

General Services Agency
Information Technology
County of San Luis Obispo

FIBER OPTIC PROGRESS REPORT



December 18, 2012

Our Vision:
Delivering Excellence to Every Customer

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Introduction

This Fiber Optic Progress Report was developed at the request of the County of San Luis Obispo Board of Supervisors. In its October 16, 2012 meeting, the Board of Supervisors requested “next steps” and a list of specific projects that could be developed. This Report focuses on the activities between October 16, 2012 and December 1, 2012 and provides an initial list of potential projects for consideration. The scope of the Report includes:

- Background on fiber optics and related activities to date
- General descriptions of approaches used to gather information for the report
- Overviews and outcomes of key meetings and discussions regarding fiber optics
- Specific findings and project opportunities that may be pursued

Background

General Services Agency – Information Technology and Fiber Optics

The General Services Agency – Information Technology (GSA-IT) department primarily serves other departments who directly interact with the public. GSA-IT’s mission is to provide cost effective, accurate, reliable, and timely information technology solutions that deliver excellence to our customers and support efficient delivery of services to the community. GSA-IT’s services are a significant contributor to every facet of county business and help to ensure a Safe, Healthy, Livable, Prosperous, and Well-Governed Community.

GSA-IT is integrated into the County at all levels. All County services including judicial, public protection, health, social services, planning, public works, emergency response, elections, financial management, and general administrative services depend on the technologies GSA-IT provides every day. Some of the technologies are strategic in nature, while others are tools used for the day-to-day activities carried out by County employees. As the County’s centralized information technology team, GSA-IT is uniquely positioned to move the County’s technology platforms forward to meet the growing need for the County to increase service delivery and quality while minimizing cost.

At the core of GSA-IT’s services is the support for electronic communications of all kinds. The backbone of these electronic communication tools is fiber optics. For instance, GSA-IT supports over 20 microwave sites for public safety radio communications. Without these sites, Sheriff’s deputies and Cal Fire firefighters could not communicate to be dispatched to support County citizens. Similarly, the telephones, voice mail, email systems, mobile devices, and computer networks used by County employees, regardless of location, are all supported by GSA-IT employees. Today, the County manages, owns, operates, or has specific, dedicated rights to over 120 miles of fiber optics. The use of these fiber optic lines for communications is not limited to the County. School districts, community service districts, State agencies, and numerous quasi-governmental agencies rely on and benefit from County fiber optics.

County General Plan

Early in Fiscal Year 2011-2012, the Board of Supervisors identified ten high-priority General Plan and related programs to be pursued during the current fiscal year in addition to other already authorized

activities. Among those programs was the continued collaboration the Economic Vitality Corporation (EVC) in the development and execution of a countywide economic strategy and companion updates to the County's Economic Element of the General Plan. The countywide economic strategy was prepared through a collaboration of public, nonprofit, and private stakeholders, with the nonprofit EVC acting as the lead agency. The economic strategy project identified six business clusters that represent 90% of regional job growth since 1995. Through a series of work sessions and input from 125 business leaders, a listing emerged, which identified the most promising opportunities as well as the leading inhibitors to business. Citizens, business leaders, and County employees are working to implement the strategy to build prosperity and job growth throughout SLO County. Their efforts are focused on six business clusters identified as:

- Building, Design & Construction
- Green Energy
- Health Services
- Knowledge & Innovation
- Specialized Manufacturing
- Uniquely SLO County

The vision for the Knowledge & Innovation cluster is to achieve recognition of SLO County's cradle of innovation and technology infrastructure which offers a superior set of resources available to encourage, grow, and sustain each business with a competitive advantage. The cluster core objectives are to:

- Endorse fiber optic connectivity throughout SLO County
- Complete Broadband identification project and organize cluster companies with community partners to take action
- Foster collaboration with Cal Poly State University and Cuesta College to hold job fairs for local companies
- Explore innovation test bed possibilities with a specific project towards health information exchange with the Health Services cluster
- Increase regional awareness of the Knowledge and Innovation companies and their hiring needs

The focus on these core objectives is driven by the fact that San Luis Obispo County has emerging information and technology industries which are some of the greatest contributors of new head of household jobs in the region. Many of the establishments are international service providers which rely heavily upon high speed broadband to remain competitive. The potential to grow this industry is directly impacted by the available fiber optic infrastructure.

