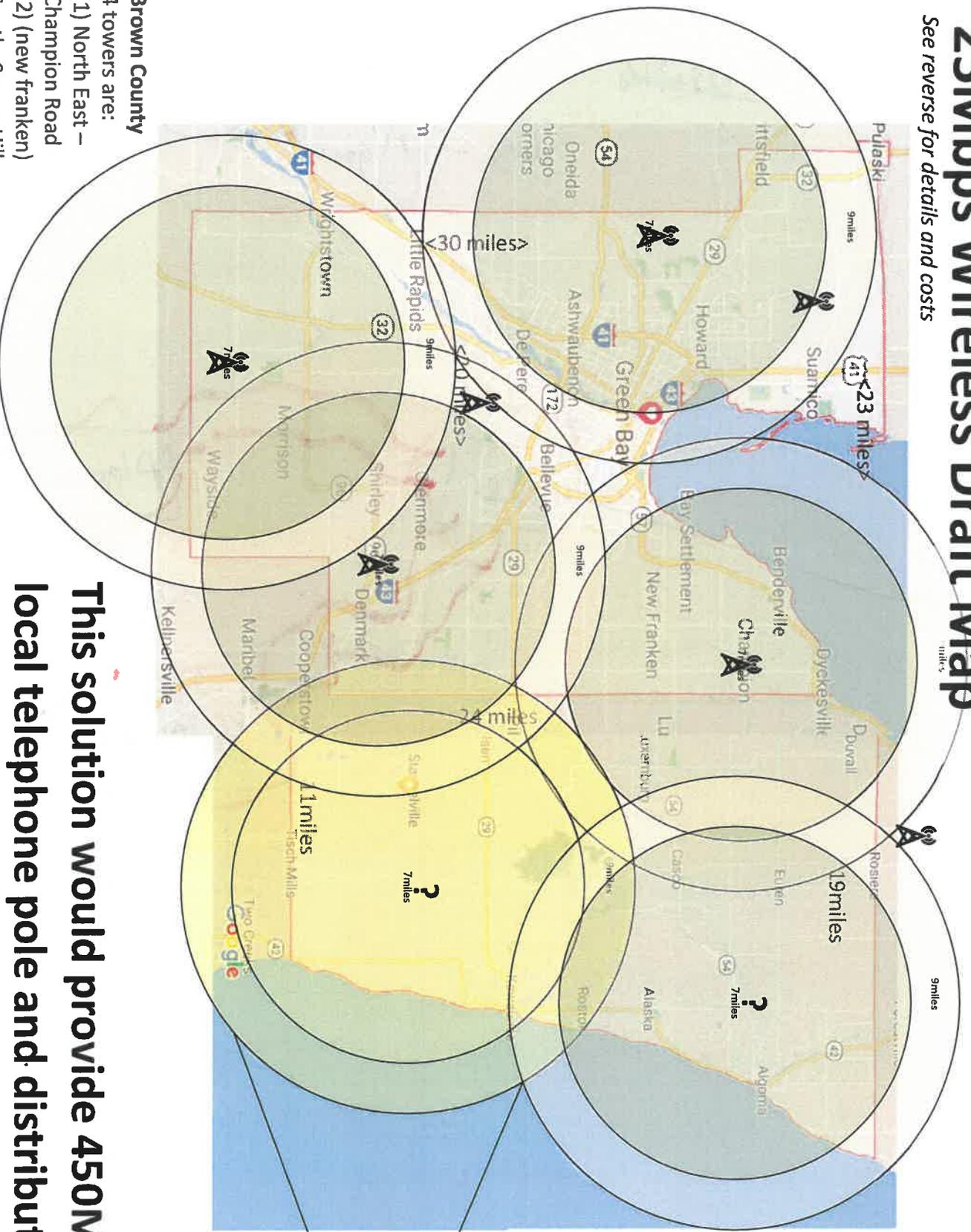
Community: This route will allow a future connection with Kewaunee County for Public Safety initiatives and economic development opportunities. It will have revenue generating opportunities along the way including Highway 54/57 Business Development Area, medical clinics, etc. This expansion could also support a rural broadband initiative.

A

Kewaunee County Extension to Luxemburg. Cost estimate of \$525,760.

25Mbps Wireless Draft Map

See reverse for details and costs



Kewaunee County

Tower locations are unknown, but working with Broadband Committee to clarify.

