



DATE: January 24, 2017
TO: Mayor and City Council
FROM: City Manager
SUBJECT Draft Fiber-Optic Master Plan

RECOMMENDATION

That Council reviews the Draft Fiber-Optic Master Plan and provides comments following the consultant presentation.

SUMMARY

The development of a fiber optic network is a complex process that requires strategic planning to ensure the system is well designed, subscribed to, and managed. The City initiated the formulation of a Fiber Optic Master Plan to collect the data needed to analyze and recommend the most feasible path and business model to deploy a fiber optic network that meets the community's needs with an initial emphasis on serving businesses in the Industrial Technology and Innovation Corridor. The Draft Fiber Optic Master Plan (Fiber Master Plan) is attached for Council's review (Attachment II).

BACKGROUND

In today's fast-moving, technology-driven world, broadband internet service is considered the foundation for economic growth, job creation, global competitiveness and a better quality of life. Like electricity did a century ago, broadband infrastructure is driving economic development. It attracts new advanced industries and is helping existing businesses expand and remain competitive. Broadband is also changing the way communities educate children, provide public services, and access and disseminate knowledge.

Work Task IS3.C of the [Economic Development Strategic Plan \(FY 2014-2018\)](#) tasks staff to "explore a public/private partnership to secure broadband/fiber optic network in the industrial area." To achieve this task, which is programmed over the duration of the five-year plan, Economic Development staff developed, and is actively executing, a comprehensive work plan designed to meet near- and long-term needs. Core elements of this program include:

1. Collecting data on existing broadband resources and business needs;
2. Engaging with technology and service providers to identify each organization's plan or willingness to expand service to the Industrial Crescent and explore potential public-private partnerships;
3. Pursuing funding opportunities including federal economic development and public works grants for network design and construction; and
4. Developing a Fiber Master Plan to guide the City in planning, budgeting and implementing a telecommunications infrastructure project.

Staff outlined this programmatic approach and presented regular activity updates at meetings of the City Economic Development Committee ([September 14, 2015](#); [February 1, 2016](#); and [October 3, 2016](#)) and the Council Technology Application Committee (October 15, 2015; [December 9, 2015](#); and [November 3, 2016](#)).

On [February 23, 2016](#), Council authorized the City Manager to negotiate and execute a professional services contract with consultant CTC Technology and Energy (CTC) to prepare a Fiber-Optic Network Master Plan. The contract was executed on April 6, 2016.

Over the past ten months, CTC and staff have worked closely to produce a Draft Master Plan that thoroughly analyzes and recommends the best potential approach and business model to deploy the High Speed Hayward system. This extensive work program incorporates the products of data collection and analysis, market research, interviews with staff, and an extensive public outreach initiative targeting the business community in the Industrial Crescent.

Staff completed multiple reviews of the Master Plan iterations and is prepared to share publically the results of the study effort and consultant final recommendations. Specifically, this Master Plan:

- Provides the City with information and data to set its goals and objectives to facilitate the design and deployment of a fiber optic network in Hayward;
- Presents and evaluates the current supply of broadband communications assets, products, and services in the City;
- Provides an inventory and assessment of existing City-owned assets and infrastructure required to support deployment of a fiber optic network;
- Defines and evaluates potential fiber optic network routes and requirements;
- Identifies potential impacts of a fiber optic network, including impacts on City right-of-way (ROW), City-owned conduit, streetlight poles, traffic lights, existing fiber systems, and other real property;
- Defines services and technologies to be offered on the fiber optic network;
- Presents an engineering study, network design, and deployment cost model;
- Outlines a potential phased approach to deliver the network; and
- Evaluates potential business models to build, operate, and make "last-mile" connections to a fiber optic network.

DISCUSSION

A. Evaluating Business Model Options

While the Master Plan provides detailed guidance for technical specifications and configurations of the network, its primary goal is to analyze and recommend the best potential path and business model to deploy a fiber optic network that meets the community's goals. The following provides a brief summary of the three business models analyzed in the Master Plan.