County Facility Plans

Each year, the GSA-IT organization updates its fiber optic strategic plan. The plan can be found on the Internet at: <http://www.slocounty.ca.gov/it/Presentations.htm>. The plan focuses solely on the needs of the County of San Luis Obispo offices and facilities. It does not address needs of the community. The plan offers a means to utilize the fiber optic resources available to the County and thus support the County's mission. As of 2012, the most populous County facilities were connected using fiber optics. However, over 35 remote facilities throughout the county still use copper telephone wire or the Internet for data communications. Priorities for the connection of these remaining facilities are updated with each updated release of the fiber optic strategic plan. Facilities not listed in the plan are viewed as either too small to connect via private fiber or too distant from other fiber assets to make the connection

financially feasible. The priorities identified in the 2012 plan can be found in Table 1 – County Facility Priorities.

Id	Proposed Project Description	Rank
1	Extend L3 to Longbranch site & connect Public Health Grover Beach to Longbranch *	1
2	Connect L3 Fiber to Atas. Health Clinic (old Hospital) *	1
3	Connect Hotel Park building to Atas. Health Clinic *	1
4	Create initial North County fiber ring - Connect L3 to NWP in Paso Robles	1
5	Connect Social Services Arroyo Grande to Longbranch	2
6	Connect NWP fiber at Stenner Creek into SLO Data Center	2
7	Connect Coroner's Office to UMAN	3
8	Connect El Chorro to UMAN	3
9	Connect Dairy Creek Golf Course to El Chorro	3
10	Connect South County Regional Center to Social Services-Arroyo Grande	3
11	Connect Social Services Paso to L3	3
12	Connect Social Services Atas. To Level3/WilTel fiber	4
13	Extend NWP fiber to Public Health Paso Robles	4
14	Connect Mental Health Arroyo Grande to Social Services Arroyo Grande	5
15	Connect Mental Health SLO to Hawthorne school	5
16	Extend NWP fiber into Atas. Health Clinic	5
17	Connect Morro Bay Social Services -Public Health to UMAN	5
18	Extend NWP fiber to Social Services Cuesta North Campus	5
*Projects already funded or underway		

Table 1 - County Facility Priorities

Research Approach

Given the relatively short amount of time available to develop this report, a limited approach was used in GSA-IT's attempt to find potential project opportunities. Potential partners were broken down into the following groups:

- Carriers (e.g. AT&T, Charter, Digital West, and Time Warner)
- School Districts
- Other governmental agencies (e.g. Cities and Community Services Districts)
- County of San Luis Obispo departments (e.g. Planning and Building)
- Private businesses (e.g. Twin Cities Hospital)

Where time allowed, face-to-face meetings were held with groups or individuals to understand their current needs and identify possible leverage points. However, most discussions were held over the telephone. Meetings with several key carriers, such as AT&T and Charter, are still being scheduled.

These organizations tend to build their own networks using private capital and often find “partnerships” to be less-than-advantageous to their business models.

Apart from a few key future economic sites within the community of Templeton (Ramada Lane and the greater Twin Cities Hospital area), research was primarily conducted related anchor sites such as County facilities, school district buildings, libraries, and other governmental facilities. This approach was taken due to time constraints and the difficulty in reaching out to the business communities in the short time span allotted. Using existing maps, see Figure 1 – County Managed Fiber Optics, and projects identified in the County facility fiber optic strategic plan, discussions to identify needs were held.