See reverse for Detailed Enlargement

Brown County

- 4 towers are:
- (1) North East – Champion Road
 - (2) (new franken) South -Scrays Hill
 - (3) Oneida tower
 - (4) Wrightstown

This solution would provide 450Mbps to local telephone pole and distribute from there at 25Mbps, 1-2mile radius per silo or 40ft telephone pole

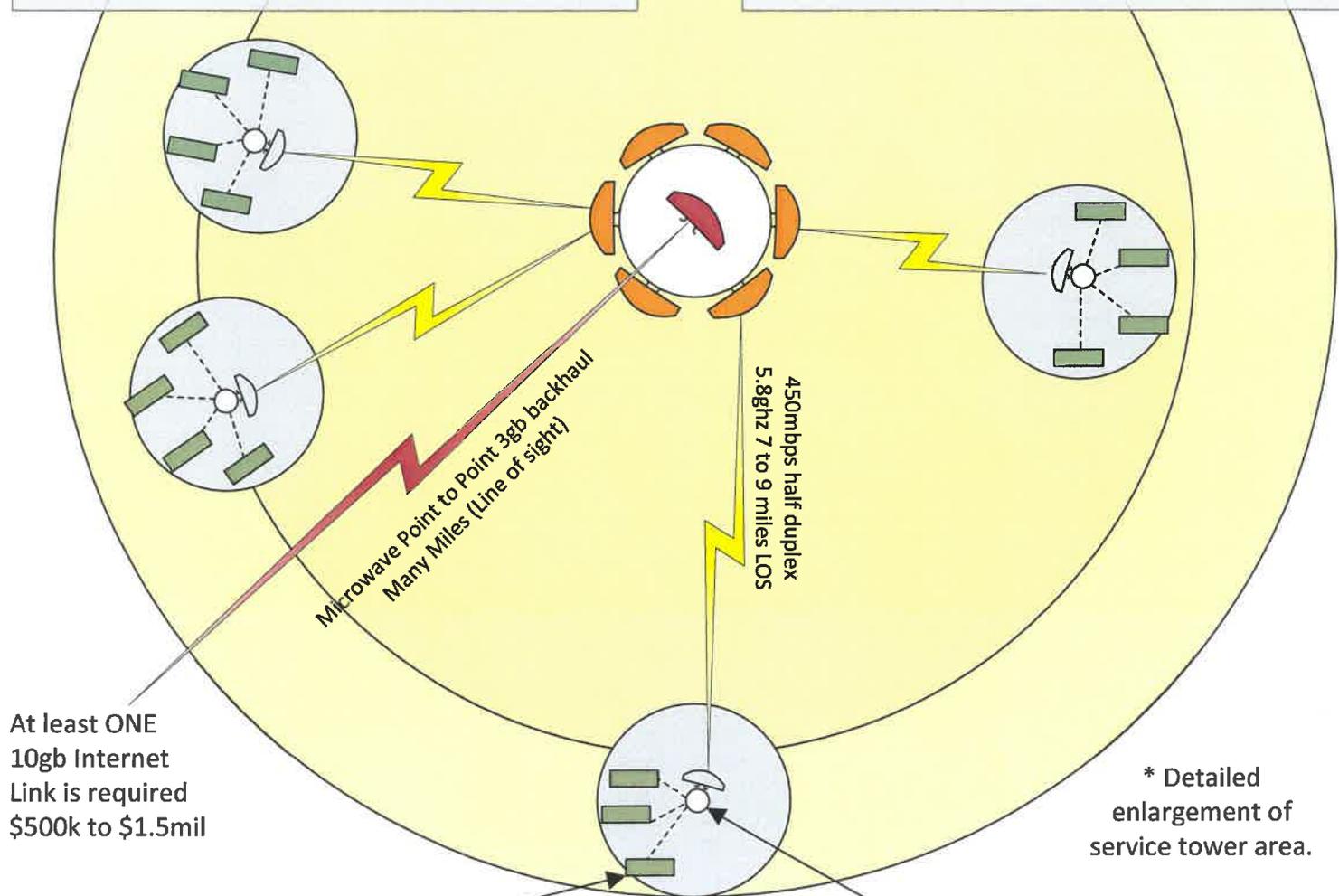
25mbps Wireless Draft Design*

Each service tower has a range of 7 to 9 miles (line of sight). Each service tower connects back through fiber or line of sight to another tower with a microwave link. The service tower connects to "telephone poles" with line of sight 450mbps radios. The telephone pole connects locally at 25mbps within a 1 to 2 mile radius.

