ENTRUST SOLUTIONS GROUP

ENCOMMUNICATIONS

City of **Mountain View**

Broadband Needs Assessment and Gap Analysis

SUMMARY REPORT
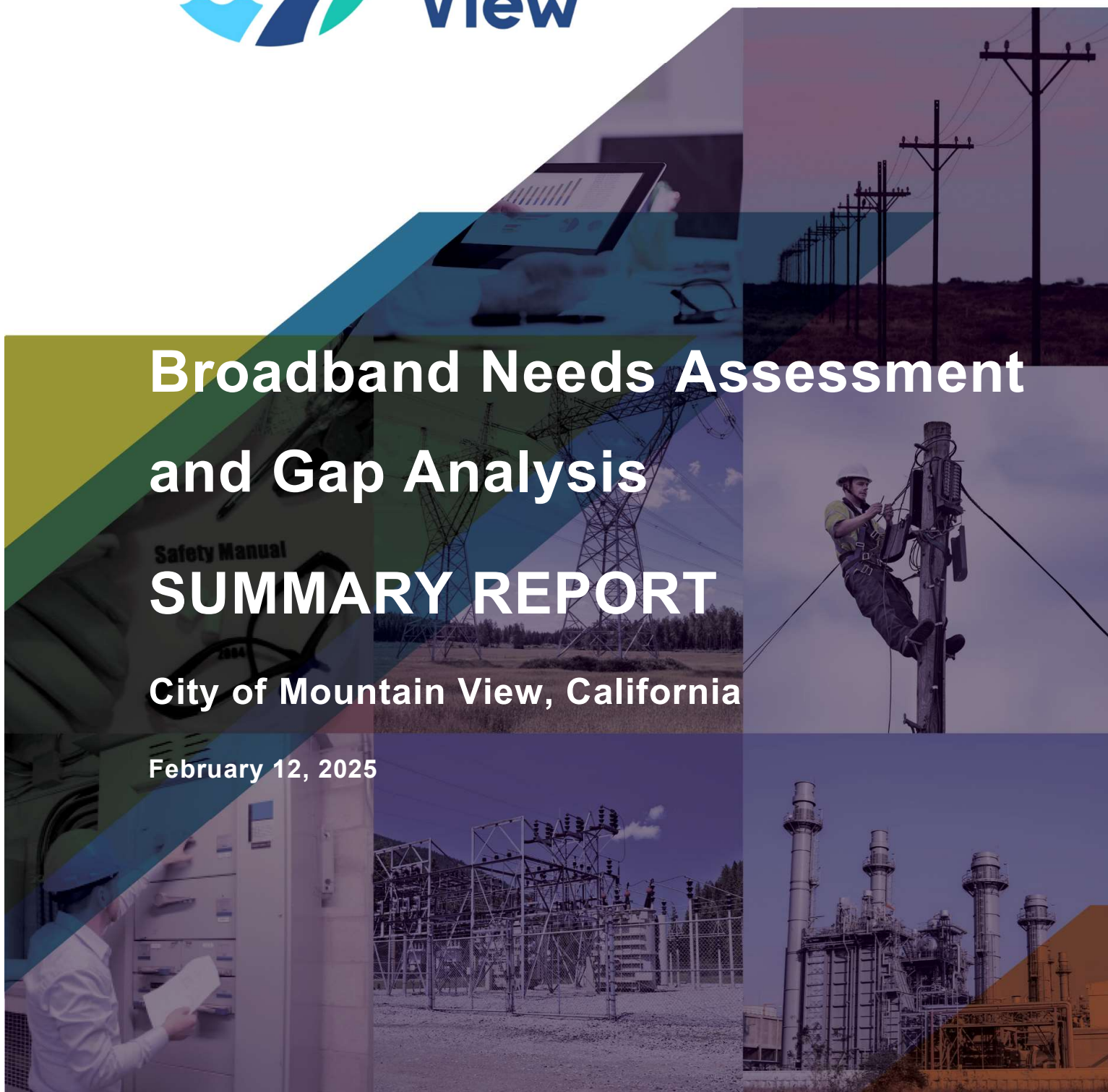
City of Mountain View, California

February 12, 2025

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1. Overview

Communities are navigating a digital landscape where broadband is often regarded as a public utility, similar to water and electricity. The transition to online learning, remote work, telehealth, e-commerce, service automation, autonomous vehicles, and technological advancements requires a long-term vision for community growth and prosperity.