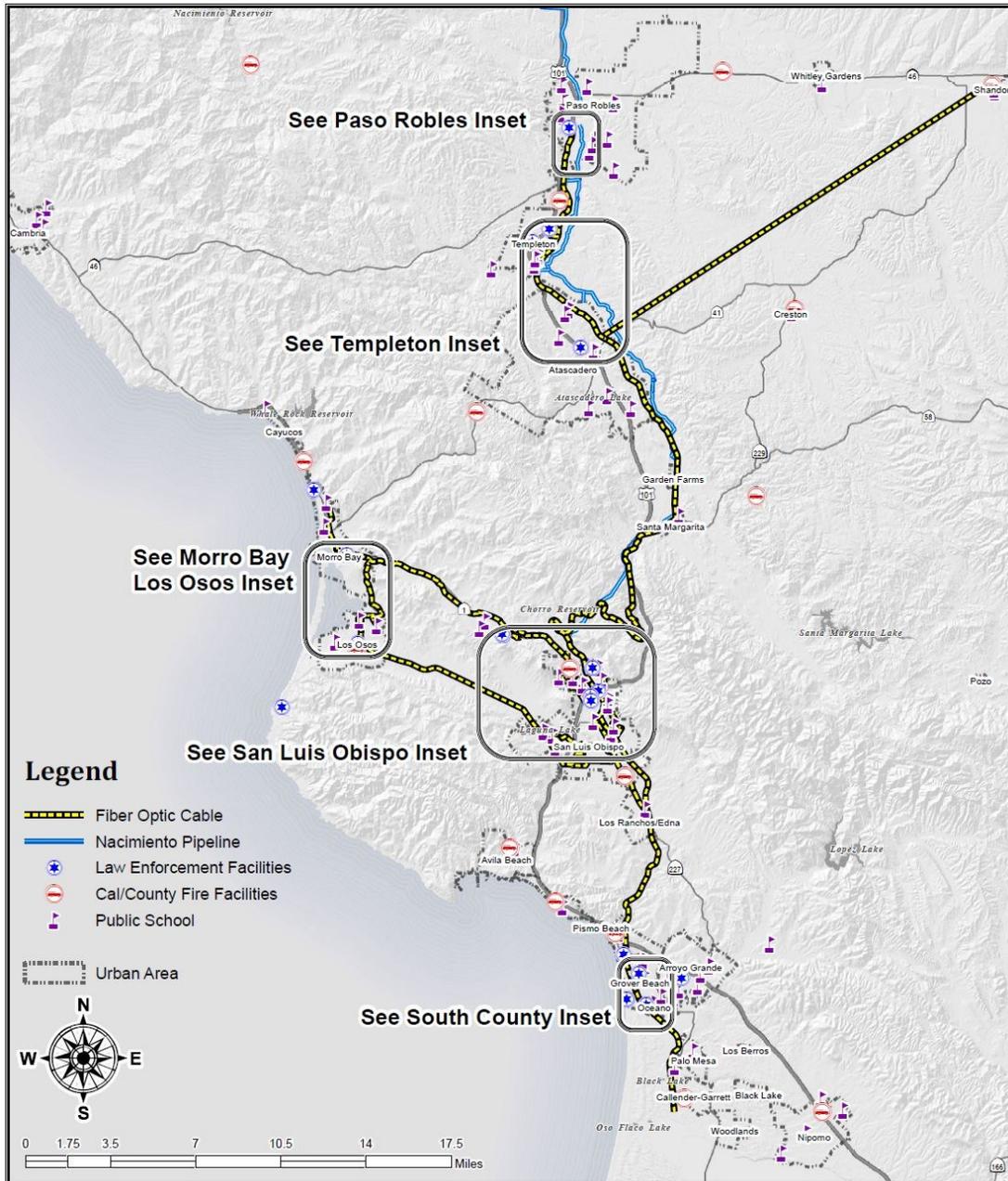


Figure 1 – County Managed Fiber Optics

Key Findings and Opportunities

Priorities

A number of Findings and Opportunities were identified while researching the needs of fiber optics throughout the county. Apart from the initial Finding listed below, *Build a Comprehensive Plan*, no effort to prioritize has been attempted or provided. Clearly, given the complexities involved and the number of potential partners, building a more comprehensive plan is in order and should be treated as the number one priority. Other Findings and Opportunities could be pursued simultaneously, but concerted efforts should be undertaken to *Build a Comprehensive Plan*.

Schools

Schools generally fell into two categories: private fiber connected and E-rate users. Those schools that are connected via private fiber include Cal Poly, Cuesta College, and the San Luis Coastal Unified School District. Most of the remaining schools, which make up the majority of schools within the county, leverage the E-rate program. Under the E-rate program, non-profit private schools, public schools, and libraries can receive discounted telecommunications services from any qualified provider.

The E-rate program is administered by the Schools and Libraries Division of the Universal Service Administrative Company. The program was set up in 1997 when the Federal Communications Commission adopted a Universal Service Order implementing the Telecommunications Act of 1996. The Order was designed to ensure that all eligible schools and libraries have affordable access to modern telecommunications and information services. Up to \$2.25 billion annually is available to provide eligible schools and libraries with discounts under the E-rate program.

The E-rate program provides discounts of 20 percent to 90 percent for eligible telecommunications services, depending on economic need and location (urban or rural). The level of discount is based on the percentage of students eligible for participation the National School Lunch Program or other federally approved alternative mechanisms.

Fiber Construction Costs

Table 2 – Fiber construction costs describes can be used to approximate the overall cost of a fiber construction project. The table assumes the use of prevailing wage and 20% project management overhead. Actual construction costs will vary depending on local factors, such as terrain.

