ULTRA-HIGH-SPEED
COMMUNITY-OWNED INTERNET

Los Altos Hills Community Fiber (LAHCF)

Solving the problem of inadequate broadband in Los Altos Hills

Community-owned broadband service
- Private fiber optic network directly connecting homes
- Member-owned non-profit organization
- Managed by professional operator

Actual LAHCF Member Speed Test

PING	DOWNLOAD	UPLOAD
1 ms	9635.50 Mbps	9542.85 Mbps

10-gigabit-speed internet service
- 10,000 Mbps (down & up)

Futureproof solution
- Every home connected by a dedicated fiber optic cable
- Network easy to upgrade

Inadequate Broadband Options

Comcast has a monopoly on broadband in Los Altos Hills
- Slow speeds during periods of peak usage
- Very slow upstream
  - Limits use of security cameras, ability to work from home, online gaming, etc.
- Cost issues
  - Constant price fluctuations
  - Expensive equipment fees and other surcharges
  - Very high cost to extend network to your home if not available
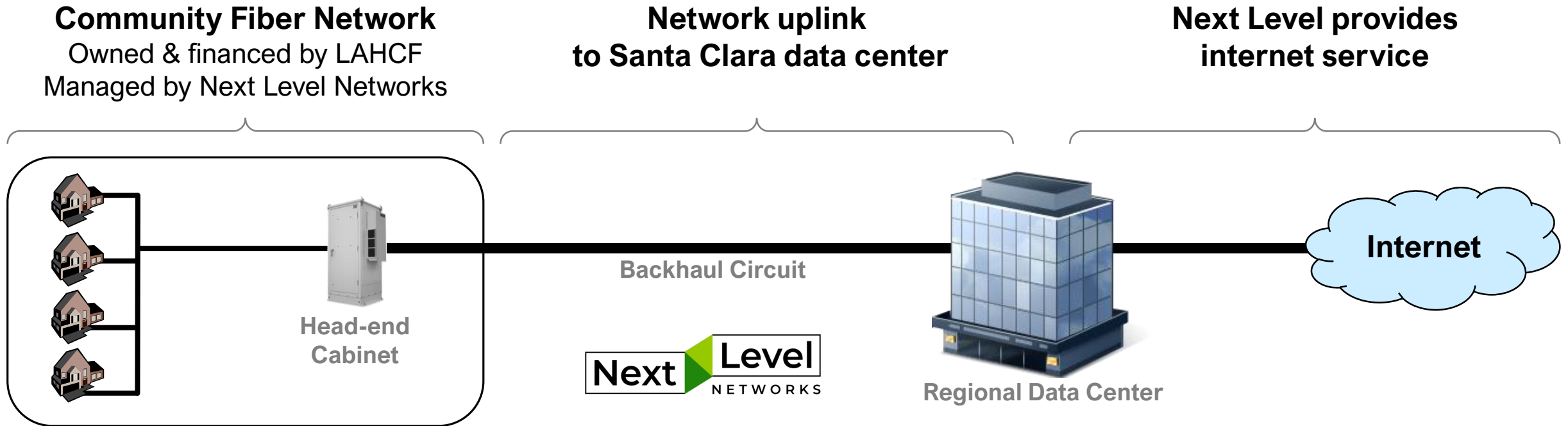- Historically poor customer service

Many homes served only by AT&T DSL
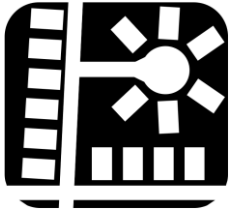- Extremely slow…technically not even broadband

Data privacy and network neutrality concerns
- Incumbent broadband providers track your web browsing and often sell this data
- Operators can advantage their own streaming services over competitive options
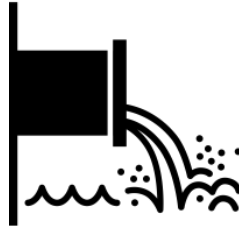
Turnkey Solution for Community-Owned Network

Community Fiber Network
Owned & financed by LAHCF
Managed by Next Level Networks

**Network uplink
to Santa Clara data center**

**Next Level provides
internet service**

Head-end
Cabinet

Backhaul Circuit

Regional Data Center

Internet

Community-Owned Infrastructure is Common
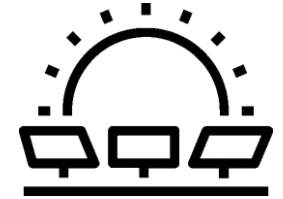
Homeowner Association

