



COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT

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March 11, 2015

AGENDA: March 24, 2015

Board of Supervisors
County of Santa Cruz
701 Ocean Street
Santa Cruz, CA 95060

SUBJECT: Broadband Master Plan

Dear Members of the Board:

On February 10, 2015, your Board directed staff to return on today's agenda with the final assessment of the County's broadband options as part of establishing a Broadband Master Plan. Staff have been working with Design Nine, a nationally recognized broadband planning firm, to perform a "Rapid Assessment" of the County's current state of broadband and provide recommendations for future goals. The attached report details findings, goals and objectives based on the work of Design Nine, meetings with County staff and broadband stakeholders, and a tour of the County's focus areas for economic development.

One of the key goals identified in the report is to encourage and create public/private partnerships. It is our intention to coordinate strategic improvements with the Sunesys Project, a 91.18 mile fiber network from Santa Cruz to Soledad that is funded by a grant from the California Public Utilities Commission. Sunesys submitted an environmental study that was required by the State. Once Sunesys receives approval to move forward, the middle mile fiber network will be built within 18 to 24 months. Sunesys will then work with service providers and other entities to gain access to the network. Surfnet and Cruzio are two service providers and last mile carriers that have planned to partner with Sunesys and serve the Sunesys Project area. Through a public/private partnership, an independent Fiber Initiative Team (hereinafter referred to as FI) could be formed to build off these plans in developing a last mile fiber network. It would be appropriate to identify a plan, including funding and staffing components, to support the work of the FI.

As part of the Rapid Assessment, Design Nine also developed detailed cost estimates for potential projects within the County. They are organized into sections that would allow the FI to decide how and when to invest and what different options may cost. The estimates can also be used to model projects in other areas of the County. The approximate costs of materials and

labor are included in the estimates. The potential projects are located in Davenport, Live Oak, the Medical Area, Upper 41st and the Aptos Area. There is also a larger project that groups Live Oak, the Medical Area and Upper 41st as part of the Urban Core Backbone. These are all areas where the FI could partner with local service providers to invest in a last mile fiber network.

It is therefore RECOMMENDED that your Board take the following actions:


1. Accept and file this report;
2. Direct the County Administrative Officer to present the results of the Rapid Assessment, including the recommendation to form a Fiber Initiative Team, to the City Selection Committee; and
3. Direct staff in Information Services, Planning and Public Works to work with the cities to
 - 1) establish complimentary policies, such as the County's model "dig once" ordinance,
 - 2) propose changes in planning requirements for residential and business construction,
 - 3) explore grant opportunities, and
 - 4) coordinate sewer, water and road construction projects so that conduit for fiber can be incorporated where feasible in order to enhance broadband connectivity and expansion.

Sincerely,



Kathy M. Previsich
Planning Director

RECOMMENDED:

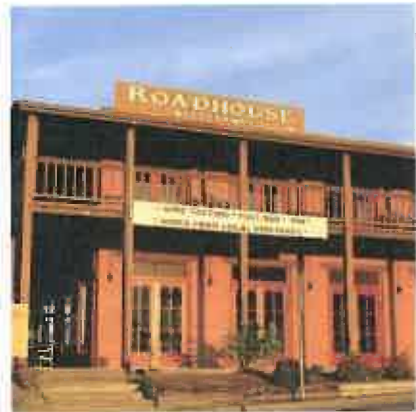


SUSAN A. MAURIELLO
County Administrative Officer

Attachments:

1. Broadband Network Rapid Assessment
2. Santa Cruz County Cost Estimates and Maps

cc: County Administrative Office
Information Services
Public Works



Broadband Network Rapid Assessment

MARCH 16, 2015

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Disclaimer

The telecommunications business is continually evolving. We have made our best effort to apply our experience and knowledge to the business and technical information contained herein. We believe the data we have presented at this point in time to be accurate and to be representative of the current state of the telecommunications industry.

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For more information:

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Executive Summary

In 2013, the County of Santa Cruz Board of Supervisors requested that County staff establish a Broadband Master Plan. Since November 2014, members of the County Government have been working with Design Nine, a nationally recognized broadband planning firm to perform a “Rapid Assessment” of the County’s current state of broadband and provide recommendations for future goals. This report details the findings and recommendations based upon the Design Nine work and meetings with County staff and broadband stakeholders.

