



Rural Project #3
Holland Marsh
Project Overview

June 23, 2021

CENGN Overview

CENGN Vision and Mission



Advancing global technology innovation for the prosperity of all Canadians



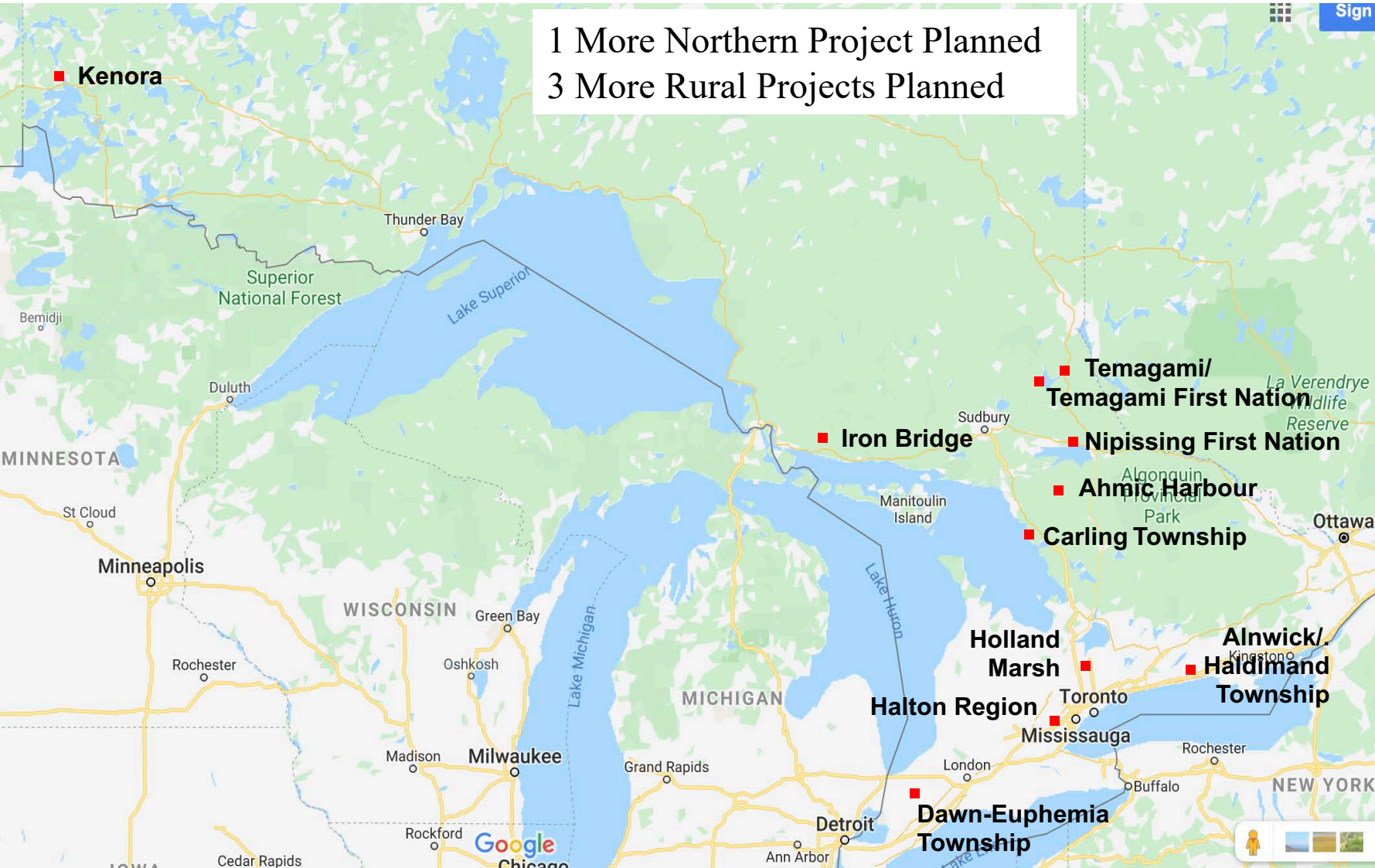
CENGN drives technology innovation and industry growth through our test bed, technical expertise, talent development, and partner ecosystem