Private Road

Sewer (move off septic)
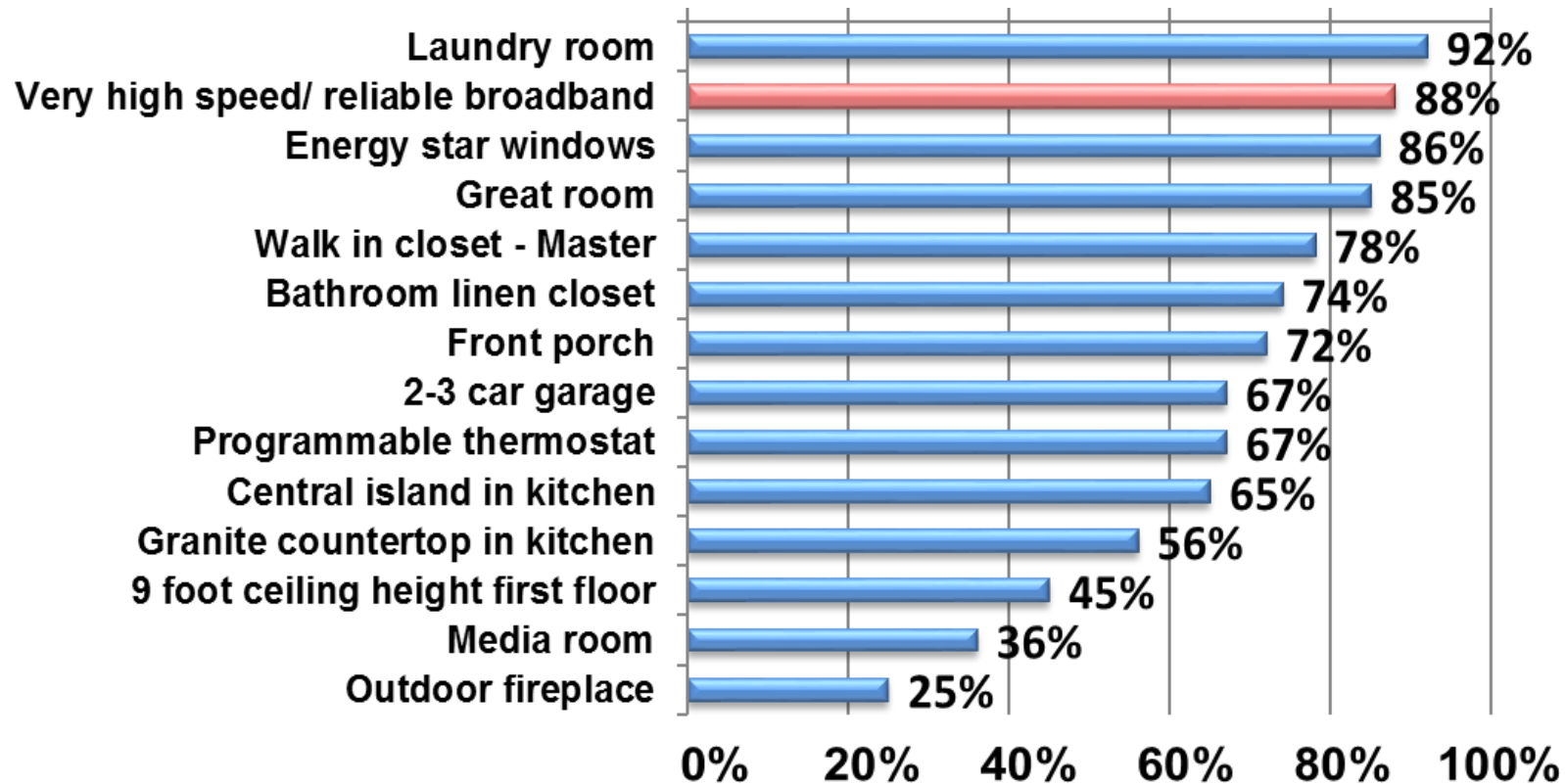
Mutual Water Company

Microgrid Solar

LAHCF simply applies this approach to broadband infrastructure

- Each participant contributes to the cost of construction (assessment) and shares the ongoing cost of operation

Fast Broadband Is a Highly Desired Amenity

FTTH is Important to Single Family Home Purchase

Amenity	Percentage
Laundry room	92%
Very high speed/ reliable broadband	88%
Energy star windows	86%
Great room	85%
Walk in closet - Master	78%
Bathroom linen closet	74%
Front porch	72%
2-3 car garage	67%
Programmable thermostat	67%
Central island in kitchen	65%
Granite countertop in kitchen	56%
9 foot ceiling height first floor	45%
Media room	36%
Outdoor fireplace	25%

FiberBroadband ASSOCIATION
Accelerating the Connected Future

RVA LLC
Market Research & Consulting

Gigabit Internet Improves Home Value

In a national study of 520,000 homes with a median price of $175,000... *

> Homes with **gigabit internet** had a transaction price **over 7% more** than similar homes that have 25 Mbps or less

- Median home value in Los Altos Hills is $4.3 million**

- Even a 1% increase in value would be significantly more than investment in LAHCF network

* National study of 520,000 homes with a median price of $175,000 showed a transaction price improvement of 7%.
Molnar, G., Savage, S., & Sicker, D. (2015). Reevaluating the Broadband Bonus: Evidence from Neighborhood Access to Fiber and United States Housing Prices.

** Zillow: Los Altos Hills CA Home Prices & Home Values, Jul 2019 (www.zillow.com/los-altos-hills-ca/home-values/)

How Much Does it Cost?

One-time fee typically ranges from $3,000 to $10,000

- Neighborhood connection fee (assessment)
  - Pays for extension of the network into your neighborhood
  - Costs vary depending on participation rate, build type, lot size, etc.
- Home connection fee
  - Extend fiber from backbone to your home
  - In-home equipment (router w/ Wi-Fi)

Monthly service fee

- Shared operation expense that covers…
  1) Network management and internet fees
  2) Pro rata portion of the network uplink and of LAHCF's overhead expenses
  3) Reserve contribution for maintenance, upgrades and technical support
- As participation increases, cost sharing improves and monthly fees decrease

Broadband Price Breakdown

Item	Monthly	Detail
Network management	$25	Manage the network infrastructure and supporting services
Internet service	$15	Provide internet access, 24x7 support and billing services
Network uplink	Varies*	Connects neighborhood network to regional data center
Overhead, reserves, utilities, etc.	$10 to $30	Reserves for equipment & technical support, utilities, insurance, holding company overhead.
TOTAL:	~$60 to ~$140	

* LAHCF's "dark fiber" backhaul circuit costs $3,500/mo. Normally all members would pay a pro rata share but Next Level is subsidizing 50% of this cost for the first 200 subscribers.

Costs Improve as Membership Grows

Members:	25	100	310 (10%*)	775 (25%*)
Network management	$25	$25	$25	$25
Internet service	$15	$15	$15	$15
Network uplink	$70**	$18**	$11	$5
Overhead, reserves, utilities, etc.	$30	$20	$15	$10
TOTAL:	**$140**	**$78**	**$66**	**$55**

Assessment:	**Typically $3,000 to $10,000***
Home Connection Fee:	**Typically $700 to $1,700**

* ~3,100 homes in Los Altos Hills

** Cost after applying 50% NLN subsidy (provided for initial 200 members)

*** Buildout cost varies depending on participation, lot size and construction specifics.

How Does it Grow?

