9. Appendix A: Glossary of Terms

3G – Third Generation	The third generation of mobile broadband technology, used by smart phones, tablets, and other mobile devices to access the web.
4G – Fourth Generation	The fourth generation of mobile broadband technology, used by smart phones, tablets, and other mobile devices to access the web.
ADSL – Asymmetric Digital Subscriber Line	DSL service with a larger portion of the capacity devoted to download communications, less to upload. Typically thought of as a residential service.
ADSS – All-Dialetric Self-Supporting	A type of optical fiber cable that contains no conductive metal elements.
AMR/AMI – Automatic Meter Reading/Advanced Metering Infrastructure	Electrical meters that measure more than simple consumption and an associated communication network to report the measurements.
ATM – Asynchronous Transfer Mode	A data service offering that can be used for interconnection of customer's LAN. ATM provides service from 1 Mbps to 145 Mbps utilizing Cell Relay Packets.
Bandwidth	The amount of data transmitted in a given amount of time; usually measured in bits per second, kilobits per second (kbps), and Megabits per second (Mbps).
Bit	A single unit of data, either a one or a zero. In the world of broadband, bits are used to refer to the amount of transmitted data. A kilobit (Kb) is approximately 1,000 bits. A Megabit (Mb) is approximately 1,000,000 bits. There are 8 bits in a byte (which is the unit used to measure storage space), therefore a 1 Mbps connection takes about 8 seconds to transfer 1 megabyte of data (about the size of a typical digital camera photo).
BPL – Broadband over Powerline	A technology that provides broadband service over existing electrical power lines.
BPON – Broadband Passive Optical Network	BPON is a point-to-multipoint fiber-lean architecture network system which uses passive splitters to deliver signals to multiple users. Instead of running a separate strand of fiber from the CO to every customer, BPON uses a single strand of fiber to serve up to 32 subscribers.
Broadband	A descriptive term for evolving digital technologies that provide consumers with integrated access to voice, high-speed data service, video-demand services, and interactive delivery services (e.g. DSL, Cable Internet).
CAD – Computer Aided Design	The use of computer systems to assist in the creation, modification, analysis, or optimization of a design.
CAI – Community Anchor Institute	Community anchor institutions (CAIs, sometimes called anchor institutions) are usually non-profit organizations that often provide essential services to the public. Universities, colleges, community colleges, K12 schools, libraries, health care facilities, social service providers, government and municipal offices are all community

	anchor institutions.
CAP – Competitive Access Provider	(or "Bypass Carrier") A Company that provides network links between the customer and the Inter-Exchange Carrier or even directly to the Internet Service Provider. CAPs operate private networks independent of Local Exchange Carriers.
Cellular	A mobile communications system that uses a combination of radio transmission and conventional telephone switching to permit telephone communications to and from mobile users within a specified area.
CLEC – Competitive Local Exchange Carrier	Wireline service provider that is authorized under state and Federal rules to compete with ILECs to provide local telephone service. CLECs provide telephone services in one of three ways or a combination thereof: 1) by building or rebuilding telecommunications facilities of their own, 2) by leasing capacity from another local telephone company (typically an ILEC) and reselling it, and 3) by leasing discrete parts of the ILEC network referred to as UNEs.
CO – Central Office	A circuit switch where the phone lines in a geographical area come together, usually housed in a small building.
Coaxial Cable	A type of cable that can carry large amounts of bandwidth over long distances. Cable TV and cable modem service both utilize this technology.
CPE – Customer Premise Equipment	Any terminal and associated equipment located at a subscriber's premises and connected with a carrier's telecommunication channel at the demarcation point ("demarc").
CWDM – Coarse Wavelength Division Multiplexing	A technology similar to DWDM only utilizing less wavelengths in a more customer-facing application whereby less bandwidth is required per fiber.
Demarcation Point (demarc)	The point at which the public switched telephone network ends and connects with the customer's on-premises wiring.
Dial-Up	A technology that provides customers with access to the Internet over an existing telephone line.
DLEC – Data Local Exchange Carrier	DLECs deliver high-speed access to the Internet, not voice. Examples of DLECs include Covad, Northpoint and Rhythms.
Download	Data flowing from the Internet to a computer (Surfing the net, getting E-mail, downloading a file).
DSL – Digital Subscriber Line	The use of a copper telephone line to deliver "always on" broadband Internet service.
DSLAM – Digital Subscriber Line Access Multiplier	A piece of technology installed at a telephone company's Central Office (CO) and connects the carrier to the subscriber loop (and ultimately the customer's PC).

DWDM – Dense Wavelength Division Multiplexing	An optical technology used to increase bandwidth over existing fiber-optic networks. DWDM works by combining and transmitting multiple signals simultaneously at different wavelengths on the same fiber. In effect, one fiber is transformed into multiple virtual fibers.
E-Rate	A Federal program that provides subsidy for voice and data circuits as well as internal network connections to qualified schools and libraries. The subsidy is based on a percentage designated by the FCC.
EON – Ethernet Optical Network	The use of Ethernet LAN packets running over a fiber network.
EvDO – Evolution Data Only	EvDO is a wireless technology that provides data connections that are 10 times as fast as a traditional modem.
FCC – Federal Communications Commission	A Federal regulatory agency that is responsible for regulating interstate and international communications by radio, television, wire, satellite and cable in all 50 states, the District of Columbia, and U.S. territories.
FDH – Fiber Distribution Hub	A connection and distribution point for optical fiber cables.
FTTN – Fiber to the Neighborhood	A hybrid network architecture involving optical fiber from the carrier network, terminating in a neighborhood cabinet with converts the signal from optical to electrical.
FTTP – Fiber to the premise (or FTTP – Fiber to the building)	A fiber-optic system that connects directly from the carrier network to the user premises.
GIS – Geographic Information Systems	A system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data.
GPON- Gigabit-Capable Passive Optical Network	Similar to BPON, GPON allows for greater bandwidth through the use of a faster approach (up to 2.5 Gbps in current products) than BPON.
GPS – Global Positioning System	a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites.
GSM – Global System for Mobile Communications	This is the current radio/telephone standard developed in Europe and implemented globally except in Japan and South Korea.
HD – High Definition (Video)	Video of substantially higher resolution than standard definition.
HFC – Hybrid Fiber Coaxial	An outside plant distribution cabling concept employing both fiber-optic and coaxial cable.
ICT – Information and Communications Technology	Often used as an extended synonym for information technology (IT), but it is more specific term that stresses the role of unified communications and the integration of telecommunications, computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.
IEEE – Institute of Electrical Engineers	A professional association headquartered in New York City that is dedicated to advancing technological innovation and excellence.
ILEC – Incumbent Local	The traditional wireline telephone service providers within defined

Exchange Carrier	geographic areas. Prior to 1996, ILECs operated as monopolies having exclusive right and responsibility for providing local and local toll telephone service within LATAs.
IP-VPN – Internet Protocol-Virtual Private Network	A software-defined network offering the appearance, functionality, and usefulness of a dedicated private network.
ISDN – Integrated Services Digital Network	An alternative method to simultaneously carry voice, data, and other traffic, using the switched telephone network.
ISP – Internet Service Provider	A company providing Internet access to consumers and businesses, acting as a bridge between customer (end-user) and infrastructure owners for dial-up, cable modem and DSL services.
ITS – Intelligent Traffic System	Advanced applications which, without embodying intelligence as such, aim to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated, and 'smarter' use of transport networks.
Kbps – Kilobits per second	1,000 bits per second. A measure of how fast data can be transmitted.
LAN – Local Area Network	A geographically localized network consisting of both hardware and software. The network can link workstations within a building or multiple computers with a single wireless Internet connection.
LATA – Local Access and Transport Areas	A geographic area within a divested Regional Bell Operating Company is permitted to offer exchange telecommunications and exchange access service. Calls between LATAs are often thought of as long distance service. Calls within a LATA (IntraLATA) typically include local and local toll services.
Local Loop	A generic term for the connection between the customer's premises (home, office, etc.) and the provider's serving central office. Historically, this has been a wire connection; however, wireless options are increasingly available for local loop capacity.
MAN – Metropolitan Area Network	A high-speed intra-city network that links multiple locations with a campus, city or LATA. A MAN typically extends as far as 30 miles.
Mbps – Megabits per second	1,000,000 bits per second. A measure of how fast data can be transmitted.
MPLS – Multiprotocol Label Switching	A mechanism in high-performance telecommunications networks that directs data from one network node to the next based on short path labels rather than long network addresses, avoiding complex lookups in a routing table.
ONT – Optical Network Terminal	Used to terminate the fiber-optic line, demultiplex the signal into its component parts (voice telephone, television, and Internet), and provide power to customer telephones.
Overbuilding	Building excess capacity. In this context, it involves investment in additional infrastructure projects to provide competition.
OVS – Open Video Systems	OVS is a new option for those looking to offer cable television service outside the current framework of traditional regulation. It would allow more flexibility in providing service by reducing the build out requirements of new carriers.

PON – Passive Optical Network	A Passive Optical Network consists of an optical line terminator located at the Central Office and a set of associated optical network terminals located at the customer's premise. Between them lies the optical distribution network comprised of fibers and passive splitters or couplers. In a PON network, a single piece of fiber can be run from the serving exchange out to a subdivision or office park, and then individual fiber strands to each building or serving equipment can be split from the main fiber using passive splitters / couplers. This allows for an expensive piece of fiber cable from the exchange to the customer to be shared amongst many customers, thereby dramatically lowering the overall costs of deployment for fiber to the business (FTTB) or fiber to the home (FTTH) applications.
QOS – Quality of Service	QoS (Quality of Service) refers to a broad collection of networking technologies and techniques. The goal of QoS is to provide guarantees on the ability of a network to deliver predictable results. Elements of network performance within the scope of QoS often include availability (uptime), bandwidth (throughput), latency (delay), and error rate. QoS involves prioritization of network traffic.
RF – Radio Frequency	a rate of oscillation in the range of about 3 kHz to 300 GHz, which corresponds to the frequency of radio waves, and the alternating currents which carry radio signals.
Right-of-Way	A legal right of passage over land owned by another. Carriers and service providers must obtain right-of-way to dig trenches or plant poles for cable systems, and to place wireless antennae.
RMS – Resource Management System	A system used to track telecommunications assets.
RPR – Resilient Packet Ring	Also known as IEEE 802.17, is a protocol standard designed for the optimized transport of data traffic over optical fiber ring networks.
RUS – Rural Utility Service	A division of the United States Department of Agriculture, it promotes universal service in unserved and underserved areas of the country with grants, loans, and financing.
SCADA – Supervisory Control and Data Acquisition	A type of industrial control system (ICS). Industrial control systems are computer controlled systems that monitor and control industrial processes that exist in the physical world.
SNMP – Simple Network Management Protocol	An Internet-standard protocol for managing devices on IP networks.
SONET – Synchronous Optical Network	A family of fiber-optic transmission rates.
Steaming	Streamed data is any information/data that is delivered from a server to a host where the data represents information that must be delivered in real time. This could be video, audio, graphics, slide shows, web tours, combinations of these, or any other real time application.
Subscribership	Subscribership is how many customers have subscribed for a particular telecommunications service.
Switched Network	A domestic telecommunications network usually accessed by

	telephone, key telephone systems, private branch exchange trunks, and data arrangements.
T-1 – Trunk Level 1	A digital transmission link with a total signaling speed of 1.544 Mbps. It is a standard for digital transmission in North America.
T-3 – Trunk Level 3	28 T1 lines or 44.736 Mbps.
UNE – Unbundled Network Elements	Leased portions of a carrier's (typically an ILEC's) network used by another carrier to provide service to customers.
Universal Service	The idea of providing every home in the United States with basic telephone service.
Upload	Data flowing from your computer to the Internet (sending E-mail, uploading a file).
UPS – Uninterruptable Power Supply	An electrical apparatus that provides emergency power to a load when the input power source, typically main power, fails.
USAC – Universal Service Administrative Company	An independent American nonprofit corporation designated as the administrator of the Federal Universal Service Fund (USF) by the Federal Communications Commission.
VDSL – Very High Data Rate Digital Subscriber Line	A developing digital subscriber line (DSL) technology providing data transmission faster than ADSL over a single flat untwisted or twisted pair of copper wires (up to 52 Mbit/s download and 16 Mbit/s upload), and on coaxial cable (up to 85 Mbit/s down and upload); using the frequency band from 25 kHz to 12 MHz.
Video on Demand	A service that allows users to remotely choose a movie from a digital library whenever they like and be able to pause, fast-forward, and rewind their selection.
VLAN – Virtual Local Area Network	In computer networking, a single layer-2 network may be partitioned to create multiple distinct broadcast domains, which are mutually isolated so that packets can only pass between them via one or more routers; such a domain is referred to as a Virtual Local Area Network, Virtual LAN or VLAN.
VoIP – Voice over Internet Protocol	A technology that employs a data network (such as a broadband connection) to transmit voice conversations using Internet Protocol.
VPN – Virtual Private Network	A virtual private network (VPN) extends a private network across a public network, such as the Internet. It enables a computer to send and receive data across shared or public networks as if it were directly connected to the private network, while benefitting from the functionality, security and management policies of the private network. This is done by establishing a virtual point-to-point connection through the use of dedicated connections, encryption, or a combination of the two.
WAN – Wide Area Network	A network that covers a broad area (i.e., any telecommunications network that links across metropolitan, regional, or national boundaries) using private or public network transports.
WiFi	WiFi is a popular technology that allows an electronic device to exchange data or connect to the Internet wirelessly using radio waves. The Wi-Fi Alliance defines Wi-Fi as any "wireless local area network (WLAN) products that are based on the Institute of

	Electrical and Electronics Engineers' (IEEE) 802.11 standards".
WiMax	WiMax is a wireless technology that provides high-throughput broadband connections over long distances. WiMax can be used for a number of applications, including “last mile” broadband connections, hotspot and cellular backhaul, and high speed enterprise connectivity for businesses.
Wireless	Telephone service transmitted via cellular, PCS, satellite, or other technologies that do not require the telephone to be connected to a land-based line.
Wireless Internet	1) Internet applications and access using mobile devices such as cell phones and palm devices. 2) Broadband Internet service provided via wireless connection, such as satellite or tower transmitters.
Wireline	Service based on infrastructure on or near the ground, such as copper telephone wires or coaxial cable underground or on telephone poles.

