CITY OF MOORPARK

Broadband Strategic Plan

Magellan ADVISORS

www.MAGELLAN-ADVISORS.COM

FINAL

Table of Contents

Executive Summary ____ *4*
Introduction ____ 4
Methodology ____ 5
Summary of Findings ____ 6
Recommendations ____ 7
1. Background ____ *11*
1.1 Overview of Broadband Infrastructure ____ 11
1.2 Broadband & Economic Development ____ 14
1.3 Enhancing Public Services ____ 15
1.4 Reducing Municipal Telecommunications Spending ____ 15
1.5 Addressing Community Needs ____ 16
2. Needs Assessment ____ *17*
2.1 Economic Development ____ 17
2.2 Government Innovation and Smart City ____ 19
2.3 Conclusions ____ 24
3. Analysis of the Current Broadband Market & Infrastructure ____ *24*
3.1 Business Broadband Availability ____ 25
3.2 Fiber locations in Moorpark Market ____ 26
3.3 Business Broadband Survey ____ 29
3.4 GAP Analysis ____ 33
4. 5G Readiness and Broadband Policies ____ *34*
4.1 5G Deployment ____ 34
4.2 Federal and State Broadband Policy Environment ____ 35
4.3 Policies and Actions Needed for 5G Deployment ____ 39
4.4 Recommended Actions ____ 42
5. Smart City Applications ____ *43*
5.1 Smart City Applications for Moorpark ____ 45
5.2 Connected and Autonomous Vehicles ____ 47
5.3 Smart City Policy Issues ____ 48
5.4 Preparing Moorpark for Smart City ____ 48
6. Asset Inventory ____ *50*
6.1 Vertical Assets ____ 50
6.2 Other Assets ____ 51
6.3 Capital Improvement Projects ____ 51
6.4 Development Projects ____ 53
6.5 Identification of Anchors ____ 55
6.6 Building Additional Assets incrementally & Opportunistically ____ 55
6.7 Conduit construction Specifications ____ 56
6.8 City Civic Center Design Considerations ____ 57
7. Recommendations & Next Steps ____ *59*
7.1 Incorporating broadband and smart City into planning processes ____ 59
7.2 Building and operating a citywide network ____ 59

7.3 Provider Investment/Partnership Opportunities _____ 60
7.4 Funding Opportunities _____ 63
7.5 Ventura County Broadband Project _____ 66
7.6 Next Steps for Moorpark's Broadband Strategy _____ 67

Table of Figures

Figure ES-1. Capital Improvement and Development Projects for Broadband Infrastructure Deployment 7
Figure ES-2. Conceptual Network Vision with CIP, City Facilities, and Business Parks..... 8
Figure 1-1. How Fiber Connects Communities..... 11
Figure 1-2. Physical Bandwidth Capacity Comparisons 12
Figure 1-3. Diagram of 5G Infrastructure..... 14
Figure 2-1. Components of a Tech Ecosystem..... 18
Figure 3-1. Commercial Addresses Selected for Analysis 25
Figure 3-2. Long-Haul Fiber Routes in Moorpark 27
Figure 3-3. Metro Fiber Routes in Moorpark 27
Figure 3-4. Lit Buildings in Moorpark..... 28
Figure 3-5. Service Providers (n = 37) 30
Figure 5-1. The Smart City 44
Figure 6-1. City of Moorpark Vertical Assets..... 50
Figure 6-2. Moorpark Capital Improvement Plan Projects for Broadband Infrastructure Deployment..... 52
Figure 6-3. Development Projects for Broadband Infrastructure Deployment 54
Figure 6-4. Conceptual Citywide Network..... 56
Figure 6-5. Civic Center Design with Conduit and Vaults 57
Figure 7-1. Moorpark RDOF Map..... 64

Executive Summary

INTRODUCTION

In an increasingly digital world, access to broadband internet has become crucial to governments, businesses, and residents. Recognizing this, the City of Moorpark, California, commissioned development of this Broadband Strategic Plan to develop a strategy for ensuring abundant broadband connectivity for municipal operations, fully capitalizing on City assets and planned projects for private companies to provide network services, maximizing economic vitality, and minimizing costs and disruptions for the community.

The City recognized the need to interconnect its various sites, most crucially the City's new Civic Center and Library campus, the Police Department, and Arroyo Vista Community Park to improve services to residents and capitalize on efficiencies through interconnectivity. Moorpark also requires connectivity to enable Smart City innovations including intelligent transportation, security and traffic cameras, and other applications controlled through sensors and servomechanisms. These technologies can result in substantial cost savings, faster and more flexible response times, and improve quality of life; however, all of them require connectivity to high-bandwidth, low latency broadband.

In addition to the communications needs of the City itself, Moorpark seeks to improve connectivity for its businesses to enable operations for tech-focused companies that will boost economic development. Over the past several years, commercial activity across many sectors has become increasingly reliant on the availability of broadband, and the current COVID-19 pandemic has further highlighted and accelerated those needs in recent months. To keep pace with other cities in attracting and retaining businesses, the City recognizes the need to ensure that reliable, affordable broadband options are available, particularly in the City's three business parks and new development sites.

Simultaneously, Moorpark needs policies and a strategy for responding to telecommunications carriers' plans to deploy 5G wireless service. This new generation of connectivity will require densely placed "small cell" telecommunications devices, as well as fiber-optic cables to backhaul data from user devices to the internet. The placement of these devices is governed by an interrelated legal framework characterized by shared jurisdiction between state and federal authorities (the Federal Communications Commission, or FCC);[1] however, over the past two decades the FCC has preempted the authority of state and local jurisdictions. Although the City's ability to regulate deployment of small cell technology has been usurped by the federal government, ideally, the rollout of these devices in Moorpark will be guided by the City to maximize local control over placement and aesthetics, and to receive fair compensation for the use of publicly owned assets.

To meet these needs, the City of Moorpark selected Magellan Advisors to develop this Plan, which will provide a strategy for the City of Moorpark to attract and guide investment from broadband providers, as well as economically deploy its own broadband infrastructure when and where it has clear value for employers, residents, and visitors.

METHODOLOGY

Over the course of five months between February and June 2020, Magellan Advisors worked with staff to develop a clear picture of the current broadband environment in the City, understand the current and future operational needs of businesses and the City itself, assess the assets and planned projects that Moorpark could use to enhance broadband availability, identify potential obstacles and funding sources, and analyze the City's current policies as they relate to the deployment of broadband.

Magellan's team interviewed a variety of City departments including the City Attorney, City Manager, Community Development, Community Services, Finance, Information Services, Parks and Recreation, Planning, and Public Works, as well as the City's Police Department, Ventura County Sheriff, and City Councilmembers. These discussions centered on the current and future needs of the City for internal operations, as well as the broadband needs of businesses and residents of Moorpark. Potential Smart City applications and their impact on the community were also discussed and weighed in on by the City's team.

We also spoke with incumbent telecommunications providers including AT&T and Spectrum/Charter to get an understanding of their current offerings and future plans in Moorpark. Other providers including CenturyLink, GeoLinks, and Zayo were also engaged to understand whether they had assets and interest in the Moorpark market. Magellan also analyzed maps of available fiber-optic infrastructure in the City through its national database of fiber assets.

To further vet findings about the current market, a short survey was promoted among Moorpark's businesses, especially those located within the City's three business parks. The survey requested information about current services including provider and type of connection, as well as an embedded speed test, which measures actual download and upload speeds. Participants were also asked about satisfaction and given an opportunity to provide open-ended feedback about broadband for businesses in Moorpark. Based on input from the City's team, survey responses, conversations with providers, and the mapped locations of current assets, a gap analysis was developed to identify areas of the City that lacked a robust broadband environment.

Magellan's team of policy experts also examined the City's existing broadband-related policies, especially as they relate to the rollout of 5G. Additionally, an inventory of City-owned assets including fiber-optic cable, conduit, streetlights, and traffic signals was performed to gain an understanding of how Moorpark might leverage its assets to expand broadband availability.

Finally, Magellan analyzed the City's capital improvement and development projects, as well as planned Ventura County capital projects, to determine opportunities for Moorpark to deploy conduit and fiber at locations where excavation work was already

planned. Projects were identified and vetted with the City's team before being incorporated into a conceptual network design that would allow Moorpark to deploy new broadband assets in key areas of the City as defined in the gap analysis, subject to available funding.

SUMMARY OF FINDINGS

Based on these evaluations, the most important gaps in broadband availability for the City's operations are connections between the City's Civic Center campus, Arroyo Vista Community Park, and the Police Department at an annual cost of $24,000. The City currently has an agreement with Spectrum/Charter to connect these key facilities, as well as a backup wireless line-of-sight connection through AT&T, but the amount of bandwidth needed to support Smart City applications will increase dramatically over the coming years.

Although conversations with the City's team revealed only a few Smart City applications that are currently desired (including cameras, public wi-fi at Arroyo Vista and on High Street, and improved traffic devices), the City's recent purchase and consequent upgrading of its streetlights to light-emitting diode (LED) bulbs will allow for additional Smart City and intelligent transportation applications in the future. Therefore, to save the City money on its telecommunications budget as needs for bandwidth grow, Moorpark would be well-served to develop its own resilient, reliable fiber-optic network with connections between these three key sites.

Findings also indicate that although most business locations in Moorpark have access to broadband, competition is limited. In some locations, only one provider offers service, while others have the option to choose between either Spectrum/Charter or AT&T. Generally, the costs for businesses to connect to fiber are high; in some areas, fiber is simply unavailable. Although the City's western and eastern business parks are relatively well-served by at least one provider, there is concern about the lack of competition and the high costs of fiber-based connections. The central business park (Science Drive/Patriot Drive area) represents a major gap in broadband availability, and businesses in these locations report having no access to broadband at all.

