

Bringing FTTH Broadband to Remote and Rugged Areas

A difficult build on Block Island in Rhode Island provides seven lessons for successful deployments from mountains to islands.

By Michael A. Solitro / *Sertex Broadband Solutions*

With new federal funding, fiber networks are increasingly deployed in rural and remote locations where infrastructure buildout is arduous.

Years of working on deployments with varying geographic issues and operational challenges have imparted valuable lessons about timely project execution despite uncontrollable variables.

From the mountains to the coast, here are seven best practices and the stories behind them.

1 Careful planning and network design – flexibility overcomes issues. Though planning and design are critical, unanticipated factors often come into play. Understanding a community’s geography, influencers and eccentricities can facilitate smooth network deployment.

- Securing needed materials can be a considerable challenge, and placing orders well in advance helps ensure sufficient supplies for project deadlines. Specifying fewer materials can minimize inventory and supply chain issues, control costs and reduce errors. Leftover standardized materials can be easily redirected to new jobs.
- In the many months between network engineering and project completion, technology advances. Fiber experts should inform customer communities of cost-effective new technologies that can improve original designs. On Block Island in Rhode Island, BroadbandBI administrators upgraded the network to XGS-PON technology, which became available during the buildout, expanding the original GPON capacity.
- Design changes happen on the fly, especially when property access is problematic. Some 50 percent of all roadways on Block Island are privately owned, and every owner had to approve fiber drops for premises accessible through their parcels. Access issues were responsible for most of BroadbandBI’s record-breaking 69 design revisions. Extra materials were required for circuitous alternate paths to homes.
- Planning often won’t vet natural or historical landmarks, and sometimes preservation authorities

must grant permission for underground construction. On Block Island, planned infrastructure in three areas had to be redesigned around Native American burial grounds.

2 Weather challenges – working with/around Mother Nature. In the Northeast, challenging terrain and extreme weather conditions can mean complex installations.

- In high-elevation areas, the ground is frozen and snow-covered for up to six months, making areas impassable and construction impossible. When trenching is unachievable, crews can lay temporary ground cables, providing households access to broadband until permanent drops can be installed.
- Spring means mud season. Equipment gets stuck, and plows move mud rather than snow. Sometimes, conditions are so extreme that crews wade through mud to access homes. State and local authorities can help remove runoff soil and lay foundational stones so construction can resume.
- Recent years have been extremely wet in the Northeast, with days of torrential rain. In mountainous areas, flooding and mudslides mean work stoppages. Clearer days allow crews to push the schedule and compensate for lost time.
- In offshore communities, weather challenges include rough seas, high winds and seasonal storms. Block Island’s blizzard in 2022 brought more than 2 feet of snow, stopping work for several days until the snow melted. The island experienced two hurricanes and hundreds of gale warnings during the two-year build.
- Winds must be constantly monitored to ensure the safety of workers in buckets extended 25 feet aloft and to secure equipment and supplies on the ground. Block Island’s average wind speed is 11 miles per hour, and the strongest winds blow during prime construction months, so monitoring gusts requires constant vigilance.



In high-elevation areas, the winter season lasts up to six months. Crews deploy fiber through challenging terrain and extreme weather conditions.

3 Transporting supplies and equipment – using advanced logistics eliminates delays.

Though most construction projects take transportation for granted, sometimes getting there isn't so easy.

- Working on an island accessible only by planes or ferries that run

when nature permits requires intensive planning and advanced logistics. Ferry space is limited in every season. Sertex project management and ferry operators planned equipment and supply shipments for months, moving 90 miles of fiber optic cable in multiple 54-foot tractor-trailer loads over 12 months.

- Logistics teams must be continuously alert for transportation, mechanical and weather issues. Throughout winter 2021, only a tiny ferry ran to Block Island, and every shipment had to be broken into multiple small trips.
- Sertex stored backup equipment on the island, as replacement



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Once western Massachusetts utilities completed make ready and poles were licensed, Sertex crews were redirected to aerial cable installation.

equipment could take months to transport by ferry.