The City of Mountain View contracted ENTRUST Solutions Group to conduct a Broadband Needs Assessment and Gap Analysis. The purpose of this assessment was to identify tasks, goals, and potential next steps for broadband development. ENTRUST's scope of work included the following:

- An *Asset Inventory* to identify, map, and evalue public and private assets that could be leveraged to expand broadband access and services in Mountain View.
- A *Broadband Market Assessment* to review the broadband environment in Mountain View for existing market conditions and service gaps.
- A *Broadband Needs Assessment* to identify indicators of need, survey community organizations and residents about their internet experiences, and host stakeholder focus groups.
- A *Gap Analysis and SWOT Matrix* to identifying key issues and barriers to meeting the community's broadband needs and outline steps that could address any deficiencies.

Details of these analyses and assessments have been provided to the City in technical memos. Key findings,conclusions, and potential   next steps are summarized in this Summary Report.

2. Asset Assessment

ENTRUST identified key assets that the City uses for its own communications requirements, which can be used to expand broadband capabilities and leveraged to create a more robust broadband infrastructure. The most relevant assets are summarized here; additional assets with related broadband opportunities were identified and evaluated as part of the Asset Inventory Technical Memorandum dated October 2, 2024.

City Communications Network (INET)

The City currently uses INET, a Comcast-owned and maintained fiber network, to support all City communication needs and services, including interconnection between City sites. The INET network itself has evolved and aged over time so that it can no longer provide for all the City's communication needs – either because the asset is old, no longer maintained by Comcast, or simply cannot provide the speeds and connectivity required for the community.

Comcast has informed the City that because providing INET is tied to a franchise agreement that was replaced in 2008 by the statewide franchise agreement, they are no longer obligated to provide the network for free to the City. Comcast advised the City that INET should be replaced with new dark fiber leases, which could be provided by Comcast or other third party private providers for a monthly recurring cost.

A broadband network that is not reliant on INET will enhance the City's ability to control its communications network, reducing its exposure to service interruptions, including during emergency responses.

Traffic Communication Network

The City has a limited traffic communication network that connects some signalized traffic intersections over copper wire along stretches of Shoreline Boulevard and Grant Road, as shown in Figure 1. The City also has additional copper conduit sections along Charleston Road and Evelyn Avenue that are not connected to the main traffic communication network.

The copper is run through approximately 3.7 miles of conduit (exclusive of the Charleston Road and Evelyn Avenue sections) which is interconnected at a single point via INET fiber cable back to City communications.

As-built plans for the traffic -communication network showed that the conduit, typically between 1-3" in size, does not exceed 50% capacity, which provides an opportunity for the City to install a new, fiber optic cable (288+ strands) that could provide enhanced City and community connectivity. Existing conduit serving the traffic -communication network represents a significant cost savings opportunity since 50-65% of the typical cost for installing new fiber is the labor involved in underground construction.
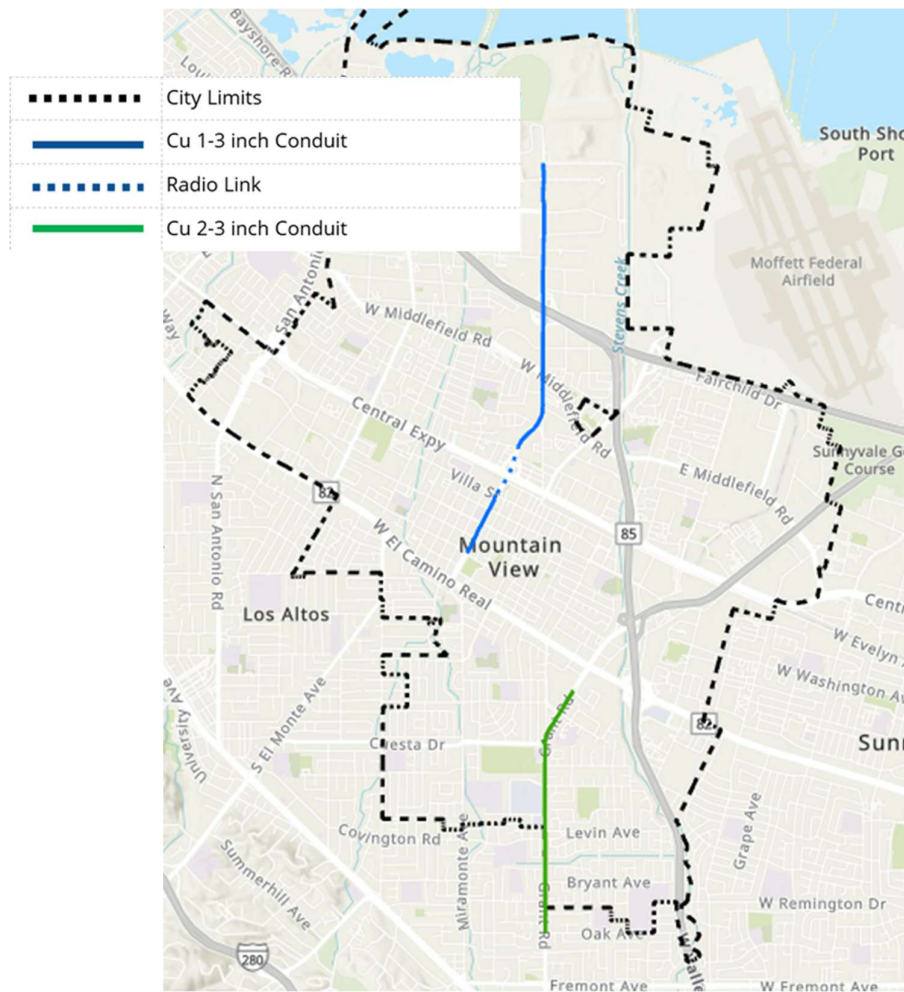
Figure 1. Traffic Communication Network