Total service tower cost estimate is \$100k to \$250k including installation, power and leasing.

Each service tower has 6 separate 450mbps radios and a microwave link. Each of the six radios is \$8k each. The backhaul microwave is approximately \$10k for each end. This provides a total of 2700mbps so backhaul needs to be 2000 to 3000mbps (3gbps)

- \$48k in radios
- \$20k in backhaul (both ends)
- \$?? Installation, mounting electrical and cabinet
- Lease of tower



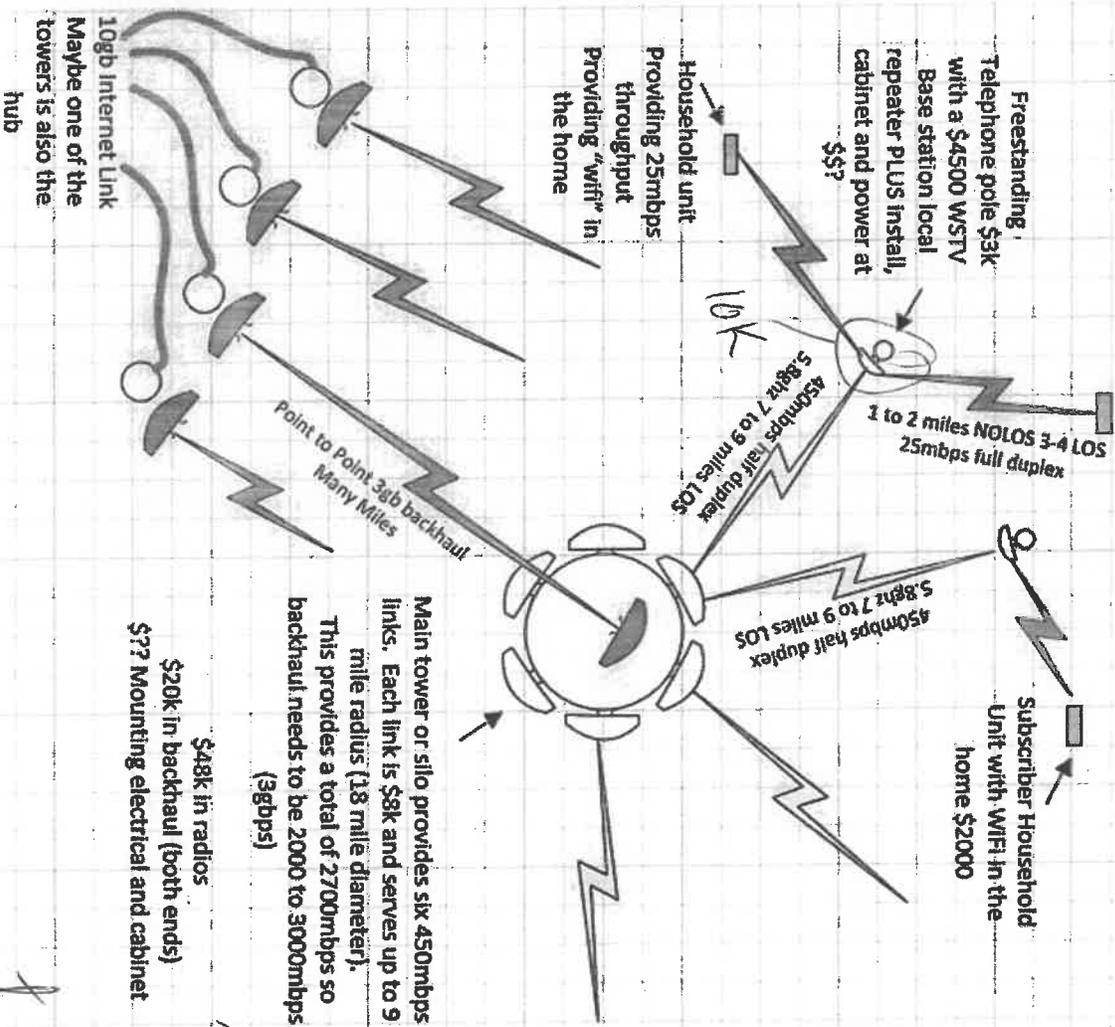
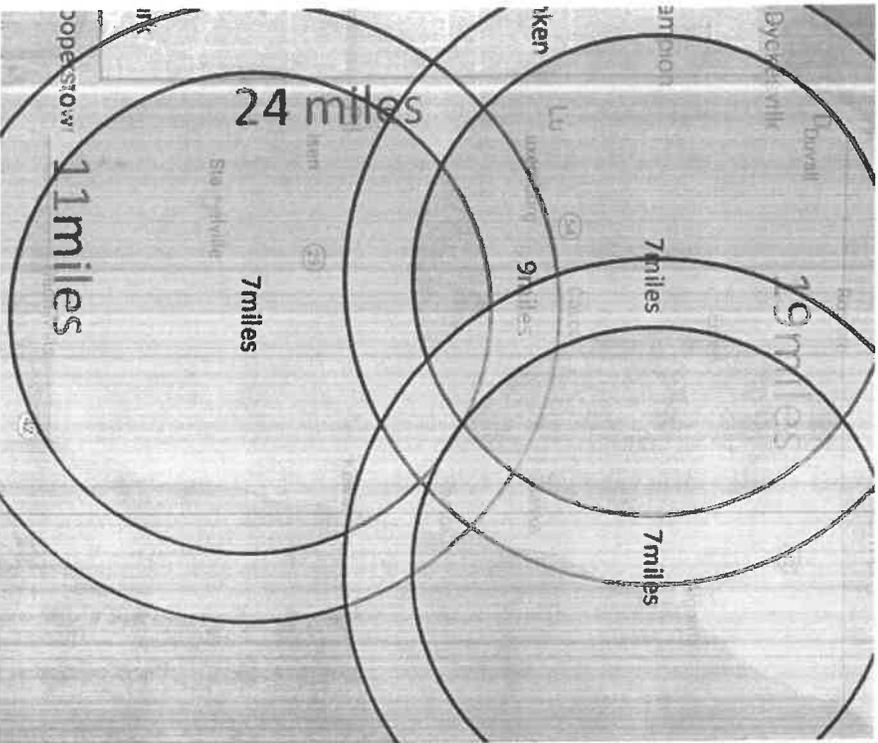
* Detailed enlargement of service tower area.