Staff seeks Council feedback on the approach to be adopted.

Retail Service Model (Highest Risk Option):

In a Retail Service model, the City deploys the fiber optic network, "lights" the network to provide internet service and directly offers services to end users. In this model, the City constructs and maintains the network and all related electronics and markets and sells services to retail customers. The City essentially becomes an internet service provider and enters the market as a direct competitor to existing providers.

While this model presents the benefits of complete control over the network, it also presents the greatest risk to the City. Not only does the approach not include any level of partnership from private providers, it also places the City with the responsibility for all aspects of network construction and administration; marketing and advertising; and billing and customer service. Because complete financial and operational responsibility for the network and service falls to the City, the City would need to compete with private providers that have an established presence and brand in the market and that can make use of economies of scale. As a result of these significant risks, the consultant and staff do not recommend the Retail Service model approach.

Dark Fiber Model (Recommended Option):

The Dark Fiber model involves the City directly deploying a fiber optic network and providing a private partner with a license or lease to use the City-owned fiber. This partner then "lights" the fiber and offers services to end users. In this model, the City would be responsible for all construction and maintenance of the fiber, but would not incur costs of managing network electronics, customer premise equipment, marketing or customer contracts. This model assumes the private partner will make a substantial investment in network electronics and lead the marketing, advertising and support responsibilities associated with providing service to end users.

The consultant team recommends and staff concurs that the Dark Fiber Model represents the best option. This approach will leverage City assets and create the public-private partnerships called for in the Council-adopted Economic Development Strategic Plan. The Dark Fiber model is essentially a public works model, in which fiber is infrastructure that the City manages and maintains.

Wholesale Service Model (Hybrid Option)

A Wholesale Service model represents a hybrid of the Dark Fiber and Retail Service models. In a Wholesale Service model, the City would deploy the network and would add network electronics to “light” the fiber. The City would then offer these “lit” services over the network to one or more private internet service providers, who then would offer services to end users. This would allow the City to retain control of the fiber and network electronics while shifting responsibilities for daily operation, marketing, sales and customer service to the private sector. It would also enable multiple service providers to utilize the City’s network to offer services, thereby lowering the barriers to entry.

While this model represents a lower-risk option than the Retail Service model, the approach does expose the City to significant financial and operational risk. In this model, the City would be tasked with operating and maintaining both the fiber *and* network electronics. The private partners with which the City partners with bear less of the responsibility to maintain the network infrastructure and related electronics. As a result of these significant risks, staff does not recommend the Wholesale Service model approach.

B. Evaluating Other Key Recommendations for Near-Term Action

The Master Plan also recommends multiple high-level policy and operational initiatives that can be undertaken by the City in the near term to advance the High Speed Hayward effort. These initiatives are designed to create an environment conducive to the phased construction approach outlined in the Plan. Staff seeks Council direction on whether staff should proceed to begin scoping and programing the following key Master Plan recommendations into work tasks:

1. Adopt a Dig-Once Policy: A “Dig-Once Policy” would require any excavation plans fitting specific criteria to install municipal fiber conduit or fiber, unless the City opts out. This would allow the City to leverage public and private projects to expand the City’s conduit and fiber network.
2. Conduct an Extensive Infrastructure Audit and Implement Records Management System: A thorough evaluation and compilation of all City fiber assets and their condition is key to accurate planning and management. While the Master Plan involved a major data collection effort, more detailed information and a formalized record keeping system will be necessary as a robust fiber optic network is constructed. For example, documenting the network’s fiber runs and individual strand usage is crucial to managing leases and expanding the system.
3. Engage the Private Sector through a Procurement Process: If Council adopts the recommendation to pursue the Dark Fiber model, staff recommends that a Request for Information or Request for Proposals be issued to signal to the private sector that the City is willing to invest in infrastructure and is seeking a partner. San Leandro Dark

Fiber, the service provider of the City of San Leandro's fiber system ("Lit San Leandro") has been working with the City to negotiate a lease. However, it may be necessary to solicit other marketplace actors to ensure the City achieves its goals and maximizes the return on investment.