Neighborhoods get added when there is sufficient interest

- Members share the cost of the network extension
- The greater the participation the lower the cost for each home

Help drive participation

- Register your interest: https://lahcommunityfiber.org/contact/
- Encourage your neighbors to join
- Become a neighborhood champion

Be an angel for your neighborhood

- Provide a loan or grant to cover the cost of your neighborhood's construction

LAHCF Provides Superior Broadband
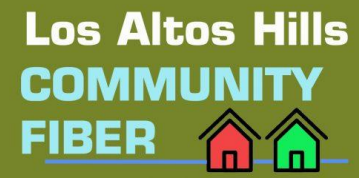
Alternative to Comcast & AT&T's aging infrastructure
- Community-owned fiber optic network
- Cost transparency
- Respects privacy and Network Neutrality

Next-generation, futureproof solution
- 10-gigabit capability and dedicated fiber for each home
- Dramatic improvement in upstream bandwidth

Improve your property value
- Highly desired amenity
- Home value increase likely far greater than install cost

Support your community
- Member-owned non-profit cooperative
- Greater participation reduces costs for everyone

"We're paying rent essentially as a country to a handful of companies that are selling second-rate, extraordinarily expensive internet access."

SUSAN CRAWFORD
HARVARD LAW SCHOOL PROFESSOR & TELECOMMUNICATION EXPERT
AUTHOR, "FIBER: THE COMING TECH REVOLUTION—AND WHY AMERICA MIGHT MISS IT."

LAHCF Expansion Scenarios

LAHCF's Initial Footprint

LAHCF pilot network (green)

- 721' backbone
- Passes 6 homes

LAHCF Phase 2 Expansion (blue)

- Add homes on west side of Fremont Pines Ln
- 1,254' backbone
- Passes 6 homes

Wildflower Extension

Network extension spearheaded by Twinkie Lyman

- 4 homes on Wildflower cul-de-sac can only access the internet at 6 Mbps
- Owner of two large parcels touching Robleda also participating
- At least 5 homes along extension path plan to participate
- Build cost is $55,000
  - 10 homes implies per-home assessment of $5,500
  - Per-home connection fee of $700 to $1,700 (connect from home to backbone)

Wildflower Ln (yellow)

- 400' backbone
- Pass 6 homes

Backbone extension (magenta)

- 3,700' backbone along footpath (and/or rear fence-line easements)
- Pass 27 homes
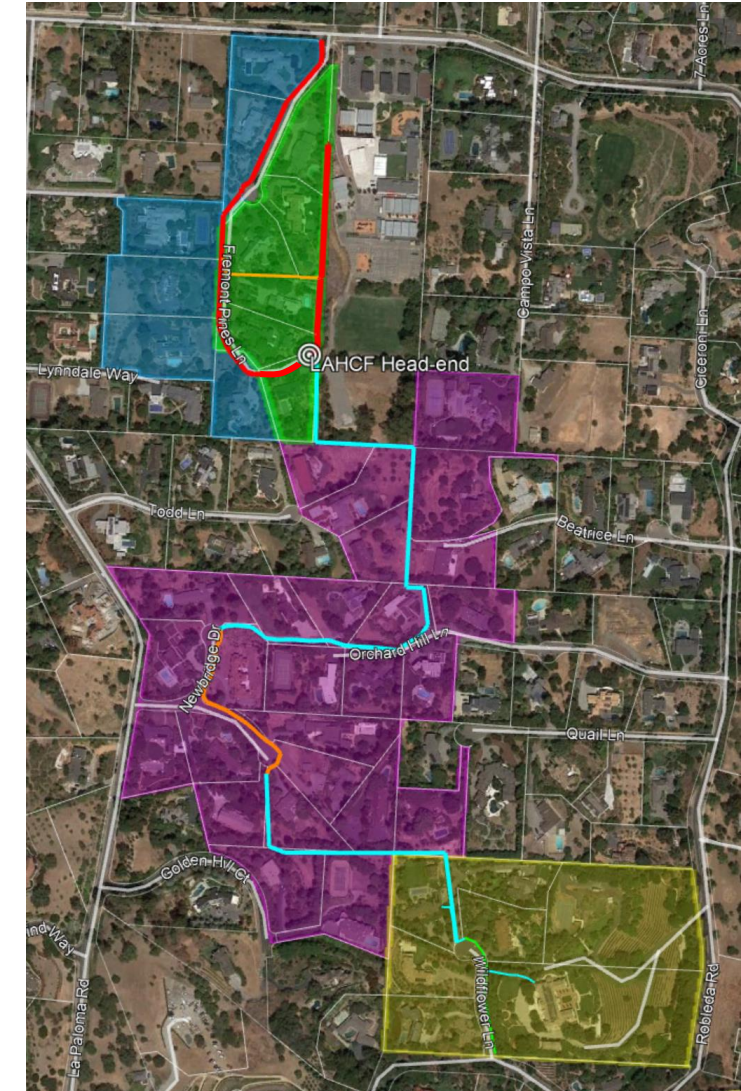
Wildcrest Extension

Wildcrest Dr (orange)

- Network extension from Wildflower build
- 2,400' backbone
- Pass 10 homes on Wildcrest Dr
- Build cost $47,000
  - Potentially less expensive if some/all of the backbone can be built in softscape vs. microtrench along road