10. Appendix B: Countywide Survey Results

A. Residential Survey

Residential Survey Questions

1.

Please use the link below to report your Internet speed. Once you click the link, you'll see a new web browser window appear that goes to speedtest.net. You'll see a "Begin Test" icon in the middle of your screen. Click this icon to begin the speed test. Wait a few moments while the test runs and measures your download and upload speeds. Once the test finishes, please record these speeds in the boxes below.

Speedtest Link - Click Here

Download Speed:

Upload Speed:

2. Please provide your name and physical address where you are testing your Internet connection. (This information will be used solely for determining the availability of broadband in Yolo County, California and may become publicly accessible however no names or email addresses will be provided as public information).

Name

Street Address

City

Zip Code

3. Do you have Internet service in your home? If not, please answer No and move on to question 4.

- Yes
- No
- Not sure

4. What is the NUMBER ONE reason why you don't have Internet service at home?

- Too expensive
- Slow connection in my area
- Not available in my area
- Don't know much about technology
- I have Internet at work, school, library, etc., and don't need it at home
- Other

Other (please specify)

5. From which broadband Internet service provider do you receive service?

6. What type of broadband Internet service do you have?

- High-speed (e.g. DSL, cable modem, fiber)
- Mobile Internet for a phone or tablet
- Dial-up
- Not sure
- Other

Other (please specify)

7. How many devices that connect to the Internet such as computers, iPads, tablets, Kindles, iPods, TiVo, Xbox, PlayStation, etc. do you have in your home?

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 or more
- Not sure

8. Do you have a wireless router set up in your home?

- Yes
- No
- Not sure

9. On a scale from 1 to 10, how important is high speed Internet to members of your household? 1 means "It's unnecessary" and 10 means "We couldn't live without it."

It's unnecessary									We couldn't live without it.
○	○	○	○	○	○	○	○	○	○

10. Do you or any members of your household have a home-based business?

- ○ Yes
- ○ No
- ○ Not sure

11. Do you or any members of your household telecommute?

- ○ Yes
- ○ No
- ○ Not sure

12. What is the best estimate of the cost of your home internet connection?

- ○ Less than $20 per month
- ○ $20 to $29 per month
- ○ $30 to $49 per month
- ○ $50 to $74 per month
- ○ $75 to $99 per month
- ○ $100 to $124 per month
- ○ $125 to $149 per month
- ○ $150 to $199 per month
- ○ $200 or more per month

13. Does that cost include something else besides internet connection, such as cable TV, mobile phone, etc.?

- ○ Yes
- ○ No
- ○ Unsure

14. What kind of impact do Internet problems including reliability and speed have on your home experience?

- ○ No disruption
- ○ Minimal disruption
- ○ Moderate disruption
- ○ Severe disruption
- ○ Total disruption
- ○ Other

Other (please specify)

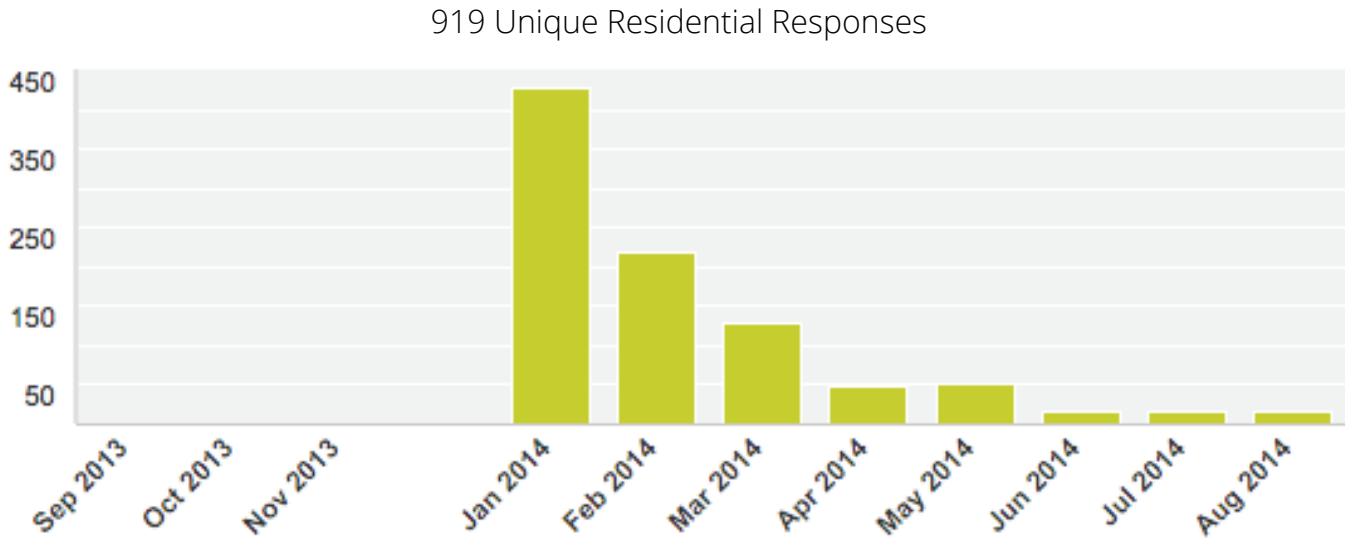
15. Please rate your current Internet services on a scale of 1 - 5, with 5 being the best.

	1	2	3	4	5
Price	○	○	○	○	○
Reliability	○	○	○	○	○
Speed	○	○	○	○	○
Customer service	○	○	○	○	○

16. Do you currently have a "triple-play" offering available in your area? Triple-play includes Internet, voice and video services.

- ○ Yes
- ○ No
- ○ Unsure

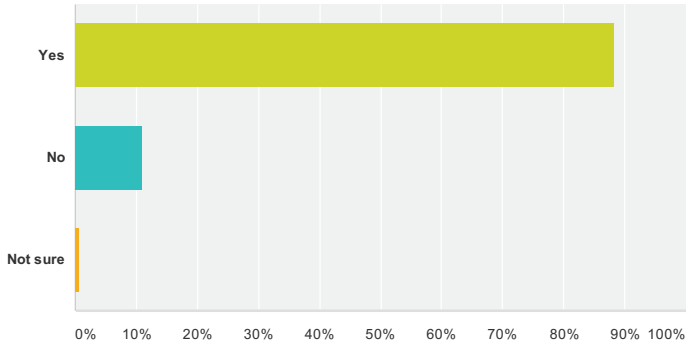
Residential Survey Collection Results



Residential Survey Response Results

Q3 Do you have Internet service in your home? If not, please answer No and move on to question 4.

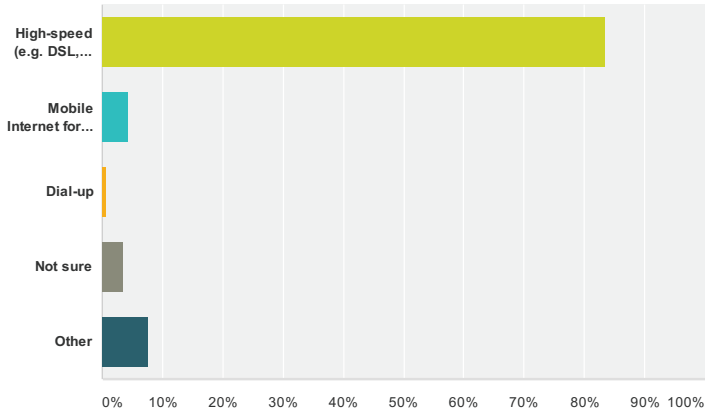
Answered: 893 Skipped: 26



Answer Choices	Responses	
Yes	**88.24%**	788
No	**11.09%**	99
Not sure	**0.67%**	6
Total		**893**

Q6 What type of broadband Internet service do you have?

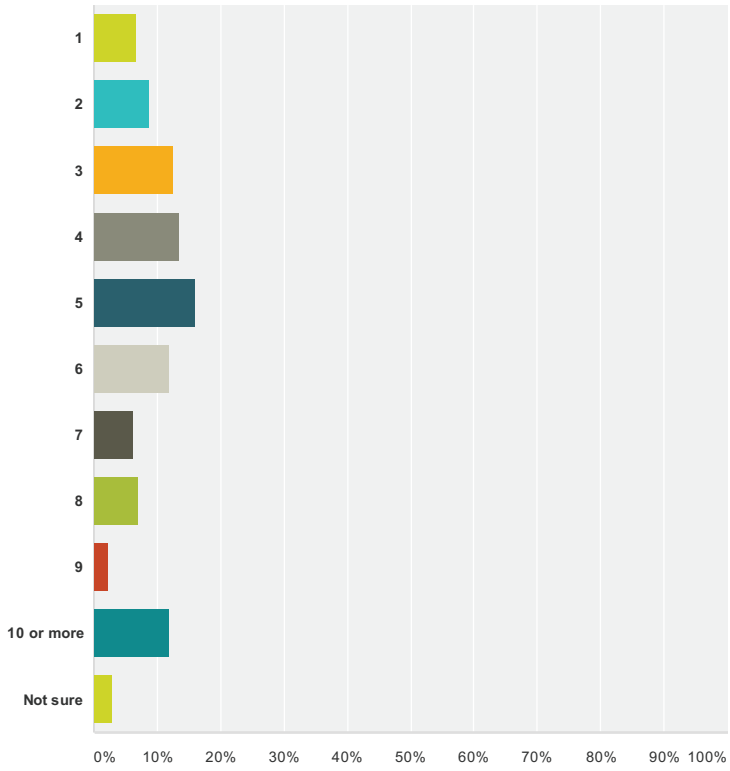
Answered: 831 Skipped: 88



Answer Choices	Responses	
High-speed (e.g. DSL, cable modem, fiber)	**83.51%**	694
Mobile Internet for a phone or tablet	**4.45%**	37
Dial-up	**0.72%**	6
Not sure	**3.61%**	30
Other	**7.70%**	64
Total		**831**

Q7 How many devices that connect to the Internet such as computers, iPads, tablets, Kindles, iPods, TiVo, Xbox, PlayStation, etc. do you have in your home?

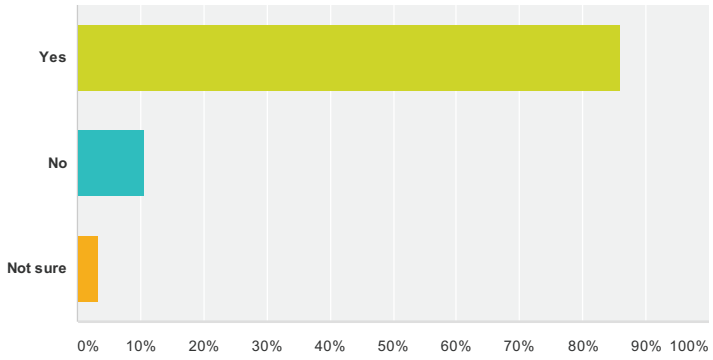
Answered: 849 Skipped: 70



Answer Choices	Responses	
1	6.60%	56
2	8.72%	74
3	12.60%	107
4	13.55%	115
5	16.14%	137
6	11.90%	101
7	6.36%	54
8	7.07%	60
9	2.24%	19
10 or more	11.90%	101
Not sure	2.94%	25
Total		849

Q8 Do you have a wireless router set up in your home?

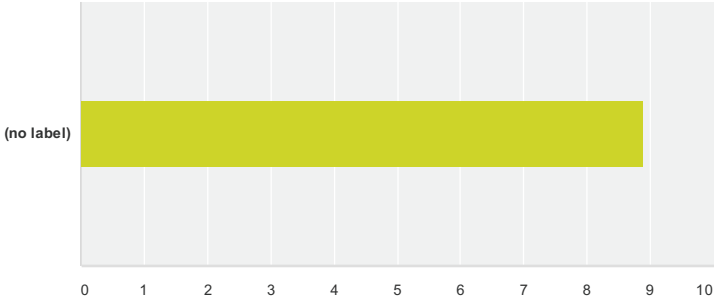
Answered: 846 Skipped: 73



Answer Choices	Responses	
Yes	**86.05%**	728
No	**10.64%**	90
Not sure	**3.31%**	28
Total		**846**

Q9 On a scale from 1 to 10, how important is high speed Internet to members of your household? 1 means "It's unnecessary" and 10 means "We couldn't live without it."

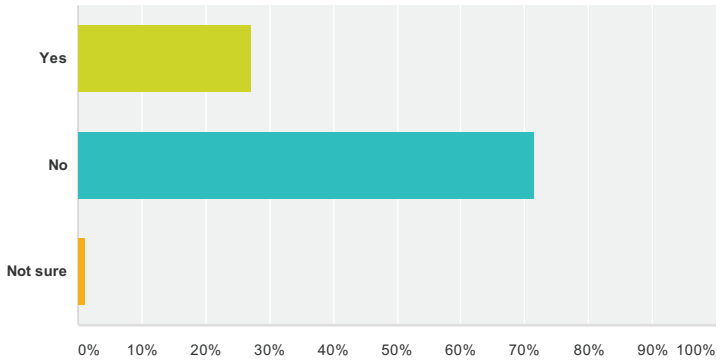
Answered: 853 Skipped: 66



	It's unnecessary	(no label)	(no label)	(no label)	(no label)	(no label)	(no label)	(no label)	(no label)	We couldn't live without it.	Total	Average Rating
(no label)	**1.64%** 14	**0.59%** 5	**0.35%** 3	**0.35%** 3	**1.41%** 12	**2.58%** 22	**6.21%** 53	**15.01%** 128	**20.40%** 174	**51.47%** 439	853	8.90

Q10 Do you or any members of your household have a home-based business?

