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

Innovative Tech Solutions

Validation in Real Environments

GDP Growth

Tech Business Growth

Professionals &

Highly Qualified

Job Growth

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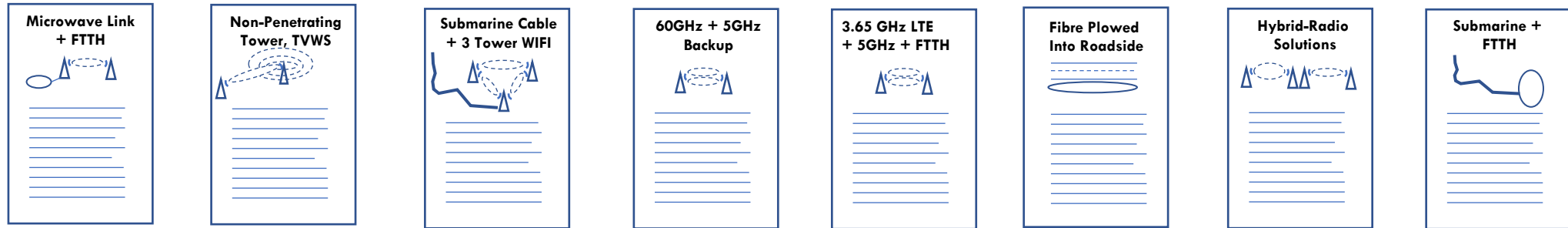
CENGN Residential Broadband Projects Underway

1 More Northern Project Planned
3 More Rural Projects Planned
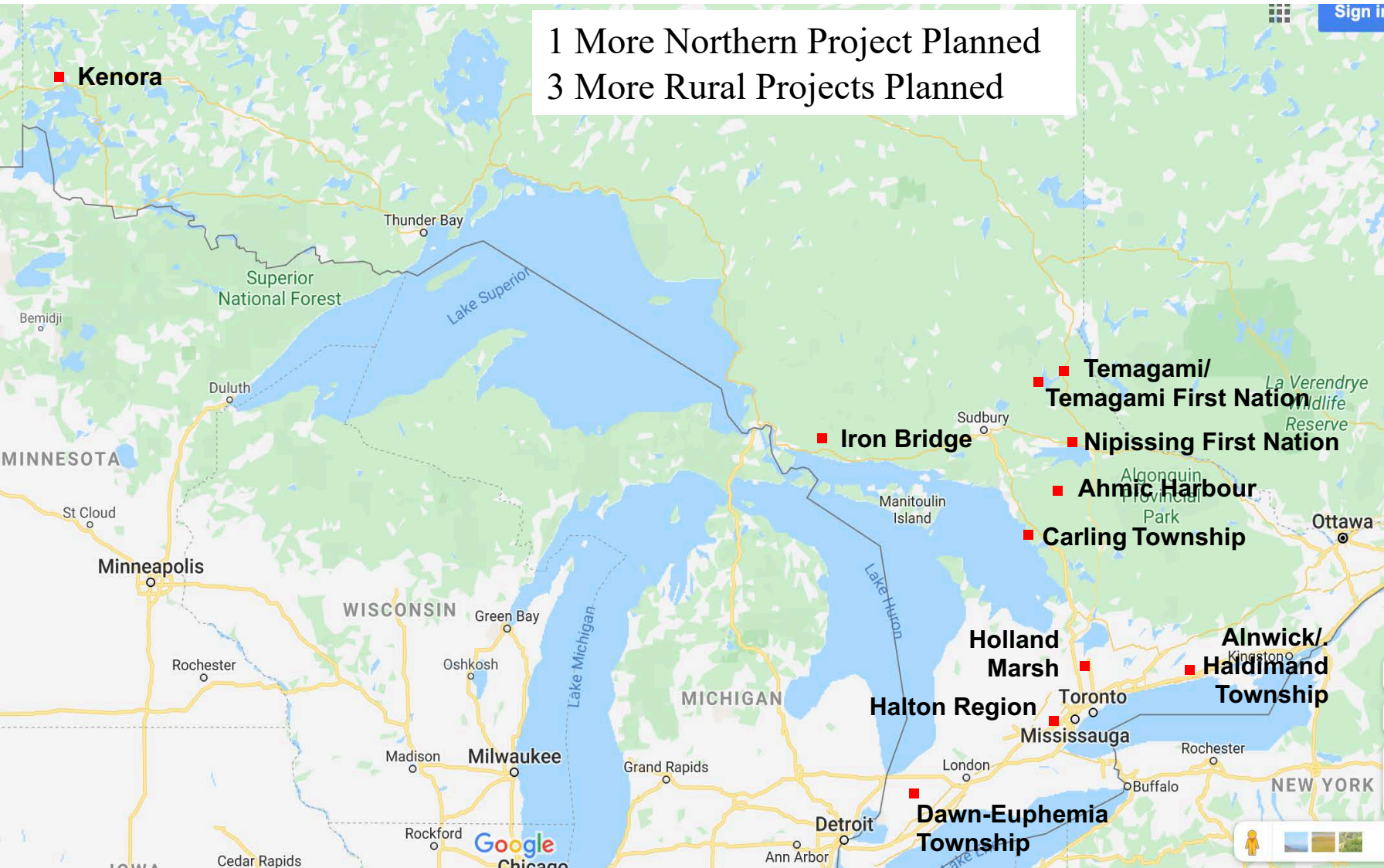
- **Carling Township (near Parry Sound)**
  - Microwave middle km; FTTH
  - Network Operational – FTTH Installs Ongoing