| # Participants:	1	4	7	10
Assessment	$47,000	$11,750	$6,714	$4,700
Home connect	$1,700			
TOTAL	**$48,700**	**$13,450**	**$8,414**	**$6,400**
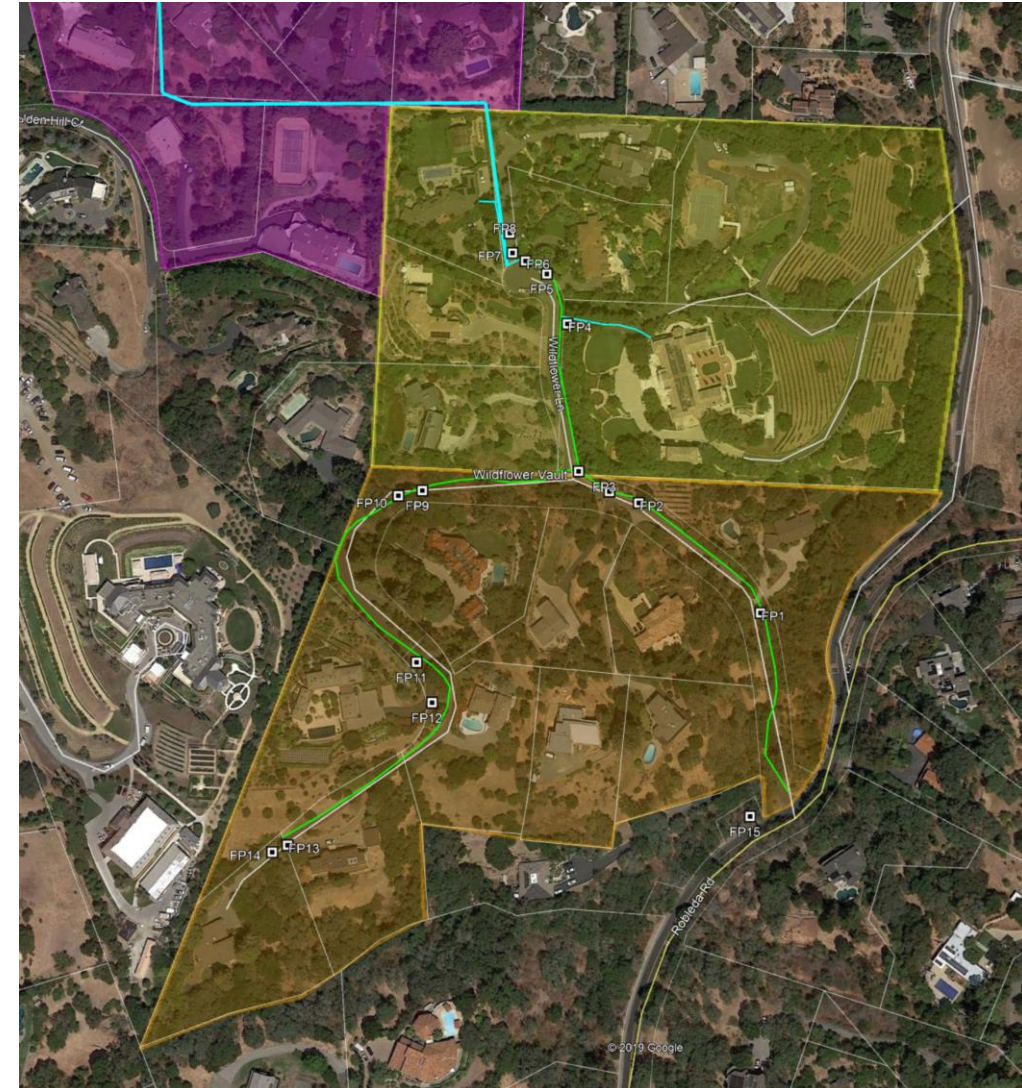
La Rena Ln, Dianne Dr, O'Keefe Ln, etc.

Also referred to as "Zone 22"

- 8,000' backbone
- Pass 48 homes
- Build cost estimate: $199,000
- Project could be expanded to include homes east of Dianne Dr

Participants	12 (25%)	24 (50%)	36 (75%)	48 (100%)
Assessment	$16,583	$8,291	$5,528	$4,146
Home connect	$1,700			
TOTAL	**$18,283**	**$9,991**	**$7,228**	**$5,846**
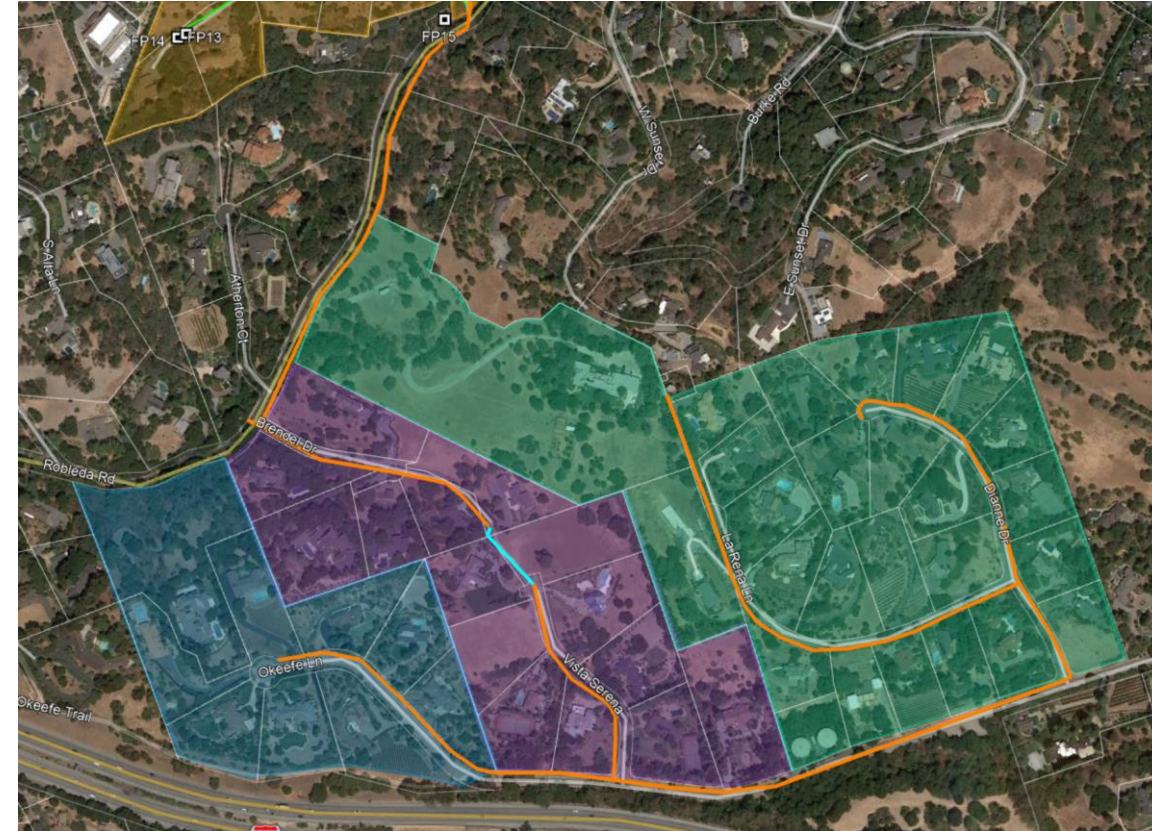
Alternate Backbone Scenarios