High-performance broadband is essential infrastructure for support of 21st century economic development in Santa Cruz County. Technology firms, film makers, artists, entrepreneurs, medical providers, banks, businesses, and startups require fast, reliable, and affordable connections to their clients. Educational institutions increasingly depend on broadband to provide high quality instruction and meet standards for integrating technology into the classroom to prepare students for careers.

Through a public – private partnership, an independent Santa Cruz Broadband Initiative would seek to increase access to fiber and significantly lower the cost of broadband for business by stimulating competition for private sector service delivery through public and private infrastructure investment.

Design Nine was tasked to explore current conditions of broadband in the County and to provide recommendations on partnership options, funding options, and provide detailed cost estimates on potential projects within the County. The overall goals of this effort is to:

- ▶ Identify the kind and type of broadband network needed to retain existing Santa Cruz county businesses and to help attract new businesses and jobs.
- ▶ Provide better and more affordable connectivity options for the large number of home-based workers and those running a business from home.
- ▶ Identify the benefits of a high performance, affordable broadband network to community institutions like County government, healthcare, and higher education.
- ▶ Identify the costs to develop potential pilot project if a decision is made to move forward.

For the County government to make an informed decision about moving forward with a broadband initiative, several questions have to be answered:

- ▶ Does the demand exist for improved high performance, affordable broadband?
- ▶ What are the design goals for the effort?
- ▶ If a new high performance fiber network is built, who will own and manage it?
- ▶ What is the business model for the venture (e.g. retail services, wholesale only)?

- ▶ Can the venture generate the necessary revenue to be financially sustainable?
- ▶ How will it be funded?

FEASIBILITY OF A FIBER INITIATIVE

A fiber project in Santa Cruz County is feasible and practical. The county has significant assets and advantages. These include:

- ▶ **Local demand** - Santa Cruz County has a critical mass of government and municipal agencies, colleges, health care institutions, and large and small businesses that can provide the early customer base needed to generate the revenue that would provide the financial support for the network.
- ▶ **Excellent quality of life** – Abundant possibilities for rural mountain and coastal living and the County's high quality of life can be an economic development attractor, especially for self-employed businesspeople and entrepreneurs.
- ▶ **Excellent recreational activities** – The area has superb outdoor recreational activities, including water-based sports, surfing, kayaking, hiking, and other many other outdoor opportunities.
- ▶ **Rich history** – The region has a rich set of traditions and history dating back to the early 1800s that adds historical interest to the area and enhances the quality of life.
- ▶ The county has some **private fiber** passing through it--more than some other similar areas. This is currently an under-used economic development tool. Some investment is needed to make access to this fiber more widely available to the business community.
- ▶ The grant funded Sunesys middle mile fiber project provides even **more possibilities** for lowering the cost of telecommunications. Sunesys fiber will pass by key economic development areas, including the Medical District, Upper 41st, and Aptos. However, to truly bring the benefit of that regional network to the County, an expanded last mile fiber investment is needed. Additionally, there are other local and regional service providers that could also use the network to offer services to business, institutional, and residential customers.
- ▶ The Regional Transportation Commission is willing to work with the County to extend existing middle mile and access fiber in the region.
- ▶ UCSC is a key asset and contributes significantly to the economic prosperity of the region. Faculty, staff, students, and off-campus facilities all represent a significant market opportunity for high performance **affordable fiber services**.
- ▶ **Santa Cruz** has tremendous potential to attract younger people, start up businesses, and entrepreneurs if affordable Gigabit fiber services are more widely available in the area,

including some of the residential areas of unincorporated (and incorporated) regions of the County (for live/work opportunities).

- ▶ Over **8000 home based businesses** represent another key market segment that will be early prospects for improved fiber services.

