

The Three Ring Binder

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Maine Fiber Company

- Maine Fiber Company, Inc. (MFC) is a Maine owned and operated private company that was formed to oversee the construction, leasing, and maintenance of the Three Ring Binder.
- MFC provides dark fiber leasing to all telecommunication providers and entities in Maine.
- MFC's mission is to enhance 'middle mile' fiber access for carriers looking to provide quality broadband services to customers in many areas of Maine, including some of the most rural areas of the state.

Tilson Fiber Technology

- Tilson Fiber Technology, LLC (TFT) is part of the Tilson family of companies, a family of consulting firms providing IT and telecommunications consulting services for private and public sector clients. Founded in 1996 and headquartered in Portland, Maine, Tilson has satellite offices in New York, New York and Zug, Switzerland.
- TFT was hired by Maine Fiber Company to construct, lease and maintain the Three Ring Binder project.



The Three Ring Binder

- The Three Ring Binder is an open access, 1,100 mile high capacity fiber optic network. It was so named because it features three "rings" of fiber strung throughout Maine.
- The Three Ring Binder will make broadband access more readily available to 110,000 households and 600 Community Anchor Institutions (CAI's) across the state of Maine. More on CAI's to follow.
- Known as "dark fiber" and "middle mile fiber", the network provides the backbone infrastructure to telecommunications companies aka internet service providers (ISP). These ISP's sell directly to residences and commercial entities needing internet access and are known as "last mile" providers.

Three Ring Binder Funding

- The Three Ring Binder is a public, private partnership and represents an investment of over \$32 million in Maine.
- \$25.4 million in funding is provided through the Broadband Technology Opportunities Program (BTOP) which was funded by the American Recovery and Reinvestment Act (ARRA) of 2009, and is monitored by the National Telecommunications and Information Administration (NTIA).
- This federal subsidy provides a benefit to the public by making broadband service more widely available in Maine as private companies will not build out broadband infrastructure to rural areas.
- Another \$7 million in matching funds is provided by private investment.

Federal Funding

- Federal funding has specific rules regarding procurement.
- Formal Requests for Proposal processes must be established and followed on large dollar procurements.
- Smaller dollar procurements also have specific processes to establish and follow.
- Annual audits and inspections are required and documentation needs to be properly completed and maintained.

History of the Three Ring Binder

- After the federal government set aside money in 2009 to improve access to broadband Internet service in rural areas, a coalition of Maine state officials, representatives of the University of Maine System and Maine telecommunications companies got together in early 2009 to discuss how Maine might leverage some of the stimulus funds to enhance broadband access.
- It became clear that the lack of a middle mile network of high-capacity fiber optic cable was a major obstacle to improving data transmission in many areas of the state. During those discussions, Great Works Internet (GWI) stepped forward to be the lead sponsor of a grant proposal to fund the construction of such a network.

History of the Three Ring Binder

- As part of the grant application, GWI said it would turn over responsibility for the network to a new, independent company, and that company would offer access to the network on an equal basis to all qualified users.
- Maine Fiber Company, Inc. was formed during the grant application process to take charge of the project should it win funding.
- On Dec. 17, 2009, U.S. Secretary of Commerce Gary Locke came to Bangor to announce that the Three Ring Binder would receive the federal grant and, with the additional, private matching funds, a project was born.

Transparency & Oversight

- The Three Ring Binder project is highly transparent – a Google map on Maine Fiber Company’s website identifies the entire 1,100 mile route.
- The NTIA and the Office of the Inspector General are some of the governmental bodies providing oversight to the project.
- Annual and quarterly federal reports are filed with the NTIA and are available to the general public.

Middle Mile Dark Fiber

- The Three Ring Binder will allow carriers to have their own middle mile facilities.
- The network provides carriers access to communities that they can't currently serve enabling the carriers to use their own capital to build last mile connections.
- We act as a wholesaler; commercial carriers are our clients, not our competitors.
- Our project is both reducing the cost of delivering broadband internet, and increasing access to broadband internet throughout Maine.

Open Access

- The Three Ring Binder provides fiber optic cable that is available for lease to all qualified users on an open access, non-discriminatory basis.
- Our potential customers include telecommunications providers and entities with a high demand for data transmission.
- No customers are given preferential treatment, and no single entity may use more than 20% of the capacity of any segment of the network.
- We have the capacity to provide fiber to all interested parties, and are obligated to lease fiber to all qualified parties. Leasing rates are the same for all customers.

Capacity and Speed

- The network is expected to have more than sufficient capacity to meet customer needs for the foreseeable future and provides ultra-modern, high capacity (144-288 strands) fiber optic cable.
- The network will provide middle mile fiber that supports a variety of the last mile technologies, with middle mile speeds per fiber pair today over 3 Terabytes, with that getting faster as the 'optronics' improve year by year.