Construction Type	Approximate cost per foot	Approximate cost per mile
Aerial, using existing poles	\$20.00	\$105,000
Open trench construction	\$35.00	\$185,000
Boring (lateral)	\$50.00	\$265,000

Table 2 – Fiber Construction Costs

Findings

Build a Comprehensive Plan

As noted in the October 16, 2012 presentation, broadband connections based on a fiber optic infrastructure will play as crucial a role in the future as roads, clean water, telephones, and the electrical grid have. In addition to strengthening emergency communications in the event of a disaster, the finding

to *Build a Comprehensive Plan* would investigate existing fiber optic availability and identify a prioritized list of additional opportunities that could be pursued.

San Luis Obispo County has a number of significant fiber optic broadband networks; however, the type, location, and the economic development value of these assets are unknown to any single entity. Specifically, public and private sectors develop their own strategies for deploying broadband for their internal purposes without consideration of a more comprehensive and planned approach. This lack of coordination has led to redundant infrastructure and numerous street cuts to create parallel fiber optic infrastructure. *Build a Comprehensive Plan* will evaluate countywide network “linkages” for the purpose of identifying opportunities to facilitate the development of an expanded fiber optic infrastructure and increased broadband capacity for community-wide benefit.

Obtaining information from the larger carriers can be a difficult process. In many cases, they view the information as proprietary and a business differentiator. Consequently, the time required to *Build a Comprehensive Plan* will likely be measured in months, not weeks. However, GSA-IT believes it could undertake or support the development of such a plan in FY 2013-14.

Determine Feasibility of Using Nacimiento Water Project Conduit

Many discussions have been held on the potential use of the “spare” conduit that was laid during the construction of the Nacimiento Water Project (NWP). However, a detailed examination of the potential use by private carriers has not been completed. For some local carriers, the ability to connect fiber assets south of the Cuesta Grade in the City of San Luis Obispo to fiber assets north of the Cuesta Grade is critical. Their ability to further expand fiber networks that support citizens and businesses north of the Grade are hampered due to this lack of infrastructure. County Public Works and GSA-IT should be directed to work with the NWP Commission to determine the restrictions and feasibility of using this key asset.

Opportunities

Paso Robles Connection

A clear opportunity to partner with the City of Paso Robles exists. As noted in the October 16, 2012 presentation, the City of Paso Robles has an immediate need to connect to various water and sewage facilities. At the same time, the County has a desire to cross connect its Level 3 (L3) fiber to the Nacimiento Water Project fiber. The total distance of the project is estimated to be 2 miles; however, the portion of the project that would involve the County is just over ½ mile.

Shandon Fire Station, School District, and Branch Library Connection

The County owns unused, dark fiber that runs to the community of Shandon. Cal Fire Station 31 sits just over a quarter mile from the endpoint of the fiber. Additionally, Shandon High School is less than another quarter mile east of Station 31. Finally, the Shandon Branch Library sits less than a half mile east of the High School. Consequently, all three locations could be connected by installing approximately one mile of aerial fiber.

Templeton Community Service District and Unified School District Connection

The Templeton community and the Templeton Community Services District (CSD) in particular have expressed interest in partnering with the County to bring NWP fiber across the river into the community of Templeton. The CSD has already obtained permits to cross the railroad tracks – a key step in getting fiber into the community. In addition, CSD staff identified pipes that could potentially be used as conduit for a fiber backbone or laterals within the community. While discussing potential opportunities with the CSD, it became clear that fiber connections could also be made to the Templeton Unified School District. Finally, the CSD has potential plans to extend the fiber west along Las Tablas Road, across Highway 101, towards Twin Cities Community Hospital. During discussions, Twin Cities Community Hospital representatives expressed a need for additional bandwidth and talked about how better connectivity would be beneficial to their business. Fiber expansion in this area could also provide for opportunities discussed in countywide economic strategy related to health information exchanges within the Health Services cluster.

The CSD also expressed interest in extending fiber from the North County Regional Center further north along Main Street and Ramada Lane. This area was identified in the County General Plan as a key location for future commercial business expansion.

Morro Bay Landing and Disaster Recovery

One of the goals identified in the most recent countywide Information Technology Strategic Plan (ITSP) is to find suitable facilities where county computing systems could be restored following a disaster. GSA-IT would prefer to maintain a secondary site that is usable 100% of the time as opposed to having hardware and software sitting idle waiting for a disaster to occur. The most efficient way to run a second “hot site” is to have dedicated fiber that runs from the County’s data center to the secondary site. GSA-IT discovered a telecommunications carrier that has a fiber network connection north to Santa Cruz County and south to Santa Barbara County. The Santa Barbara County connection is very near existing County of Santa Barbara fiber assets and could provide the connectivity necessary to build a disaster recovery site. The telecommunications carrier is interested in better access to the greater City of San Luis Obispo area. Discussions are continuing regarding whether a “trade” of fiber assets or bandwidth could be completed.