OVERVIEW OF MASTER PLAN RECOMMENDATIONS

We recommend that the network effort have the following characteristics:

- ▶ **Passive Assets** - Fiber in Santa Cruz County could be based on a passive infrastructure model or an “active” lit fiber network. In the passive only model, the new network entity would build fiber and conduit and allow independent providers to “light” the fiber in an open-access model that would promote competition among providers for customers. A passive infrastructure model reduces the initial investment and would have low operational costs. Service providers would be responsible for installing and managing the network electronics for their own customers. In an active model, the community enterprise would install and operate network electronics to create a full provisioned network. Service providers would lease circuits on the network rather than dark fiber.
- ▶ **Scalable** - The initial development of the network should be in County economic development focus areas, and over time should support a graceful expansion to be extended to all areas of the County.
- ▶ **Business-class capable** - The passive infrastructure would give service providers the ability to deliver any amount of bandwidth needed by any business connected to the network, with any desired quality of service (QoS) required to make Santa Cruz businesses competitive in the world economy.
- ▶ **Offer equal access to all providers** – The network should be operated on an open access, wholesale business model with all business and residential services provided by qualified private sector providers. A single public wholesale price list will be used to determine the cost of provider use of the network.
- ▶ **Equal access to all residents and businesses over time** – The goal of the network investment would be to deliver high performance fiber services to all residents and businesses who request service as rapidly as possible consistent with fiscally conservative operations.
- ▶ **Support a wide range of competitive providers and services** – the multi-provider, multi-service network would give Santa Cruz businesses, institutions, and residents with a wide range of competitive price and service options.
- ▶ **Dig Once** - The County should continue to promote the existing “dig once” strategy when and where it makes sense, adding telecom conduit, handholes, and other basic

infrastructure as part of other projects (e.g. private sector construction, street rehabilitation, sidewalk repairs and construction, etc.).

- ▶ **Limited County Role** - When feasible, Santa Cruz County can make targeted investments in passive infrastructure (e.g. conduit, handholes, dark fiber) that further specific County goals (e.g. smart traffic management, smart street lighting, reduced energy use, and reduced telecom costs for connections between County facilities). In deploying Dig Once, the County should also consider making spare conduit capacity available on an equal access basis for community-based and private sector networks.
- ▶ **Ownership and Governance** - The network should be operated as an independent entity firmly vested as a community enterprise. Network management and outside plant maintenance (e.g. routine repairs and emergency break-fix) operations could be outsourced to a qualified private sector firms to minimize permanent staff costs.
- ▶ **Business Model** - The network should be available to any and all service providers, including incumbent providers who want access to the significant market opportunity represented by Santa Cruz. This shared business model is fundamentally different from the twentieth century copper-based networks where each provider has to build and operated a completely duplicated network (i.e. two providers each build a separate and duplicated network to reach the same customers, which results in higher costs across the board for customers).
- ▶ **Funding Strategy** - The enterprise should develop a “basket” of funding options, including long term service commitments from anchor tenants (e.g. major businesses, County Government, incorporated city governments), state and Federal grant opportunities (e.g. public safety grants), revenue from the network itself, charitable contributions, tax credits, and one time fees for costs associated with connecting a new customer to the network.

ABOUT THE REPORT

This report presents information that Santa Cruz County and stakeholders needs to make an informed decision about strategic investments in modern broadband infrastructure. This includes investments for Santa Cruz County infrastructure needs, and for the wider business and institutional needs in the County . Business retention and new business attraction can only be accomplished if Santa Cruz County has the right telecommunications infrastructure that will enable area businesses to compete in the global economy.

A word about the report content and organization may be helpful at the outset. This subject area is a very challenging one for governments. The complex technical nature of the undertaking sometimes makes the policy issues hard to assess. This report attempts to assist in this regard by providing technical information which can be thought of as informational or educational, in the body of the report and in several appendices.

The goal is not to make this a technical document but to assist the reader in placing the policy decisions in context.

- ▶ The *Economic Impact* chapter describes the potential benefits of a community-owned fiber network.
- ▶ The *Master Plan Strategies and Goals* chapter outlines strategies and goals for the County of Santa Cruz Broadband Master Plan.
- ▶ The *Economic Impact of Broadband* provides an overview of existing conditions and the significance and impact of improved and affordable broadband.
- ▶ The *Business Models and Ownership* section describes a variety of business models and ownership models available and in common use and their advantages and disadvantages.
- ▶ *Financing Options* provides an overview of funding options and strategies.
- ▶ The *Planning for Success* section provides a summary of best practice from other community projects
- ▶ *Project Phases* provides a high level overview of the tasks and activities that are required to be successful in deploying community-owned broadband infrastructure.
- ▶ *Operating and Managing a Network* provides detail on roles, responsibilities, and tasks related to network operations.