Total for 3 mile network passing >200 homes: ~$500,000

Build 1.7 mile community fiber backbone (green)
- Fremont Pines Ln to Brendel Dr
  - West along Fremont & south along Robleda
- Pass 127 homes
- $290,000

Option: also extend to Town Hall (yellow)
- West along Fremont Rd (0.5 miles)
- Pass 32 homes
- $95,000

Option: also extend to Foothill College (orange)
- South along Robleda Rd & Josefa Ln (0.84 miles)
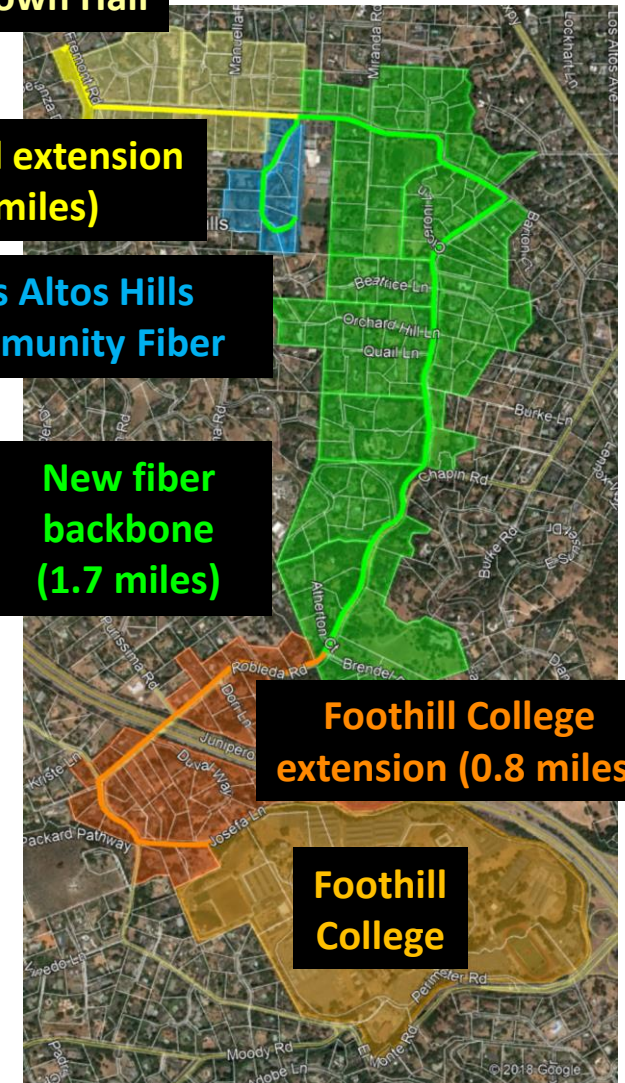- Pass 45 homes
- $130,000

Town Hall

Town Hall extension (0.5 miles)

Los Altos Hills Community Fiber

New fiber backbone (1.7 miles)

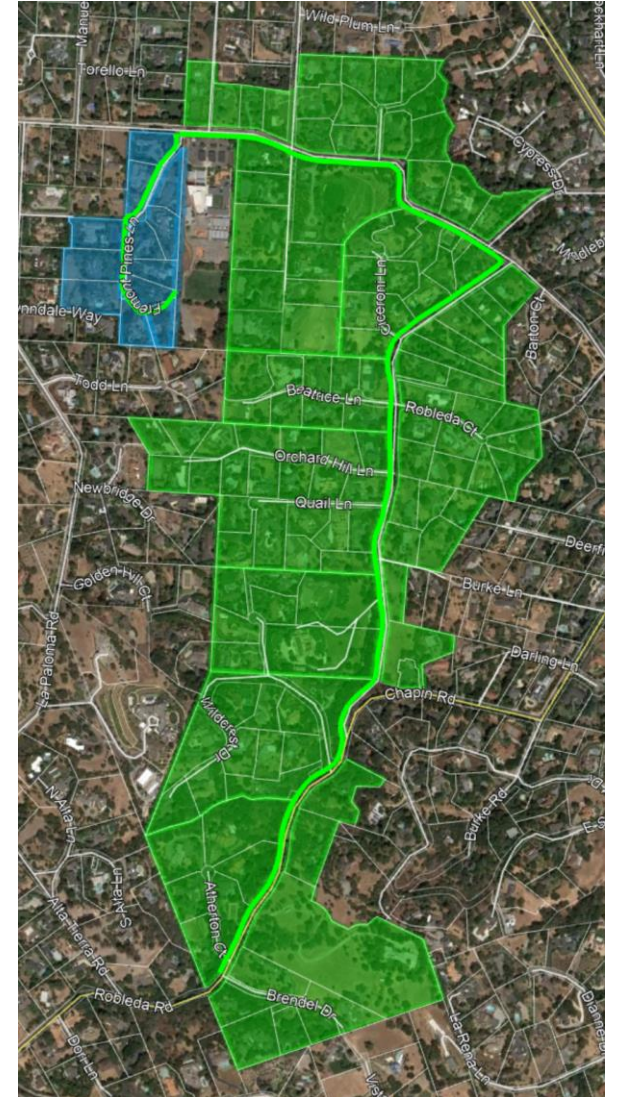Foothill College extension (0.8 miles)

Foothill College

Note: additional per-neighborhood cost to extend into cul-de-sacs

LAHCF Backbone Extension

New 1.7 mile community fiber backbone

- Fremont Pines Ln to Brendel Dr
  - Along Fremont & Robleda
- Pass 127 homes
- $288,200