Grover Beach and Arroyo Grande Connections

The County’s has identified several needs within the community of Grover Beach. The current, top priority for facility connectivity involves extending L3 fiber optics north from the Oceano Sheriff’s Substation to County and State offices located at Longbranch Avenue and 13th Street; and simultaneously connecting the Public Health offices in Grover Beach to the Longbranch facilities. The County has also prioritized connecting the Department of Social Services, at 1086 E Grand Avenue, Arroyo Grande, and Mental Health Services, at 354 Halcyon Road, Arroyo Grande. The Mental Health Services facility is directly across the street from Arroyo Grande Community Hospital. Lastly, the County could pursue connecting the South County Regional Center, at 800 W Branch Street, Arroyo Grande, which houses offices for the Agricultural Commissioner and Library. This last facility is also adjacent to a vacant lot that the City of Arroyo Grande has identified for construction of their new Police headquarters.

Independent of County activities, the City of Grover Beach has been developing plans to expand their private fiber optic infrastructure by providing connectivity to the business areas north of Grand Avenue along Highway 1 and south of Farroll Road.

The local carrier doing the work for the City has expressed a willingness to partner with both the City of Grover Beach and the County to complete all of the connections for both agencies while simultaneously making connections key to their operations along Halcyon Road in Arroyo Grande. Excluding the specific work that the Grover Beach and the local carrier want to complete, the total distance for County related activities is approximately 6.5 miles.

Oceano Elementary School, Community Library, and Educational Center Connection

The Oceano Elementary School, Oceano Community Library, and San Luis Obispo County Office of Education facilities take up roughly 6 blocks between 17th and 19th Streets in Oceano. All of these facilities lack dedicated connectivity. The location is located less than a half-mile from the Sheriff Substation located at 1681 Front Street in Oceano. The County has L3 fiber optic assets connected at the Sheriff Substation and has planned projects in the area, providing the potential to “drop off” a connection at these facilities. One option to create this connectivity is to change the route to connect the Longbranch Avenue facilities in Grover Beach by as little as a half mile of extra fiber to provide a connection.

Glossary

Bandwidth – A generic measure of the volume of data being uploaded or downloaded.

Broadband – A general description for the amount of information that is flowing over a connection. A broadband connection ensures 0.9Mbps upload and over 4 Mbps download speeds.

Cold Site – A cold site is similar to a hot site, but the equipment usually sits idle until a disaster occurs. Use of a cold site takes longer to get an enterprise back to full operation following a disaster.

Carrier Fiber (Public Fiber) – Fiber that is owned or managed by a “for profit” entity and sold to end users based on various amounts of bandwidth.

Dark Fiber (Unused Fiber) – Fiber that is not currently in use is often referred to as dark fiber. Much like when your home’s lights are off and your house is dark; fiber that does not have light beams travelling through it is dark. In most cases, dark fiber does not have any equipment on either end of the fiber strand. Dark fiber is contrasted with active fiber which is often referred to as “lit” fiber.

Download – A general term for information coming from an outside source, such as the Internet, to your local PC or device. For home users, the need to download data is usually much greater than the need to upload data.

Ethernet – The most widely installed family of computer networking technologies used in local area networks (LANs).

Hot Site – A hot site is a disaster recovery facility that allows a business to continue computer and network operations in the event of a disaster. For example, if an enterprise's data center becomes inoperable, that enterprise can move all data processing operations to a hot site. A hot site may have all the equipment needed for the enterprise to continue operation, including office space and furniture, telephone jacks and computer equipment.

Lit Fiber – Fiber that is regularly being used to transmit data. The light passing through the fiber carries data from one point to another. Sometimes, buildings are referred to as being a “fiber lit facility.” A fiber lit facility is one that has fiber connectivity and full Ethernet access.

Private Fiber – Fiber that is owned or managed by the entity or entities using it. Generally, data transmitted over private fiber is limited to the using entities. For instance, the Unified Metropolitan Area Network (UMAN) is a fiber network shared by the County Office of Education, County of San Luis Obispo, San Luis Coastal Unified School District, and Cal Poly.

Unified Metropolitan Area Network (UMAN) – A fiber network shared by the County Office of Education, County of San Luis Obispo, San Luis Coastal Unified School District, and Cal Poly.

Upload – A general term for information going to an outside source, such as the Internet, from your local PC or device. For home users, the need to upload data is usually much lower than the need to download data.