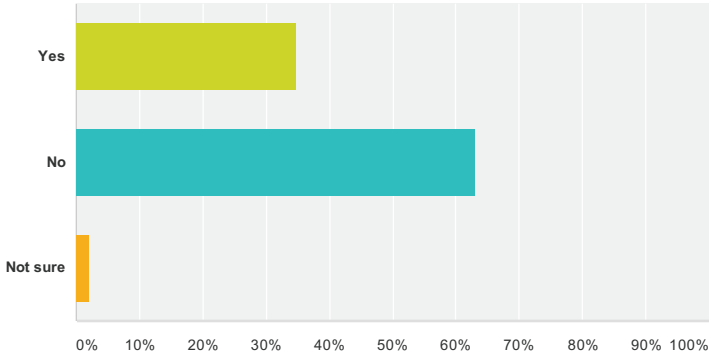
Answered: 854 Skipped: 65



Answer Choices	Responses	
Yes	**27.05%**	231
No	**71.66%**	612
Not sure	**1.29%**	11
Total		**854**

Q11 Do you or any members of your household telecommute?

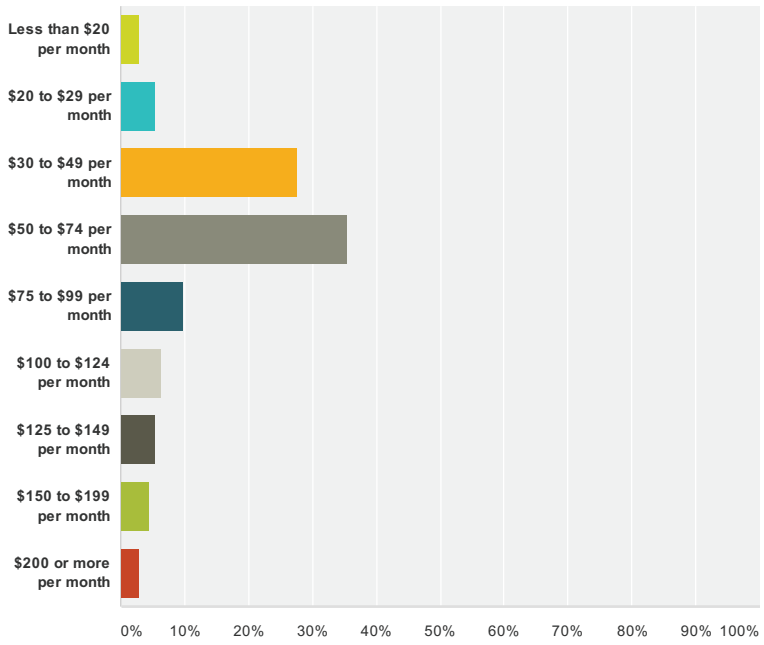
Answered: 857 Skipped: 62



Answer Choices	Responses	
Yes	**34.89%**	299
No	**63.01%**	540
Not sure	**2.10%**	18
Total		**857**

Q12 What is the best estimate of the cost of your home internet connection?

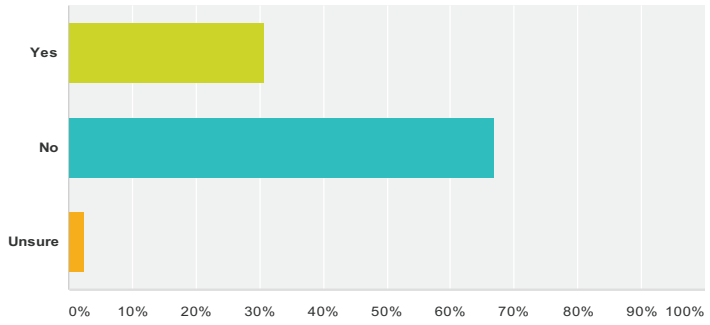
Answered: 841 Skipped: 78



Answer Choices	Responses	
Less than $20 per month	2.85%	24
$20 to $29 per month	5.35%	45
$30 to $49 per month	27.47%	231
$50 to $74 per month	35.55%	299
$75 to $99 per month	9.75%	82
$100 to $124 per month	6.18%	52
$125 to $149 per month	5.47%	46
$150 to $199 per month	4.40%	37
$200 or more per month	2.97%	25
Total		**841**

Q13 Does that cost include something else besides internet connection, such as cable TV, mobile phone, etc.?

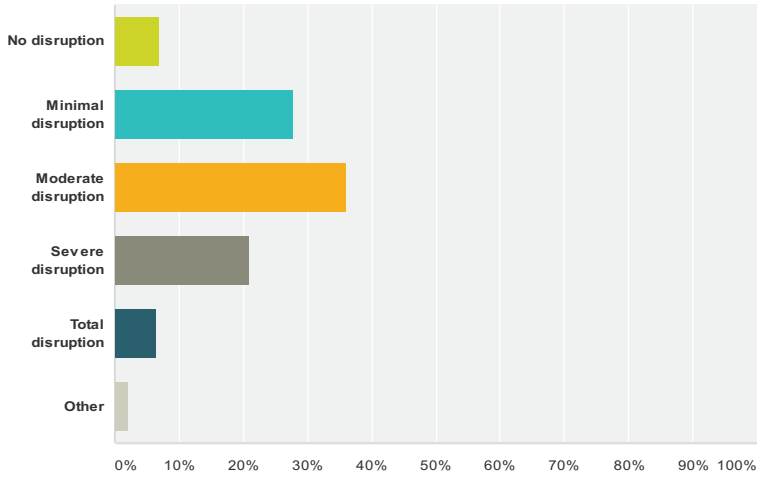
Answered: 845 Skipped: 74



Answer Choices	Responses	
Yes	**30.65%**	259
No	**66.75%**	564
Unsure	**2.60%**	22
Total		**845**

Q14 What kind of impact do Internet problems including reliability and speed have on your home experience?

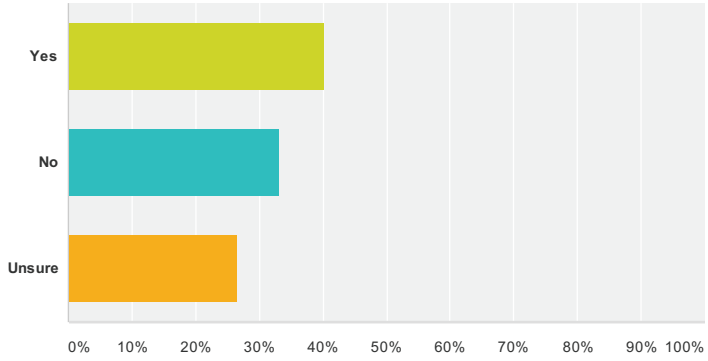
Answered: 840 Skipped: 79



Answer Choices	Responses	
No disruption	**6.79%**	57
Minimal disruption	**27.74%**	233
Moderate disruption	**36.07%**	303
Severe disruption	**20.95%**	176
Total disruption	**6.43%**	54
Other	**2.02%**	17
Total		**840**

Q16 Do you currently have a "triple-play" offering available in your area? Triple-play includes Internet, voice and video services.

Answered: 857 Skipped: 62



Answer Choices	Responses	
Yes	**40.37%**	346
No	**33.14%**	284
Unsure	**26.49%**	227
Total		**857**

	1	2	3	4	5	Total
Price	**19.38%** 162	**22.85%** 191	**36.48%** 305	**16.99%** 142	**4.31%** 36	836
Reliability	**9.28%** 77	**13.25%** 110	**28.31%** 235	**36.99%** 307	**12.17%** 101	830
Speed	**16.00%** 133	**17.93%** 149	**28.40%** 236	**28.88%** 240	**8.78%** 73	831
Customer service	**14.39%** 118	**16.46%** 135	**25.73%** 211	**26.83%** 220	**16.59%** 136	820

B. Business Survey Results

Business Survey Questions

1.

Please use the link below to report your Internet speed. Once you click the link, you'll see a new web browser window appear that goes to speedtest.net. You'll see a "Begin Test" icon in the middle of your screen. Click this icon to begin the speed test. Wait a few moments while the test runs and measures your download and upload speeds. Once the test finishes, please record these speeds in the boxes below.

Speedtest Link - Click Here

Download Speed:

Upload Speed:

2. Please provide your physical business address where you are testing your Internet connection. (This information will be used solely for determining the availability of broadband in Yolo County, California and may become publicly accessible however no names or email addresses will be provided as public information).

Business Name

Street Address

City

Zip Code

3. Please provide the number of staff in your Yolo County location.

4. Please provide your industry.

- ☐ Agricultural & Farming
- ☐ Construction
- ☐ Manufacturing
- ☐ Retail trade
- ☐ Transportation and warehousing
- ☐ Finance and insurance
- ☐ Real estate, rental and leasing
- ☐ Professional, scientific, and technical services
- ☐ Educational services
- ☐ Healthcare and social assistance
- ☐ Arts, entertainment, and recreation
- ☐ Accommodation and food services
- ☐ Hospitality

Other (please specify)

5. From which broadband Internet service provider do you receive service for your business?

6. Please indicate all of the ways you use the Internet (Check all that apply):

- ☐ General use: email, general Internet browsing
- ☐ Online business applications such as accounting, payroll or other
- ☐ Online credit card processing
- ☐ Online banking
- ☐ Gathering online research and information
- ☐ Agricultural research
- ☐ Farming technologies
- ☐ Social media applications for your business
- ☐ Online data backup services
- ☐ Video and/or television, (including video conferencing)
- ☐ Security monitoring
- ☐ Web hosting
- ☐ Telephone services such as Vonage, Skype or other
- ☐ Online file sharing and collaboration

Other (please explain)

7. Based on Question 2 above, would your business benefit from the services below if not currently in use? (Select all that apply)

- [ ] General use: email, general Internet browsing
- [ ] Online business applications such as accounting, payroll or other
- [ ] Online credit card processing
- [ ] Online banking
- [ ] Gathering online research and information
- [ ] Social media applications for your business
- [ ] Online data backup services
- [ ] Video and/or television, (including video conferencing)
- [ ] Security monitoring
- [ ] Web hosting
- [ ] Telephone services such as Vonage, Skype or other
- [ ] Online file sharing and collaboration

Other (please explain)

8. What kind of impact do Internet problems including reliability and speed have on your business?

- ○ No disruption
- ○ Minimal disruption
- ○ Moderate disruption
- ○ Severe disruption
- ○ Total disruption

Other (please explain)

9. Are your current Internet services sufficient for your business needs?

- ○ Yes
- ○ No
- ○ Not sure

10. If you answered "No", to Question 9, how are your Internet services insufficient for your business needs?

- Not fast enough
- Unreliable
- Availability of options
- Access to technical support

Other (please explain)

11. If you answered "No", to Question 9, why haven't you upgraded your Internet services?

- I don't know who can provide services in my area
- Services are not available in my area
- I don't have the technical skills necessary
- The price is too high

Other (please explain)

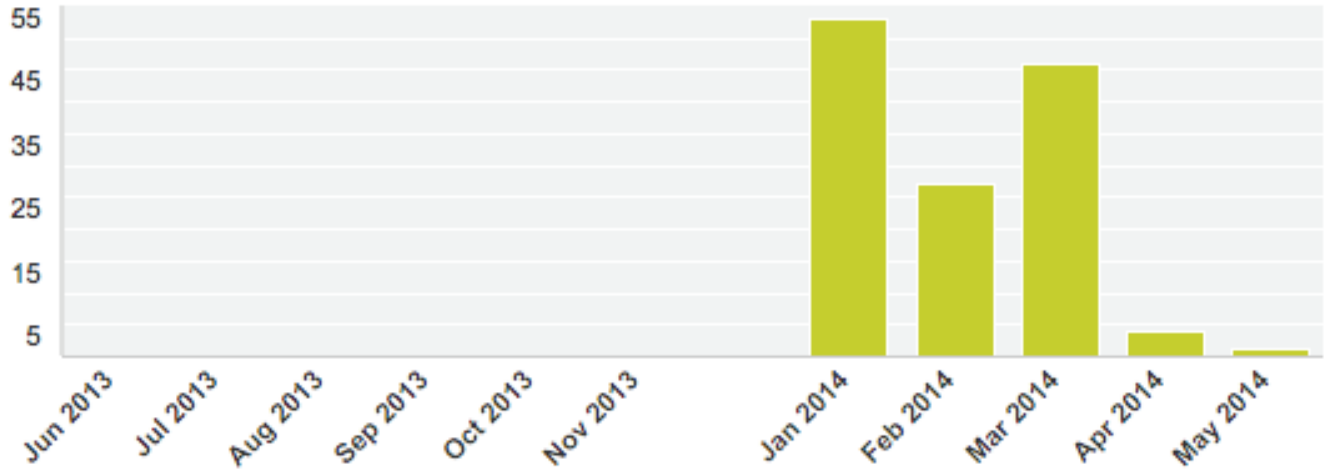
12. Please rate your current Internet services on a scale of 1-5, with 5 being the most important.

	1	2	3	4	5
Price					
Reliability					
Speed					
Customer Service					

13. How important is having multiple choices of Internet and broadband providers to your business.

- Not important
- Somewhat important
- Moderately important
- Very important
- Extremely important

Business Survey Collection Results

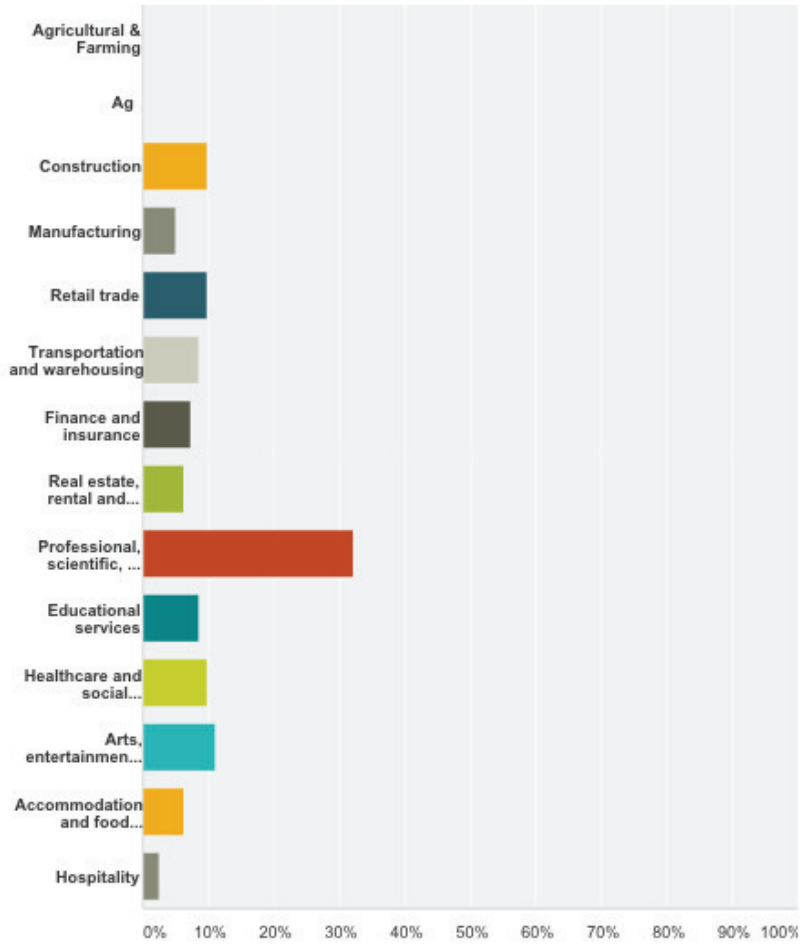


131 Unique Business Responses

Business Survey Response Results

Please provide your industry.