Note: additional per-neighborhood cost to extend into cul-de-sacs

LAHCF Backbone Extension

Option 1: Extend network to Town Hall

- West along Fremont Rd (0.5 miles)
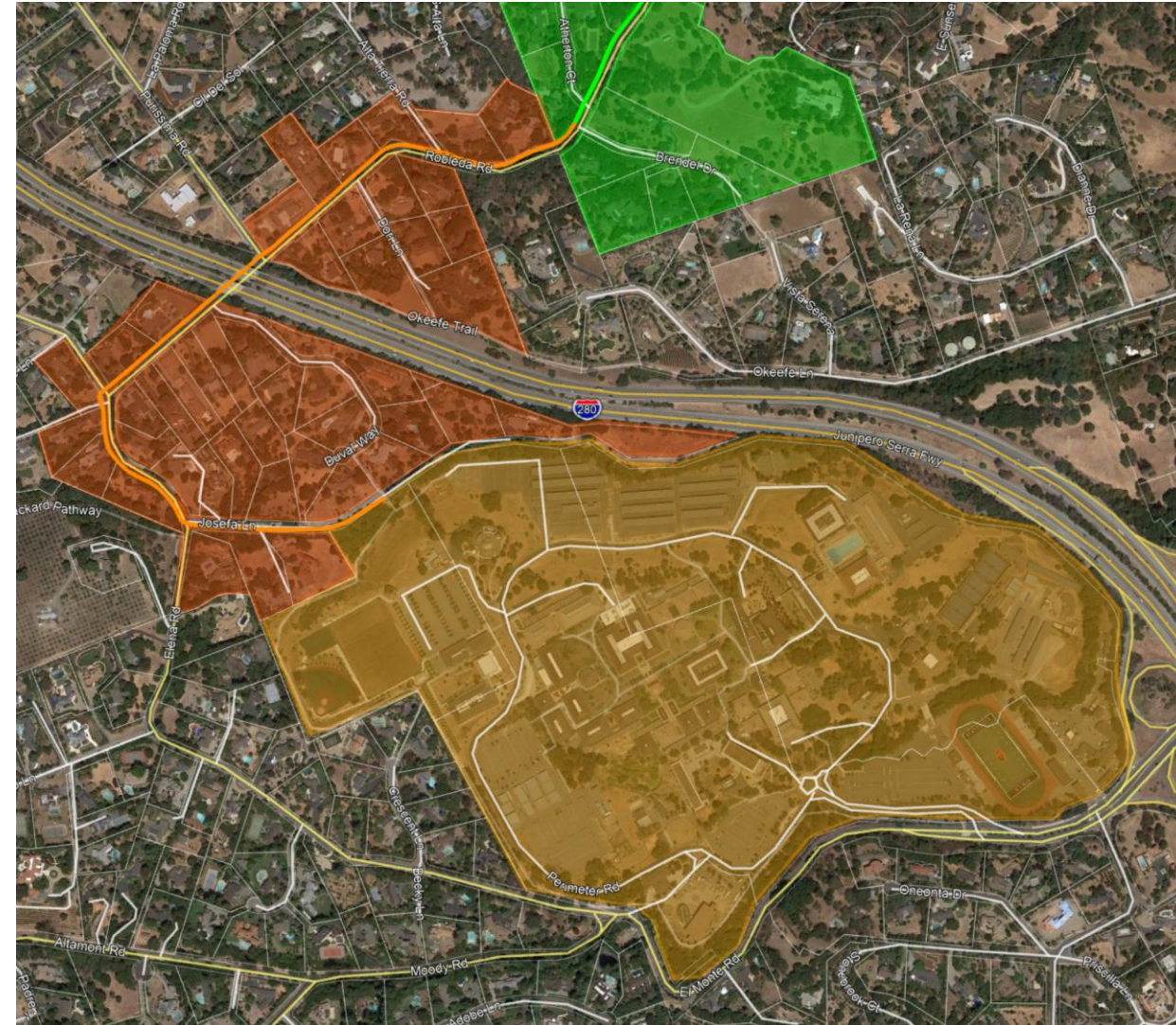- Pass 32 homes