Solidifying Canada's Leadership in Networking



CENGN enables innovative tech solutions through its **Rural & Northern Ontario Residential Broadband Program**

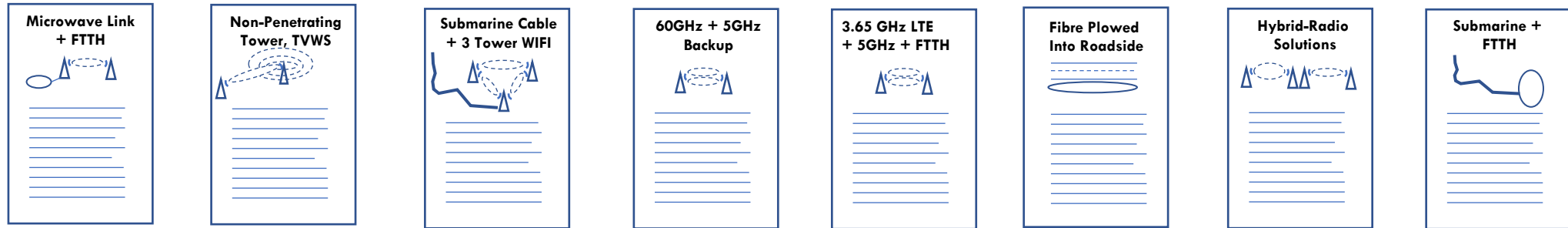
CENGN Residential Broadband Projects Underway



1 More Northern Project Planned
3 More Rural Projects Planned

- **Carling Township (near Parry Sound)**
 - Microwave middle km; FTTH
 - Network Operational – FTTH Installs Ongoing
- **Iron Bridge (near Sault Ste Marie)**
 - Hybrid FWA incl. TVWS
 - Network Operational – FWA Installs Ongoing
- **Dawn Euphemia Township (near Chatham-Kent)**
 - Multiple FWA: 5GHz WIFI, 24GHz MW, 3.65GHz LTE, 60GHz; FTTH in one village
 - 5GHz & LTE Service Operational, FWA installs ongoing. FTTH installs ongoing
- **Halton Region (Rural Milton Area)**
 - Hybrid FWA: 60 GHz, 5 GHz WIFI heavily meshed, distributed pole-based architecture
 - Installations starting July 2021
- **Ahmic Harbour and Ahmic Lake**
 - Hybrid FWA: 5.0 GHz WIFI, 3.65 GHz LTE
 - Installation of Towers – July 2021
- **Alnwick/Haldimand Township**
 - Micro-duct FTTH 20 km of Fibre
 - Installation Underway
- **Holland Marsh**
 - 5G Distribution with 60GHz Wireless Backhaul
 - Planning Underway
 - Installation Starting Sept.2021
- **Temagami/Temagami First Nation**
 - 5GHz and TVWS Radio Distribution Across Large Lake
 - Installation Underway – July 2021
- **Nipissing First Nation**
 - Non-ground Penetrating Tower with TVWS/5GHz
 - Installation Starting – July 2021
- **City of Kenora (Northern Lake region)**
 - Use of Tree Points of Presence for Distribution + FTTH
 - Installation Starting – July 2021

Compile Collection of Blueprints for Broadband Innovation



**Collection of Blueprints
for
Broadband Solutions
For Small Northern
and Rural
Communities**



High on Innovation

Low on Cost

Focusing on Micro-Projects

- Many small northern & rural communities only have 100-500 permanent or year-round homes within a 3-5 km radius of the centre of the hamlet or village
- Some communities double the number of users in the summer months

Key Properties of Micro-Projects

- These communities are too small to justify more than \$150,000 - \$500,000 Investment by WISPs
- \$150,000 to \$500,000 contribution by government funding can launch the project
- ROI typically can be within 2-4 years with 50% government funding
- Excellent service result for community with on-going investment by ISP
- Single committed technology company or WISP makes sense for very small communities