However, the City has only 21 intersections interconnected via the city traffic communicatoin network, limiting the City's ability to manage traffic congestion and key commuting corridors.

City Facilities and Anchor Institutions

Public and some community anchors could be used to build out a public network through deployment of antennas, radios, sensors, cameras, data servers, community Wi-Fi spots, and interconnection points for redundancy and disaster recovery. City facilities, particularly those connected to the aging INET, can provide a baseline of demand to justify a more extensive fiber network than what currently is in place.

The City identified 209 public and private anchors that included buildings, facilities, utilities, parks, healthcare facilities, and schools. A summary of the number of anchors by category and ownership is on Table 1.

Table 1. Public and Private Anchors

Category	Mountain View	Private	School District	Federal, Other Cities, and Unknown	TOTAL
Administrative	4	1	0	0	5
Arts and Culture	1	1	0	0	2
Community Centers and Library	4	1	0	0	5
Education	0	10	31	3	44
Entertainment and Dining	2	0	0	0	2
Federal	0	0	0	5	5
Health	0	3	0	0	3
Housing	0	6	0	0	6
Park and Recreation	71	2	0	2	75
Parking	35	1	1	0	37
Public Safety	8	0	0	2	10
Public Works	8	0	0	0	8
Transportation	0	3	0	4	7
Anchors of Interest	**133**	**28**	**32**	**16**	**209**

Streetlights

Public streetlights offer a significant and valuable asset that can be leveraged for broadband deployment in urban areas through placement of antennas and smart city equipment. There are 4,766 streetlights throughout the City.

The typically dense nature and geographic reach of streetlights offers a significant opportunity, particularly for deployment of fixed wireless or 5G small cell technology, either through City-deployed infrastructure or through leasing poles to the major cellular carriers (AT&T, Verizon, & T-Mobile) that can provide enhanced coverage into neighborhoods that lack adequate internet. Streetlight poles can also be offered as in-kind contributions for public-private partnerships, providing cost-efficient City infrastructure that can be used to deploy new fiber cables in existing conduit, and/or install smart city devices on poles (smart lighting management, cameras, traffic management, environmental monitoring, etc.).

3. Market Assessment

ENTRUST documented service offerings by incumbent internet service providers (ISPs), with a particular focus on facilities-based carriers, or those that own their own physical infrastructure including fiber, copper, coaxial cable, or fixed wireless equipment. The evaluation included pricing, service tiers, access, and market division utilizing public data such as the updated 2022 FCC Broadband Map, previous studies and reports conducted by ENTRUST, carriers' websites, and ENTRUST's extensive database and knowledge of the broadband industry.