As in many cities, the lack of available broadband is a result of a convergence of issues that comes down to a simple question for broadband providers: is the investment worth it? When faced with challenges such as crossing railroad tracks or major highways, providers need to see a business case that will return their investment, including aggregated demand from users. Lowering costs by making public assets in the public right-of-way available to a number of service providers to enter the market can also inspire investment.

The central business park represents a potential area where, if enough demand is aggregated and the costs to serve businesses can be lowered, broadband providers may consider making additional investments. If Moorpark deploys additional infrastructure such as conduit and/or fiber that it could lease to broadband providers, the cost of serving businesses could be lowered, creating a business case that would attract additional providers, increasing the number of options available to Moorpark's

businesses, enhancing competition and creating downward pressure on broadband pricing.

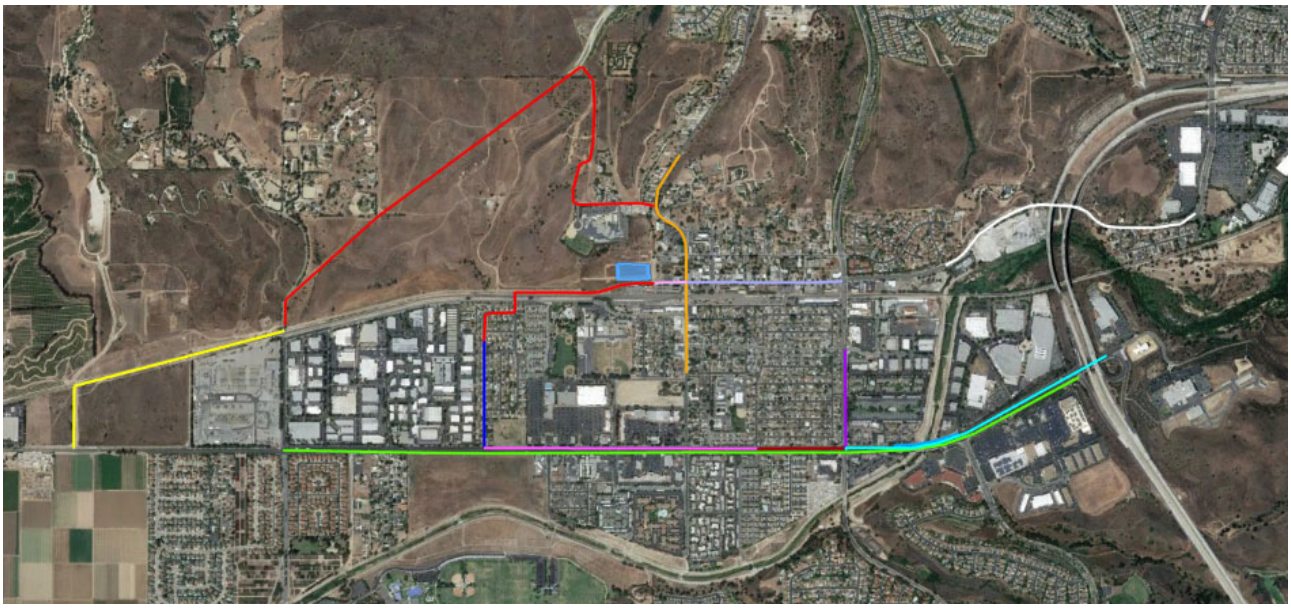
Such partnerships and leveraging of the City's assets should be considered during discussions with providers about their plans to rollout telecommunications infrastructure as well. Negotiating agreements that consider in-kind arrangements and implementing policies such as Dig Once could allow Moorpark to work with telecommunications providers to strategically invest in additional broadband assets in key areas while reducing Moorpark's spending on the margin.

RECOMMENDATIONS

The most effective means of improving the broadband environment in Moorpark is for the City to consider incremental, opportunistic deployment of additional broadband infrastructure. While building a fiber-optic network can be costly for cities, major savings can be realized if it is done in coordination with projects that already require the ground to be excavated at a depth of at least 24 inches.

The City of Moorpark and Ventura County's Capital Improvement Projects revealed several opportunities for laying conduit and/or fiber over the next several years. The map below shows the locations of these projects in green. Additionally, planned develoments include Hitch Ranch development, are opportunities to negotiate with developers for the placement of broadband infrastructure. These projects are shown below in red.

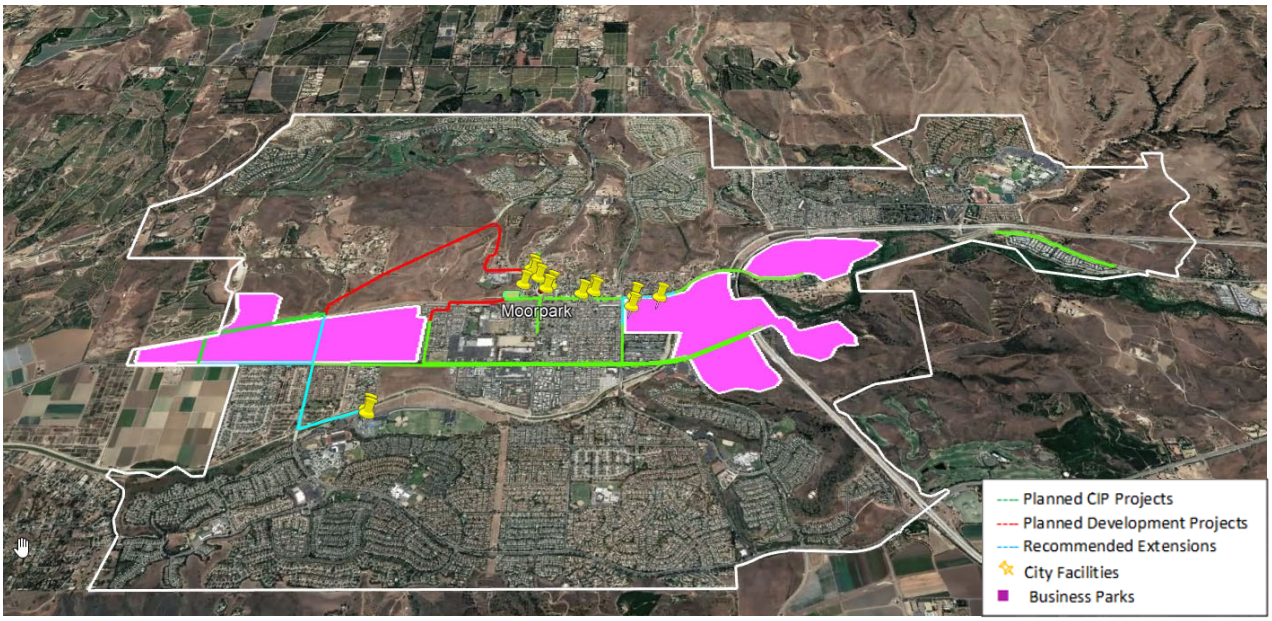
Figure ES-1. Capital Improvement and Development Projects for Broadband Infrastructure Deployment



The City should set aside funds for deploying conduit and/or fiber along these routes while the ground is already open. Developers should be encouraged to install conduit, especially in the new Hitch Ranch development, to mitigate the need for the City to fully fund the network. Although including conduit and/or fiber in these routes may call for borrowing money from another well-funded CIP or increase budgets during the City's annual budget update, the marginal cost to the City will be greatly reduced by joint buidling with these CIP projects, resulting in savings of up to one third of the cost to deploy the network instrastructure.

In addition, the City should consider filling in "gaps" in this burgeoning network that would create a resilient backbone fiber loop in Moorpark, as shown below. This fiber could be used to connect key City faciliites, including the three-way connection between the new Civic Center Campus, Arroyo Vista Community Park, and the Police Department. As indicated in the map, these routes run along many of Moorpark's major arterials and pass key City facilities. The fiber could also be leased to telecommunications providers to serve business customers in all three of the business parks, including the central business park that is currently underserved. This design includes fiber along Los Angeles Avenue, where CalTrans has already planned to replace aging traffic signal infrastructure with fiber. The City is engaged in discussions with CalTrans to place City-owned fiber and conduit along this route if possible, as well as negotiating the use of CalTrans fiber for Moorpark. The City can use this conduit and fiber not only to support its own Smart City applications and other operational needs, but also to allow internet service providers to lease these assets that will enable them to serve underserved locations such as the central business park.

Figure ES-2. Conceptual Network Vision with CIP, City Facilities, and Business Parks



Although the scope of this Plan does not include the design, costs, or revenue projections for a Moorpark network, over the course of developing this Plan, a network was mapped that could readily be built incrementally based on upcoming CIP and development projects. Using current estimate for laying fiber and conduit in California

of between $30-40 per linear foot, we estimate the total cost of building such a network at between $1.80 million and $2.39 million, not including any costs for engineering, permitting, or other considerations. This is only provided as a high-level estimate; detailed engineering would need to be performed to create a more accurate cost analysis.

Additionally, because the ground is already being excavated in the CIP locations, costs could be reduced by up to 33%. Also, an additional 11,622 linear feet of assets could be installed by developers already working in the Hitch Ranch area, further reducing the cost by up to $464k.

The leased network could be managed by telecommunications providers, relieving the City of any obligation to operate or maintain it, with a revenue sharing structure that would provide the City with additional cashflow. Although specifics of such an agreement would be detailed during contract negotiations with potential partners (likely followng an RFP process), it is Magellan's experience that the City could receive up to 50% of the gross revenue in such an arrangement.