Project Overview

Holland Marsh Area

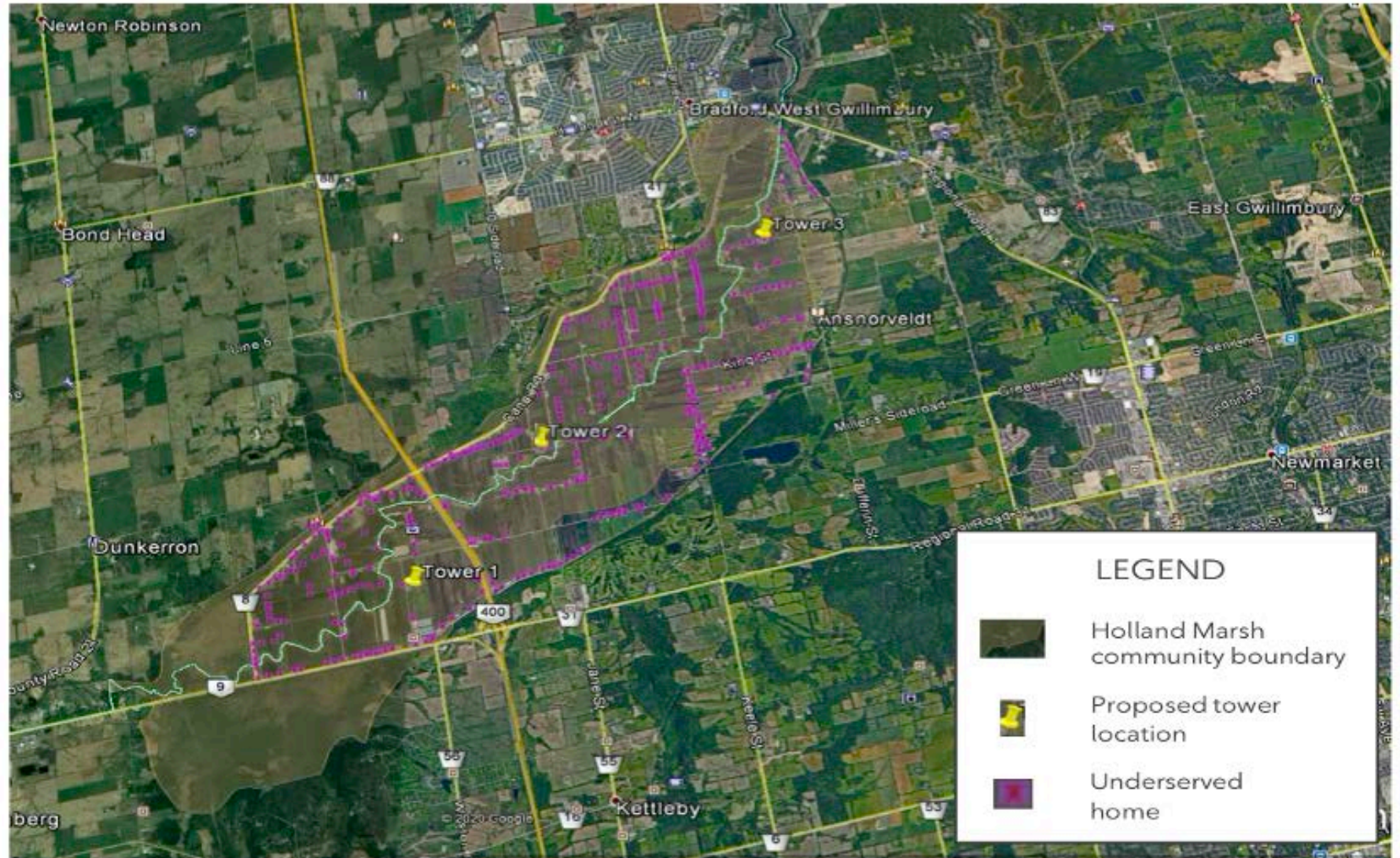


- ✓ Long wide valley
- ✓ Huge drop in elevation from the highway
- ✓ Demographics – farmers, businesses, migrant workers
- ✓ Sparse tree cover – wide open space
- ✓ Properties located on the edge
- ✓ Environmentally-sensitive area - floodplain, soft soils
- ✓ Widely underserved