Access for Education

- In accordance with the initial federal grant application, a portion of the network has been reserved for use by the University of Maine System and the State of Maine.
- The Three Ring Binder will construct subsidized laterals connecting 20 University of Maine System/State of Maine sites to the network, to each other and to existing university/state owned fiber.
- The 20 sites are located throughout the state and five of them are already under construction.

Community Anchor Institutions

- Another part of the grant is the Three Ring Binder's commitment to construct subsidized laterals to dozens of Community Anchor Institutions (CAI's). These CAI's include hospitals, rural healthcare clinics, community colleges, University of Maine campuses, libraries, government facilities, and public safety departments.
- An Advisory Board was formed to oversee the approval process of the CAI's and the use of the approved budget for construction of these subsidized laterals. Approval is based on need, sustainability, feasibility, ability to leverage each lateral to assist others in the local community, and overall benefit.
- To date, we have dozens of approved CAI's that are in various stages of pre-construction/construction. A rolling approval process continues to allocate the rest of the CAI funding.

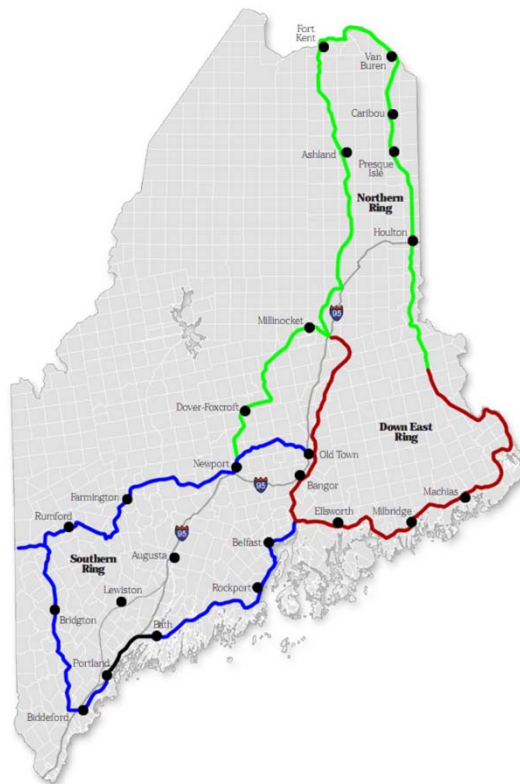
Make-Ready

- The location of each electrical and telecommunications lines on utility poles is regulated by MPUC and FCC guidelines.
- Before new fiber lines can be installed, a pre-construction process called make-ready must occur to make room for the new fiber lines.
- This process is lengthy and includes negotiating contractual attachment agreements; an application and survey period; plus the actual make-ready time...all before construction can begin.
- Some poles involve three or more pole owners all of whom must be communicated with to get the poles ready for the project's fiber installation.

Progress to Date

- Over 60% of the project's make-ready is complete.
- 150 miles of existing fiber and over 200 miles of newly constructed fiber are currently available for lease from:
 - Portland to Brunswick
 - Bangor to Orono
 - Hodgdon to Orient
 - Belfast to Bar Harbor
 - Portland to Biddeford
 - Medway to Ashland and to Millinocket
- 500 miles will be constructed by the end of 2011.
- The remaining 600 miles will be constructed by the fall of 2012.

Three Ring Binder Map



Scope of Work

- 1,100 miles of brand new fiber to engineer, furnish and install on new and existing utility poles.
- Over 30,000 poles exist on the Three Ring Binder route.
- 16 electrical and telecommunications pole owners requiring specific and unique communication.
- Dozens of university and CAI laterals to construct.
- Where do we begin? How do we break it down?

Step 1: The Segments

- We segmented the overall route into 24 geographic areas, most about 50 miles in length, some longer, some shorter.
- Each segment has its own benefits: high need for unserved/underserved rural areas; high marketability for denser areas; high demand for completion from everyone, the linking of new areas together, etc.
- Each segment has its own challenges: bridges, highway crossings, winter access, constructability, etc.

Schedule Input & Critical Path

- The BTOP federal funding requires the overall project complete in three years: September 2010 - August 2013.
- Private investment requires construction completion in two years: by the end of 2012.
- Traditionally, the make-ready process doesn't allow more than 200 poles to apply for make-ready at one time and could take up to six months per application. At that rate, the schedule would take years.
- In addition, federal funding required completion of a lengthy environmental assessment process before any work could start on the project.