4 Natural barriers, environmental challenges and permitting. Building around natural barriers and complying with environmental regulations is always tricky. Sometimes rerouting is the answer. At other times, creative thinking solves problems and satisfies permitting authorities.

- Environmental preservation is critical in coastal and wetland areas. On Block Island, where 35 to 40 percent of construction involved wetlands, Sertex worked closely with environmental authorities to design the least disruptive routes and secure permitting. Miles of the most advanced erosion and sediment control materials were ordered, warehoused and installed.

- Natural barriers such as island brush, ponds and wetlands must be painstakingly navigated. Innovative Sertex crews use drones to fly weighted lines – tied on one end to the drone and on the other to fiber cable – from one side of barrier areas to the other. The attached fiber cabling is pulled to its destination with little environmental disturbance. Drones also help install cable drops to inaccessible properties.
- In the mountains, Sertex crews threw metal strands over rivers from one utility pole to another, then attached fiber cable to the strands and rolled them to the opposite side. River crossings were also installed along overpasses whenever possible.
- Utilities often follow direct paths through forested areas that vehicles can't access. In these cases, crews drag fiber through forests, attaching it to utility poles by climbing ladders.

5 Working through delays by scheduling alternative tasks.

Many project delays are outside the control of the network builder, but there's almost always something to do to move a project forward.

- In seasonal tourist communities, population and traffic can vary dramatically between offseasons and high seasons. On Block Island, aerial construction slowed to a virtual halt in summer when the population exploded from about 1,000 year-round residents to more than 20,000. Sertex kept construction moving by focusing summer work on private properties and side roads and scheduling mainline construction during the offseason.
- While local utilities move slowly on make ready, efficient deployment experts redirect crews to work underground, installing conduit and fiber drops. Once poles are licensed, crews are moved on to aerial cable installation.

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The BroadbandBI network required transporting 90 miles of fiber optic cable by ferry in multiple 54-foot tractor-trailer loads.

6 Communications in remote areas.

Critical to successful deployments, communication is sometimes elusive and must be MacGyvered.

- In the mountains, cellular dead zones can prevent real-time communication. Sertex worked with the FCC to secure long-range communication antennas that were then mounted on trucks and equipment. The radio network allowed seamless collaboration between utility crews and other construction teams.
- Throughout the BroadbandBI build, most of the island was either grossly underserved or unserved. Sertex set up its project trailer outside New Shoreham town offices to access the island's only working fiber connection. For reporting, communication and entertainment, deployed crews used hot spots, which were only as good as the area cell signal.
- Weekly project meetings kept Block Island officials informed about progress. Anxious residents received regular construction updates shared on

the project website, social media and in the local newspaper.

7 Housing crews far from home and maintaining morale on the road.

Crews in remote locations live where they work for days and weeks. Deployment teams are challenged to secure housing, recruit and retain employees willing to sacrifice their personal time, and incentivize model behavior.

- Housing in deployment areas is costly. Over the yearslong western Massachusetts buildout, Sertex crews stayed primarily in hotels. Limited and expensive, rental housing on Block Island was secured six months in advance, although the nature or amount of upcoming work was unknown. Offseason rental expenses of thousands of dollars a month inflated to thousands a week during peak season.

- To maintain morale and respect workers' time, four-day work weeks were scheduled as possible, providing crews with long weekends off.
- Food resources are limited in remote areas. In the mountains, Sertex installed microwaves in trucks, or crews brought small camp grills for cooking and coffee. Block Island crews ordered online grocery delivery. They had to wait for food supplies if the ferry didn't run or an order was placed too late.

Providing fiber internet in dense urban areas is easy. Rural and remote buildouts require flexibility, creativity, dedication and some luck to conquer challenges and boost motivation. Once built, these networks deliver decades of reliable service to people in need at minimal costs. 🙌



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