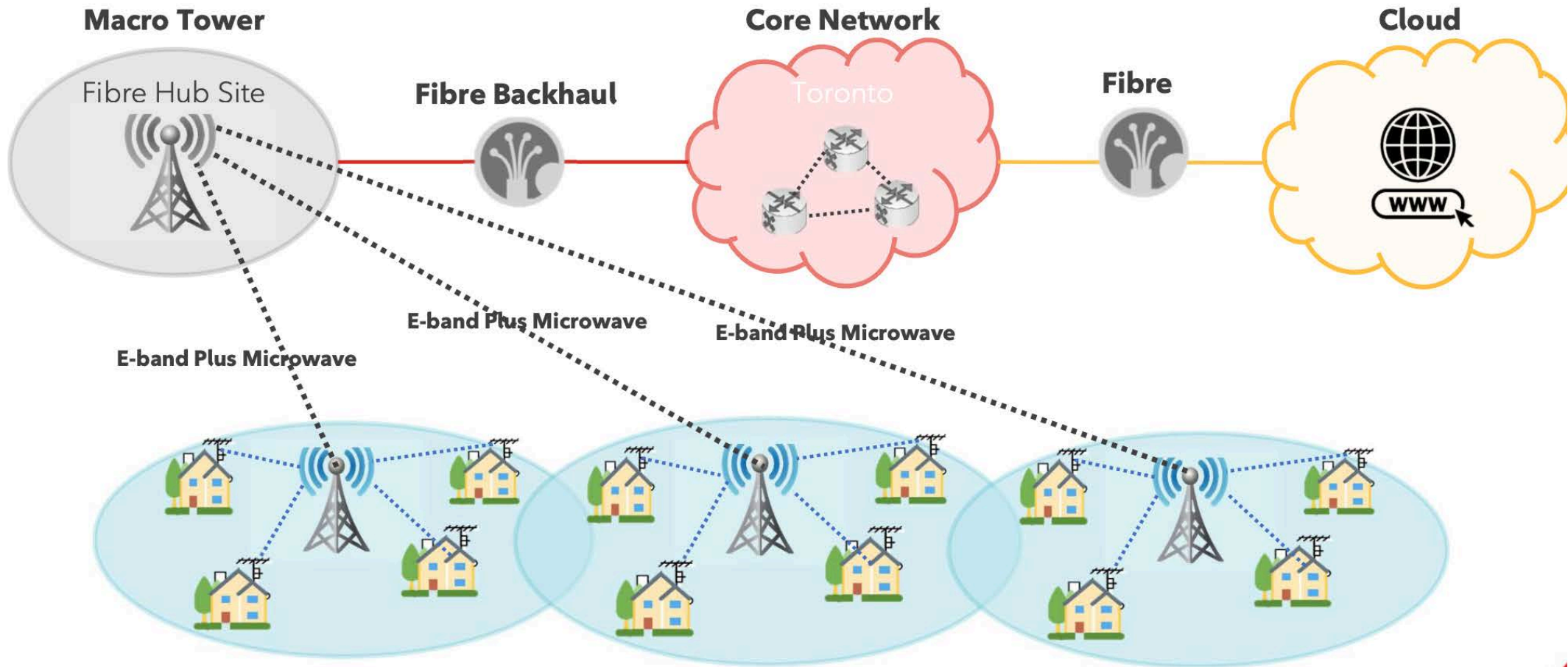
Technology Overview

Proposed High Level Network Design

- Three low-profile, monopole towers distributed along the length of the valley
- Tower placement optimized for best customer service support
- Tower size and placement optimized to minimize visual impact
- Design optimized to get services installed and implemented quickly
- Network design will support key deliverables of:
 - Significantly improved high-speed internet access
 - Significantly improved cellular services
 - New precision agriculture wireless service access