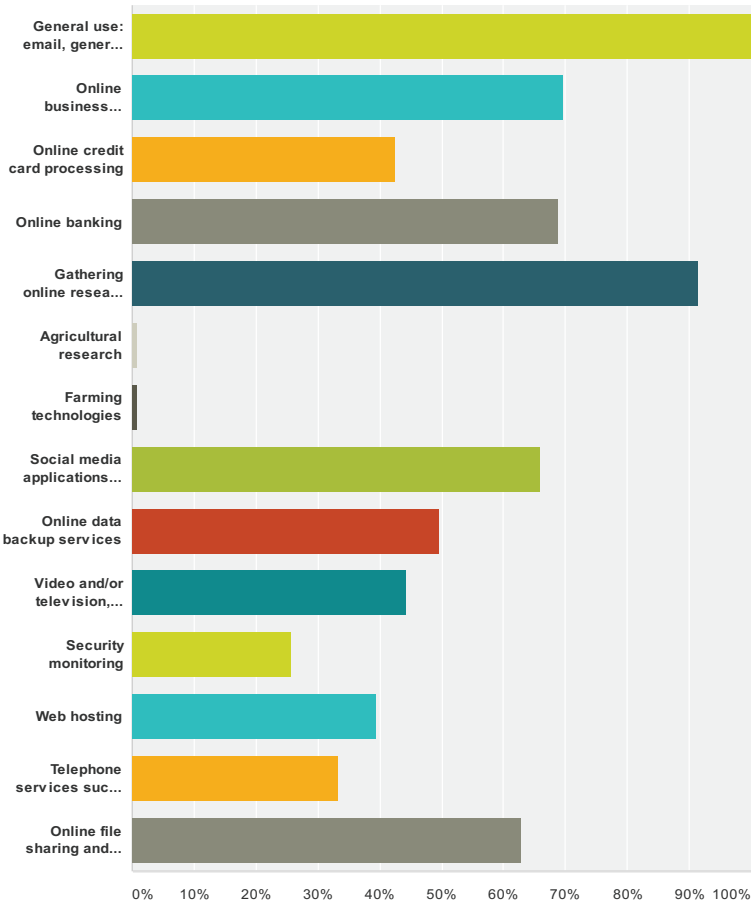
Answered: 81 Skipped: 50



Answer Choices	Responses	
Agricultural & Farming	0.00%	0
Ag	0.00%	0
Construction	9.88%	8
Manufacturing	4.94%	4
Retail trade	9.88%	8
Transportation and warehousing	8.64%	7
Finance and insurance	7.41%	6
Real estate, rental and leasing	6.17%	5
Professional, scientific, and technical services	32.10%	26
Educational services	8.64%	7
Healthcare and social assistance	9.88%	8
Arts, entertainment, and recreation	11.11%	9
Accommodation and food services	6.17%	5
Hospitality	2.47%	2
Total Respondents: 81		

Q6 Please indicate all of the ways you use the Internet (Check all that apply):

Answered: 129 Skipped: 2

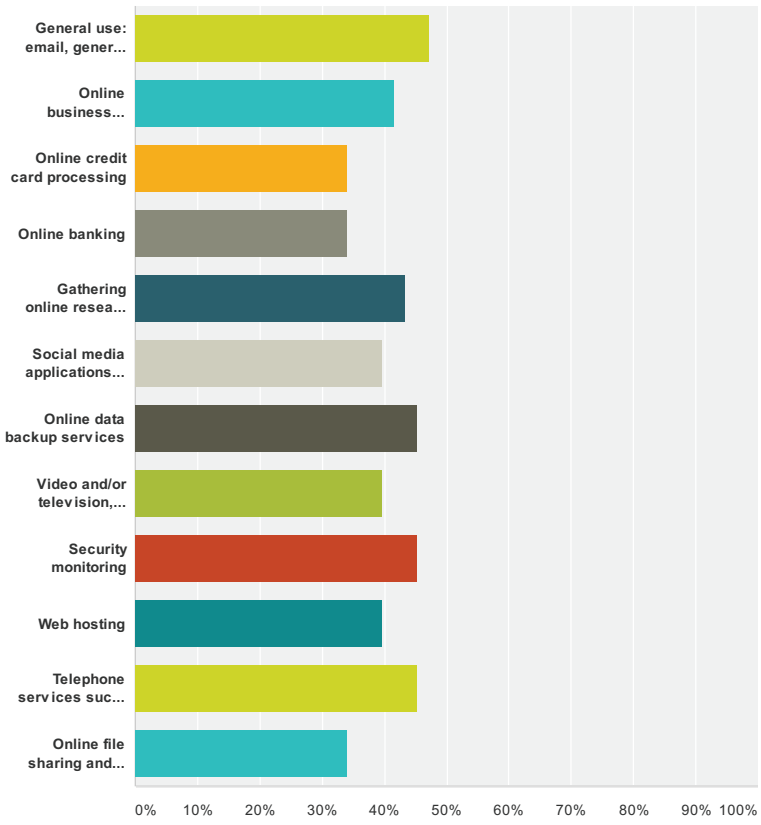


Answer Choices	Responses	
General use: email, general Internet browsing	**100.00%**	129
Online business applications such as accounting, payroll or other	**69.77%**	90
Online credit card processing	**42.64%**	55
Online banking	**68.99%**	89
Gathering online research and information	**91.47%**	118
Agricultural research	**0.78%**	1
Farming technologies	**0.78%**	1
Social media applications for your business	**65.89%**	85
Online data backup services	**49.61%**	64
Video and/or television, (including video conferencing)	**44.19%**	57
Security monitoring	**25.58%**	33
Web hosting	**39.53%**	51
Telephone services such as Vonage, Skype or other	**33.33%**	43
Online file sharing and collaboration	**62.79%**	81

Total Respondents: 129	

Q7 Based on Question 2 above, would your business benefit from the services below if not currently in use? (Select all that apply)

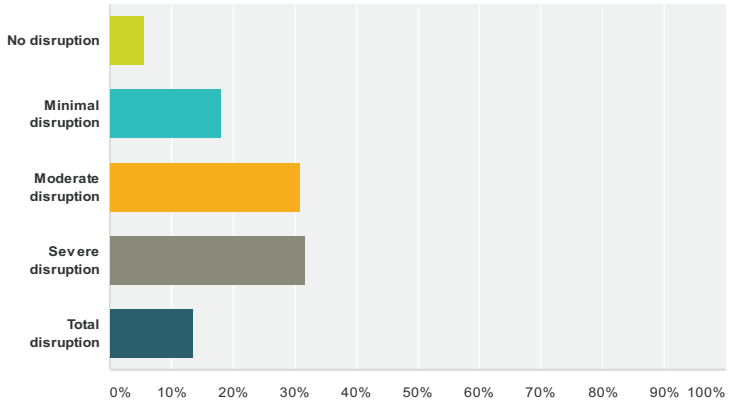
Answered: 53 Skipped: 78



Answer Choices	Responses	
General use: email, general Internet browsing	47.17%	25
Online business applications such as accounting, payroll or other	41.51%	22
Online credit card processing	33.96%	18
Online banking	33.96%	18
Gathering online research and information	43.40%	23
Social media applications for your business	39.62%	21
Online data backup services	45.28%	24
Video and/or television, (including video conferencing)	39.62%	21
Security monitoring	45.28%	24
Web hosting	39.62%	21
Telephone services such as Vonage, Skype or other	45.28%	24
Online file sharing and collaboration	33.96%	18
Total Respondents: 53		

Q8 What kind of impact do Internet problems including reliability and speed have on your business?

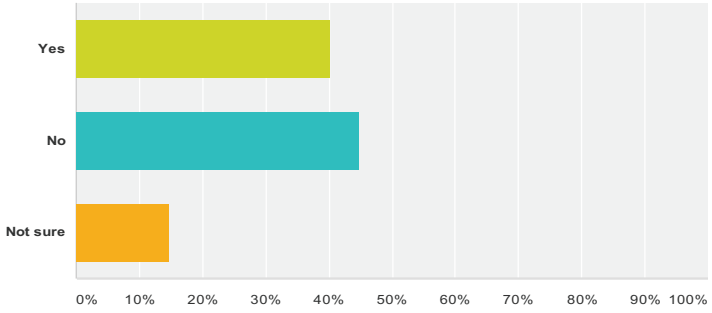
Answered: 126 Skipped: 5



Answer Choices	Responses	
No disruption	5.56%	7
Minimal disruption	18.25%	23
Moderate disruption	30.95%	39
Severe disruption	31.75%	40
Total disruption	13.49%	17
Total		126

Q9 Are your current Internet services sufficient for your business needs?

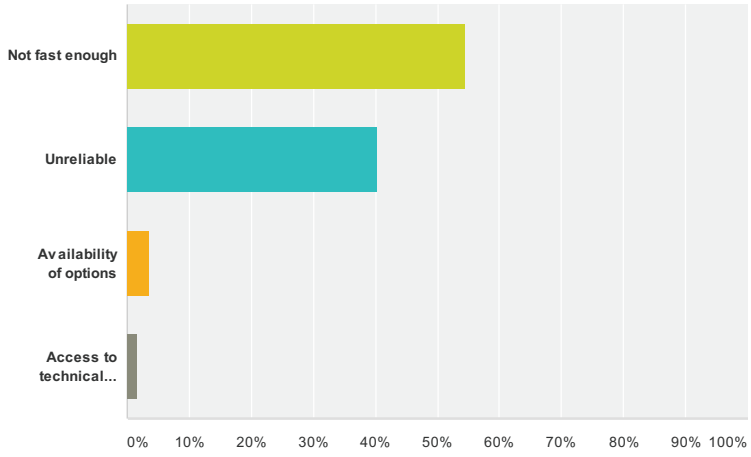
Answered: 129 Skipped: 2



Answer Choices	Responses	
Yes	40.31%	52
No	44.96%	58
Not sure	14.73%	19
Total		129

Q10 If you answered "No", to Question 9, how are your Internet services insufficient for your business needs?

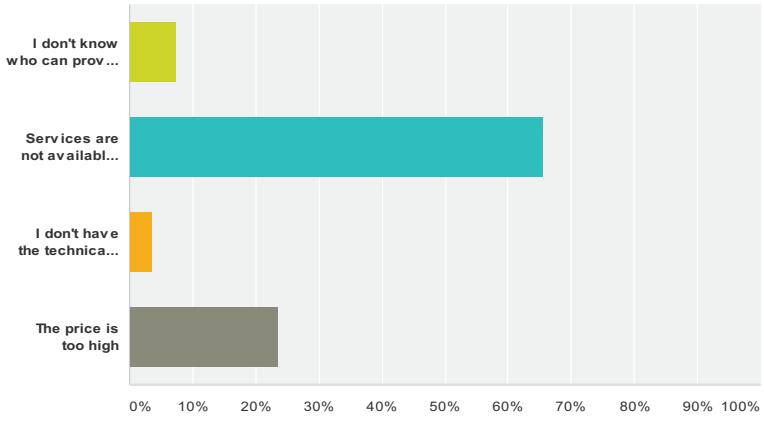
Answered: 57 Skipped: 74



Answer Choices	Responses	
Not fast enough	**54.39%**	31
Unreliable	**40.35%**	23
Availability of options	**3.51%**	2
Access to technical support	**1.75%**	1
Total		**57**

Q11 If you answered "No", to Question 9, why haven't you upgraded your Internet services?

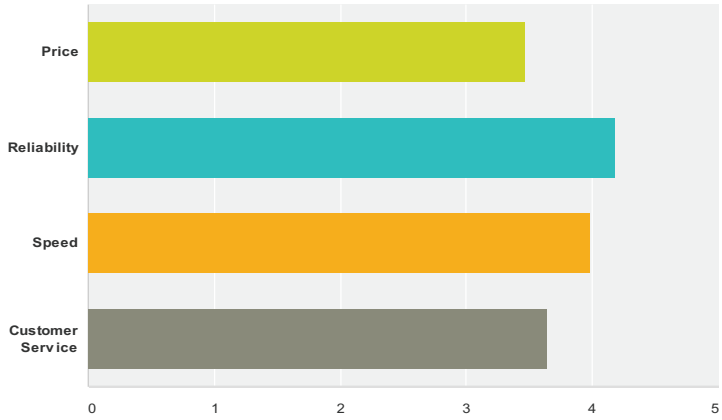
Answered: 55 Skipped: 76



Answer Choices	Responses	
I don't know who can provide services in my area	7.27%	4
Services are not available in my area	65.45%	36
I don't have the technical skills necessary	3.64%	2
The price is too high	23.64%	13
Total		55

Q12 Please rate your current Internet services on a scale of 1-5, with 5 being the most important.