- **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

Microwave Link + FTTH	Non-Penetrating Tower, TVWS	Submarine Cable + 3 Tower WIFI	60GHz + 5GHz Backup	3.65 GHz LTE + 5GHz + FTTH	Fibre Plowed Into Roadside	Hybrid-Radio Solutions	Submarine + FTTH

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
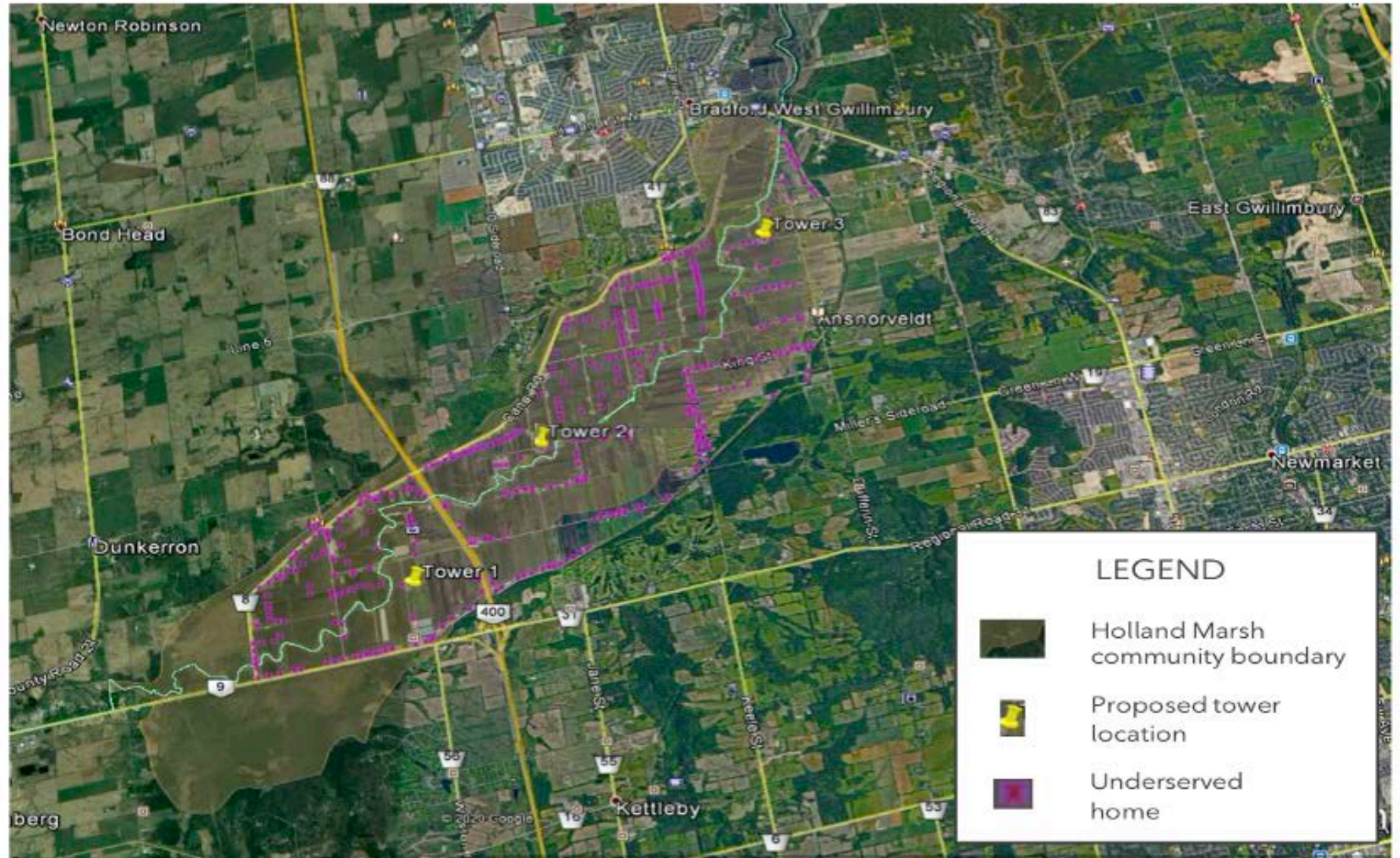
Project Overview

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
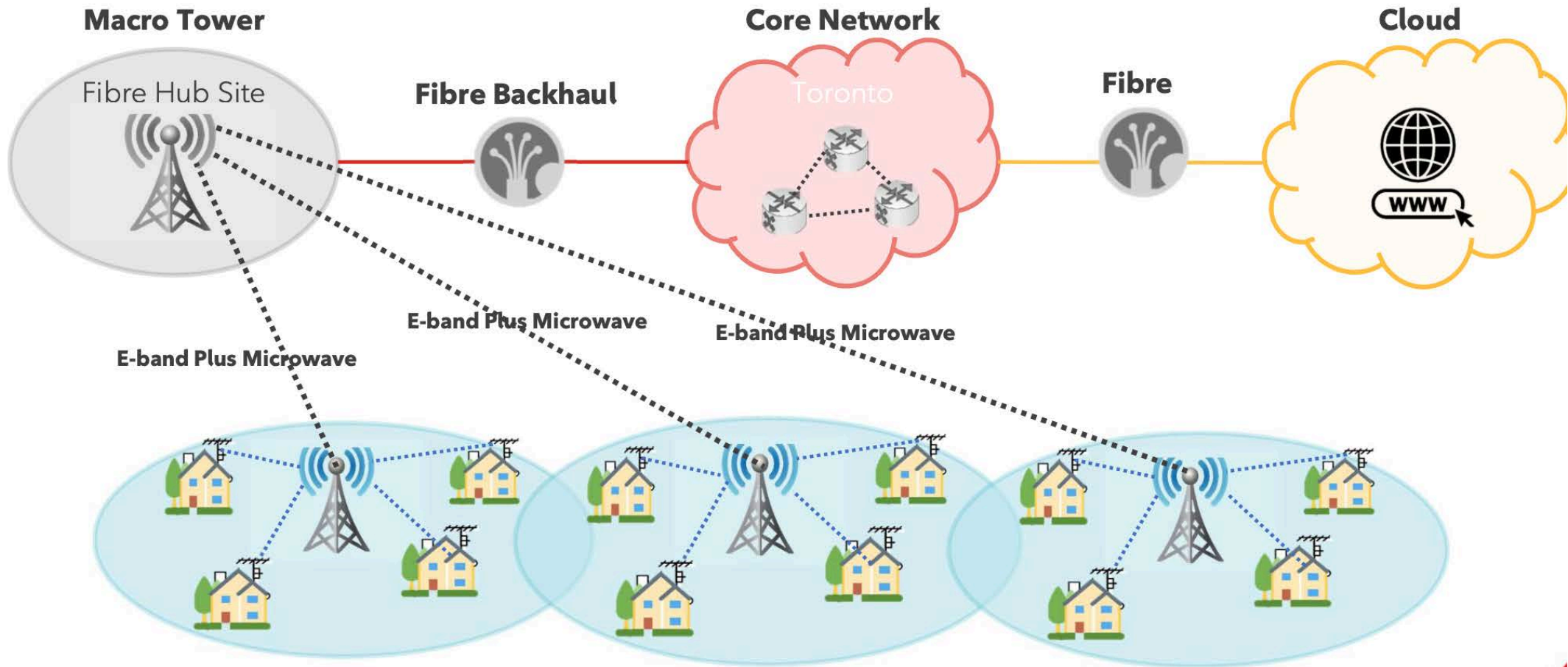- Widely underserved