Extending broadband to Holland Marsh



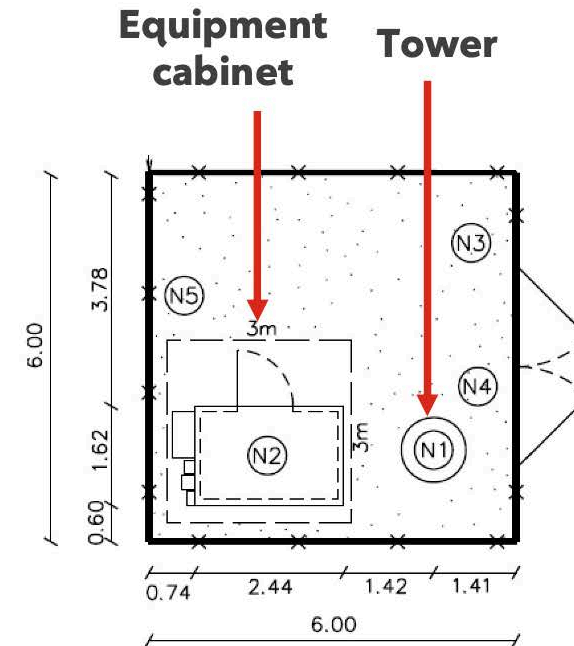
Holland Marsh Area: Three new towers to address ~480 households that will be outfitted with external antennas

Low Profile Monopole Tower Selected



Typical Compound Size

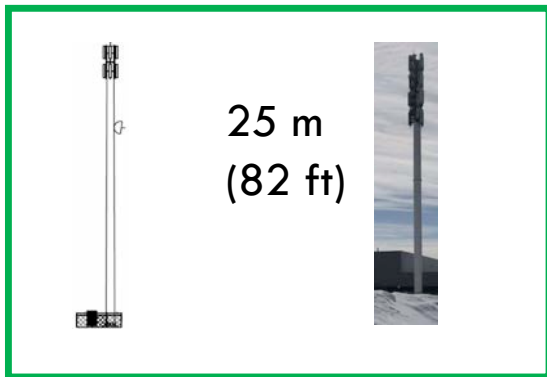
Range 6 meters x 6 meters
to 10 meters x 10 meters



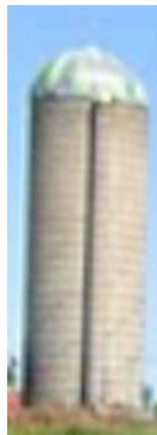
Comparing Visual Impacts of Rural Tower Solutions



Monopole Tower



36.5 m
(120 ft)



Typical Silo

36.5 m
(120 ft)



Typical Grain Elevator

350 ' Radio Tower



View of Monopole Tower VS Conventional Telecom Tower from Distance of 150m

Monopole Tower (3 Towers Required)

- ✓ Much Lower Visual Impact
- ✓ Very small footprint (no farmland loss)
- ✓ No Flashing Lights Required
- ✓ No guy wires

25 m
(82 ft)



Conventional Telecom Tower (Single Tower Required)

107m
(350 ft)
Radio
Tower

- ✗ Much Higher Visual Impact
- ✗ Much Larger Footprint
(would require expansion onto farmland to secure guy wires)
- ✗ Flashing Lights Required
- ✗ Guy wires Required
(difficult to work around for farming)



Tower and Network Design Considerations

- ✔ Minimize Visual Impact of Towers
- ✔ Maximize Service Delivery to Holland Marsh Residents
- ✔ Minimize or eliminate impact on working farmland
- ✔ Minimize Impact to Private Landowners by Selecting Municipal Owned Property
- ✔ Improve internet services, cellular services, and support precision agriculture through wireless support for farmers.

Customer Premise Equipment



| | |
|-------------------|---------------------------|
| Ethernet | 2.5G |
| Wi-Fi | 802.11n |
| Antenna | Outdoor high gain antenna |
| IPx rating | IP67 |
| USIM | 2FF |

*Typical installation and equipment shown. Actual install may vary.