Because a full ROI analysis was not performed as a part of this Plan's scope, detailed revenue projections are not available. Should the City be interested in further exploring costs and revenues of this network, we encourage Moorpark to conduct detailed design engineering and perform additional outreach to businesses and potential partners in order to generate take rate estimates and other key metrics that could be input into a pro-forma to provide more detailed return on investment estimates. Because the full construction of the network would be a 10+ year project, a more detailed ROI analysis could be prepared based on individual portions of the network.

In addition to this long-term network deployment, the City should continue its coordination with Ventura County on its Countywide Fiber Network project, which is currently ongoing and seeks to create a backbone that will connect County facilities, anchor institutions, and municipal networks. Because of Moorpark's central location and the presence of the rail alignment, the City would be an ideal place for a "Meet-Me Room" that could connect the County network, as well as private networks. This central location would further attract investment in broadband infrastructure within the City, putting Moorpark at the center of the broadband crossroads of Ventura County. Such a Room could be incorporated into the existing design for the new library, and connections to carrier locations on Poindexter Avenue have been included as a part of the network design. Considerations for dimensions, air conditioning, power conditioning, conduit access, and dual route entry should be considered in the design of the building and are detailed later in this report.

This Broadband Strategic Plan identified key next steps for the City of Moorpark to contmplate as it moves forward toward development and implementation of a comprehensive strategy. These elements include:

1. Incorporate broadband and technology into all planning, permitting and construction approval considerations, especially the City's 2050 General Plan update.

2. Implement policies related to the deployment of small cell telecommunications facilities including an MLA, Small Cell Design and Deployment Standards, and an updated telecommunications ordinance. A Dig Once policy and practice may be used in some significant projects as well, subject to the discretion of the Public Works Director
3. Include broadband in development agreements, with considerations for impact fees and mitigations for the placement of conduit.
4. Set aside funds to build conduit and/or fiber infrastructure during CIP projects.
5. Incrementally and opportunistically build connections for a Citywide fiber network.
6. Engage with potential partners about agreements to use City assets for increasing service offerings.
7. Track and participate in the Ventura County broadband project and other local initiatives to promote a regional broadband vision and increase interest in the region.
8. Provide space for a "Meet Me Room" in the design plans for the new Civic Center.
9. Continue tracking grant opportunities for funding expansion of broadband assets including EDA, RDOF, and CASF.
10. Should the City desire to further understand the cost and revenue potential of the network identified in this Plan, it should perform a full financial analysis based on further outreach to the business community.

1. Background

1.1 OVERVIEW OF BROADBAND INFRASTRUCTURE

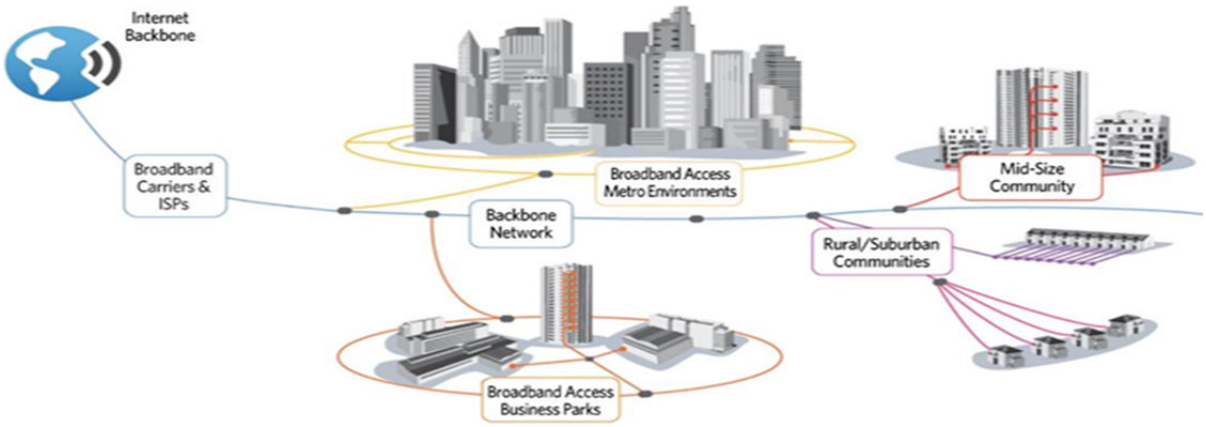
The term "broadband" refers to high-speed internet services that provide users access to online content including websites, television shows, videoconferencing, cloud services, or voice conversations. These applications can be accessed and shared through a variety of technologies including personal computers, smartphones, tablets, and other connected devices. Although demands for this high-speed data are rapidly increasing, the Federal Communications Commission (FCC) defines broadband speeds as at least 25 Mbps downstream and 3 Mbps upstream. Cable, DSL, fiber, and wireless are the prime broadband delivery systems used to meet these demands by connecting users to the internet.

Fiber-optic cables (or just "fiber") are strands of glass the diameter of a human hair that carry waves of light. Unlike other connections that carry electrons across copper wire, fiber supports fast, reliable connections by using photons across glass, giving it the capacity to carry nearly unlimited amounts of data across long distances at spectacularly fast speeds. Because of this speed and reliability, fiber is considered the gold standard for supporting broadband across the full spectrum of devices and applications. Fiber's usability and resiliency have brought fiber to the forefront of broadband, making it a highly desired asset for all entities, public and private, that own or control it. If properly maintained, fiber-optic cable has a lifespan of up to forty years. Due to its capacity for transmitting large amounts of data at high speeds, it will remain a preferred communications infrastructure type and will be essential for backhauling wireless communications for many years to come. The availability of a reliable, cost-effective fiber connection creates opportunities for the communities it serves.

Generally, broadband is one of many services offered by telecommunications companies on multiple tiers of performance and cost. These services are divided into business and consumer users and are then offered at a subscription fee. The variety of services and technologies are increasing—exemplified by the explosion in smartphone apps—but the networks themselves are converging, so that any device operated by any user can potentially connect with vast amounts of information either inside or outside of the same network.

Broadband is deployed throughout communities as wired cables or wireless technologies that carry digital signals to and from users. The content comes into the local community from around the world via global, national and regional networks. The local infrastructure is built, connected and operated by internet and telecommunications companies that own the physical wires to each household. This started with telephone companies, which deployed twisted-pair copper telephone lines. The second wire came from television companies in the form of coaxial cable. Later satellite and wireless phone companies provided video and voice, with more flexibility to mobile and remote devices using radio waves. Beginning in the mid-1990s these companies repurposed their infrastructures to connect to the internet and carry digital content.

Figure 1-1. How Fiber Connects Communities



Infrastructure built on the older technologies described above is aging and results in slower, less reliable access to content. Capacity limits of this infrastructure of the infrastructure limit service providers' ability to reliably provide high speeds, and in turn, the amount of data consumers can use is also limited. Fiber provides the robust infrastructure that connect telephone, cable, and internet infrastructure between communities and around the world. It was originally used by telecommunications for their core infrastructure, to connect their major switching centers, and was only available to their biggest corporate and institutional customers. Today, fiber-optic networks serve homes and businesses throughout the world providing telephone and television as well as internet access services.

With fiber-optic broadband networks, speeds in the billions of bits per second range are possible. The fiber-optic network today operates at nearly 300 Terabits per second, which is so fast that a single fiber could carry all the traffic on the internet. More commonly, fiber-optic networks provide between 100 Mbps and 10 Gbps to users. Fiber-optic networks can be designed to be highly reliable as well as fast. Fiber-optics are used extensively by major corporations and institutions and are beginning to be at the core of every telecom company's network.

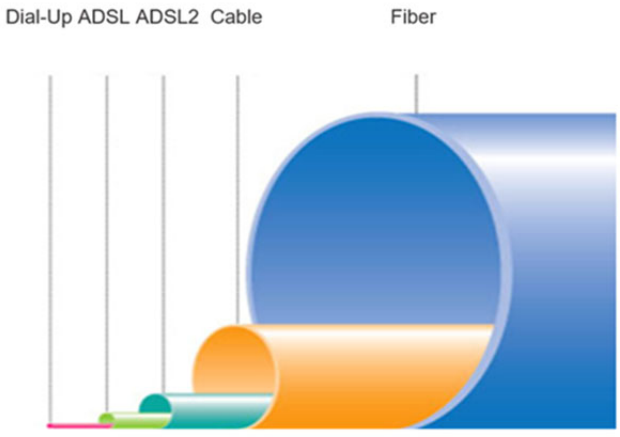
Figure 1-2 illustrates the relative difference between common internet connection methods, comparing access technologies from basic dial-up service through DSL, cable, and fiber. Whereas traditional broadband technologies have an upper limit of 300 Mbps, next-generation broadband that utilizes fiber-optic connections surpasses these limitations and can provide data throughputs of 1 Gbps and greater.