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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

LEGEND

Holland Marsh community boundary

Proposed tower location

Underserved home

Extending broadband to Holland Marsh

Macro Tower
Fibre Hub Site

Fibre Backhaul

Core Network
Toronto

Fibre

Cloud
WWW

E-band Plus Microwave
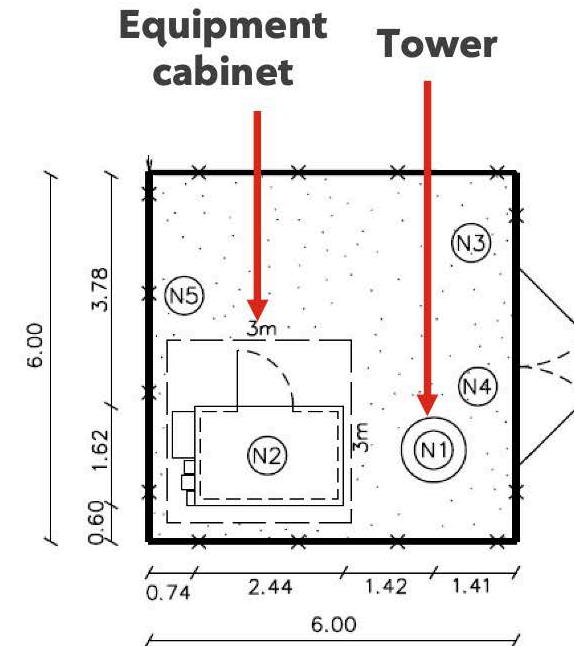
E-band Plus Microwave

E-band Plus Microwave

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

Low Profile Monopole Tower Selected
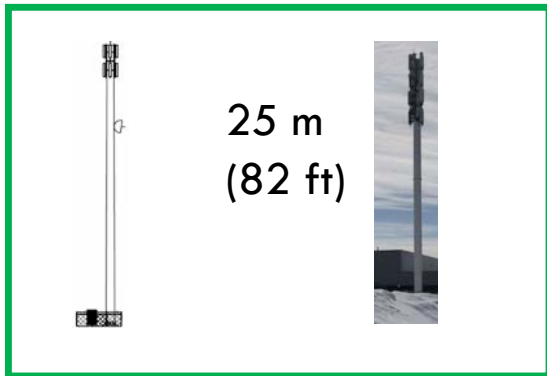

25m

Typical Compound Size

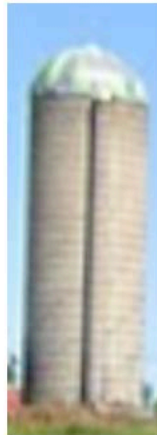Range 6 meters x 6 meters
to 10 meters x10 meters

