

Gillies Bay Wireless Internet Tower Final Report



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Gillies Bay Wireless Internet Tower, Completion Report, April, 2012

PRIMARY OBJECTIVE

The primary objective was to establish an inexpensive, reliable, wireless network over the Gillies Bay area on Texada Island from sector antennas on a new tower to be constructed on Mt. Pocahontas, to the east of Gillies Bay. The Mt. Pocahontas tower will accommodate antennas connected to a transmitter via a high capacity backhaul feed from the Sunshine Coast Health Centre (SCHC) on the mainland, south of Powell River. Coverage is line-of-sight but, because of the ground elevation of 500m, the Mt. Pocahontas site is ideal to cover a very large service area. The intention is to expand coverage in several phases to as much of the surrounding area as possible; Upper Gillies bay and the Oasis areas are the first areas outside the community for consideration. Mt. Pocahontas is the optimal location for servicing the area with line of sight to about 300 residences.



Map of backhaul link from SCHC and sectors from Pocahontas

SPECIFIC OBJECTIVES

- (i) Install a 100ft tower on Mt. Pocahontas, with erection by helicopter.
- (ii) Establish a backhaul link between the SCHC and Pocahontas.
- (iii) Install backup batteries and standby power generator and peripheral equipment in the equipment building on Pocahontas.
- (iv) Install several sector antennas on the Pocahontas tower.
- (v) Install a backhaul link from the Pocahontas tower to the Gillies Bay TV tower.
- (vi) Test the system for coverage in locales around Gillies Bay.
- (vii) Install APs (access points) north and south of Gilles Bay at the Oasis and Upper Gillies Bay to extend coverage to these areas. These are required because many residences in these areas do not have line-of-sight to either tower due to tree coverage.
- (viii) Connect businesses and individuals requesting service.

Approach

To ensure that the tower meets all government and industry standards we have taken a conservative approach, using specialists whenever appropriate. This has involved the tower manufacturer, professional engineers, tower and communication experts, electricians, geotechnical consultants, a helicopter company and a rock driller. All of these experts have high fees and are all from off-island, so putting a large tower on a mountain top on an island is an expensive proposition.

Project management has been largely handled by the Society Directors who provide this service on a volunteer basis. Some of the non-skilled labour to construct the equipment shed, complete the tower base, and assemble the tower sections has been through local volunteers. Local contractors have been utilized for some of the work that is beyond the capability of volunteers.

The final tower completion was by a professional crew from Prestige Telecom and helicopter from Talon Helicopters. Installation of all electronics, system setup and startup has been completed by a local communications contractor. Testing for coverage in locales around Gillies Bay has been completed by Society Directors.

We communicate with potential clients by email, the web page www.gilliesbay.ca and by notices in the Texada Express Lines, a monthly newspaper. About sixty clients have been connected, with a further twenty having site tests.

Technical Details

The tower accommodates radios connected via a backhaul to an E10 Telus feed located at the Sunshine Coast Health Centre on the mainland south of Powell River. A sketch map of the link from SCHC and sector antenna directions is shown on Page 1. The wireless network via sector antennas from Pochontas covers Gillies Bay and surrounding area. The tower also houses an Emergency Repeater Station, part of the Provincial Emergency Program. Because of the remote location, a back-up battery power supply and power generator is needed. This will be added when funds are available.

We are grateful that SCHC host the connection at no cost. They give us space in a small room and allow us to install a dish on the side of one of their buildings.



The dish at SCHC and the GBISoc equipment and the Telus cable.

Pictorial View of Progress

The tower and peripherals comprised four phases: the base, the equipment building, building the tower sections, erecting the tower, the electrical connections and the link to SCHC.

The Base

The tower base is an integral part of the system and has very specific technical constraints to meet industry standards. It was necessary to drill holes 13ft. into the bedrock for the anchor bolts. The least expensive drilling crew we could find was from Cobble Hill, Vancouver Island, and they came to Texada for three days. After the drilling crew finished, twelve 12ft. long anchor bolts were cemented into the rock with special grout. These were individually pull-tested while a professional geotechnical engineer observed. The concrete part of the base, using over 200 bags of special concrete mix, was constructed by a crew of volunteers assisted by professional advisers.