ECONOMIC IMPACT

The job creation impacts attributable to this initiative cannot be estimated at this time. However, information collected through the Economic Development Business Visitation Program since September 2014, as well as the results of the business surveys and interviews conducted during the Master Plan formation process, indicates there is demand for broadband connectivity for small to medium-sized businesses within the advanced industries sector. Firms in the biotechnology, construction and engineering, information and business services, and manufacturing sectors have expressed a need for such service to help them grow and remain competitive.

The ability to add this infrastructure to Hayward's Industrial Crescent will also serve as a competitive advantage over other communities. Improved broadband connectivity in the City's industrial areas will support business attraction efforts. While the existence of fiber is only one of many site selection factors (such as lease rents, building configuration, traffic patterns, etc.), being able to market Hayward's broadband connectivity to the business community at-large not only helps satisfy a site selection criterion, it will strengthen the City's reputation as a center for innovation and growth.

FISCAL IMPACT

The formulation of the Master Plan comes on the heels of a \$2.74 million grant award from the U.S. Department of Commerce - Economic Development Administration. As part of the federal grant application, former City Manager Fran David committed the City to a 50 percent match (\$2,744,824). As outlined in Attachment V – Letter of Commitment, dated July 10, 2015, this amount is comprised as follows:

- An in-kind contribution of City owned right-of-way land at an estimated value of \$2,108,117;
- Funds already committed to construction and installation of fiber conduit in the Whitesell Street segment of the loop valued at \$156,000; and
- A City General Fund contribution of \$480,707 (cash).

The grant funding enables the City to install conduit and fiber optic cables in the Industrial Crescent to construct the backbone of the fiber optic network. This backbone will consist of existing infrastructure and newly constructed conduit and fiber. These grant funds served as the basis for the engineering design and were included in the cost estimate developed by the consultant and presented in the Master Plan.

Staff is currently developing a grant implementation plan, which will identify project staffing resource requirements, sources for the required matching funds and outline project milestones. A staff update on the grant project will follow this spring.

Note that the consultant estimates that an additional \$5.4 million will be required to deploy the complete fiber optic network described in Section 5 of the Master Plan. To be clear, the \$2.7 million grant will build the fiber optic backbone, but an additional \$5.4 million will be needed to complete the last mile components of the network.

In dark fiber business model recommended by the consultant, the City deploys, owns, and operates the network and seeks a private partner to lease city assets and invest in additional electronics to “light” the network and offer services to end users. The cost estimate does not include any potential City revenue from lease contracts with service providers.

Also note that the cost estimates do not include the resource requirements to initiate the near-term recommendations outlined above. Additional research and staffing resources may be required to develop a “Dig Once Policy,” conduct an infrastructure audit, and implement a Records Management System.

Following Council direction and adoption of the Plan, staff will begin scoping costs, funding sources and timelines of all future actions needed for implementation of the Fiber Master Plan.

PUBLIC CONTACT

Development of the Fiber Master Plan incorporated a thorough outreach effort to the City’s industrial business community. This work included an online survey and telephone interviews with business representatives and organizations, property owners and other public and private stakeholders. The survey was sent by the City and also by the Hayward Chamber of Commerce to over 2,600 businesses in July 2016. There were 259 respondents. Of these 259 respondents, 24 were further contacted for in-depth telephone interviews.

NEXT STEPS

Following the Work Session, staff and the consultant will integrate Council’s comments and produce a Final Fiber Optic Master Plan for Council adoption. Following adoption, staff will initiate scoping for the timelines, specific resource requirements and funding sources for implementing the near-term and long-term actions outlined in the final plan.

Prepared by: Paul Nguyen, Economic Development Specialist

Recommended by: Micah Hinkle, Economic Development Manager

Approved by:

A handwritten signature in black ink, appearing to read 'K. McAdoo', written in a cursive style.

Kelly McAdoo, City Manager