Figure 1-2. Physical Bandwidth Capacity Comparisons

Dial-Up – 56Kbps
- *Legacy Technology*
- *Shared Technology*

ADSL – 10Mbps
- *First Generation of DSL*
- *Shared Technology*

ADSL2 – 24Mbps
- *Second Generation DSL*
- *Shared Technology*



Cable – 150Mbps
- *Data Over Cable (DOCSIS 3.0)*
- *Shared Technology*

Next Generation Fiber – 1Gbps
- *Passive Optical, Active Ethernet*
- *Shared and Dedicated Technology*

5G and Fiber Dependency

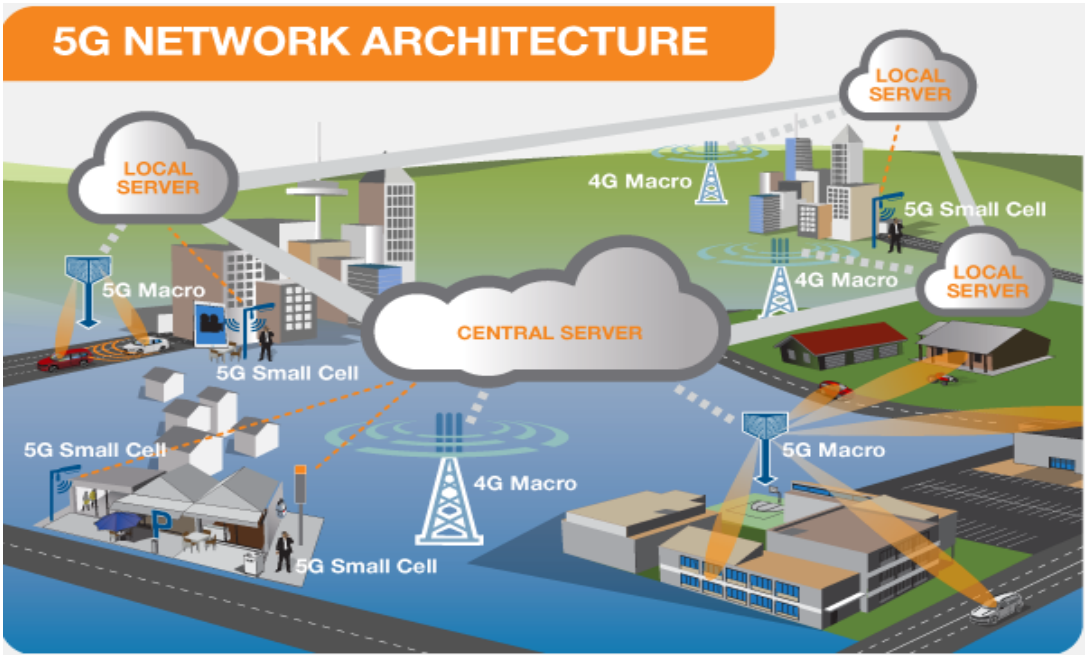
Fourth Generation or "4G" mobile wireless technology has been widely available for many years. Now "5G", the latest generation, is emerging, with forecasted commercial availability in 2021 and an increased maturity of the network in 2035. These new networks are designed to provide increased efficiencies while decreasing latency and are anticipated to improve the performance of connected devices, including the IoT and network architectures with an emphasis on massive multiple input multiple output technologies (MIMO) and device-to-device (D2D) communications such as autonomous vehicles, healthcare technologies (such as blood glucose monitoring), and ultra-high-definition video.

5G networks operate multiple frequencies in three bands using millimeter wavelengths—the highest of which is anticipated to offer download/upload speeds of 1 Gbps. The speed and range the consumer gets depends on a variety of factors, including what spectrum is being used by the service provider:

- Low-band frequencies work well across long distances and in rural areas; speeds are greater than 4G but slower than other 5G frequencies.
- Mid-band frequencies are currently sought after since they permit greater speeds while covering relatively large areas.
- High-band frequencies provide the fastest speeds but in more limited circumstances such as close to the antenna and in areas without physical obstructions (i.e., windows, buildings, walls). Thus high-band will work well in dense areas where antennas can be placed every few hundred feet. This spectrum delivers the high speeds that are commonly associated with 5G when the subject comes up.
- It is therefore likely that 5G networking will be a combination of low, mid, and high-band frequencies.
- Also, obtaining 5G service requires using a 5G-ready device, of which at present there are only a handful (though the number is growing).

5G networks are distinguished from the present 4G technology by use of low power transmitters with a coverage radius of approximately 400 feet; 5G thus requires the use of wireless technology for maximum usability, meaning close spacing and increased numbers of antennas. These 5G antennas must be connected to and backhauled via fiber due to the vast amounts of data being transmitted and the high speed required to provide low latency and reliability. Therefore, we consider 5G wireless and fiber optics to be complementary, rather than competing technologies.

Figure 1-3. Diagram of 5G Infrastructure[2]



A recent study and report by Deloitte noted that "Deep deployment of fiber optics into our nation's network infrastructure might not be as glamorous as the eagerly anticipated launch of fifth-generation mobile networks (5G); however, it is just as important—if not more so. In fact, 5G relies heavily on fiber and will likely fall far short of its potential unless the United States significantly increases its deep fiber investments."[3] The study estimates that the US will need to invest $130 - $150 billion in the next 5-7 years in fiber infrastructure in order to support the roll out of next generation wireless.

1.2 BROADBAND & ECONOMIC DEVELOPMENT

Across the board, industries increasingly rely upon transmitting and receiving large amounts of data and the internet to operate and thrive. Consequently, the availability and affordability of broadband has become a driver for decisions about where companies locate their headquarters, manufacturing facilities, distribution centers and satellite locations.

To attract and retain these industries, infrastructure that supports a competitive environment for affordable, reliable, redundant broadband services must be readily available in areas where office, technology, and industrial parks and other major commercial developments exist today or are being planned and built. In some cases, local governments have taken it upon themselves to ensure that this infrastructure exists so they can continue to drive economic investment in their regions. This includes

[2] http://www.emfexplained.info/?ID=25916
[3] https://www2.deloitte.com/us/en/pages/consulting/articles/communications-infrastructure-upgrade-deep-fiber-imperative.html

working with residential developers for the delivery of fiber-to-the-home for support of home-based businesses, telemedicine, aging in place, public safety, and emergency response. Other benefits include managing the energy grid and increasing housing and property values for the high-tech jobs needed to support economic growth supported by the internet.

Although it would be misleading to imply that the availability (or lack thereof) of broadband is the only factor by which businesses decide their locations, many companies do consider a lack of affordable, reliable broadband a major barrier to entry. In locations such as Santa Monica, California, major employers have been dissuaded from relocating because the local government was able to offer an alternative cost-efficient broadband service. Following in this effort, cities and counties across the country are implementing fiber and wireless networks for economic development and quality of life. These include Fort Collins, CO, Centennial, CO, Inglewood, CA, Culver City, CA, Santa Clarita, CA, Oxnard, CA, Ventura, CA, Paso Robles, CA, San Luis Obispo, CA, San Leandro, CA, Carlsbad, CA, Chattanooga, TN and hundreds more throughout the country.

1.3 ENHANCING PUBLIC SERVICES

The private sector is not the only major consumer of broadband. As technology becomes more integrated into daily life, government operations have also become increasingly reliant on transmitting and receiving large amounts of data via broadband internet connections. These networks are becoming increasingly important to cope with the rapid growth in connected devices, from utility assets, to streetlights, to traffic signals, to surveillance cameras, combining "Smart City" technologies to create Smart Regions of interconnected infrastructure that allow governments to be more efficient, reducing costs and increasing the value they deliver to their constituents.

In addition to using internet connections for communications for field staff, the burgeoning Internet of Things (IoT) enables municipal applications that can promote citizen engagement and government innovation. These improvements can foster efficiency and innovation across a variety of community services including public safety, sustainability and energy efficiency, recreation, intelligent transportation, traffic and parking, and environmental monitoring.

Smart cities, towns, and municipalities capitalize on internet enabled smart IoT devices to make their organizations more efficient and effective while gathering data from devices to make better informed decisions regarding operations. The opportunities range from connected Supervisory Control and Data Acquisition (SCADA) networks, electric grids, traffic cameras and signalization systems, smart light pole grids for monitoring and control, people sensors, vehicle sensors, smart trash cans, smart park benches, smart parking and wayfinding, smart irrigation systems, IoT systems within buildings for energy management, and access control systems, can all enable more responsive crowd management along with dynamic planning for public safety responses.

1.4 REDUCING MUNICIPAL TELECOMMUNICATIONS SPENDING

Many cities invest in advanced communications (broadband) infrastructure not only to enhance local internet services, but also to support their own operational needs and

other public agencies, utilities, and transportation districts in their area. Investment in fiber backbone infrastructure is generally utilized to provide a foundation for broadband. This allows cities to allocate some of the costs of broadband to their own purposes, which has a positive impact on the overall cost structure for deploying broadband since local governments can realize a return on investment by offsetting the monthly recurring fees they currently pay for connectivity. The telecommunications budget required for many of the applications used in Smart City applications that are enabled by broadband purchased through a third-party internet service provider will continue to grow as the need for bandwidth and the number of sensors and internet enabled devices increases. Owning the infrastructure within a Smart Region allows support for high-bandwidth connectivity without the need for increasing telecommunications costs from commercial providers.

1.5 ADDRESSING COMMUNITY NEEDS

In addition to private and public organizations, broadband supports community needs including telemedicine, aging in place, distance learning, and telecommuting. The COVID-19 pandemic has accelerated the long-term trend of digitalization of business processes, the economy overall, and everyday life.

The coronavirus pandemic is accelerating shifts and trends toward internet technologies and business trials. Perhaps the obvious example is the boom in Zoom meetings, but there are many other trends developing or accelerating as well, including an increase in remote telework and distance learning. The proportion of companies ramping up globally on automation technologies will at least double over the next two years, according to a Bain survey of nearly 800 executives.[4] The Wall Street Journal recently pointed out that

> "The coronavirus pandemic is deepening a national digital divide, amplifying gains for businesses that cater to customers online, while businesses reliant on more traditional models fight for survival. The process is accelerating shifts already under way in parts of the US economy in ways that could last long after the health crisis has passed…"[5]

From a community perspective, interconnection of billions of devices allows evolution of smart cities, smart homes, smart schools, safer and autonomous vehicles, and a safer, healthier, smarter place to live. From a business perspective, interconnection of devices provides data previously unavailable to inform operations, enhance decision-making and automate/innovate in the production process.