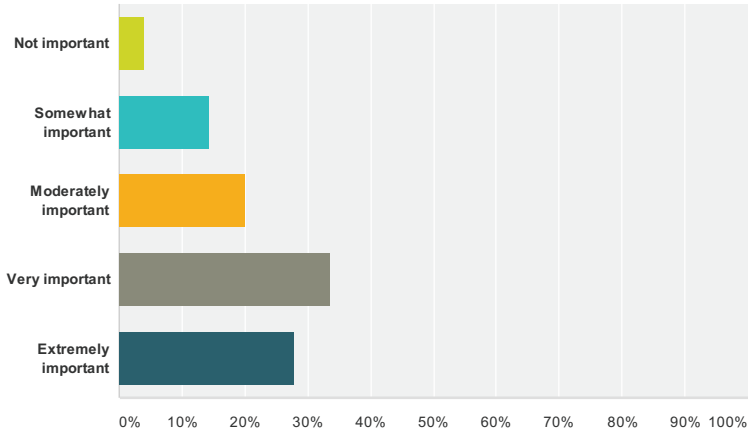
Answered: 124 Skipped: 7



	1	2	3	4	5	Total	Average Rating
Price	4.31% 5	11.21% 13	36.21% 42	30.17% 35	18.10% 21	116	3.47
Reliability	6.45% 8	4.84% 6	11.29% 14	17.74% 22	59.68% 74	124	4.19
Speed	5.65% 7	7.26% 9	12.90% 16	30.65% 38	43.55% 54	124	3.99
Customer Service	5.08% 6	11.86% 14	24.58% 29	31.36% 37	27.12% 32	118	3.64

Q13 How important is having multiple choices of Internet and broadband providers to your business.

Answered: 125 Skipped: 6



Answer Choices	Responses	
Not important	**4.00%**	5
Somewhat important	**14.40%**	18
Moderately important	**20.00%**	25
Very important	**33.60%**	42
Extremely important	**28.00%**	35
Total		**125**

11. Appendix C: Conceptual Community Broadband Network

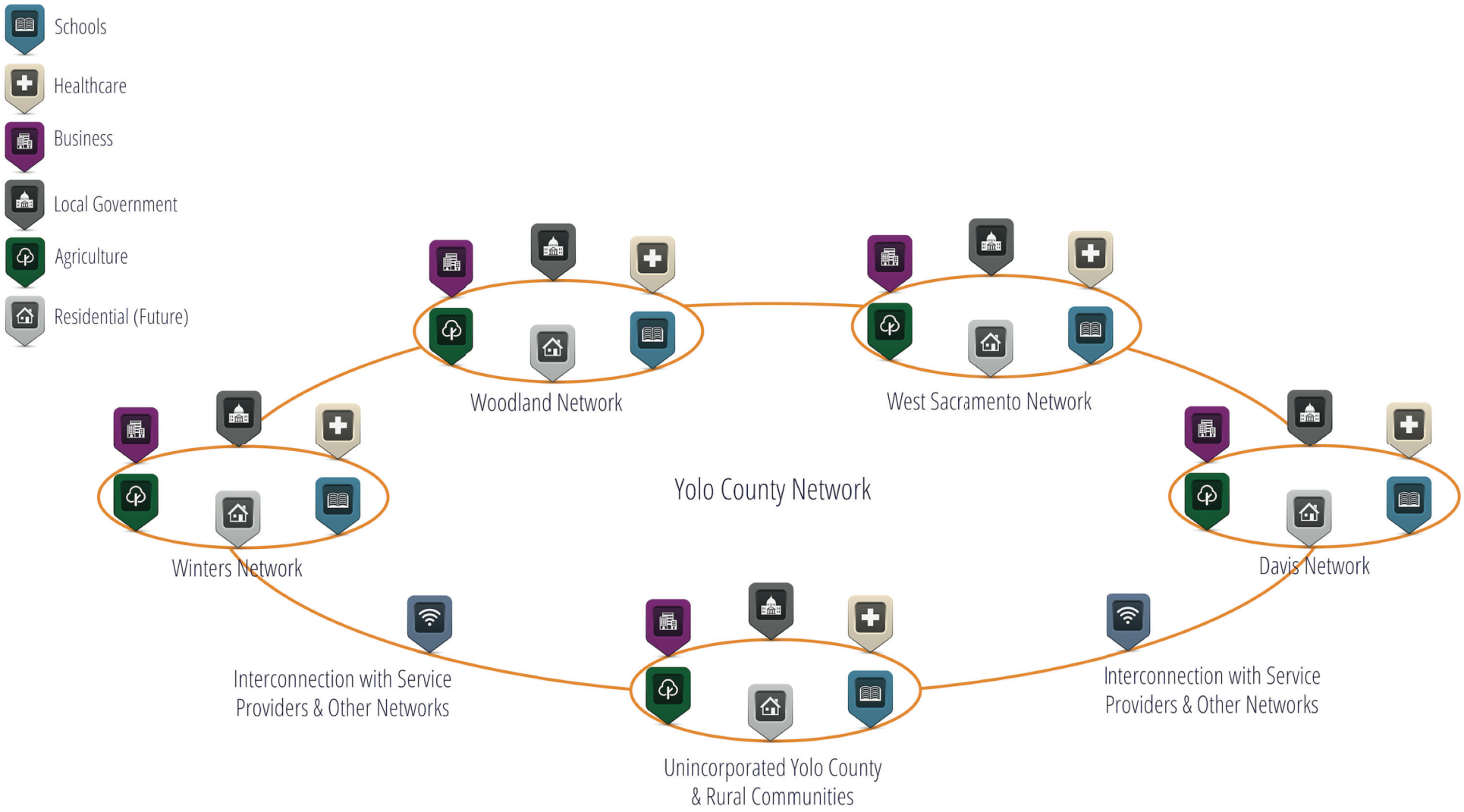
For Yolo communities, the development of a community broadband network would create a countywide publicly owned fiber system that interconnects community organizations, businesses, service providers, and potentially even residents. It would include fiber infrastructure connecting each of the cities to a common network backbone and local distribution fiber infrastructure used to connect organizations to the network. The network would provide either dark or lit fiber services between all organizations; allowing each organization the necessary capacity it requires throughout the entire footprint of the network.

The network would provide advanced, high-bandwidth broadband services to the County, cities, schools, hospitals, doctor's offices, and other community organizations. The network would interconnect with service providers at multiple points throughout the county and enable them to provide fiber-rich services to community anchors, businesses and even residents if desired.

Yolo County already owns fiber infrastructure connecting Woodland to West Sacramento and Davis. The County also owns fiber infrastructure throughout the City of Woodland to connect various County facilities. Yolo County has a successful track record of working with providers and utilities to jointly construct broadband infrastructure. This practice will continue to allow the County to build more backbone routes throughout the region while supporting the concept of a countywide network.

Each City would implement a fiber-based local broadband network to support their local broadband initiatives and connectivity needs. Several cities including West Sacramento and Woodland already maintain current fiber infrastructure and could expand on this to deploy additional network to connect more of their sites as well as business districts and redevelopment areas. These networks would allow high-speed connections between each city's various facilities allowing for significantly expanded capacity while reducing their recurring telecommunications costs. The countywide network should be planned and built collaboratively between all participating organizations to ensure the maximum benefits at the lowest overall cost. For example, connectivity into West Sacramento may hold value to all the cities connected to the Yolo Community Broadband Network to gain access to the regional data center for Internet services, disaster recovery, and cloud applications.

Yolo County Community Broadband Network – Conceptual Design



Who Could Use it?

The Yolo Community Broadband Network would provide a foundation of fiber connectivity for use by a comprehensive list of community stakeholders, including:

- Yolo County
- City of Davis
- City of West Sacramento
- City of Winters
- City of Woodland
- Yolo County Office of Education
- Davis Joint Unified School District
- West Sacramento Unified School District
- Winters Joint Unified School District
- Woodland Joint Unified School District
- Yolo Private Schools
- Broadband service providers
- Wireless and cellular providers
- Yolo County Flood Control and Water Conservation District
- Yolo County Farm Bureau
- Yolo County Housing Authority
- CommuniCare central offices and clinics
- Woodland Memorial Hospital
- Doctors' offices and clinics
- Yoche Dehe Wintun Nation
- Local Businesses and Enterprises
- Agricultural Industry
- Current and Future Utility Providers
- Broadband Service Providers
- Others to be determined

What Benefits Would it Provide?

A broadband network could become a part of region's long-term strategic planning and provide a valuable resource that both the Cities of Yolo and Yolo County can leverage to achieve their organizational objectives. By creating a high-speed, redundant and scalable network environment that will support further growth of municipal services that rely on network resources, more of the cities' and County's municipal operations can take place electronically; saving money and staff time while increasing convenience for citizens. Additionally, this new community network could facilitate greater collaboration between public organizations within Yolo County. These organizations could potentially benefit in the following ways:

- *New opportunities to collaborate with local government organizations across a common communications platform.*
- *Share critical needs across multiple local government organizations including Internet, Intranet voice services, backup services, and others.*
- *Share municipal applications across multiple local government organizations including GIS, expanded public safety dispatch/records management systems, and web applications.*
- *Develop shared disaster recovery and business continuity programs utilizing common infrastructure.*

- *Reduce taxpayer spending across all participating public organizations in the Yolo County region.*

- *An investment into infrastructure that will provide a long-term reduction in telecommunications operating expenses.*

For other community anchors, businesses, and potentially residents, a community broadband network would mean increased options for receiving telecommunications services from current and new providers. In addition, the network would "level the playing field" for service providers across Yolo ensuring equal access and equal pricing for wholesale services on Yolo's Community Broadband Network. This would positively impact the competitive landscape, enable more providers to operate across Yolo's communities, and potentially drive down prices for broadband services.

Potential benefits to the community include:

- *Broadband price stability across all anchors connected to the network.*
- *Enhanced economic development tools to attract and retain businesses.*
- *A new source of fiber infrastructure for local service providers.*
- *New capacity for Yolo's growing tech sector and related companies.*
- *Improved technology transfer from UC Davis to new startups.*
- *Enhanced services and new capabilities for Yolo's schools.*
- *Scalability to accommodate current and future broadband needs.*
- *A platform for municipal operations that enable new capabilities and reduce cost.*
- *A platform that supports integrated utilities that help Yolo manage water and energy resources.*

How Would it Be Built?

Most successful community broadband projects are built incrementally and on demand. Regional broadband networks are built in phases with each phase building on the successful implementation of the previous phase. The County and each City would take responsibility for development of the network in their local jurisdiction based on the needs of each community. The County and each City should develop a conceptual design for their portion of the Community Broadband Network. This conceptual design should include all City, County, and Community Anchor facilities and should include preliminary fiber routes throughout the local area and the connections to the County's inter-city routes. The County and cities should also coordinate the development of their local networks

with the larger regional network to ensure full interoperability between systems and to ensure the network serves the countywide needs of the stakeholders.

A steering committee composed of representatives from the County and each City should be established to ensure the multiple projects are coordinated with one another and each organization's goals remain aligned in the development of the network. The steering committee would carry forward the mission of implementing the Community Broadband Network and tracking its impact within Yolo.

Once a total investment has been developed from the conceptual design, the preliminary fiber routes can begin to be vetted against potential opportunities to cut build costs. Alignment with upcoming capital improvement projects such as water, sewer, road widening, and other undergrounding efforts can positively impact the costs to build infrastructure. Additionally, underground vs. aerial routes should be further analyzed to determine the best options for these routes. Opportunities to IRU or swap fiber with local providers should also be explored as these are great options to potentially reduce the overall capital investment of building a network.

Who Would Own and Operate It?

There are many options available for developing an ownership and operational model for the Yolo Community Broadband Network. These options range in organizational and operational complexity yet offer the cities and County the ability to manage as much or little of the asset as they deem appropriate. As an owner of the infrastructure assets, each City and Yolo County would have a direct ability to impact how broadband infrastructure is developed in the region. The participants will have to jointly decide how an organization is developed to oversee the deployment of future network resources and how the network is managed and operated.

Using simple dark fiber assets in an unlit network, the cities and County would have to dedicate a certain amount of fiber for their own communications needs while providing local capacity to the greater Yolo Community Broadband Network. This type of architecture is less efficient as it relates to the use of the dark fiber assets. Excessive use of fiber strands is required to interconnect facilities and sites because of the requirement to dedicate fiber strands for each connection. A lit model would allow the network to operate on the basis of network capacity instead of dark fiber strands. A lit network would require the provisioning of circuits at predetermined levels of bandwidth. This architecture allows for a much greater efficiency in the use of fiber strands as network traffic can be aggregated on the core backbone links throughout and between the Cities. Under either architecture, an agreement as to how the network will be operated and maintained must be reached.

The following questions must be answered:

- Who should operate the network? The County? The cities? A Consortium?
- How will the network be maintained from an outside plant perspective?
- How will operations be funded?

- Are there private partners that can participate?

What Must Be True to Develop a Community Broadband Network?

A number of key factors must be present for Yolo to develop a successful community broadband network.

1. *Community anchors must commit to utilizing the network*
   Yolo's community anchors will be the largest beneficiaries of the network and must commit to using its resources. They must be willing to participate and subscribe to services from the network at agreed upon fees.

2. *Yolo's service providers must commit to utilizing the network*
   Without the participation of Yolo's service providers, financial sustainability of the community broadband will be more challenging for Yolo. Secondly, without service provider participation, Yolo's businesses and potentially residents will not receive the benefits from the network in terms of more affordable rates and higher quality services. A key goal of the network is to make a new source of affordable next-generation broadband available to the community. If service providers do not utilize the network this goal may remain unachieved.

3. *Yolo must develop the right operational model for the network*
   Development of a sound operations strategy for the network is important to ensure that network performance, reliability, and capacity is managed to the levels required by both service providers and end users. This includes determining the party that will provide management of the network and which components will be maintained by Yolo County, cities and/or outsourced network operators.

4. *Yolo must find ways to reduce costs for construction for the network*
   Building the community broadband network without cost reducing construction methods will yield an expensive proposition for the community and one that may be challenging to sustain financially. A combination of joint trenching opportunities, companion capital projects, use of existing network assets, and wise investments in broadband infrastructure will help reduce the high costs of building significant fiber infrastructure throughout the County.

5. *The network must achieve an operating break-even and pay its debt service*
   The network must achieve at minimum a breakeven scenario where incoming revenues from community anchor organizations and service providers cover all operating costs and repay debt service over the period of the project. Adequate financing structures will also need to be achieved to ensure the network's cash flows can support its debt service.