\$2000 Local receiver in each home or business. Provides 25mbps "wifi" internet locally. The range of the local repeater is 2 miles with line of sight or 1 mile without line of sight and minimal barriers. Link from radio to pole is 25mbps full duplex \$20k est.

Freestanding Telephone 40ft (60ft) pole \$1300 with a \$4500 WSTV Base station local repeater PLUS install, cabinet and power at \$\$?. Links back to main tower (orange) at 450mbps half duplex at 5.8ghz 7 to 9 miles line of sight.

The exact cost is unknown at this point but we can estimate each service tower at \$200k. Plus tower or lease, plus electrical and installation. Telephone pole substations are approximately \$20k each plus lease/power/install. Each home or business costs about \$2000 + install. There are no estimates for ongoing expense. Further clarification will require engineering investment.

Possible Solution



*Do you want
more than one
backhaul*



CountyWide 5-25 mbps Internet Cost Estimate

10gb Backhaul to one tower would be \$3mil to \$5mil from UWGB to Lux area for 1st tower then relay to all others, with eventual fiber to each primary.

PRIMARY TOWERS: Likely 3 to 4 towers covering 4 to 7 miles each. Each tower approx \$150k (est). We might be able to get Packerland, Bertam, Door County Broadband, nSight or other to administer system.

DISTRIBUTION POLES: The tower would talk to a 60FT telephone pole. The pole would be about \$3k to \$4k for 60ft telephone pole installed plus ~\$6k for radios plus electrical.

RESIDENCE/BUSINESS: The receiver costs about \$2000 each.

SUPPORT: The main challenge is ongoing expenses. 2 FTEs would be \$200k/yr + system maint another \$200k+ per year in operations expenses.

ADOPTION: There are about 8239 total residences in Kewaunee. A bulk are covered by good internet in Algoma, Kewaunee and Luxemburg. So assuming about 10% which is 823 households of those I would expect less than 1/2 would sign up. So about 410 homes at \$100/mo makes about \$500k annually. At \$500k we would be about break even (assuming no surprises). So it is POSSIBLE but still very expensive.

Overall Cost Estimate \$6Mil and \$500k annually. **This estimate is not confirmed by engineering. It is a pre-quote estimate It is for discussion purposes only.**