[4] "Pandemic Speeds Up Corporate Investment in Automation"; The Wall Street Journal, April 9, 2020.
[5] "Crisis Speeds Up Economy's Shift"; The Wall Street Journal, April 2, 2020.

2. Needs Assessment

2.1 ECONOMIC DEVELOPMENT

Historically, the City of Moorpark was a hub of Ventura County due to its location, the presence of the freight railroad, and the intersection of two major automotive thoroughfares (US Highway 101 and California State Road 23). Its population hovers near 40,000 people, but approximately 87% of residents commute to locations outside of the City for work. Current business license data indicates that there are around 650 businesses supporting approximately 8,500 jobs in Moorpark. The disparity between available jobs and residents sets Moorpark up to be a bedroom community for surrounding cities with larger economies including Los Angeles (about a half-hour's drive), Thousand Oaks (just to the south) and Simi Valley (just to the east).

The City seeks to change this. All City staff, including City Manager Troy Brown, as well as councilmembers, want to encourage economic opportunities that will allow the residents of Moorpark to work in the City that they call home. They rightly point out that if the City can change the equation by bringing more jobs to Moorpark, both the City's economic outlook and quality of life are likely to improve. Specifically, attracting high-paying tech-focused companies to Moorpark could go a long way toward reversing the daytime exodus.

There is reason to be optimistic about these efforts. The City is already home to a few tech-focused employers including Laritech, a printed circuit board assembly and design company, and Aerovironment, a defense contractor producing unmanned aircraft, which collectively employ about 1,500 people. There are also large employers in other industries including defense contractor Ensign-Bickford and national home lender Penny Mac. Moorpark College is also a large employer as well as a resource for training the workers that such large firms seek.

Moorpark has several industrial parks that house these employers. While some of these parks have decent connectivity, employers at other industrial parks struggle to obtain cost-effective reliable broadband. Some of the large employers like Penny Mac have built their own internet connections to meet their needs, but the cost of doing so (upwards of $10,000) makes that option prohibitive for many local employers.

Councilmembers and staff report that there have been countless instances of businesses considering a move to Moorpark only to change their minds and locate elsewhere once they learn of the lack of connectivity. Some of the most pressing areas to consider enhanced services include:

- A proposed location for an Amazon fulfillment facility at the corner of the 118 and Princeton Avenue. There are several heavy users of broadband in this area, and the potential exists to bring in more if options for connectivity improve.
- The business park on the west side, including the location that a movie studio is currently considering. Given the current environment of streaming entertainment, such as studio would require a high level of bandwidth to operate. There is also potential space for several smaller businesses to locate

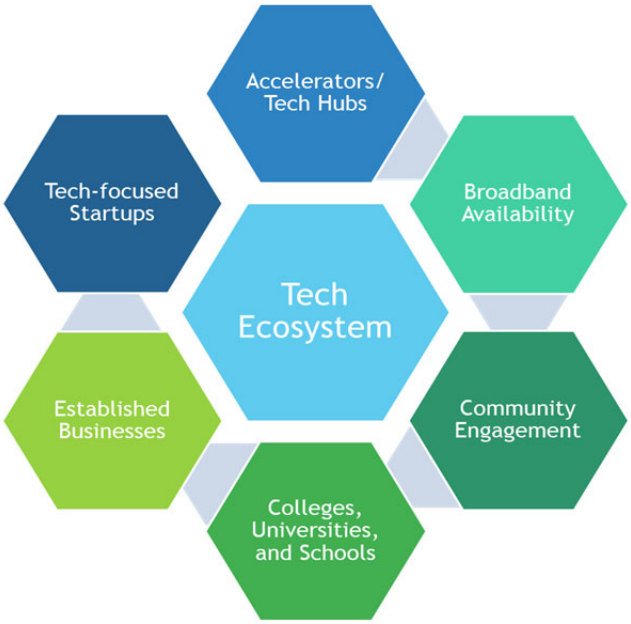
within the business park near the future site of the Hitch Ranch residential neighborhood.

- The Patriot Center and Science Drive "triangle," home to some emerging businesses. This area is a relative broadband dead zone and, though there are existing businesses in the area with potential to thrive, the limits of available service have hindered new businesses considering occupying some of the vacant space.

Tech Ecosystem

The proliferation of startups and the transition to a more digital economy has increased interest in economic development through creating a tech ecosystem that attracts tech-based companies and creates an environment for new ones. Supporting start-ups, a tech workforce, investors, incubators, accelerators, and youth/adult tech programs are key to the creation and nurturing of tech ecosystems within communities, and access to broadband is a fundamental need.

Figure 2-1. Components of a Tech Ecosystem



The City of Moorpark is well suited to nurture and expand its tech ecosystem, especially given its well-educated population and the resources that Moorpark College and the High School at Moorpark College provide. The new Library and Civic Center plans could allow for spaces dedicated to initiatives such as "hack-a-thons" or "maker spaces", which would be both engaging for the community and a boon to the economy.

To capitalize on growing the existing technology environment by nurturing start-ups and attracting new tech-based businesses, however, additional options for high-speed broadband are needed for both businesses and City facilities. As we will see in the Market Analysis (Section 3) of this report and as anecdotal evidence collected by City staff and Councilmembers suggests, the current broadband environment lacks

investment, which would increase competition and investment, driving prices down; this leaves many locations with insufficient bandwidth and higher prices.

New Mixed-Use Developments

To meet the housing guidelines designated by the State of California's Regional Housing Needs Allocation ("RHNA") requirements, the City must update its General Plan Housing Element to identify additional housing sites. Proposed development of Hitch Ranch, to the west of the Civic Center, would add an additional 755 housing units; however, there is little space for the City to expand outward, so in many locations, it must grow upward or introduce residential uses into new areas. Moorpark will see an increasing number of mixed-use developments with multi dwelling unit ("MDU") housing on upper floors and retail, restaurants, and other businesses on the lower floors. The City is currently reviewing its first mixed-use proposal, along the Historic High Street downtown corridor, called High Street Depot.

As observed in other cities, residential developments could replace some of the strip mall locations in the City, creating a more walkable community and bringing in additional commercial space for small and medium-sized businesses that will support the needs of the residents. It is important that new developments such as these have broadband connections to meet those needs and considerations for the necessary infrastructure to be in place should be part of the planning process. We will further expand on this in the Recommendations section of this report.

Historic High Street

One proposed location for the new MDUs is High Street, a historic corridor near the Civic Center's campus. High Street currently houses the High Street Arts Center, a venue used for theater productions and other community events, as well as a small number of cafes, restaurants, and retail stores. High Street Depot, a proposed MDU project, is proposed to be placed along this corridor, and the City is already preparing to accommodate more parking by paving a lot near that location. With the addition of more housing and commercial space, the street could be transformed into a prime location for economic activity, potentially transforming into a vibrant walkable destination for not only occupants of the new MDUs in the area, but residents throughout the City. Revitalizing such historic locations to become areas where emerging tech-based small businesses meet old world charm has become a trend in many cities. Broadband and its related technologies such as wi-fi are key to realizing such transformations and could be instrumental in reimagining Moorpark's downtown.

2.2 GOVERNMENT INNOVATION AND SMART CITY

The relatively small size of the City of Moorpark's internal organization brings many benefits to its community compared to larger organizations. The City has recognized the importance of forging an intimate, positive relationship with its residents and businesses and has had success in engaging the community to ensure needs are being met. Under the guidance of City leadership, initiatives such as the #TellMeMoor social

media campaign have been successful in soliciting feedback from the community to improve the City's responsiveness. Although the size of the staff is small, complaints about issues such as graffiti can often be addressed in as little as one hour.

In addition to benefits, however, the relatively small size of the organization also has constraints. As the residential population is poised to expand in relation to meeting the state housing requirements, the City would be well-served to find ways that make providing services to the community more efficient, enabling it to continue its lean model of operations. Such efficiencies can be accomplished through a variety of broadband-enabled technologies.

Traffic Management

Due to the City's location at the convergence of two state highways, State Highways 118 and 23, traffic congestion is perhaps the biggest pain point among the citizens of Moorpark. The City does not currently have a traffic management center ("TMC")[6] and only two locations (Spring at Tierra Rejada and Tierra Rejada at Miller Parkways) currently have traffic cameras in place. These cameras are only used for detecting vehicles at the signal, not for monitoring traffic flow, and the City has no plans to build a TMC.

Gravel mining operations in surrounding areas bring truck traffic through the City, particularly on Los Angeles Avenue. Los Angeles is also a bypass alternative for Highway 101 and the Conejo Grade and has potential to see heavy traffic when closures occur. All of the signals along Los Angeles Avenue are owned and maintained by Caltrans. Despite traffic signal programming efforts by that agency, the road is still the subject of continuous complaints. The City would like to increase its ability to communicate and coordinate with Caltrans about signal programming along this corridor to alleviate some of the issues. Plans exist to widen Los Angeles Avenue to six lanes from four between Spring and Moorpark and is considering replacing existing copper lines with fiber.

Tierra Rejada Road is also an area of concern. The road is a bypass alternative in case of closures on State Road 118, but the signals are not currently set up to manage additional traffic when closures occur. The only synchronized signals along the road are between Countrywood Drive and Spring Road. The City intends to eventually synchronize all signals, but the project is not currently funded.