Step 2: Prioritization

- We analyzed the different segments and prioritized them based on a variety of criteria including (in no particular order):
 - Make-Ready Preparedness
 - Route Availability
 - Coordination with MDOT and Pole Owners
 - Constructability
 - Public Need
 - Private Need
 - University Requirements
- We consistently review the schedule and update the priorities based on these criteria and any changes that occur.

Labor Resources

- We have a variety of labor resources on the project and each type requires its own level of interaction and communication.
- Owner
 - The owner of every project plays an instrumental role in the project's success. This role often requires specific definition which may change during the project's life cycle.
- Third-Party Vendors
 - On the Three Ring Binder, these are the hard-working staff of the pole owners whose commitment to the project is instrumental to its success, but they don't report directly to the project or the owner. Particular communication is required for those indirectly attached to the project.

Labor Resources

- **Consultants**
 - Independent consultants participate in different ways and to varying levels of commitment. Each has his/her style and strengths that must be recognized.
- **Employees**
 - Employee contribution on the project ranges from daily to infrequently. An established culture of success combined with clear direction is required to engage consistent and exceptional performance.
- **Subcontractors and Vendors**
 - Our subcontractors and vendors are highly invested in the project's success. Coordinated and flexible communication allows each entity to work together toward our common goals.

Step 3: People Management

- Communication
 - Consistent, clear and specific communication is key to managing the variety of different labor resources on the project.
- Coordination
 - Weekly conference calls, monthly in-person meetings, field visits, written reports, tracking sheets – these are some of the tools we use to bring the different resources together to manage progress.
- Facilitation
 - Bringing different parties together, setting the scene for a clear, joint goal and “getting out of the way” – this process lets various parties rise to the occasion, promotes ownership and sponsors success.

Constructability Challenges

- Bridges – We have 8 bridges on the main route and need to find available conduit to lease for our fiber or receive MDOT clearance to install our own conduit.
- Highway Crossings – We have several points on the route that cross highways and need to obtain approval from MDOT and the Maine Turnpike Authority to properly cross.
- Pole line gaps – There are sections of the main route without existing poles. We have to obtain permission to install our own poles and following appropriate processes to procure and install these new poles.

Step 4: Structure & Flexibility

- Structure
 - Setting up structured processes and procedures allows the project to steadily and consistently move forward regardless of expected or unanticipated challenges.
 - Structure breeds a sense of security for the project team ensuring common denominators for all involved.
- Flexibility
 - Material shortages, resource sharing, miscommunications, fire drills – all of these challenges and more arise on any project, but are particularly inherent on large scale, complex ones.
 - Being flexible and remaining open to different means and methods fosters a culture of possibility and achievement.

Software & Tools

- The project management team uses a variety of tools to manage the Three Ring Binder. Some are common, some are unique to a fiber network.
 - MS Outlook and Office is used for basic communication.
 - Excel is used for high-level budgetary and schedule information, plus we track make-ready progress, CAI information, fiber/material usage, and more with this program.
 - Timberline is construction management enterprise system that we use for the project financials as well as limited document control (meeting minutes, etc.)
 - Google Earth is used to map out the fiber route.
 - Telvent is a robust, fiber management software program that manages fiber location, designations, splicing, etc. and it is currently being implemented into the project.

PMBOK & The Three Ring Binder

- The Three Ring Binder is actually one program with 24 projects as each segment is a project in and of itself, and while each segment has its own characteristics, the system to manage them follows the five major process groups:
 - Initiating - Make-Ready progression moves the segment into preconstruction.
 - Planning - Preconstruction engineering design the segment and procure resources.
 - Executing - The construction team installs the fiber.
 - Controlling - The project management team monitors scope, schedule and cost changes.
 - Closing - OTDR testing and as-built/photo documentation verify successful installation while substantial completion and invoicing complete each project.

PMBOK & The Three Ring Binder

- The nine knowledge areas are also present within the project:
 - Integration Management – A key element as 24 projects are folded into one program: plan development, execution, change.
 - Scope Management – Control processes manage scope changes.
 - Time Management – Segment duration, schedule development
 - Cost Management – Resources, cost estimating, budgeting, etc.
 - Quality Management – OTDR testing, as-builts, photos, etc.
 - HR Management – Labor resources, Davis-Bacon guidelines, etc.
 - Risk Management – Weather, fiber supply, make-ready, etc.
 - Communications Management – Stakeholder reporting: investors, NTIA, UMS, ISP's, communities, team members, etc.
 - Procurement Management – Federal guidelines, long lead times, fiber risk, environmental/pole replacements, etc.

Questions & Additional Resources

- Please contact Amy Hayes at ahayes@tilsontech.com with questions.
- You may follow us on Twitter: [@tilsontech](https://twitter.com/tilsontech).
- Please visit the following sites for additional information:
 - www.mainefiberco.com
 - www.tilsontech.com