Volunteers mix the concrete for the base; on the right an anchor bolt is pull-tested.



Over 200 bags of special concrete were used on the base, plus special grout on each leg.

The Equipment Building

Before the tower was erected it was necessary to build a shed to house the power supply, routers and other electrical equipment. The building also houses the PEP emergency equipment.



The GBIS building on Pocahontas contains routers and the PEP emergency repeater equipment.

Assembly of the Sections

The tower itself came in thirteen boxes containing the individual rods and bolts, like a giant Meccano set. Most of the tower sections were constructed by volunteers at the Gillies Bay Airport. The lowest of the ten sections was installed directly on to the base on the mountain.



The tower was partially assembled at the Gillies Bay airport; the bottom section was assembled on site.

Tower Erection

The tower was erected by Prestige Telecom with assistance from Talon Helicopters. One of the Prestige crew was at the airport to attach the tower sections to the hoist. The schedule was supposed to be: Monday prep day, Tuesday lift day, Wednesday tighten bolts and finish off.

However, low clouds and gusty on and off wind conditions contributed to several delays. Twice sections came back to the airport due to difficult conditions on the mountain. Eventually everything was completed by late Friday. The bill for the extra helicopter time was substantial, but unavoidable. At times it looked like the weather would never cooperate, but when asked about their schedule the Prestige foreman, said “We are here until the job is finished.”



The Talon helicopter picking up a section at the Gillies Bay airport; at right waiting on the mountain top.



The Prestige crew on the tower as each section arrives by helicopter.

Pocahontas Electrical Equipment



Equipment in the GBIS building on Pocahontas; on the right is the PEP emergency repeater equipment.

The GBIS building on the mountain next to the tower contains important equipment for the wireless system and for the PEP emergency program. The building is well insulated and heated, as temperatures can plummet on the mountain top in high winds in the winter. It was wired by a local certified electrician. It still needs backup batteries and a standby power generator to cover winter storm power outages. Sector antennas are mounted on the tower.

Sunshine Coast Health Centre Link

The link to the Pocahontas tower from the Sunshine Coast Health Centre is now fully operational. The link is providing consistent connections and we have extra bandwidth to add more customers. The directors do site testing on Texada at no cost to see if a viable signal is available on any property. Assuming there is a good signal the client is given the information to order the necessary radio parts. Once the parts arrive we set up the antenna to connect with our system, again at no cost to the client.



SUMMARY OF WORK IN RELATION TO PROJECT OBJECTIVES

- (i) Install a 100ft tower on Mt. Pocahontas, with erection by helicopter. **Completed.**
- (ii) Establish a backhaul link between the SCHC and Pocahontas. **Completed.**
- (iii) Install backup batteries and standby power generator and peripheral equipment in the equipment building on Pocahontas. **Not completed, insufficient funds.**
- (iv) Install sector antennas on the Pocahontas tower. **Completed.**
- (v) Install a link from the Pocahontas tower to the Gillies Bay TV tower. **Completed.**
- (vi) Test the system for coverage in locales around Gillies Bay. **Completed.**
- (vii) Install APs north and south of Gilles Bay at the Oasis and Upper Gillies Bay to extend coverage these areas. **Not completed, insufficient funds.**
- (viii) Connect businesses and individuals requesting service. **Partially completed.**

Employment from project:

	Company or person	description	worker-days
1	Cobble Hill Blasting	rock drilling	4
2	Geotactics	geological consultant	5
3	Ian Procyk (consultant)	WiFi consultant	1
4	J&L Manufacturing	base plate fabrication	1
5	Texada Communications Ltd	project management	11
6	Larry Blanchet	specialist construction	12
7	Leigh Mortimer	construction labour	6
8	Prestige Telecommunications	tower erection	28
9	Texada Home Centre	electrical	3
10	Talon Helicopters	tower erection	2
11	Texada Transfer	transportation	2
12	Various	Testing and maintenance	10
		Total	85

Permanent Jobs:

2 part-time