There are also plans to improve Princeton Avenue between Spring and Condor by adding bike lanes and an island. This construction presents an opportunity to lay conduit and/or fiber along this stretch, a crucial connection from the east to the northern sections of the City and that would cross the 118 Freeway right-of-way.

[6] A traffic management center is a central location or "mission control" for a City's street and highway network at which traffic signals, roads, and intersections are monitored and proactively managed. (Source: Texas A&M Transportation Institute - https://mobility.tamu.edu/mip/strategies-pdfs/traffic-management/technical-summary/traffic-management-centers-4-pg.pdf)

The growth in residential areas within Moorpark is likely to compound traffic concerns if left unresolved. Connecting traffic signals along these major corridors via fiber could alleviate many of the issues.

Public Safety

Crime is quite low in Moorpark, so much so that the City has been ranked among the safest in the US. The Moorpark Police Department is contracted through the Ventura County Sheriff's Office and, as officers of the organization point out, most calls they respond to are for petty crimes such as vandalism.

Despite the low level of crime in Moorpark, public safety officials state that the addition of cameras at the City's seven ingress and egress routes could be beneficial to preventing crime and solving those crimes more quickly. The most pivotal route is the State Road 23 on ramps at Los Angeles Avenue. There are currently cameras in place at the Metrolink station and the police station as well as an offline camera at the City's skatepark on Poindexter. The park has occasional issues with vandalism and vagrancy at night, so installing an operational camera there may be beneficial. Because shoplifting is an issue at some of the large retail stores, officials indicate that the Moorpark Marketplace shopping center would also be a good location for cameras or license plate readers ("LPRs") for crime solving purposes. The City currently does not have any fixed LPRs in place.

Ventura County is currently engaged in talks with AT&T regarding FirstNet for emergency communications. Moorpark itself has some need for emergency management at large events such as the July 3 fireworks show at Arroyo Vista Community Park. The event attracts about 12,000 people annually and, with only one vehicular ingress and egress point in the park, a critical event would require substantial communication capabilities. In the event of fires, a robust communications system is also essential.

Within the last several years, wildfires have caused outages throughout the region, and the City has relied on a backup AT&T DSL line providing maximum speeds of only 5 Mbps to operate the emergency operations center ("EOC"). Additional redundant communications infrastructure could provide another option for such situations to ensure that officials are able to communicate during such events. The EOC is currently connected to City Hall using point to point with no redundant connection.

Additionally, Moorpark Police Department officials state that the wi-fi connections at the station are relatively weak. Officers using laptops over wi-fi connections are experiencing maximum speeds of just 12 Mbps and, with maximum speeds of 20 Mbps, plugging directly into the modem is not much better.

Recreation and Community Services

The citizens of Moorpark value parks and community services such as the library. As such, the City has continuously invested in recreation and community services, from creating sprawling parks such as Arroyo Vista to planning for a new Civic Center that caters to the needs of residents.

Arroyo Vista Community Park

Arroyo Vista is the largest of Moorpark's parks and offers an array of activities including tennis courts, baseball diamonds, soccer fields, and pavilions that are available for the public to rent. Park goers can sign up to use these facilities using the RecTrac application, which is currently undergoing upgrades. Arroyo Vista is also the home of the Arroyo Vista Recreation Center, offering programs that include coding classes, talent shows, festivals, sports leagues, summer camp, and even a preschool.

The park's excellent facilities draw visitors from outside of Moorpark on a regular basis. Events such as the fireworks on July 3 and regional sporting events including soccer and baseball tournaments bring in spectators from across Ventura County and the region. The City's Parks and Recreation Department has also implemented some additional innovative community events; Arroyo Vista recently hosted its first highly successful community concert, and staff is planning for at least three more of these events in the coming year. The gym at Arroyo Vista is also a designated Red Cross Shelter site in the event of emergencies. Arroyo Vista has also been historically used as a staging site for firefighters during large wildfire events in the region.

With all this activity occurring at Arroyo Vista, the park would benefit from robust broadband connections in a variety of ways. Although there are currently some CCTV cameras in place, they are outdated and lack storage space. Implementing a new camera system in the park could help to reassure league managers who store equipment at the facilities or who make use of the concessions stands during events. Blanketed public wi-fi across the park would support the use of the RecTrac application for renting facilities, point of sale technologies at the concessions stands, and live streaming events such as sports tournaments and concerts by both visitors and Parks and Rec staff. Critically, due to the gym's designation as a Red Cross Shelter site, broadband should also be available to support communications during emergencies.

Library and Civic Center

The Moorpark City Library is very popular with the community and has been for many years. Its computers see heavy use, and it offers services such as tutoring programs, children's workstations, and printing services. Plans are currently being drawn for a new library, just around the corner from the current location, and the City envisions enhancing the already popular facilities. Among the design ideas are considerations for a "maker space", more dedicated meeting rooms for home-based small business owners, and a wi-fi enabled laptop vending machine. These ambitious offerings tie nicely into the City's desire to enhance its tech ecosystem and, due to the library's location as a "bookend" to High Street, it could become a vibrant home for new Smart City applications. The library currently has a 100 Mbps connection via CENIC, which it will likely transition to the new location for its broadband needs. CENIC is limited to educational purposes and cannot be used by municipal or commercial organizations, so this network is not a viable option for connecting City facilities or telecommunications providers' networks.

The Civic Center, next door to the library, houses all City departments. Once the new library is completed, the Civic Center will move into the old library's building. Although

the Center currently offers public wi-fi, the connections are relatively slow and use access points that are ten- to fifteen-year old technology. The City's Active Adult Center, on the Civic Center campus, has a computer lab, and staff are currently looking into grant funding to upgrade it. Community events such as dance recitals also take place in the designated Council Chambers are not currently broadcast, but with more robust connections, the City may consider offering that option in the future. Magellan will be providing recommendations and guidance about broadband considerations for the new Civic Center design throughout this project.

Internal City Telecommunications Needs

The City's internal telecommunications needs are currently served by an I-net system installed by Adelphia over twenty years ago under an agreement that has since been transferred to Charter Spectrum.

Charter Spectrum owns most of the infrastructure, except for a small amount of fiber on the Civic Center campus. The network contains 6- and 12-strand dark fiber, two pairs of which are for use by the City, which pays Charter Spectrum approximately $1,100 per month for a 100 Mbps symmetrical connection. City Hall is the single point of entry with a firewall managing all City traffic.

All City buildings are currently connected using point-to-point on a hub and spoke design which lacks redundancy. The City installed Ubiquiti point-to-point wireless for backup in a few locations:

- Link from City Hall to Arroyo Vista Community Park in case fiber gets cut. Simple spanning tree design.
- Link from City to High Street Arts Center that is used for public wi-fi. The connection is about 100/7 Mbps but the equipment is so old, it doesn't support that; actual speeds are about 50/3.
- Backup connectivity between three buildings near the Police Department set up as a redundant link between them in case the fiber link fails.

The Police Department serves as the disaster recovery center and also houses the Emergency Operations Center, which is directly connected to City Hall using two 1Gb Charter Spectrum-owned links.

The City also has a back-up DSL 1.5 or 5 Mbps connection through AT&T. That connection is used for the EOC and was the only thing that worked when fires caused outages in the past.

Buildings are access controlled, all of which is managed by Information Services except for the Police Department, which manages its own access controls. The City uses some VOIP connections but has not yet planned a full migration and currently operates on a hybrid phone system. Plans are also currently in the works to implement EnerGov and Office 365.

Magellan reviewed the contract between Spectrum/Charter and the City as a part of this engagement, which allows the City to use eight strands of Spectrum/Charter's fiber for connections between Moorpark's current City Hall, the Ruben Castro Human

Services Center, Moorpark Police Services Center, and the Moorpark Public Services Facility. The agreement will span a three year term, with the City paying Spectrum/Charter $2,000 per month for this connection. Magellan advised the City to enter into this agreement with Spectrum/Charter to meet the City's communications needs over the coming years as Moorpark incrementally builds its own connections. The agreement was finalized in May 2020.

2.3 CONCLUSIONS

Priorities for connectivity include:

1. All City facilities, including Arroyo Vista Community Park and, less crucially, the skate park, with the new Civic Center site as a potential City hub site and Meet Me Room for connecting service providers to the City's fiber infrastructure.
2. All three major business parks: Patriot Center/Science Drive, Princeton Industrial Area, and the business park near Hitch Ranch, as well as a fourth emerging industrial area on Zachary Street near the current location of Enegren Brewery.
3. Traffic signals on major thoroughfares: Los Angeles Avenue, Spring Road, and Tierra Rejada.
4. High Street between Moorpark Avenue and Spring Road.
5. Future movie studio site on the western end of Los Angeles Avenue.
6. Consideration of 5G readiness for these facilities and districts, including planning guidelines.

3. Analysis of the Current Broadband Market & Infrastructure

To analyze the current broadband market and availability of infrastructure in Moorpark, a variety of sources were consulted including data reported to the FCC by incumbent providers, advertised offerings as quoted by the providers' websites, and a database of nationwide fiber assets, which provides maps of some existing fiber assets in the area.

In addition to the sources, Magellan's team conducted outreach to incumbent providers' sales teams to analyze the availability and pricing of commercial internet services at six (6) business addresses in various parts of the City. A survey was also conducted among Moorpark's business to gather geographically specific data about broadband subscription.

Based on this research, Magellan concludes that, while most businesses in Moorpark have access to broadband, many locations have only one choice of provider. Additionally, although broadband connections are widely available in the City's eastern and western business parks, the central business park in the area of Science Drive and Patriot Drive has only sparse availability of broadband.