- $93,300
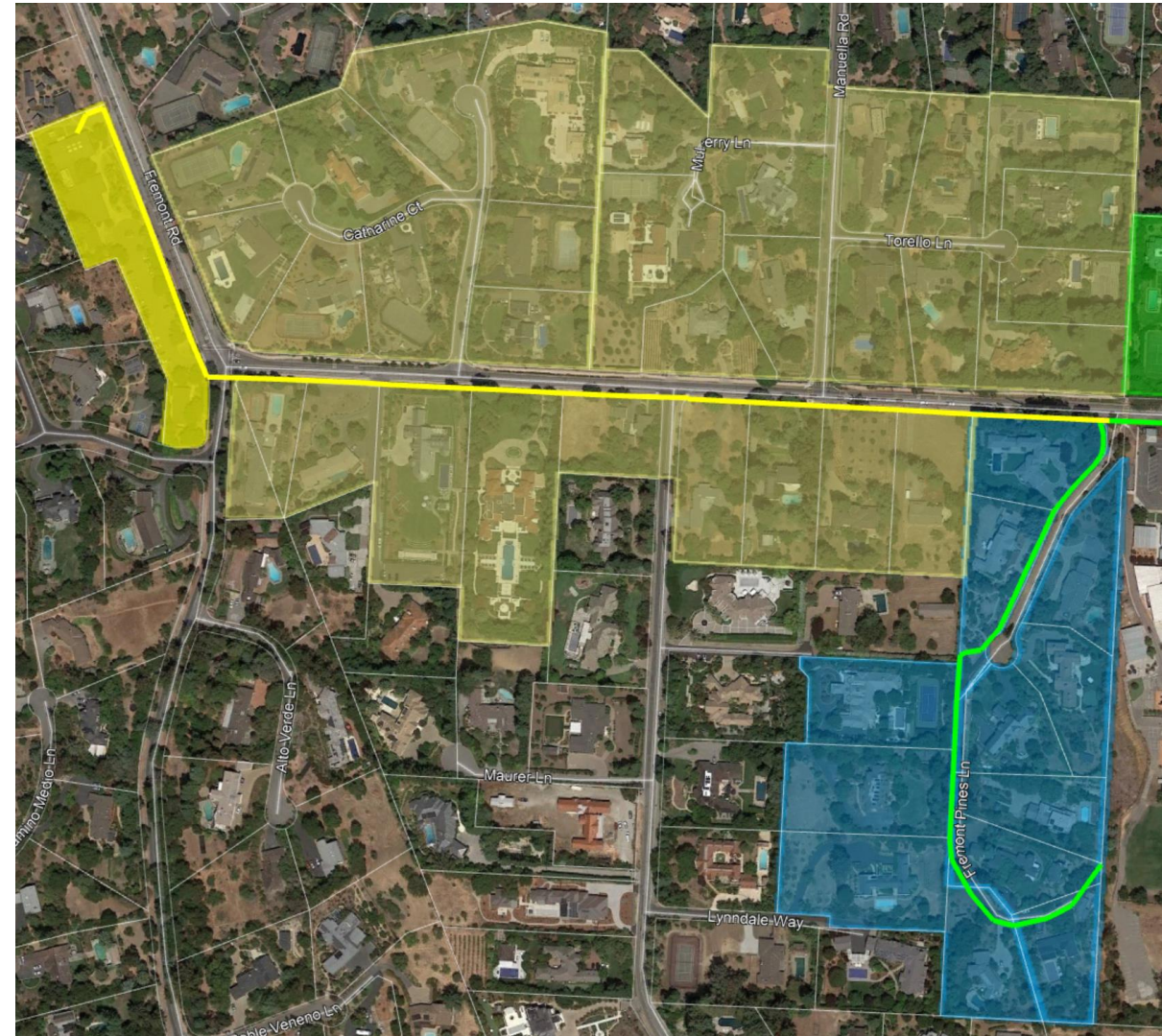
Note: additional per-neighborhood cost to extend into cul-de-sacs
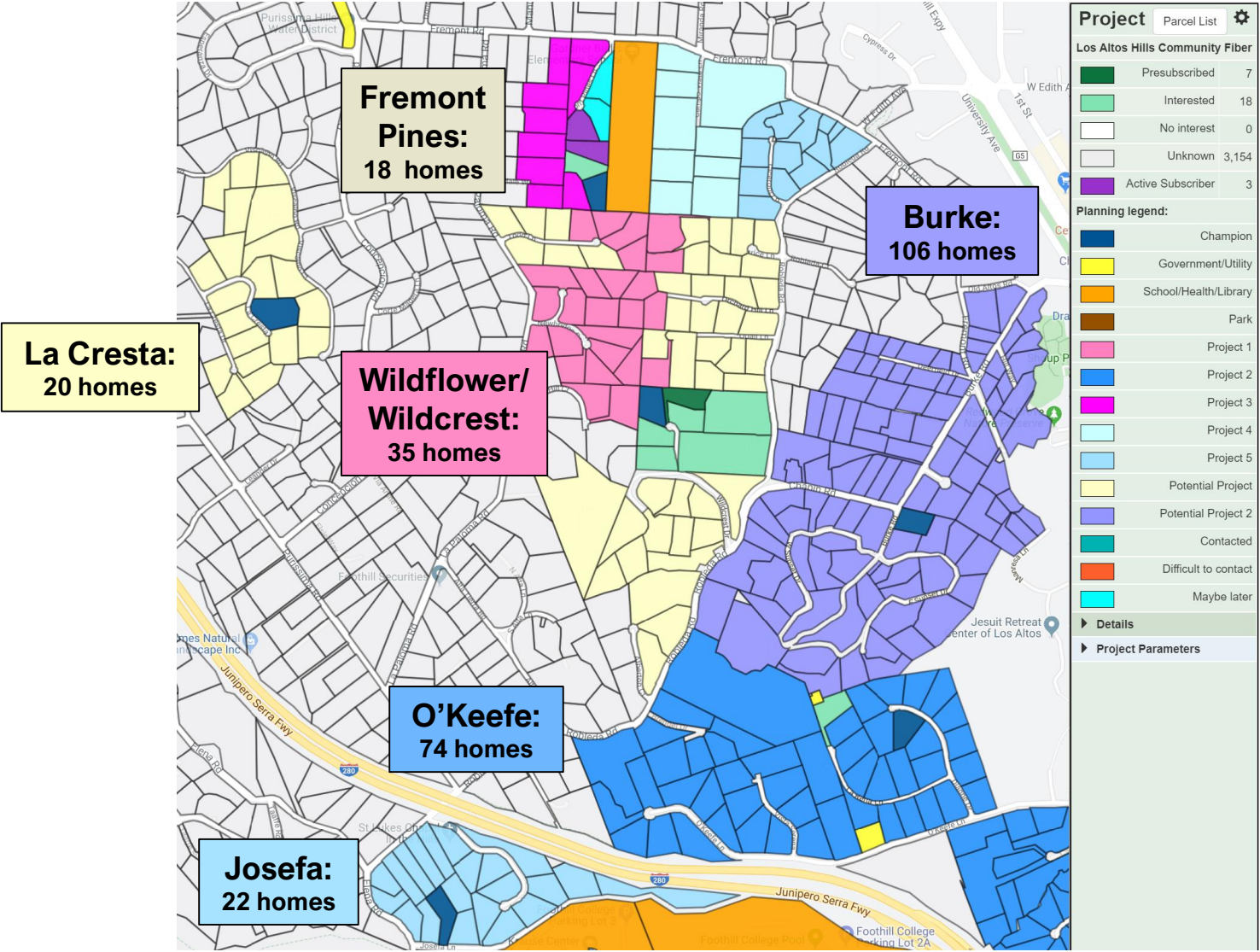
LAHCF Backbone Extension