What Other Communities Have Built These Networks?

A significant number of communities across the country have built community broadband networks to provide reliable, high-capacity fiber infrastructure to their stakeholders. There are over 1,000 similar networks across all States, including California. Some of these include:

City of Palo Alto, CA

In 1996, Palo Alto built a 33-mile optical fiber ring routed within the City to enable better Internet connections. Since then, we have been licensing use of this fiber to businesses. For the past decade, this activity has shown substantial positive cash flow and is currently making in excess of $2 million a year for the city. We now have that money in the bank earmarked for more fiber investments."

Santa Cruz County, CA

The Santa Cruz County board of supervisors in November 2013 approved an eight-month timeline to overhaul its broadband infrastructure plans and regulations. Specific areas of focus include permitting fee reductions and a proposed "dig once" ordinance that would make it easier to install new fiber optic cables during other work on area roads or utilities lanes. "The County will continue a focus on broadband infrastructure throughout the county to enable businesses to function in the digital era, and students and households to have high quality access to information and communication. The County will work with industry providers to develop a Broadband Master Plan in order to identify focus areas within the county that will be most suitable for gigabyte services, particularly as the Sunesys backbone line is constructed during 2014 and 2015. The County will work with service (last mile) providers to ensure that these focus areas are deemed a priority, in order to support streaming requirements, product development, job creation and online selling capability."

City of Palm Coast, FL

In 2006, the Palm Coast City Council approved a 5-Year fiber-optic deployment project funded at $500,000 annually for a total investment of $2.5 million. The network was developed to support growing municipal technology needs across all public organizations in the area, including city, county, public safety and education. It was also planned to support key initiatives such as emergency operations, traffic signalization, collaboration and video monitoring. The City utilized a phased approach to build its network using cost reducing opportunities to invest in new fiber-optic infrastructure. As each phase was constructed, the City connected its own facilities and coordinated with other public organizations to connect them; incrementally reducing costs for all organizations connected to the broadband network. Showing a reasonable payback from each stage of investment allowed the City to continue to fund future expansion of the network. Through deployment of this network, the City has realized a savings of nearly $1 million since 2007 and projects further annual operating savings of $350,000 annually. In addition to these savings, the City's network provides valuable new capabilities that enhance its mission of serving the residents and businesses of the community.

Seminole County, FL

Over the last 15 years, Seminole County, FL has developed its own fiber-optic network to serve the broadband needs of its municipal, public safety, education an utility needs. The 450-mile fiber network has connected 26 fire stations, 58 county buildings, 44 schools, 4 SCC campus, 41 city buildings and 17 water treatment plants to the fiber network and maintains and repairs over 375 traffic signals, 148 school flashers at 73 locations, 46 beacons and flashers and 29 VMS (variable message signs). The network saves taxpayers in the County millions of dollars a year and provides a significant backbone of high-speed broadband services to serve nearly all of Seminole's community functions.

12. Appendix D: Applicable Broadband Grant & Loan Programs

Federal Funding Programs

Connect America Fund - Rural Broadband Experiments

http://www.fcc.gov/encyclopedia/connecting-america

On January 31, 2014, the Commission released the Technology Transitions Order which, among other things, adopted targeted experiments to help learn more about the impact of technology transitions on rural America. In addition to furthering the Commission's goal to gain experience and data on how to ensure universal access as networks transition, this experiment is designed to help inform the policy decisions in various proceedings pending before the Commission. As part of these experiments, the Commission invited expressions of interest by March 7, 2014, from entities willing to deploy robust, scalable broadband to eligible high-cost areas with additional Connect America funding.

For Yolo County, the Rural Broadband Experiments portion of the Connect America Fund may provide an opportunity for local government organizations, private service providers, or partnerships between the two to apply for funding in the USF high cost census tracts throughout Yolo County. This fund would potentially enable areas within Yolo's most underserved and unserved communities to receive new broadband infrastructure. Whereas the USF dollars originally funded basic broadband infrastructure, the Rural Broadband Experiment dollars may fund more advanced types of infrastructure such as fiber and/or wireless. These dollars may also be utilized to fund not only unserved and underserved residents but also community anchors and potentially businesses in qualified census tracts.

Healthcare Connect Fund (HCF)

http://www.usac.org/rhc/defauly.aspx

The Healthcare Connect Fund (HCF) Program is the newest component of the Rural Health Care Programs. The HCF Program will provide a 65 percent discount on eligible expenses related to broadband connectivity to both individual rural health care providers (HCPs) and consortia which can include non-rural HCPs (if the consortium has a majority of rural sites). For new applicants, the filing window will open late summer 2013, with funding beginning on January 1, 2104. Starting in Funding Year 2014 (July 1, 2014 to June 30, 2015) all applicants will be on the same funding year schedule.

This program may be particularly applicable for Yolo County's rural healthcare organizations. In these cases, rural healthcare providers such as Winters Health Foundation and rural clinics throughout Yolo County may develop strategies to interconnect to broadband networks such as

California Telehealth Network at lower costs than they are doing so today. Currently, these rural healthcare providers maintain cable, DSL, and T1 infrastructure which limits their capabilities for telehealth and other electronic health applications. The HCF fund may be an opportunity for these organizations to build new fiber-based broadband infrastructure to reach other healthcare organizations, health information exchanges, and the Internet. In many cases, these organizations have partnered with private service providers to go after funding in a mutually beneficial way. For Yolo, a HCF-funded healthcare network could be used to expand healthcare services in Yolo County and enable new fiber capacity in rural communities that could be utilized to deliver expanded broadband services to businesses and residents.

State of California Funding Programs

Most states have recognized that broadband is a key aspect of long-term development of their regions and have developed State agencies to deal with these important issues. In 2009, the Department of Commerce's Broadband Technology Opportunities Program provided a pool of grant funding specifically designed for States called the State Broadband Initiative (SBI) to "implement the joint purposes of the Recovery Act and the Broadband Data Improvement Act which envisioned a comprehensive program, led by state entities or non-profit organizations, working at their direction to facilitate the integration of broadband and information technology into state and local economies."[18]

Many states have expanded on this initial program to develop state-funded broadband program offices that continue to deal with broadband policy, infrastructure, and adoption issues in their jurisdictions. States vary in terms of their participation in the broadband expansion process. Some focus on public policy measures that promote the expansion of broadband. Others take an active role in sourcing State funding for programs that build infrastructure.

In California, the California Public Utilities Commission ("CPUC") has taken an active role in shaping broadband policy and providing broadband grant funding programs to accelerate the deployment of broadband services across the State. The CPUC received $7,981,304 in grant funding from the NTIA as part of the Broadband Data & Development Program to create California's statewide broadband map. The California Interactive Broadband Map is a tool for California citizens to find and investigate broadband services in their area. The map displays all of the broadband providers offering service within the area around a particular address. This map was created by the team efforts of the California Public Utilities Commission (CPUC) Video Franchise / Broadband Deployment Group and the California State University Chico Research Foundation through a grant from the State Broadband Initiative (SBI) Grant Program. This map was utilized as one of the data sources for determining broadband availability in Yolo County.

The CPUC manages and monitors broadband policy within the State as well as administers several State grant and loan funding programs that are focused on deployment of broadband infrastructure into the areas of greatest need. There are several programs that are pertinent for Yolo County. These programs provide grant and loan funding for the construction of broadband infrastructure to

[18] State Broadband Initiative. http://www2.ntia.doc.gov/SBDD. Accesses April 2, 2014

serve unserved and underserved communities in Yolo County. Funding is also available for development of education and adoption programs for consortia organizations across the state. The following programs have been identified as strong opportunities for Yolo to pursue in its countywide broadband development program.

California Advanced Services Fund

http://www.cpuc.ca.gov/PUC/Telco/Information+for+providing+service/CASF/

California Advanced Services Fund (CASF) promotes deployment of high-quality advanced communications services to all Californians. Funding is allocated to four CASF accounts (please go to the linked page for a description of the account).

Broadband Infrastructure Grant and Loan Accounts

CASF grants and loans are designed to assist in the building and/or upgrading of broadband infrastructure in areas that are unserved or are underserved by existing broadband providers.[19] CASF funding is available to entities with a Certificate of Public Convenience and Necessity (CPCN) that qualify as a "telephone corporation" as defined under P.U. Code section 234 or wireless carriers who are registered with the Commission (i.e., hold a WIR). Wireless carriers need not obtain a CPCN to qualify for CASF funding.

For Yolo, this program would not represent a direct grant or loan funding mechanism that could be received by a local government organization due to the CPCN eligibility requirement (service providers), however; Yolo could effectively work with its local providers to identify the areas of the community that are unserved and/or underserved as potential targets for funding.

Rural and Regional Urban Consortia Account

The Rural and Urban Regional Broadband Consortia Account (Consortia Grant program) is intended "to fund the cost of broadband deployment activities other than the capital cost of facilities as specified by the Commission." Grant funds will be used to promote ubiquitous broadband deployment and to advance broadband adoption in unserved and underserved areas by:

- Increase sustainability of broadband infrastructure and projects.
- Promote broadband deployment (availability) for residences in California.
- Promote broadband access and adoption (knowledge of service options and ability to utilize services as well as subscription of services) for residences in California.

[19] An "unserved" area is an area that is not served by any form of wireline or wireless facilities-based broadband, such that Internet connectivity is available only through dial up service. An "underserved" area is an area where broadband is available, but no wireline or wireless facilities-based provider offers service at advertised speeds of at least 6 Meg download and 1.5 Meg upload.

- Increase the rate of broadband adoption by facilitating the impact of consumer education, outreach, and training.
- Support those community-based parties, especially anchor institutions, who are working to increase deployment, access, and adoption.

Approximately $2.75 million has been appropriated to regional consortia across the State under this program. For Yolo, this grant represents an important continuing funding source for broadband planning, access. and adoption activities that should follow the development of this Strategic Plan. The grant affords regional consortia such as the Connected Capital region (of which Yolo is a member) funding programs for community education, outreach, training, and related programs.

Broadband Public Housing Account

Up to $20 million from the Broadband Public Housing Account ("BPHA") will be available for grants and loans to a publicly supported community as defined in the statute to finance a project to connect a broadband network to that publicly supported community. AB 1299 also authorizes up to $5 million from the BPHA to be available for grants and loans to a publicly supported community to support programs designed to increase adoption rates for broadband services for residents in that publicly supported community.

Comments are currently being received by the CPUC for the scoping of this funding program. This grant would provide potential benefit to the Yolo Housing Authority to make improvements to public housing enabling residents to receive improved connectivity to broadband providers in the area. It may also provide opportunities for Yolo Housing Authority to upgrade internal infrastructure at public housing developments including wireless access points, in-building wiring, and related equipment to enable improved broadband service. Yolo should continue to track this grant as it develops with the CPUC.

California Emerging Technology Fund

http://cetfund.org

The mission of the California Emerging Technology Fund is to provide leadership statewide to minimize the Digital Divide by accelerating the deployment and adoption of broadband and other advanced communications services to underserved communities and populations. CETF is accomplishing this mission by making investments in programs and projects to improve access, applications, affordability, accessibility, and assistance - the "5As" requisite to achieve adoption and close the Digital Divide - and the essential components of Digital Inclusion. In addition, CETF has three priority consumer communities: Rural and Remote Areas; Urban Disadvantaged Neighborhoods, and People with Disabilities.

There are several funding programs that Yolo should target as funding becomes available in the region including the GetConnected Initiative, Telehealth Initiative, Digital Literacy Initiative, School2Home Initiative, and Smart Community Initiative. Funding programs are released at various intervals so it is important for Yolo to stay abreast of the latest news from the CETF as part of its long-term broadband development strategy.

13. Appendix E: Public Policy Implementation & Case Studies

Dig Once Policy Implementation

It is important for Yolo to develop and establish a Dig-Once policy to ensure an efficient mechanism is in place for the deployment of broadband infrastructure. A Dig-Once policy is a standard policy that is being adopted by many broadband savvy communities that maximizes excavation efforts through coordination of stakeholders mandated by the policy. Through the adoption of a Dig-Once policy, Yolo will have better opportunities to control the highest cost of broadband deployment; the burying of fiber-optic cables and conduit underground.

In order to effectively implement a Dig-Once policy, Yolo must reach out to and include all possible stakeholders to gather input and build support for the policy. Necessary stakeholders could include the following entities:

- Local Government IT Staff
- Local Government Planning & Zoning
- Local Government Public Works Staff
- County/City Attorney
- Broadband Providers
- Other Local Governments
- State Department of Transportation
- Selected Elected Officials

These primary stakeholders will be able to provide a solid foundation for drafting and finalizing a local Dig-Once policy and will be able to provide the technical expertise necessary to create the policy. Since the County and local municipalities will control the majority of the Rights of Way, it is important for those entities to take the lead when developing this policy. The policy should include language that provides a mechanism for communication between entities notifying them of planned excavations, incorporate Joint-Trench agreements (discussed later) that may already be in place, provisions for installation of empty conduit in ROW during excavations to prepare for future broadband requirements, and the use of trenchless technologies such as directional drilling and microtrenching. By assuming the leadership role, the local governments will be able to craft the primary language that will go into the policy and incorporate the appropriate sections from other stakeholders.

Since the ultimate purpose of the Dig-Once policy is to promote the development of broadband locally and making broadband more accessible to the community, it is important to structure the policy to not prevent or impede necessary excavations of the ROW and build a policy that strongly supports and encourages cooperation among stakeholders; creating a truly cooperative planning process. The County organization is in a prime position to take the leadership role in this endeavor since it is the agency that approves the utility permits to install and conduct work in the ROW and is usually responsible for the majority of the management and maintenance of the roadways. Therefore, it is essential that local governments implementing a Dig Once policy review their utility

permitting process to find gaps that may make their community "unfriendly" to expansion of local broadband infrastructure. To ensure that it is beneficial for telecommunications providers and developers to install conduit and fiber, local governments must address the following issues (at a minimum):

- The time needed to apply for and receive approval for a utility permit.
- If necessary, modify utility permit process to allow County staff to approve permits instead of an appointed land development board. This will give applicants a sort of "fast track" to move ahead.
- Adjust the fee structure associated with utility permit. Whenever possible, these fees should be reduced or waived to incentivize fiber and conduit installation.