Master Plan Strategies and Goals

This report provides a series of strategies and activities to help get more, and more advanced, broadband in Santa Cruz County. Increased affordability and availability of broadband delivered services has the potential to increase job creation in the County, help retain existing businesses, and improve the County's ability to attract new businesses and entrepreneurs.

While many residents and businesses have access to copper-based (or existing wireless) "little broadband" services with bandwidth in the range of 1-10 megabits/second, many other cities and towns in the country (more than 130, according to Broadband Communities magazine) have already made the leap to fiber-based "big broadband" with a minimum bandwidth of 100 megabits/second and many of those communities are now "Gigabit Cities" with a standard residential and business connection of 1,000 megabits (one Gigabit).

One might reasonably ask, "Why does anyone need a Gig of bandwidth?" The value of a Gig fiber connection is about the future, not the present. It is about preparing citizens, businesses, and the community to be able to compete for jobs and businesses over the next five to thirty years, with future-proof infrastructure that will support future needs.

The economy in Santa Cruz has a long and rich history of being driven by tourism, art, education, technology, and agriculture. More recently, the creative technology boom of mid-coastal California brought new opportunities to Santa Cruz. In the past fifteen years, the U.S. economy has been undergoing a dramatic transformation as digital road systems now transport the products and services of the new economy.

As just one example, music was formerly a "heavy" product that required both a local and national road system to carry first vinyl records and then CDs from manufacturing plant to customers. Today, virtually all music is transported directly to buyers over the new Internet-based digital road system. Software, formerly sold in stores, packaged in boxes, is now delivered via the digital road system. In the week after Christmas (2014) Apple Computer sold and delivered more than half a billion dollars in software--all delivered via the Internet-based transport system.

Today, Santa Cruz County needs a modern transportation system--a digital road system--both within the County and to other points in the state and the nation.

Without some action, the County will stand still economically with its current copper-based telecom infrastructure, effectively freezing economic development where it is today. But if the community wants to grow economically, retain businesses, create jobs, attract entrepreneurs, and bring new businesses, Gigabit connections in key locations like the population centers and business districts become a critical part of a forward-thinking economic development strategy.

In summary, if a fiber initiative in Santa Cruz County makes targeted investments in broadband infrastructure, with the goal of creating a successful public/private partnership,

expected outcomes can include increased economic growth through increased business attraction, increased local business expansion, and an increase in good-paying job opportunities.

LONG TERM GOALS

Long Term Goals	Description
Encourage Public/Private Partnerships	Partnerships among Santa Cruz County local government, local schools (including Cabrillo College and USCS), service providers, public safety agencies, and major businesses will assist with business attraction and lower telecom costs for all partners.
Create New Business Opportunities for Existing Service Providers	Local government should only provide basic infrastructure and transport, and should not compete with existing providers by selling services to businesses and residents.
Fiber Should Support Economic Development	Broadband investments should be targeted to promote business growth and jobs creation.
Reduce Cost, Improve Quality of Government Services	Local investments in basic broadband infrastructure will reduce the cost of telecom services and related expenses for businesses in the County while simultaneously improving service delivery.
Reduce Costs for Small and Large Businesses	Modest investments in fiber infrastructure will reduce the cost services for entrepreneurs, business start ups, and existing businesses.
Don't Wait	Many other communities have already made investments and are aggressively promoting their infrastructure as part of their economic development strategies.

ENCOURAGE PUBLIC/PRIVATE PARTNERSHIPS

The size of the region and the diversity of public and private interests in the County will require a commitment to collaboration between the private sector and local government. From a network perspective, the entire county is a single market. Important and critical partners include:

- ▶ Santa Cruz County and other local governments including the Regional Transportation Commission and four incorporated areas as well as surrounding counties.
- ▶ Existing incumbent and competitive telecom service providers, in particular the local service providers who already have invested heavily in the market.
- ▶ Businesses, institutions, and other stakeholders that have high bandwidth needs.