Technology Innovation

- ✔ E Band Plus combines E Band (multi-Gbps) Microwave with high availability traditional lower band Microwave for backhaul solution (up to 10Gbps backhaul)
- ✔ 5G Fixed Wireless Access proposed for last km solution to rural residents
- ✔ Massive MIMO antennae enable higher spectral efficiency and more capacity
- ✔ Improved 4G cellular services to improve cellular coverage in the Holland Marsh
- ✔ High-Speed Internet support for wireless precision agriculture for field-based IoT sensors and autonomous farming equipment

New Service Connections

Your Community Service Provider - Rogers



Largest Wireless Provider in Canada

By The Numbers

| | |
|---------|----------------------|
| 1960 | Founded |
| ~25,300 | Employees |
| \$15.1B | Total Revenue |
| \$39.0B | Total Assets |
| 10.9M | Wireless subscribers |
| 2.6M | Internet subscribers |

History of Innovation

- Launch of Rogers Cable TV in 1967
- Introduction of wireless network in 1985
- First to offer Broadband Internet services in Canada in 1995
- Canada's first and only wireless GSM network since 2001
- North America's first HSPA+ Network in 2009
- First LTE wireless network in Canada in 2011
- Launched Gigabit Internet from 2014-15
- We rolled out LTE-M in 2018
- First 5G Network in Canada in 2020

New Service Details for Holland Marsh Residents

New Internet Services for the Community

Residential Broadband Service Offerings

- 25 Mbps Download / 5 Mbps Upload (250GB Cap) \$ **74.99 per Month**
- 25 Mbps Download / 5 Mbps Upload (500GB Cap) \$ **84.99 per Month**
- 50 Mbps Download /10 Mbps Upload (350GB Cap) \$ **149.50 per Month**

Schedule Overview

Deployment Schedule Overview

| Project Milestones | Start Date | End Date |
|-------------------------------|-----------------------|----------------------|
| Municipal Coordination | March 2021 | June 2021 |
| Public Consultation | July 2021 | August 2021 |
| Permits | June 2021 | July 2021 |
| Construction | September 2021 | November 2021 |
| Network In-Service | December 2021 | January 2022 |

Testing and Monitoring Performance

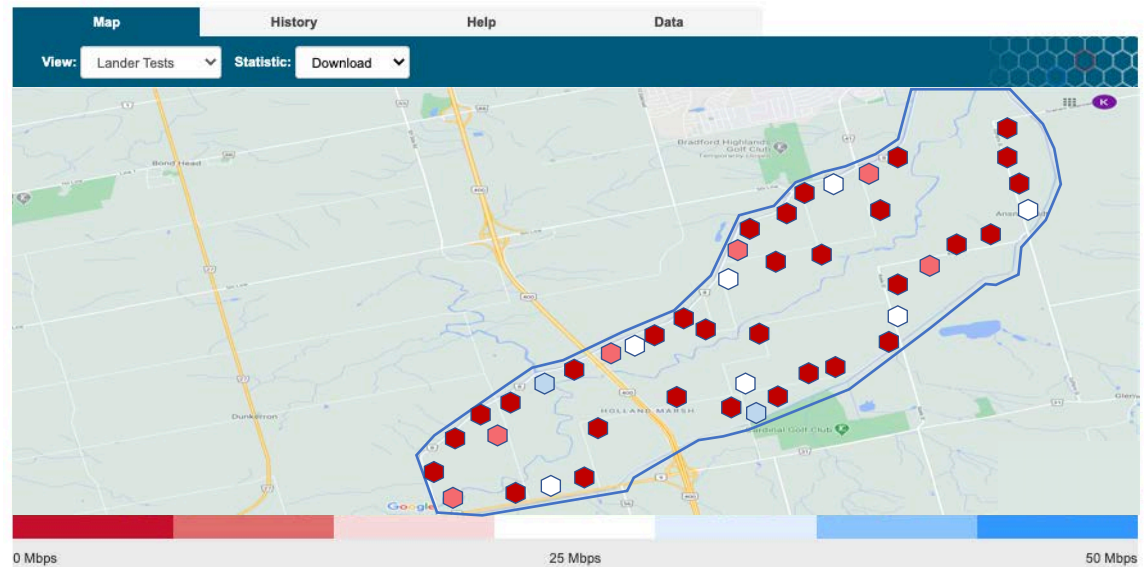
Testing Your Internet Access Performance in Holland Marsh