As the policy is developed with input from the various stakeholder groups, it will be important for any fundamental changes to the policy be thoroughly vetted by County staff to ensure that modifications and revisions support the overall spirit of the policy and enhance the opportunities for broadband development within the community; rather than solely benefit the wishes or needs of a particular single stakeholder.

Once a consensus final draft of the policy has been developed, it is crucial that the policy is adopted by all stakeholders and it is incorporated into local building codes and adopted by the County's Board of Commissioners. Since all local governments differ somewhat in their processes and procedures, there will be some variation in the implementation of this process. Implementing a Dig-Once policy at the local level is preferable than at a higher level due to these differences in process and the complexities involved when creating a policy that will span multiple jurisdictions.

Joint-Trenching Policy Implementation

A Joint-Trench Agreement, often included as part of a larger Dig-Once Policy, is an agreement between two entities (usually two telecoms or a local government and a telecom) to share the cost of excavation and installation of underground conduit. These agreements typically include very specific details as to what costs will be shared between entities, who is responsible for performing specific tasks, adoption of a standard multi-utility installation design, and how the costs will be distributed among the Agreement's participants, and many other contractual responsibilities of the parties involved.

Just as the Dig-Once Policy involved several stakeholders' participation, the Joint-Trench Agreement will as well. Generally, the local government's Planning and Zoning or Public Works departments take the lead with Joint-Trench agreements as they are the entity that are most directly affected by these sorts of agreements. In addition to Planning and Zoning and Public Works, it will be necessary to gather the input from both County/City Attorney's office and the IT Department.

It will be important for the County to actively seek Joint-Trench Agreement opportunities between these types of organizations to bolster local infrastructure and avoid potential overbuild/overlap in the Yolo community. Critical to the success of this plan is the cooperation and participation of

service providers with stakeholders in the community. We believe that community infrastructure should be positioned to make service providers more effective in delivering advanced services to the community, not to compete against them. When properly implemented, the Joint-Trench Agreement will afford various benefits to the involved parties including:

- Fewer construction crews working in the area at any particular time, thus reducing the risk of worker injury and the risk of damaging other underground utilities.
- Savings of approximately 30% to 40% by jointly installing conduit and/or fiber facilities.
- Shortened construction timeline when utilizing a standard, multi-utility, installation design.
- Conservation of the Right-of-Way.
- Uniform design makes it easier to locate existing facilities in future excavations.

Through the implementation and adoption of Joint-Trench agreements with other local governments, incumbent telecom providers, and other local utilities, the community will stimulate broadband development while relieving undergoing congestion of utilities and reduce overall cost to implement broadband infrastructure. A sample Joint-Trench Agreement from the City of Burbank is provided in Appendix XX.

Comprehensive Broadband Standards Implementation

A Comprehensive Broadband Standards document will support both the Dig-Once Policy and Joint-Trench Agreements. The Comprehensive Broadband Standards will provide a solid foundation and technical guidelines with regard to how broadband infrastructure will be built in the Yolo community. By outlining technical specifications for conduit and fiber and specifying specific installation standards for multi-utility trench design, Yolo County will standardize and automate the process of broadband infrastructure deployment; thus ensuring that broadband infrastructure becomes a part of the design for all relevant capital projects.

Yolo County's Planning and Zoning or Land Development Department must take the lead and develop Comprehensive Broadband Standards that are adopted and codified into the County's Land Development Code. This process will require the input of the County's IT Department, the County Attorney's Office, and potentially local stakeholders such as incumbent telecom providers, developers and builders, and potentially the local Chamber of Commerce to refine community needs. These Standards will outline construction materials, installation guidelines and design, and other broadband technical standards and will require all future broadband infrastructure deployments to adhere to the standards defined by the County with the ultimate goal of ensuring uniformity of design and implementation of requirements ensuring broadband components (at a minimum conduit installation) are installed every time excavation or new development occurs.

We will work with Yolo County to identify the requirements for infrastructure components that will support the broadband needs of the community both today and in the future. These Standards should include engineering and design standards for both new construction and excavation of existing utility infrastructure as well as a standard, multi-utility, installation design to be utilized in all future builds. By adopting and codifying a Comprehensive Broadband Standards document, Yolo

County will be ensuring that broadband infrastructure will be installed whenever excavation or new development occurs just as power, water, and sewer utilities are deployed. The Comprehensive Broadband Standards document should be developed as a living document that can be modified if needed to incorporate future broadband intensive application needs such as smart home/building technology which then could be implemented into the community's building standards.

Cases and Success Stories

Local governments across the country have successfully implemented the previously mentioned policies to varying degrees and with much success. Although it is a rare community that has implemented all of these strategies, examples of communities that have implemented select policies abound including Riverside, CA, San Francisco, CA, Portland, OR, and Loma Linda, CA.

Joint Use Success Story

In an effort to address the lack of broadband infrastructure in their communities, several organizations have entered into Joint-Build or Joint-Use agreements or ordinances. These sorts of agreements lead to better planning, coordination, and efficient use of conduit and fiber infrastructure but often times do not require the actual deployment of fiber. Although these agreements do not require the actual deployment of fiber, the high cost of conduit installation is shared between the municipality and the service provider; lowering the cost for all parties involved in the Joint Use agreement. These types of agreements are in place currently in Riverside, CA and Merced County, CA. By establishing this type of ordinance, the municipality, is ensuring that it will have access to and use of any conduit that is constructed in the right-of-way.

Another potential approach to the Joint Use and Dig Once policies is to require that telecommunications organizations integrate construction of infrastructure into the planning process of the municipality. This is the approach that is currently being proposed in San Francisco, CA. Although this approach would require greater coordination of projects between municipal organizations and telecom providers up to and through the excavation process, this approach will ensure that all parties are given the opportunity to install their infrastructure during the excavation process.

Comprehensive Broadband Planning Success Story

In 2004, the City of Loma Linda adopted a comprehensive broadband plan, *the Connected Community Program*, which included policies to promote the deployment of a citywide fiber optic network and made modifications to its building codes to ensure that development will be designed to meet the needs of future telecommunications technologies. For their efforts, Loma Linda has received international recognition for its ordinance which states:

> *"In recognition of the need to provide local residents and businesses within the community with additional options to meet their telecommunications needs, as adopted by city council resolution, all new development projects within the city, regardless of whether such new development falls within the fiber- optic master plan area, and additions that exceed more than fifty percent of the*

original structure that fall within the fiber- optic master plan area, will be required to participate in, and will be bound by, the connected community program." (Ord. 629 § 1, 2004)

By adopting this local ordinance, the City of Loma Linda has secured its broadband future by ensuring that fiber-optic infrastructure will be installed anytime new development or major renovations are completed within the City.

Dig Once Policy Success Story

In 2011, the City of Portland, Oregon's City Council unanimously adopted Portland's Broadband Strategic Plan (BSP) by bringing together City officials and community partners. The plans was a result of the recognition and foresight of City leaders that high-speed affordable broadband to every home and business was a requirement if the community was to thrive in the twenty-first century. The success of the BSP will have important benefits for the City's economic development strategy, climate change strategy, and to the continuing impact of the economic recession. Included in the BSP is a formal Dig Once policy; an excerpt is included below:

"Implement a 'dig once' policy that cost-effectively enables gradual deployment of infrastructure. In this model, a community implements a policy mandating installation of conduit (or fiber) any time a trench or road is open in the public rights-of-way, thus enabling build---up of a critical mass of infrastructure at relatively low incremental cost. Ideally, the conduit and fiber are specified in advance and, of course, they must be impeccably mapped and recorded. Such a policy is most effective where there exists extensive planning and coordination among the various departments responsible for infrastructure and construction (public works, transportation, IT, permitting authorities, and utilities). It also helps to coordinate the construction timelines of various departments so as to facilitate cost-effective placement of conduit and fiber. This strategy enables deployment of infrastructure for backhaul and middle-mile fiber that can be leased to the private sector and stimulate offering of services. It can also enable placement of conduit directly to wireless facilities sites, thus facilitating not only deployment of next---generation wireless services but also reducing the cost for new competitors to enter the market. This strategy recognizes that certain sections of our city are rich with fiber infrastructure such as in the Central Business District. If moved to the work plan stage, the 'dig once' strategy will be planned for the sections of Portland that are currently deficient in fiber infrastructure."

Frequently Asked Questions

If I have a companion project going on, water, sewer or other, how am I going to manage installing conduit on top of this other infrastructure, similar separation issue?

It is imperative that as the local government, you adopt a detailed multi-utility installation design for the right-of-way. These design specifications should be codified in your organizations Land Development Code, thus ensuring that separation of infrastructure is preserved.

Where's the money going to come from to fund installation of new infrastructure by the county and cities?

Although many times installation is paid for through general fund dollars, there are opportunities to reduce the burden through various federal and state grant programs. Also, through the adoption of Joint-Trench and Dig-Once policies, opportunities will become available to share costs with telecommunications providers and developers resulting in lower expenses to the local government.

Why would service providers be interested in joint trenching?

With regard to service providers, a dig once policy could be extremely beneficial. Just as it is the local government's desire to deploy broadband infrastructure in the most effective and efficient manner, this also applies to service providers. Advantages of joint-trenching and dig once agreements to service providers include:

- Lower frequency of construction in the right of way
- Lower instances of damaging existing infrastructure
- Lower installation costs
- Increased access to new markets
- Decreased time to deploy fiber infrastructure

Who needs to be involved from the County and city perspective?

Since these policies and ordinances will have an effect on several departmental functions, it is very important that the local government assemble a team that is includes members from:

- Leadership (City/County Manager or representative)
- City/County Attorney's Office
- Land Development/Planning and Zoning
- Information Technology
- Public Works
- Economic Development

By including team members from all of the departments mentioned above, you will ensure that there are representatives available to answer any questions that may arise and will be able to address any technical, legal or policy issues.

14. Appendix F: Yolo Broadband Statistics & Datasets

Figure 16.1: Broadband Penetration Per Census Tract in Yolo

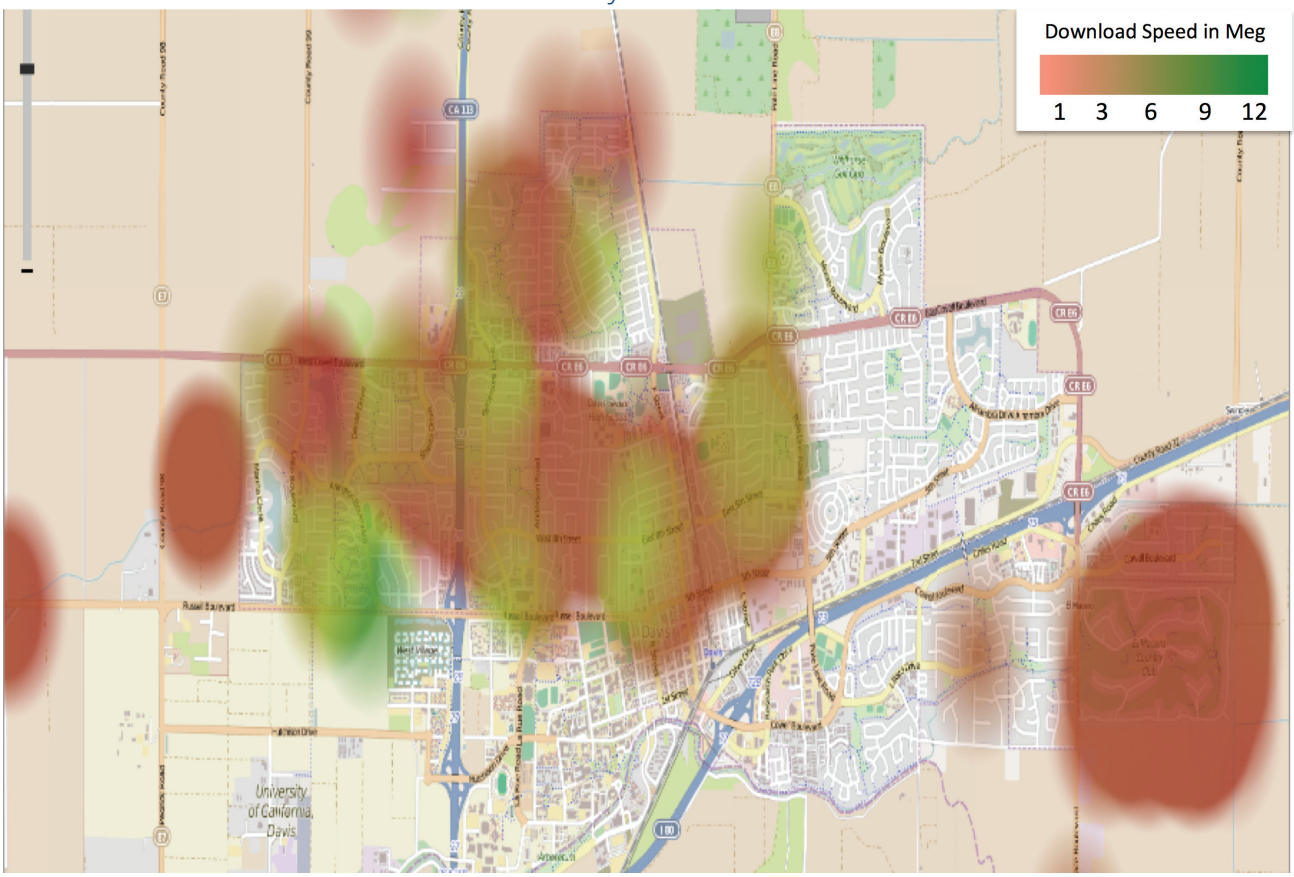
Census Tract Name	Total Household	Occupied	Vacant	Average Penetration	Households with Broadband
Census Tract 101.01	2,628	2,219	409	50%	1,110
Census Tract 101.02	2,468	2,321	147	50%	1,161
Census Tract 102.01	1,213	1,114	99	70%	780
Census Tract 102.03	2,293	2,014	279	30%	604
Census Tract 102.04	2,233	2,173	60	50%	1,087
Census Tract 103.02	2,663	2,432	231	90%	2,189
Census Tract 103.10	1,843	1,819	24	90%	1,637
Census Tract 103.12	2,023	1,852	171	90%	1,667
Census Tract 104.01	1,921	1,790	131	70%	1,253
Census Tract 104.02	1,249	1,173	76	90%	1,056
Census Tract 105.01	1,127	1,093	34	30%	328
Census Tract 105.05	1,779	1,627	152	70%	1,139
Census Tract 105.08	1,064	983	81	70%	688
Census Tract 105.09	1,330	1,330	-	70%	931
Census Tract 105.10	2,104	2,068	36	70%	1,448
Census Tract 105.11	1,255	1,204	51	70%	843
Census Tract 105.12	1,182	1,182	-	90%	1,064
Census Tract 105.13	1,201	1,150	51	90%	1,035
Census Tract 106.02	2,606	2,360	246	70%	1,652
Census Tract 106.05	1,202	1,138	64	90%	1,024
Census Tract 106.06	2,831	2,728	103	70%	1,910
Census Tract 106.07	1,650	1,580	70	90%	1,422
Census Tract 106.08	2,045	1,909	136	90%	1,718
Census Tract 107.01	2,076	1,939	137	70%	1,357
Census Tract 107.03	1,878	1,711	167	90%	1,540
Census Tract 107.04	914	864	50	70%	605
Census Tract 108	1,457	1,370	87	50%	685
Census Tract 109.01	1,907	1,881	26	50%	941
Census Tract 109.02	2,581	2,368	213	50%	1,184
Census Tract 110.01	2,612	2,441	171	50%	1,221
Census Tract 110.02	1,439	1,375	64	70%	963
Census Tract 111.01	1,213	1,063	150	50%	532
Census Tract 111.02	1,635	1,560	75	50%	780
Census Tract 111.03	1,144	1,124	20	70%	787
Census Tract 112.03	1,074	994	80	70%	696
Census Tract 112.04	1,759	1,731	28	70%	1,212
Census Tract 112.05	2,645	2,427	218	90%	2,184
Census Tract 112.06	2,287	2,037	250	70%	1,426
Census Tract 113	2,634	2,606	28	70%	1,824
Census Tract 114	1,515	1,372	143	10%	137
Census Tract 115	1,959	1,738	221	50%	869
Totals	74,639	69,860	4,779		46,684