There are two primary wireline providers in the City: Comcast (Xfinity) and AT&T. While Comcast is capable of providing speeds up to 1+ Gbps download over its hybrid fiber-coaxial cable network, its upload speeds are capped at 35 Mbps. However, AT&T fiber, capable of delivering up to 5 Gbps symmetrical services (equal download and upload speeds), is only available in approximately 42% of the City, as shown in Figure 2. This means that nearly 60% of the City is subject to a cable monopoly with no real choice for high-speed broadband.
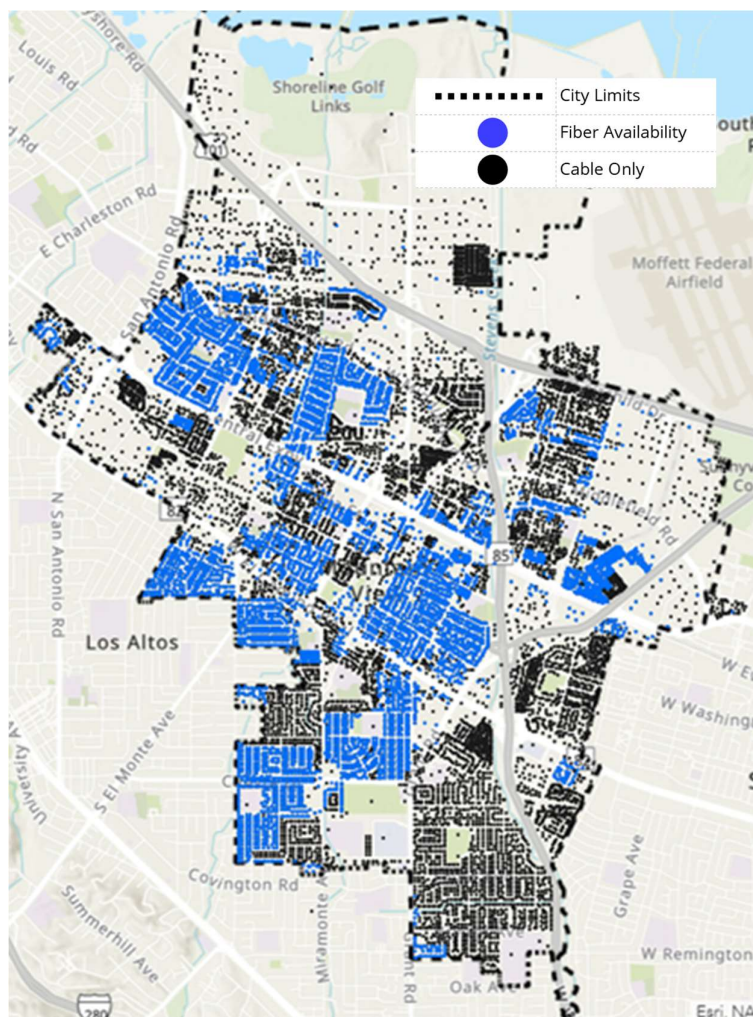

Figure 2. Mountain View Broadband Option Availability

Monthly prices for internet service in Mountain View is shown in Table 2.

There are also enterprise-level service providers in Mountain View that typically serve anchor institutions or large businesses, as well as fixed wireless providers that serve residences.

Table 2 - Internet Pricing for Mountain View ISPs

Provider	Technology	Download Speed (Mbps)	Upload Speed (Mbps)	Monthly Rate ($/mo)
Comcast / Xfinity (Promotional pricing)	Cable	50	11	$ 9.95
		100	23	$ 29.95
		150	23	$ 19.99
		300	23	$ 30.00
		500	23	$ 50.00
		800	23	$ 60.00
		1,000	23	$ 65.00
		1,200	40	$ 70.00
AT&T (Promotional pricing)	DSL	100	20	$ 55.00
AT&T	Fiber	300	300	$ 55.00
		500	500	$ 65.00
		1,000	1,000	$ 80.00
		2,000	2,000	$ 125.00
		5,000	5,000	$ 225.00
T-Mobile	Fixed Wireless	182	30	$50.00
Verizon	Fixed Wireless	50	5	$25.00
		300	50	$60.00
AT&T	Fixed Wireless	75-225	5-25	$55.00
Ridge Wireless	Fixed Wireless	20	10	$99.00
		60	20	$114.00
		85	40	$129.00
		100	60	$149.00

4. Needs Assessment

Indicators of Need

ENTRUST used data from the American Community Survey (ACS), Housing & Urban Development (HUD) databases, and the Market Assessment results to identify areas in the City where broadband availability is inadequate to meet community need.

Areas within the City where the percentage of households without any internet exceed the national average (12%) appear to be especially concentrated in two parts of Mountain View – the east and west boundaries of the City between the Central Expressway and El Camino Real. These areas also roughly align with HUD designated Low Income census blocks (at least 51% of the residents in the area have incomes at or below 80% of the area median).