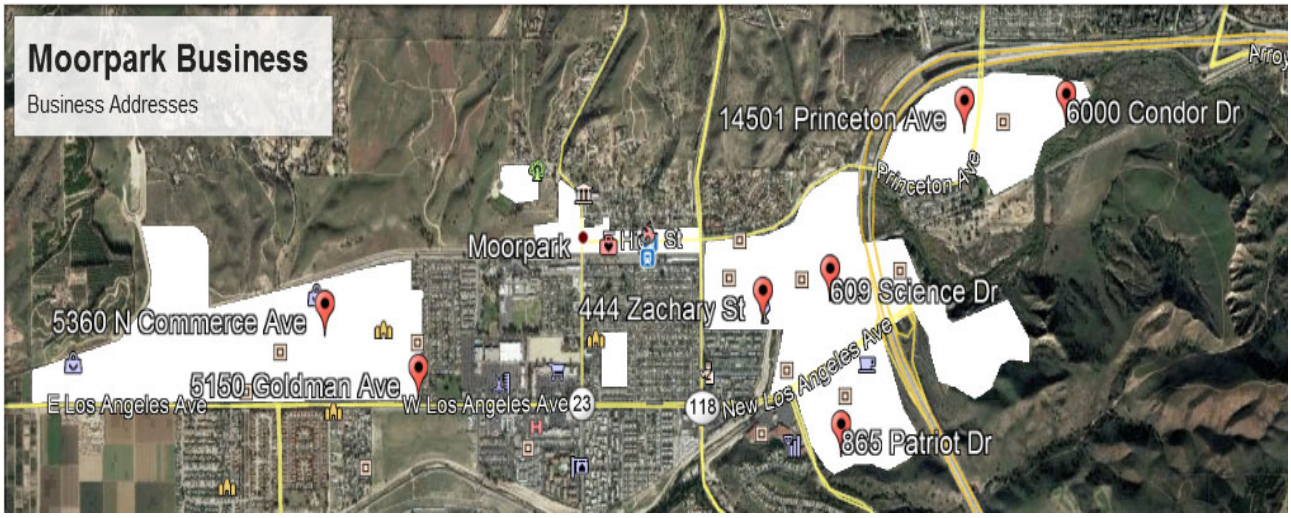
In general, the availability of fiber-based broadband is sporadic, as some larger companies have paid for private connections through AT&T. However, smaller businesses are left with few options for service and surveyed businesses cited a need for more competition through all areas of Moorpark.

3.1 BUSINESS BROADBAND AVAILABILITY

The major internet service providers for businesses in Moorpark are Spectrum/Charter and AT&T. Spectrum is the major cable provider in Moorpark, with 97.3% availability throughout the City, consisting of primarily cable infrastructure. AT&T has DSL covering 91% of the market, as well as some fiber.[7]

To gain an understanding of offerings from AT&T and Spectrum/Charter, seven business address locations across various commercial locations in Moorpark were selected to investigate coverage options. Each business location was researched for availability and service options at that location. Below is a map of the locations.

Figure 3-1. Commercial Addresses Selected for Analysis



Spectrum and AT&T are the main providers in the Moorpark market. However, despite being the primary incumbent provider in Moorpark, Spectrum/Charter only covered two of the seven addresses selected. AT&T listed coverage in six of the seven locations but most were DSL service; AT&T offered fiber at only one location. One location, 609 Science Drive, did not have service from either provider. Below is a table of the offerings from Spectrum and AT&T.

[7] Source: BroadbandNow.com

Table 3-1. Summary of Commercial Service Offering Analysis

Address	Location	Provider	Service Tier	Type
865 Patriot Drive	Central	AT&T	1000/200 mb $300.00/month 12 Mo Promotion	Fiber
		Spectrum	No Coverage	
609 Science Drive	Central	AT&T	No Coverage	
		Spectrum	No Coverage	
6000 Condor Drive	Eastern	AT&T	1.5 Mbps $49.99/month 12 Mo Promotion, 1 TB Cap	DSL
		Spectrum	No Coverage	
14501 Princeton Avenue	Eastern	AT&T	3 Mbps $40.00/month 12 Mo Promotion, 1 TB Cap	DSL
		Spectrum	200 Mbps $49.99/month 400 Mbps $69.99/month 940 Mbps $109.99/month All are 12 Mo Promotional	Cable
444 Zachary Street	Central	AT&T	3 Mbps $40.00/month 12 Mo Promotion, 1 TB Cap	DSL
		Spectrum	No Coverage	
5360 N Commerce Avenue Unit B	Western	AT&T	5 Mbps $40.00/month 12 Mo Promotion, 1 TB Cap	DSL
		Spectrum	No Coverage	
5150 Goldman Avenue	Western	AT&T	3 Mbps $40.00/month 12 Mo Promotion, 1 TB Cap	DSL- Yes
		Spectrum	200 Mbps $49.99/month 400 Mbps $69.99/month 940 Mbps $109.99/month All are 12 Mo Promotional	Cable-No

3.2 FIBER LOCATIONS IN MOORPARK MARKET

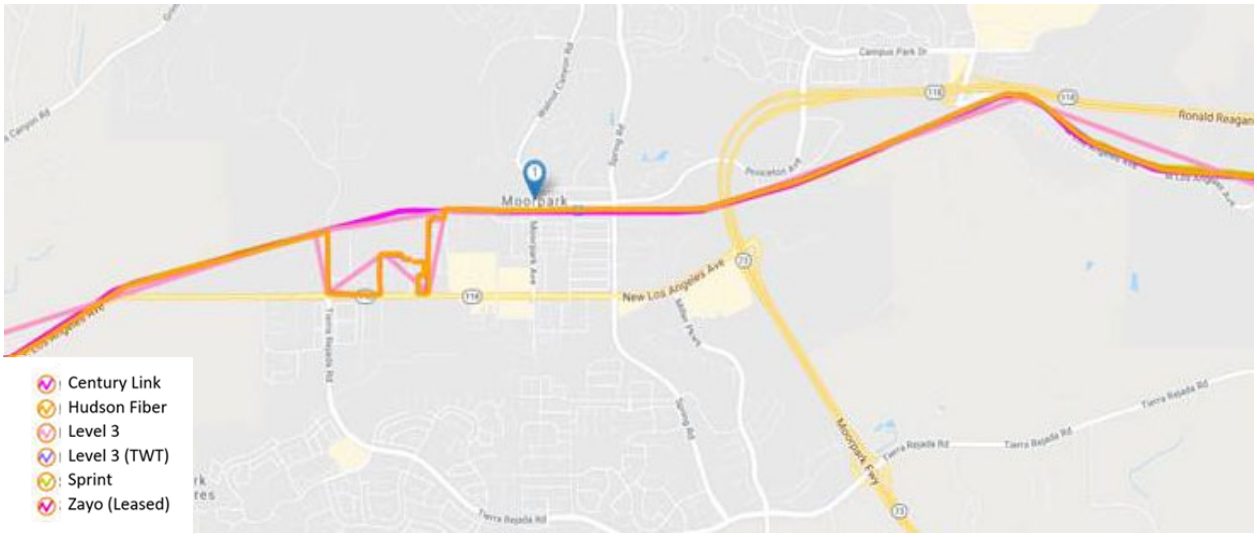
Moorpark has several providers of fiber in the market area, including both long-haul routes that connect Moorpark to a national fiber network and more localized metro routes that connect different parts of the Moorpark market to the long-haul networks.

Long-Haul Routes

Long-haul fiber networks carry data to internet points of presence over long distances, but do not provide local connections. Such fiber runs through many communities such a Moorpark, often along railway or major highway alignments, but because these networks have no local connections, they do not offer services to the community.

Moorpark has 6 long-haul providers that run mainly along the railroad that passes east-west through the center of town. As displayed in the figure below, Hudson Fiber (Orange) and Level 3 (Pink) are built into the center of town while the other providers stay on the rail path. There is ample capacity to provide service to the Moorpark community.

Figure 3-2. Long-Haul Fiber Routes in Moorpark[8]



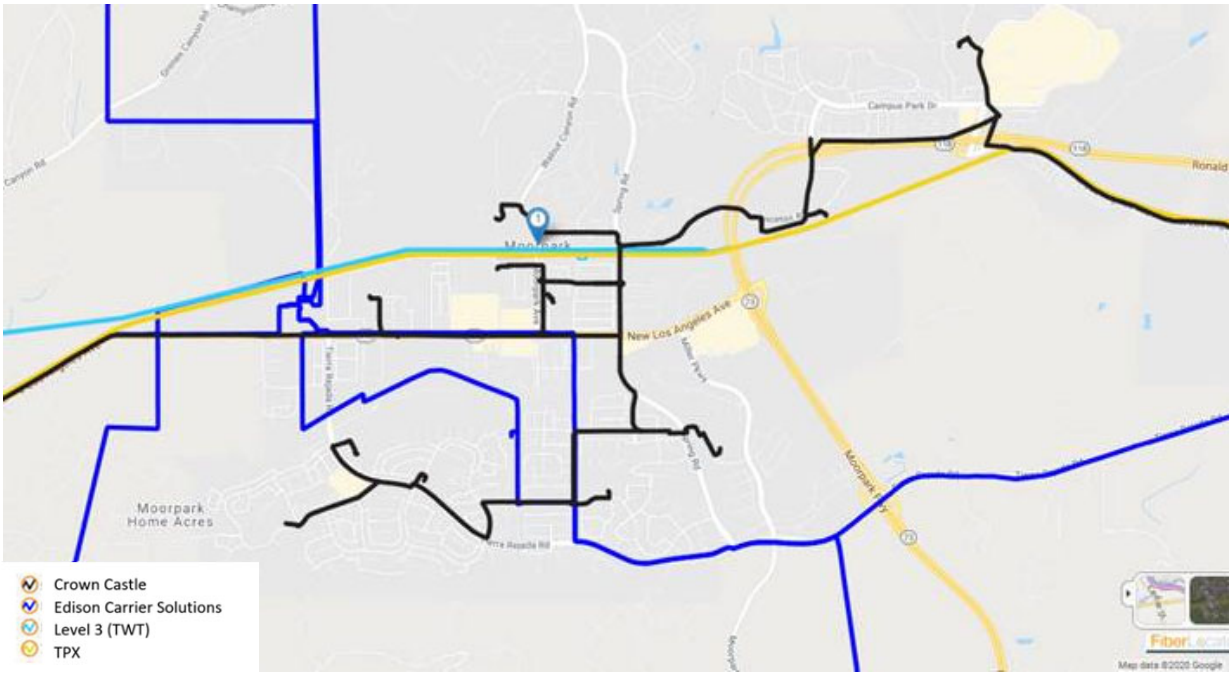
Metro Routes

Metro fiber networks consist of local connections that serve business, residential, or government customers. Unlike long-haul fiber, this infrastructure is capable of serving the community by providing connectivity to end users.