By taking the time to develop partnerships:

- ▶ Costs are spread across a larger market area, making the long term financial sustainability much more likely.

- ▶ The larger market base will attract more providers and services, leading to even lower prices and a greater diversity of service offerings.
- ▶ The larger market base will also encourage more private investment, especially in creating new and diverse fiber routes in and out of the County.
- ▶ It will be possible to raise more funds more quickly and thereby build to more businesses, residents, and institutions more quickly.

CREATE NEW BUSINESS OPPORTUNITIES FOR EXISTING SERVICE PROVIDERS

Any local government investment in telecom and broadband infrastructure should be at the basic infrastructure layer of the network. Local government should avoid selling services to businesses and residents. Providing basic infrastructure will allow providers to reach new customers at much lower cost and allow them to offer improved services to their existing customers. An important goal of any local government investment should be to create new business opportunities for existing incumbent and competitive providers.

BUILD FIBER IN SUPPORT OF ECONOMIC DEVELOPMENT GOALS

The County needs more distribution and access fiber, which is essential for meeting future demand for broadband services as well as attracting and retaining businesses.

- ▶ Fiber to the home is needed to support work from home opportunities and keep commuters in Santa Cruz more often.
- ▶ Fiber to the home is needed to support business from home ventures, especially small business start-ups and entrepreneurial ventures.
- ▶ Fiber is needed to every economic development area and corridor in the County, and open fiber is needed in the the heavily populated areas and in other commercial and retail areas of the County to reduce the cost of broadband services for businesses located in those areas.
- ▶ Broadband is needed to both improve the delivery of government services and to reduce the cost of those services.

REDUCE COST, IMPROVE QUALITY OF GOVERNMENT SERVICES

A shared network will help reduce the cost of telecommunications and broadband services for the County through increased competition and the cost advantage of shared infrastructure. Critical services like public safety will benefit from a long range plan to make fiber available to most local government locations (e.g. fire and rescue, police stations, pumping stations, and parks).

REDUCE COSTS FOR SMALL AND LARGE BUSINESSES

A shared, high performance network will reduce the cost of telephone, Internet, data back up, videoconferencing, and other business services through reduced cost of infrastructure and

increased competition. Santa Cruz County is competing for jobs and businesses with other communities in California and communities in other states that already have this kind of infrastructure in place--and most of those communities are aggressively promoting it as part of their economic development business attraction and retention strategies.

DON'T WAIT

Many other regions, some close by, are well ahead of Santa Cruz County in their plans to acquire 21st century broadband infrastructure. If Santa Cruz initiated a broadband project today, a full buildout to every home and business in the County would take between five to seven years.

- ▶ There are numerous other county and multi-county broadband networks that have been operating successfully for years. New Hampshire FastRoads is a community-owned Gigabit network providing open access services to 22 towns in rural New Hampshire.
- ▶ Kansas City, Kansas and Kansas City, Missouri have the Google partnership underway, which is connecting hundreds of government locations, thousands of businesses, and tens of thousands of homes.
- ▶ Danville, Virginia has been successfully operating a municipal open access network since 2007, and the project generates enough revenue to fund a steady expansion.
- ▶ The City of Eagan, Minnesota has built 17 miles of Gigabit fiber that passes most of the primary business and commercial areas of the city, and the network was a key factor in attracting a major data center to Eagan.
- ▶ More than 135 other communities in the United States have operating networks or have substantial network construction underway.

SHORT TERM GOALS

A variety of short term goals should be considered as next steps in this effort.

Short Term Goals	Description
Continue the Current Broadband Initiative	The current group of public and private stakeholders and interested parties should continue development of this initiative.
Select an Ownership and Business Model	Answering the questions, "What entity will own and manage the infrastructure?" and "What will the entity sell (i.e. dark fiber or lit circuits) is an essential first step.
Commitment from Key Stakeholders to Support the Effort	Support from elected officials and key stakeholders like the UCSC, local providers, County government, and local health care providers is essential to success.