ENTRUST cross referenced these areas with neighborhoods that have no fiber optic option. Figure 3 shows areas of the City that have no fiber optic option generally aligns with lower-income census blocks and/or blocks with lower than average rates of internet access, suggesting a causal relationship between broadband options, affordability, and access.
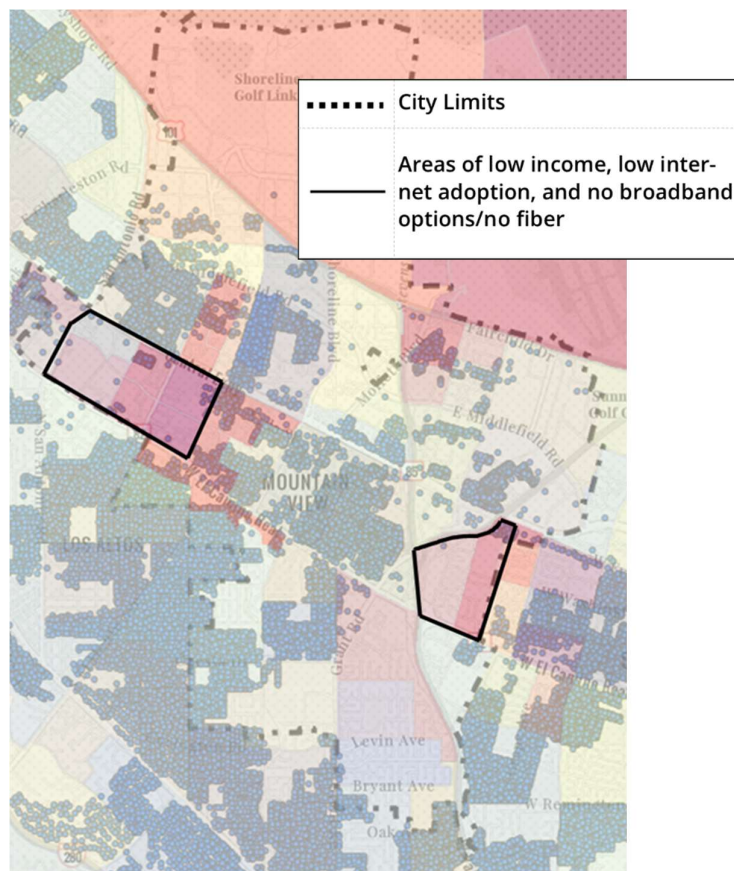

Figure 3. Areas of Low Income, Low Internet Adoption and No Broadband Options/Cable Only

The patterns seen above are often contributing factors in the Digital Divide - the division between households, individuals, and businesses where there are disparities in the access to the internet. The Digital Divide is typically caused by affordability, access, technology/devices, language, and/or geography.

Community Survey Results

ENTRUST and the City conducted an online community survey to better understand current community broadband experiences and identify potential opportunities for future improvements. The survey was open from April 24 to June 26, 2024 and received a total of 577 responses verified as submitted by residents or businesses within the City limits.

Approximately 60% of respondents noted they use Cable (Comcast/Xfinity) for their internet service; only 16% reported a fiber connection. Notably, 15% of respondents are still using legacy DSL technology (old copper phone lines), which are not capable of speeds that meet the California minimum standard of 100 Mbps download and 25 Mbps upload.

However, while most residents reported purchasing a service that advertised speeds in excess of the California minimum (100/25 Mbps), Figure 4 illustrates the disparity between contracted and *actual* internet speeds for residential customers. Survey data reveals that respondents generally achieved only half of their contracted download speeds.
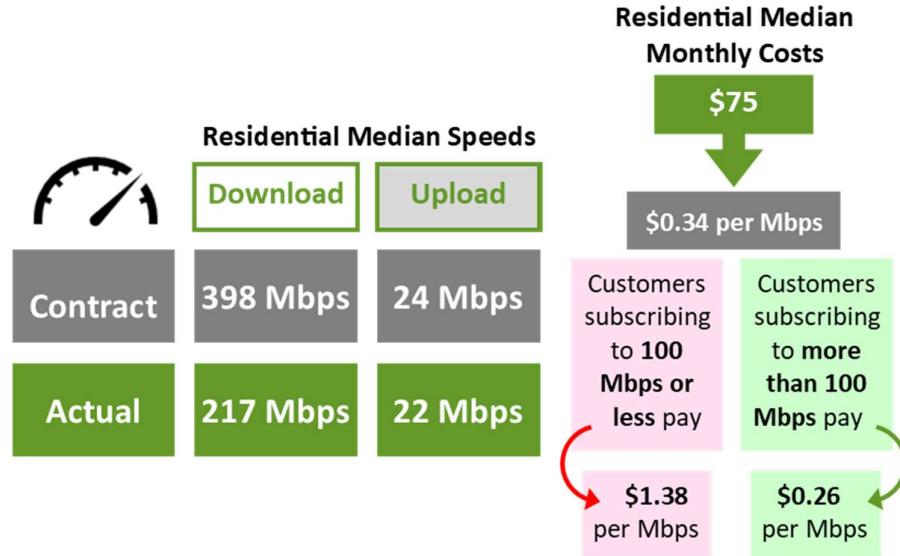
Figure 4. Median speeds and pricing for residential service

On average, residents paid $75 for their internet service, equating to approximately $0.34 per Mbps. However, those with contracts for 100 Mbps or less paid around $1.38 per Mbps, whereas subscribers with higher-tier services advertising over 100 Mbps paid just $0.26 per Mbps. This disparity in the rate per MB between minimum-speed and higher-tier broadband packages further exacerbates the Digital Divide by

not only providing sub-par speeds to households with lower discretionary income, but then charging those who cannot afford higher bandwidth plans more for those services.