My Internet Performance Test

Your IP is 142.182.241.3. Verify the information below, edit if needed, and click **Start** to begin
If you wish to inform us of a location without internet access, [click here](#).

| | | | | |
|------------------------------|--|---------------------------|-----------------------------|-------------------------------|
| My Location Change | My ISP kirby.koster@cengn.ca | How often? Once | For how long? N/A | Test Server Toronto |
| Upload Speed | My Device | ISP Network | The Internet | Download Speed |



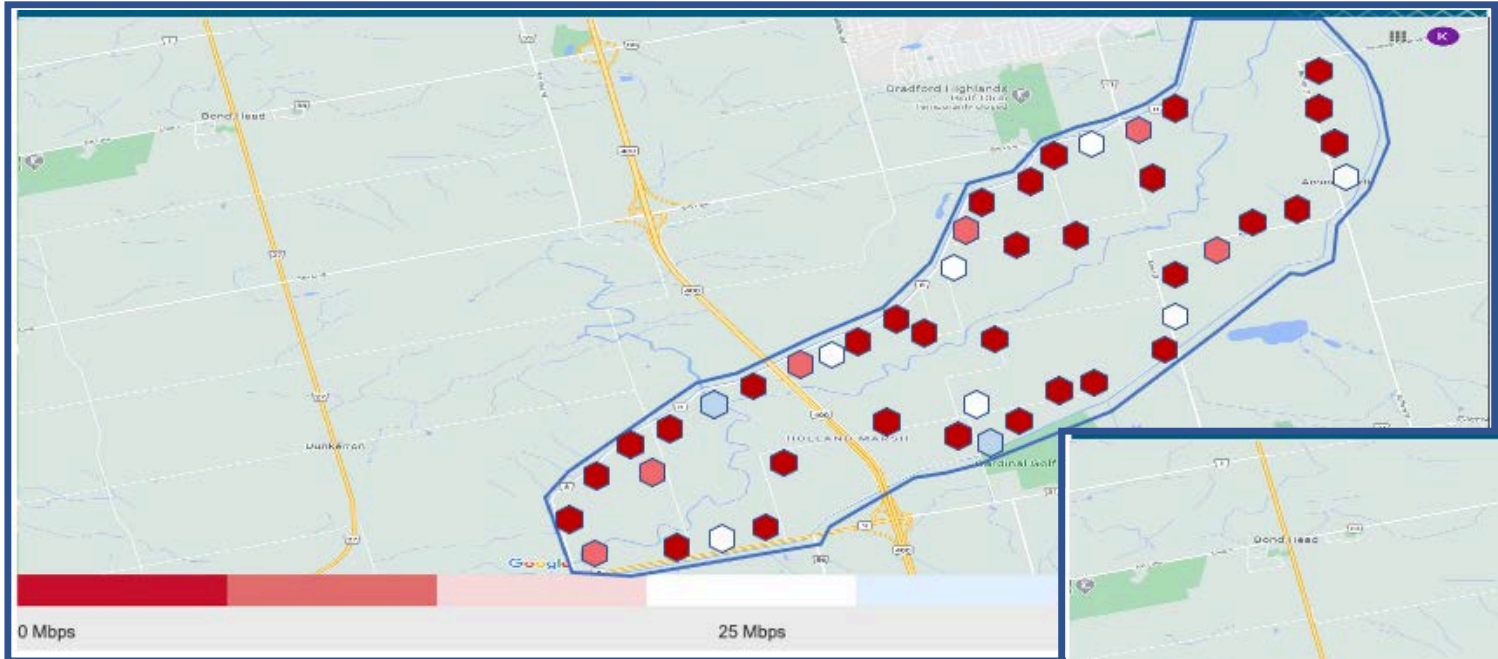
80 Tests Run in Holland Marsh

Terms & Conditions
Built by CIRA

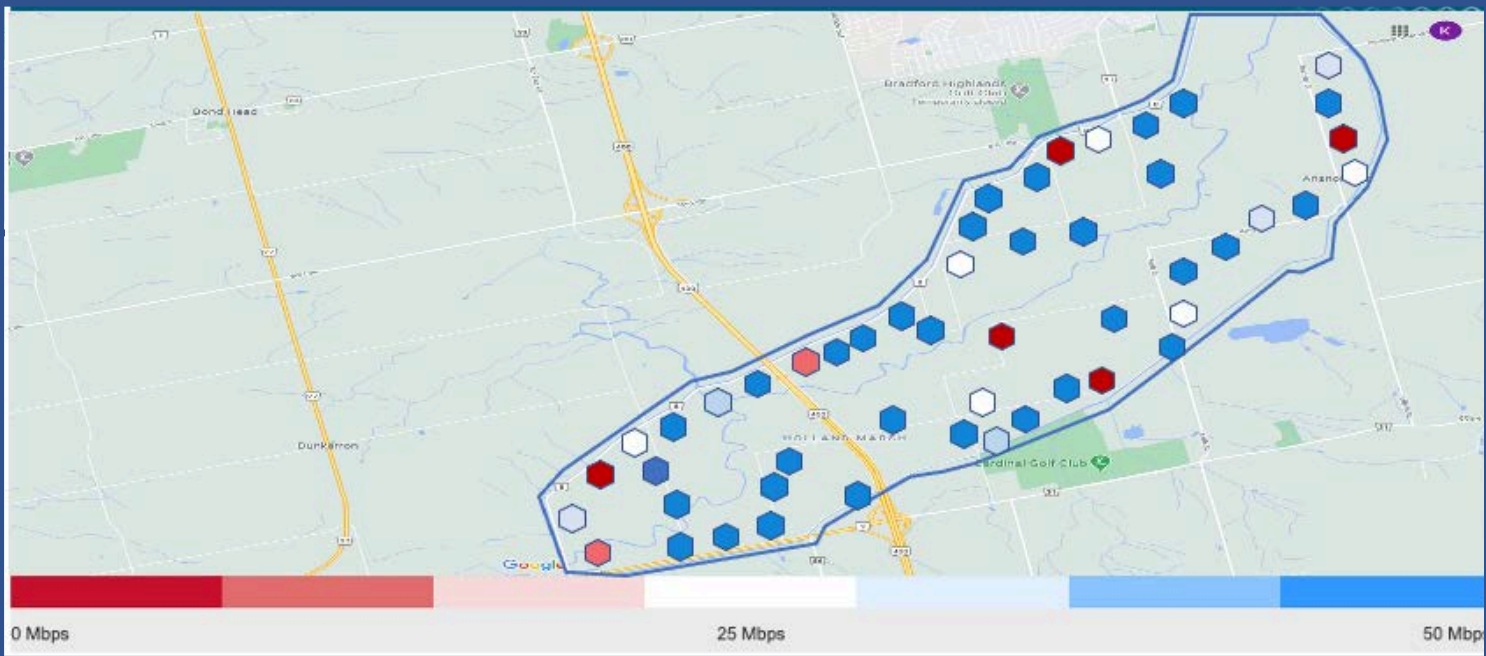
- CENGN will be paying for an Internet Performance Tool customized for Holland Marsh
- Offers visual representation of how the existing service is performing for the community
- Allows tracking of improvement as more residents get connected to the new services
- Monitors connection for up to a year after installation
- No charge to use the tool for residents
- No charge to use the tool for the community

Visualizing Your Internet Access Performance Improvements

Before



After



Community Benefits of Project

- ✓ Very high Internet access/backhaul capacity for future needs
- ✓ Future-proof 5G Fixed Wireless Access for rural residents
- ✓ Choice of new high performance 25/5 and 50/10 broadband internet access
- ✓ Significantly improved 4G cellular services in the Holland Marsh area
- ✓ High Speed internet access for agri-businesses in the Holland Marsh
- ✓ Access to LTE and LTE-M service for precision farming and IoT devices



THANK YOU!

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