Equipment cabinet   **Tower**

Comparing Visual Impacts of Rural Tower Solutions

Lowest Visual Impact

As viewed from distance of 150 m

Highest Visual Impact

350 ' Radio Tower

Monopole Tower

25 m (82 ft)

36.5 m (120 ft)

Typical Silo

36.5 m (120 ft)

Typical Grain Elevator

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View of Monopole Tower vs Conventional Telcom Tower from Distance of 150m

Conventional Telecom Tower (Single Tower Required)

107m
(350 ft)
Radio
Tower

Monopole Tower (3 Towers Required)

25 m
(82 ft)

✅ **Much Lower Visual Impact**

✅ **Very small footprint (no farmland loss)**

✅ **No Flashing Lights Required**

✅ **No guy wires**

❌ **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)

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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

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Testing and Monitoring Performance

Testing Your Internet Access Performance in Holland Marsh


Your Community Logos Here

- 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
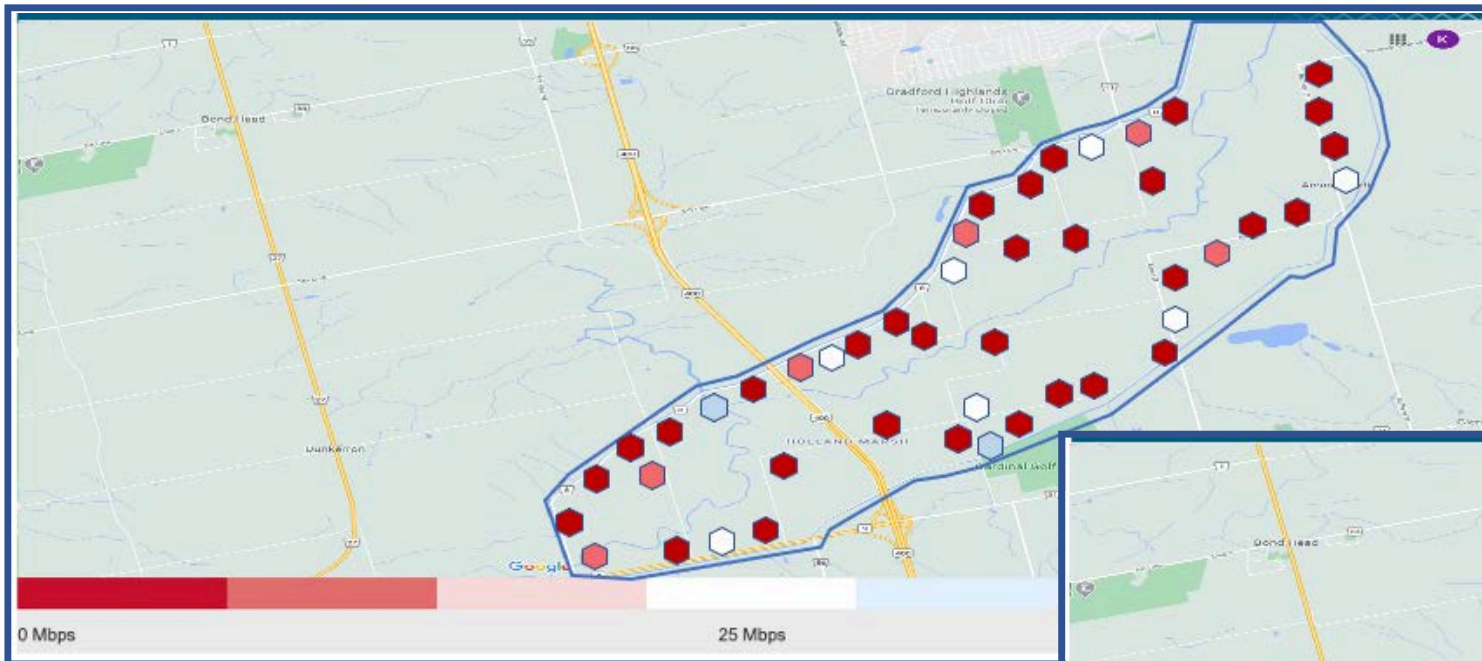
After
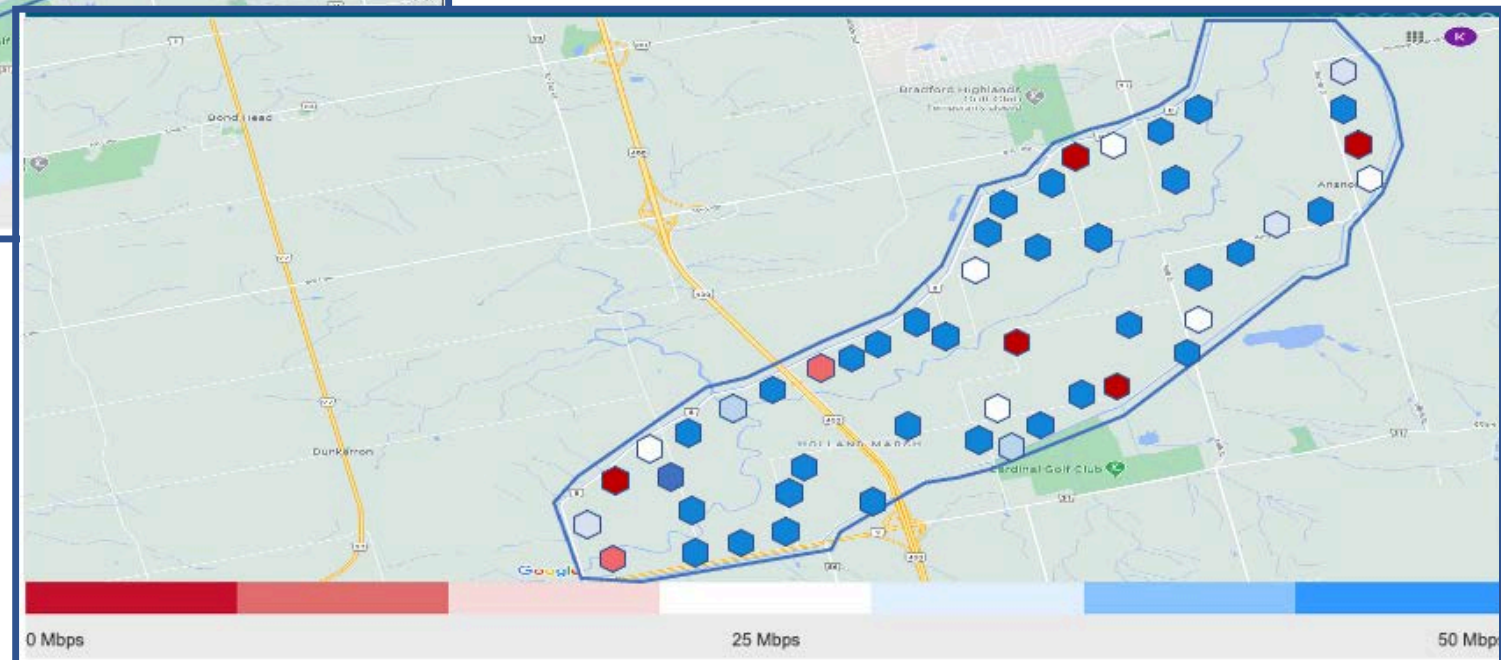
Community Benefits of Project

✓ 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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