Stakeholder Outreach Results

ENTRUST and City staff organized three focus groups comprising General Community Members (conducted in English and Spanish), Community-Based Organizations, and the Business Community. Participants shared insights on their connectivity experiences, identifying existing challenges and future requirements for internet access.

Participants highlighted significant challenges with internet connectivity in Mountain View, particularly among low-income families and seniors who rely on it for essential services and job opportunities. Many individuals, especially those living in RVs or mobile homes, depend on community centers for access. The dominant presence of Comcast as a provider was noted, with frustrations over limited alternatives like AT&T fiber. Stakeholders described the internet landscape as monopolistic, complicating efforts to secure better service and leading to struggles with renegotiating contracts.

A prevalent theme among focus group participants was the digital divide, which exacerbates socio-economic disparities and hinders educational and employment opportunities. Issues such as digital literacy gaps and the lack of effective communication about available resources were raised. Stakeholders expressed concerns over monopolistic control by providers, frequent price hikes, and inconsistent service quality across neighborhoods, all contributing to financial strain and limiting residents' access to remote work and educational resources.

Looking ahead, participants emphasized the need for improved broadband accessibility through initiatives like public Wi-Fi and leveraging emerging technologies. Business community members called for better internet infrastructure to support growth, highlighting the importance of reliable connectivity for operational efficiency. There was a consensus on the necessity of equitable internet access as a fundamental utility for all residents, alongside community education on navigating connectivity challenges and expanding digital literacy programs.

5. SWOT Matrix and Gap Analysis

SWOT Matrix

Strengths

- Approximately **200 anchors** such as City facilities and buildings, parks, schools, transportation hubs, and healthcare facilities that can be leveraged to create the foundation for a robust, cost-efficient broadband network.
- **Existing underground conduit** that can be leveraged to deploy traffic management systems, smart corridors, intelligent transportation systems, monitors, and other applications.
- Nearly **4,800 streetlight poles** which can be used to deploy broadband and/or smart city applications via wireless or cellular connectivity or leased to mobile carriers.
- **Broadband friendly policies** that are encouraging efficient deployment of broadband infrastructure, such as the City's permitting process and joint build policy.
- The City's **location in an innovation, entrepreneurial, and academic** hub ideally positions it to address broadband accessibility gaps.

Weaknesses

- The City currently does not have **broadband utility coordination** between its own need to deploy public fiber and conduit and other private utility projects. The City also does not coordinate public fiber and conduit deployment concurrent with private development projects that require other public improvements as part of a discretionary entitlement process. This limits the City's ability to cost-effectively deploy public assets, reduces private investment, and leverage planned City projects.
- The City faces the **decommission of the INET network** that connects many of its facilities. Without ownership of the network that replaces it, the City faces network vulnerabilities and potential service interruptions, especially during emergencies.
- The City does not have a **public broadband infrastructure** and thus does not have a credible public telecommunications infrastructure that it can build off of to address gaps in broadband service.