Option 2: Foothill College extension

- South along Robleda Rd & Josefa Ln (0.84 miles)
- Pass 45 homes
- $130,050

Current Extension Efforts

Appendix

TV Service Options

Keep existing satellite or cable TV service

Install satellite TV service such as DirecTV

**Roku Ultra 4K
Set-top box**

Stream TV via set-top box or Smart TV

• Choose from an array of "over-the-top" TV providers:

Telephone Options

- Keep existing landline service from AT&T

- Voice service from voice-over-internet providers such as Ooma or Vonage
  - Ooma's service is $12.50/month and includes...

Privacy
- The most advanced call blocking features available
- One-touch Do Not Disturb

Mobility
- Multi-Ring to Cell Phone OR Mobile App
- Call Forwarding
- Unlimited Mobile app calling

Home Office
- Three-way Conferencing
- Second Phone Number
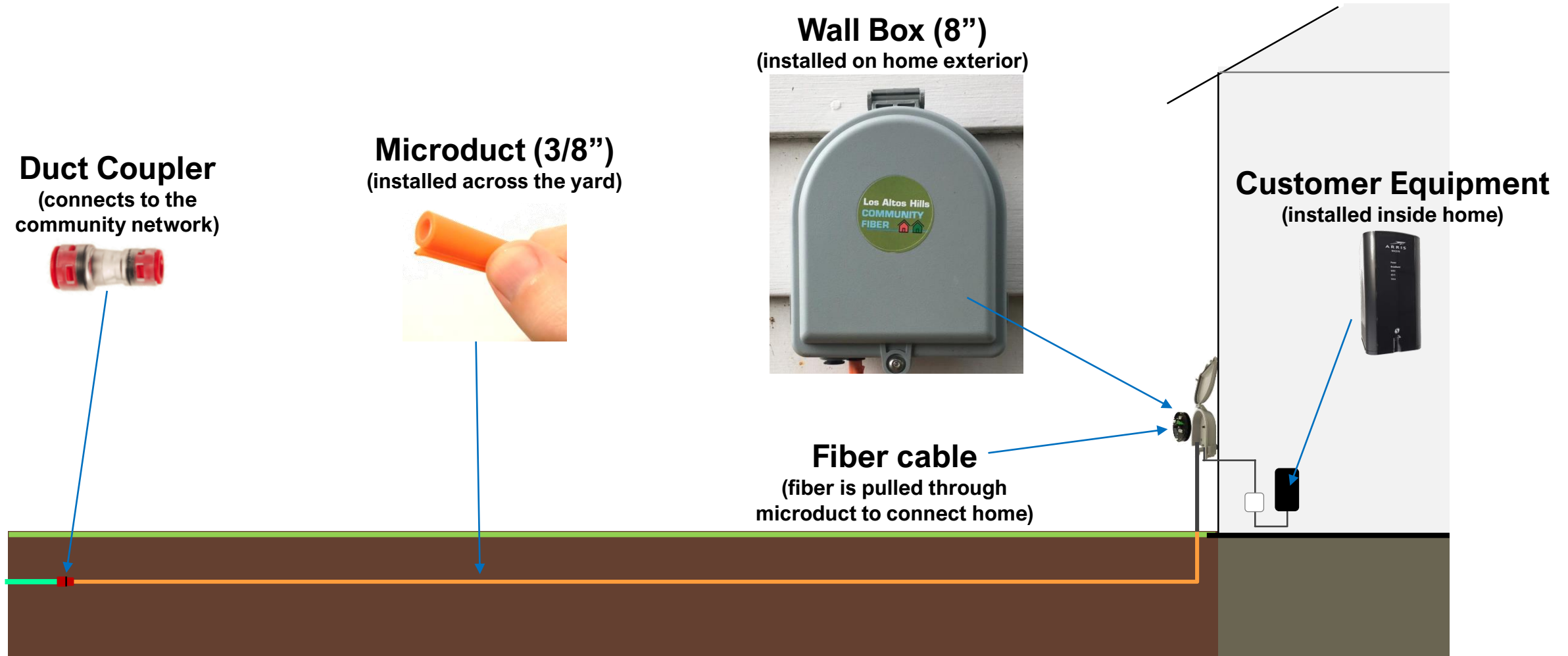- Premier Fax Mode

Smart Home
- Integrate phone line with Nest, Amazon Echo, Dropbox, etc.

Voicemail
- Voicemail to Email
- Voice-to-Text (transcription)

Establishing the Home Connection

Wall Box (8")
(installed on home exterior)

Duct Coupler
(connects to the
community network)

Microduct (3/8")
(installed across the yard)

Customer Equipment
(installed inside home)

Fiber cable
(fiber is pulled through
microduct to connect home)

Customer Equipment

Arris NVG-578

- ## 10 Gbps router
  - WAN: 10G fiber
  - LAN: 1x 10G RJ45, 4x 1G RJ45
- ## Latest Wi-Fi standard
  - 802.11 b/g/n/ac/ax
  - Wi-Fi 6 (802.11ax) is "4x4 MIMO"
    - Wireless speeds up to 1 Gbps

LAHCF is Managed by a Professional Operator

- Next Level Networks provides residential and commercial services

- Turnkey solution for building and operating community-owned broadband services

- Led by a team of highly experienced telecom executives

- Headquartered in Silicon Valley
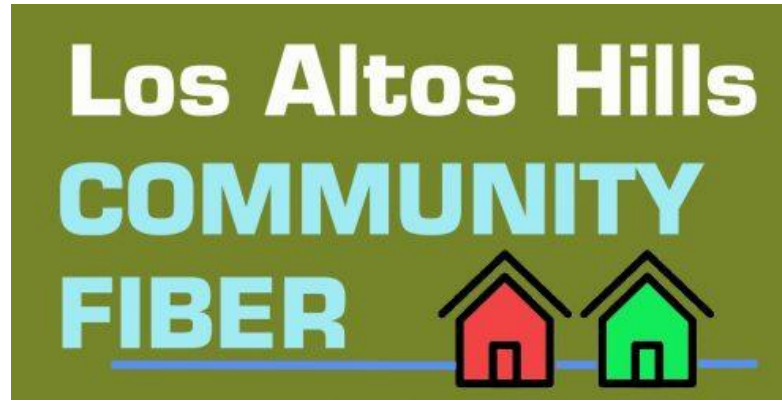
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