Source: 2010 Census Data Reported Through American FactFinder and the FCC Form 477 Report for July 2013

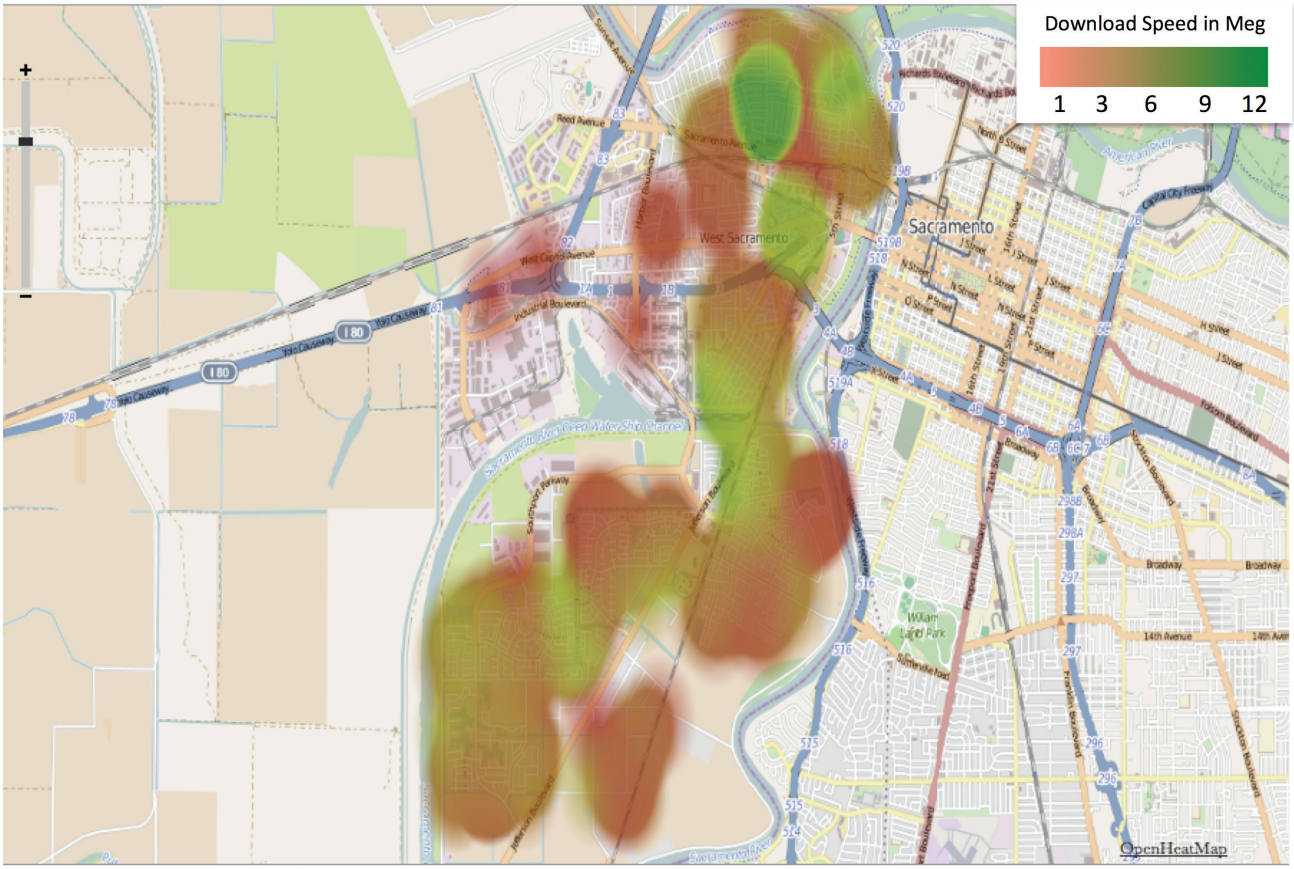
15. Appendix G: Yolo Broadband Speed Test Heat Maps

This series of heatmaps illustrates the concentration of broadband download speeds in each City within Yolo County. It provides a visual illustration of the concentration of broadband speeds, based on speedtest results reported in the project. Areas in green illustrate higher speeds of up to and above 12 megabits down. Areas in red illustrate lower speeds of not greater than 1 megabit down.

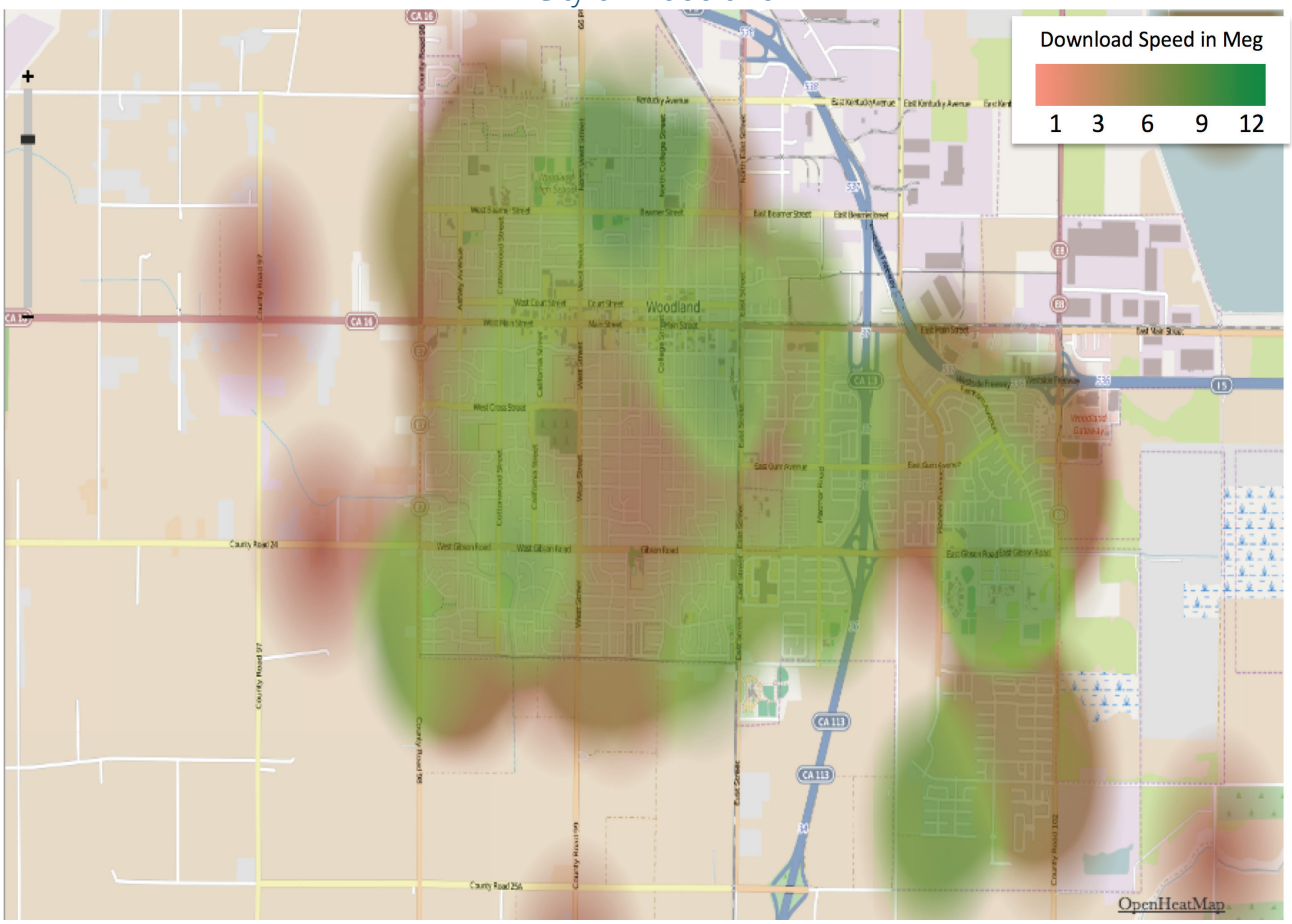
City of Davis



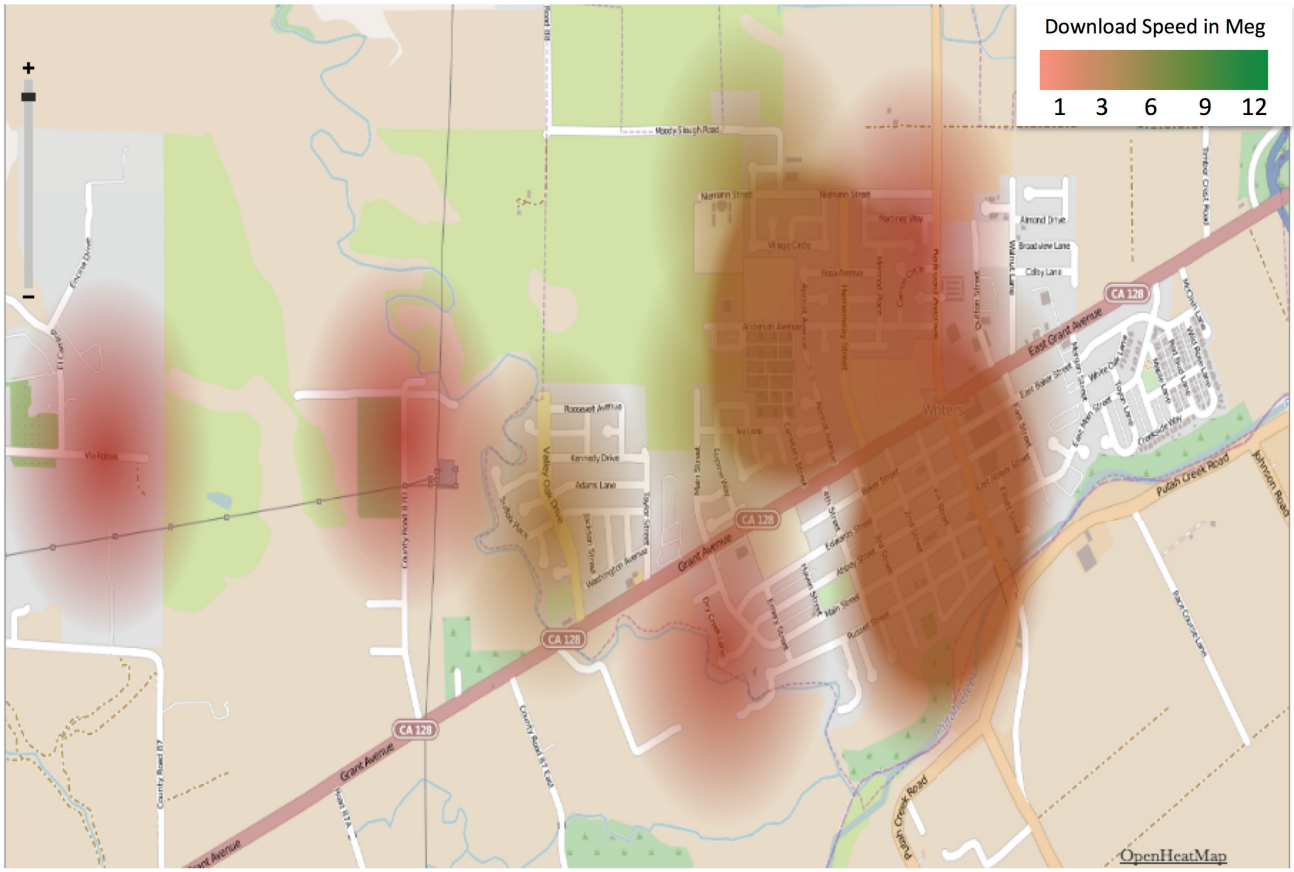
City of West Sacramento



City of Woodland



City of Winters



Yolo County (Countywide Heat Map)