Opportunities

- **Expanding broadband options** for City residents and business who believe they need more broadband options that would result in more competitive pricing, improved speeds, and enhanced customer service.
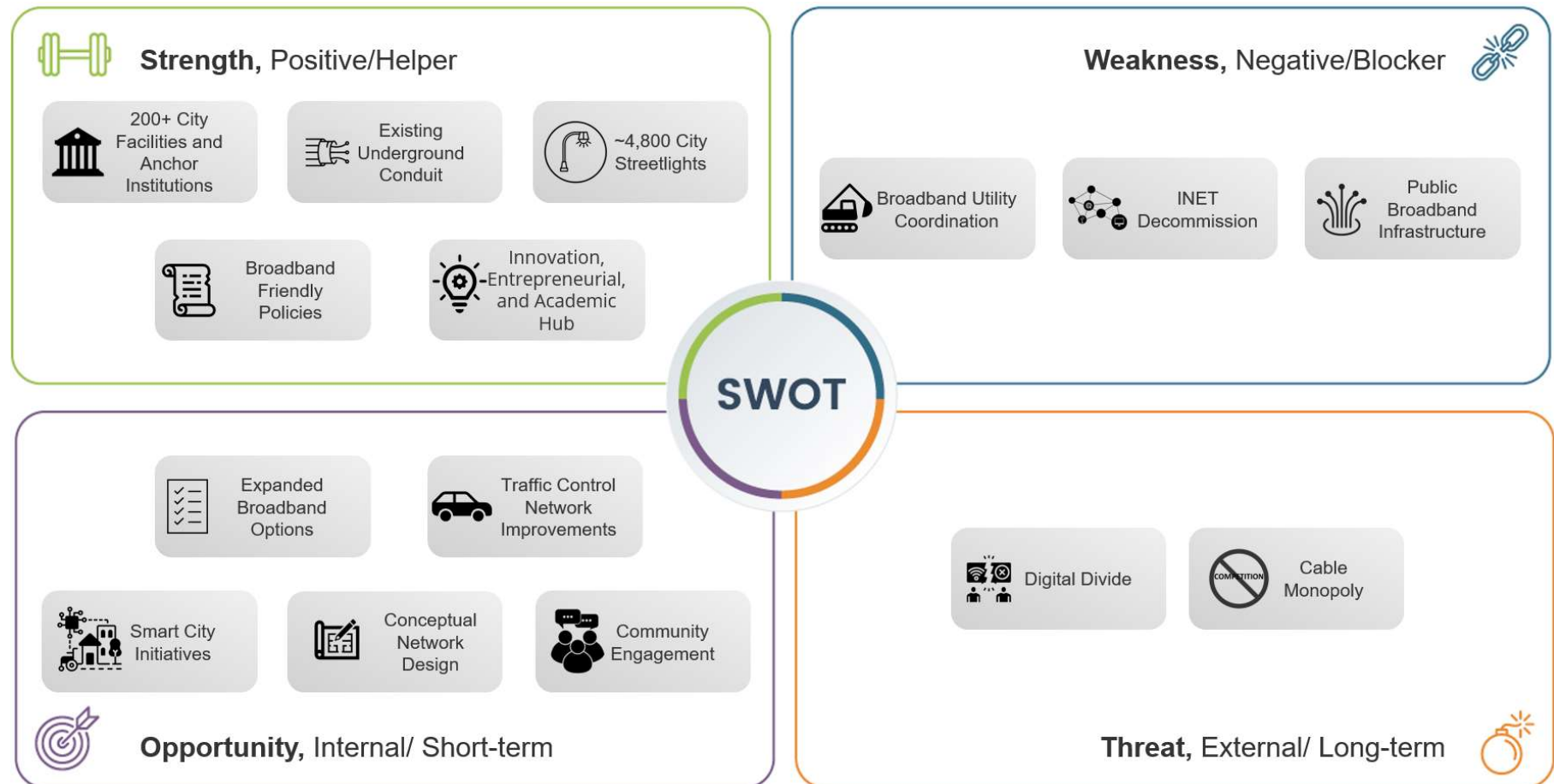
Figure 5. Mountain View Broadband Strengths, Weaknesses, Opportunities and Threats

- Expanding the **traffic communication network** and using that expanded network to provide comprehensive traffic management capabilities through use of intelligent transportation systems and devices, while simultaneously connecting more City facilities and anchor institutions.
- Implementing **Smart city initiatives** including smart street lighting, building and infrastructure health monitoring, air quality management, and water management that gives the City the ability to optimize city services and infrastructure.
- Creating a **conceptual network design** to be used for a broadband network that replaces INET and provides a foundation for the deployment of smart city technology.
- **Engaging the community** throughout the process to ensure their concerns are addressed. The high level of participation in both the focus groups and the survey highlights the community's role as an active stakeholder.

Threats

- There are **digital divides** within the City stemming from factors such as affordability of internet access, no access to technology devices in some instances, uneven digital literacy, and language barriers. The result is unequal educational, health, and socio-economic outcomes within the community.
- Significant portions of Mountain View are affected by a **cable monopoly**, where there is just a single provider of broadband that meets the California minimum speed standard of 100 Mbps download and 25 Mbps upload.

Gap Analysis

Having identified the gaps in the SWOT matrix, ENTRUST highlighted seven key findings with the potential to close those gaps, as shown in Figure 6. The analysis also included potential recommendations for filling each of these gaps, including the deployment of new infrastructure, working with providers to improve availability and quality of services, ensuring that all locations of the community have equal access, and recommending educational programs to increase digital literacy.