Short Term Goals	Description
Consistent Message and Coordinated Public Awareness	If a decision to move forward is made by the County, stakeholders, and interested parties, a consistent message about the benefits and advantages will be critical to gain public support.
Create a Public/Private Partnership	Investments in basic infrastructure create an ideal opportunity to form a public/private partnership with existing local and regional providers.
Continue to Develop a Common Fiber Overlay Plan and Open Ditch Policy	Conduit and handholes should be included where appropriate in all new public and private construction. Shared trenching should be vigorously pursued.
Coordinate Broadband Infrastructure Improvements with Public Safety Spending	Coordinate upgrades to public safety communications systems with planned fiber improvements to reduce the cost and improve the quality of public safety voice/data traffic.

CONTINUE THE CURRENT BROADBAND INITIATIVE

The current group of County officials, private sector business people, and institutional stakeholders should continue to meet regularly, identify key decision points, recommend an overall strategy, and adopt an action plan for next steps.

SELECT A OWNERSHIP AND BUSINESS MODEL

There are several ownership options (e.g. nonprofit, LLC, stock corporation), and what is chosen will depend in part on the early funding sources and key stakeholder participation.

COMMITMENT FROM KEY STAKEHOLDERS TO SUPPORT THE EFFORT

County support may consist of investments in conduit and other passive infrastructure that can be leased out on an open access basis, commitments to buy services once the network is constructed, and commitments to provide expedited rights-of-way and construction permit processing. The commitment to buy services for County facilities and agencies is particularly important for financial sustainability and stability over time. This is also true for the incorporated cities within the County. Currently, both the County and the incorporated cities utilize dark fiber provided by Comcast which will no longer be available starting in 2022 (at the current rate of \$1 per year).

As more private sector businesses are connected, government purchases of services have less financial impact on the enterprise, but early commitments from anchor tenant customers can ease financing (both for public and private ownership) and can help attract service providers.

During the planning stages of first phase of development, it is also important that local businesses consider the impact of purchasing or renewing long term broadband and telecom service contracts with providers. Large “anchor tenant” customers for the new infrastructure

can use their purchasing power to encourage local incumbent and competitive service providers to amend their contracts to allow a graceful transition to the new open network.

CONSISTENT MESSAGE AND COORDINATED PUBLIC AWARENESS

Public support for the project will be important to the long term success of the effort. All parties involved in the effort must be able to address key talking points clearly, succinctly, and consistently to avoid confusion and negative rumors. Incumbents may embark on extremely negative and mis-leading public relations campaigns that seem to suggest a wide range of poor outcomes to such an effort. Citizens may assume that taxes will be increased to support the effort. A well-managed public awareness campaign that includes helping elected and appointed officials both understand and discuss key parts of the project will be very important.

CREATE A PUBLIC/PRIVATE PARTNERSHIP

Any new community-owned entity formed should partner with local and regional private sector providers to avoid competing with the private sector and to limit the size and scope of County government involvement.

CONTINUE TO DEVELOP A COMMON FIBER OVERLAY PLAN AND OPEN DITCH POLICY

A fiber overlay plan is an essential part of any next steps. The County should continue to develop its current work efforts to identify desired fiber routes and connected facilities, any road reconstruction or repairs, and other civic construction or utility work should be compared to the overlay plan to determine if the new work is on a desired fiber route. If it is, funds should be budgeted during the planning phase of the effort to include adding duct and fiber along that route.

The Public Works Department should update new project guidelines and checklists to aggressively encourage both public and private development projects to include conduit, duct, and handholes where appropriate, just as private developers routinely provide shared infrastructure like roads and sidewalks.

The Public Works Department should be trained to install duct so that incremental build opportunities can be pursued at the least cost and funding should be made available such that the Public Works Department can invest modest funds where appropriate.

COORDINATE BROADBAND INFRASTRUCTURE IMPROVEMENTS WITH PUBLIC SAFETY SPENDING

Public safety can benefit substantially from cost sharing with a community-owned network. Fiber can be reserved specifically for public safety use so that those agencies have secure data transmission with no information co-mingled with commercial and residential data. The public safety radio network can be enhanced by running fiber (over time) to all repeater towers, improving the quality of voice transmission and potentially reducing the overall number of towers and repeaters needed.