Gap / Findings	Broadband Utility Coordination	INET Decommission	Public Broadband Infrastructure	Expanded Broadband Options	Traffic Communication Network Improvements	Smart City Initiatives	Conceptual Network Design	Community Engagement	Digital Divide	Cable Monopoly
Infrastructure Findings										
1. The City Needs a City Fiber Network Conceptual Design		●	●	●	●		●			●
2. The City has Limited Ability to Manage its Traffic Network					●					
3. Wireless Technology can Help Address Short-Term Gaps			●					●		●
Policy Findings										
4. The City Has Not Formalized Broadband Coordination Across All Projects	●		●							
5. A Technology Enterprise Fund Can Create a Sustainable Funding Mechanism for Broadband Projects			●						●	
Digital Equity Findings										
6. CASF Broadband Grant Funds Can Help Close the Digital Divide								●	●	
7. Public-Private Partnership Discussions Could Address Resource Constraints						●			●	●

Figure 6. Gap Analysis Findings Summary

6. Key Findings

Finding #1: The City Would Benefit from a City Fiber Network Conceptual Design

With the pending retirement of INET and need for the City to ensure it has full control over its primary communications network for public safety, emergency response, and City services, the City will need to identify a strategy to replace the infrastructure and ensure current and future City communication needs. A conceptual network design for a broadband fiber backbone can connect city facilities and anchor institutions (including city facilities and school buildings currently on INET), expand the traffic communication network (and other intelligent transportation systems), and address underserved neighborhoods.

Finding #2: The City has Limited Access to Manage its Traffic Network

The City is in a major metro area with traffic congestion but has limited access to manage key traffic corridors because only a fraction of the 92 City owned and operated signalized intersections are currently connected via a traffic communication network. An expanded network – and one converted from copper to fiber - could provide comprehensive traffic management capabilities through use of intelligent transportation systems and devices, while simultaneously connecting more City facilities and anchor institutions.

Finding #3: Wireless Technology can Help Address Short-Term Gaps

With lower capital costs and fewer infrastructure requirements, wireless technology could be an interim solution to target key areas and underserved neighborhoods in Mountain View. This short-term, cost-effective strategy would allow the City to focus on bridging connectivity gaps and enhancing digital inclusion across the city while a longer-term strategy for broadband connectivity is considered (City fiber network expansion, P3, etc.).

Finding #4: The City Has Not Formalized Broadband Coordination Across All Projects

The City has not integrated broadband infrastructure planning into all projects within the City. There are opportunities for coordination and collaboration between Capital Improvement and City Utility Projects, private utility and telecommunications

projects (PG&E, Comcast, AT&T, etc.), and private development projects that require public improvements as part of an entitlement process. Broadband planning should include joint trenching and dig-once opportunities for all parties that streamlines infrastructure deployment and significantly reduces everyone's costs, which encourages more private investment in the City. This approach involves incorporating broadband considerations into the city's overall capital improvement strategy, ensuring that new projects, such as road repairs or utility upgrades, account for broadband needs.

Implementing these policies will facilitate a more cohesive and integrated approach to infrastructure planning and development, laying a solid foundation for future broadband advancements. It is important that the City recognize this approach also requires specific, additional resources to successfully implement, such as staff time to curate and review projects. Budget constraints and grant limitations with the City's capital improvement projects may also limit the number of projects where these coordination opportunities are possible. Other constraints include coordinating construction schedules and ensuring that all parties involved remain committed to the project until its completion. Balancing these factors is crucial to effectively enhancing the City's broadband infrastructure.

Finding #5: A Technology Enterprise Fund Could Create a Sustainable Mechanism for Broadband Projects

A dedicated Technology Enterprise Fund is a mechanism to support and finance broadband infrastructure projects within the City, particularly opportunities that arise through joint trenching where there may not be time for a conventional budgeting and planning process. This fund could be primarily financed through revenue generated from leasing or monetizing city-owned assets such as utility poles, rooftops, and other infrastructure, and/or through recurring contributions from the General Fund (salary savings, mid-year adjustments, or budget line items).

Finding #6: CASF Broadband Grant Funds Can Help Close the Digital Divide

The California Advanced Services Fund (CASF) was created in 2007 to bridge the digital divide. With CASF as a potential funding source, the City could develop online resources, including a digital toolkit, to act as a central hub for information on broadband availability and resources. This initiative will enhance awareness and accessibility, enabling residents to connect with the necessary tools to improve their digital skills, support digital inclusion, and effectively address gaps in knowledge and access.

Finding #7: Public-Private Partnership Discussions Could Address Resource Constraints.

The City could investigate the feasibility of entering into a Public Private Partnership (P3) with an ISP to address underserved areas in the City. The essence of such a partnership is that for-profit and for-people entities collaborate to achieve complementary, if not common, objectives. The bottom line for private entities is profit, while it is quality of place for public agencies. In concept, private entities can flexibly mobilize resources where there is money to be made and public agencies can redistribute resources to ensure no one is left out. A P3 can help realize both these outcomes: public involvement reduces risk to private investment, and private involvement enables faster and more extensive execution. Generally, partnerships decrease risks while enabling larger or new forms of rewards.