The metro routes are provided by four vendors. Crown Castle and Edison Carrier Solutions are the major providers of metro routes. Crown Castle (black) has major east-west locations while Edison covers a large north-south area. Both transit the downtown business park areas. The other two providers, Level 3 and TPX, only have routes along the rail alignment, which don't appear to serve any of Moorpark's business parks or major commercial areas.

Figure 3-3. Metro Fiber Routes in Moorpark[9]

[8] Source: FiberLocator, accessed March 2020.
[9] Source: FiberLocator, accessed March 2020.



Edison Carrier Solutions (ECS) has a large fiber network connecting many cities in the Los Angeles are and all over California. ECS was contacted concerning providing dedicated internet service to the 6 business locations. The 444 Zachary St location was singled out for quotes. An ECS representative declined to give rough estimate quotes saying they would be "too expensive".

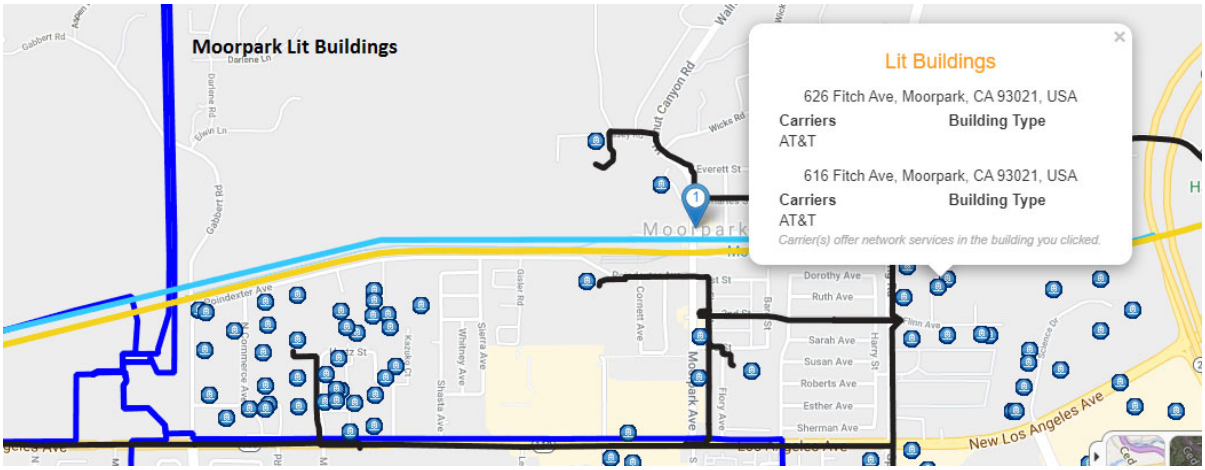
Crown Castle Fiber is a large nationwide provider of dark and lit fiber. They also provide symmetrical, dedicated fiber internet access service to government and businesses. Magellan contacted Crown Castle Fiber and asked for estimated quotes for service rates and installation costs for dedicated internet access to the 6 business addresses. Rates quotes were for symmetrical, dedicated fiber services and were around $1,000/month for 100 Mbps, $2,000/month for 1 Gbps and closer to $6,500/month for 10 Gbps. Crown Castle provided specific quotes for 444 Zachary St and 965 Patriot Drive. For the Zachary St location, the rate would be around $1,800 per month over 36 months for 1Gbps. For Patriot Dr, it would be around $2,200 per month.

Installation costs were included in the monthly totals quoted for the 3-year contract. Again, these are informal quotes produced quickly, so they may change when formal quotes are requested.

Crown Castle does have fiber within 2000 feet of the locations in the western and eastern business park.

The fiber database also shows which buildings have "lit" fiber and who the provider is. AT&T lists many buildings in Moorpark that have lit fiber. AT&T provides a database of lit buildings but does not share its fiber routes. Crown Castle Fiber does provide fiber routes and "lit" buildings. Below is a map of the lit buildings in Moorpark area. Over 97% have AT&T listed as the fiber provider.

Figure 3-4. Lit Buildings in Moorpark



Based upon this information and the results of our outreach to providers, it can be concluded that AT&T does have some fiber in Moorpark, but that many of its connections to these lit buildings may be to just one large business that has paid to build a connection. While these connectivity options may work for such large entities, the cost for such a connection is likely too expensive for small- to medium-sized businesses to take on.

3.3 BUSINESS BROADBAND SURVEY

To better understand the current and future broadband needs of businesses in Moorpark, Magellan and the City administered a short survey that was distributed to businesses throughout Moorpark. City staff conducted outreach to promote the survey among a predetermined list that included businesses with five or more employees whose industries indicated that they would be likely to be users of broadband. Questions gathered information about a few key insights including broadband adoption, reason for not having broadband (if applicable), service subscription types, performance, and satisfaction.

The survey was open for approximately six weeks and resulted in a total of 49 responses from businesses across the City. While all responses to each of the survey's questions were captured and analyzed, respondents were not required to provide answers for all questions. An analysis of the responses received for each question follows.

Respondents' Industries and Locations

The survey received a relatively diverse sample in terms of the locations and industry sectors of businesses that responded. The top three sectors, as shown in the figure below, were Professional, Scientific, and Technical Services (20.4%), Health Care and Social Assistance (18.4%), and Manufacturing (18.4%), all of which are industries likely to be heavy users of broadband due to their operational practices.

The survey results include responses from all three of Moorpark's commercial areas including the business parks in the eastern, central, and western parts of the City, as well as home-based businesses and other locations that fall outside of these main commercial zones. Businesses located in the central and western business parks make

up the majority of responses (15 and 13 respondents respectively), but other areas were also well represented.

Broadband Adoption

Most of the respondents (93.9%) indicated that they have broadband connections at their locations. All three of the responses that indicated they do NOT have broadband connections and could only connect to internet via cell phone, dial-up, or satellite were located in the central commercial area of the City near Science Drive and the Patriot Commerce Center. None of these three respondents identified or ranked factors for not having broadband connections.

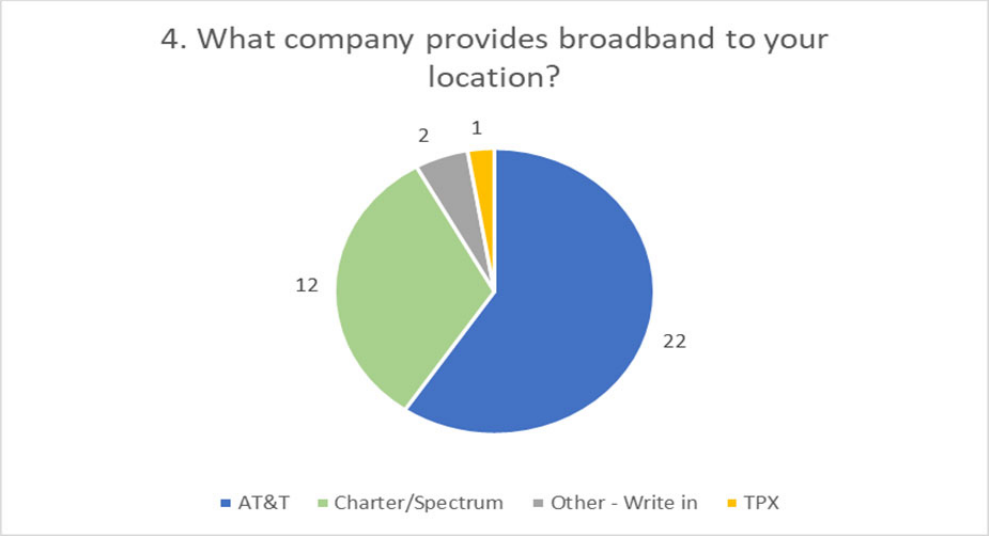
Table 3-2. Total Responses and Broadband Adoption by Location

	Eastern	*Central*	*Western*	*Home-based*	*Other*
Total Responses	6	15	13	8	6
Yes, this location has broadband.	6	12	13	8	6
No Broadband	0	3	0	0	0

Service Subscription

Overall, most respondents subscribed to services from AT&T, with Spectrum as the second most frequent response provided. Two respondents reported subscribing to services from other providers, although only one wrote in a response ("Site Server"[10]). Just one respondent indicated subscribing to services from TPX.

Figure 3-5. Service Providers (n = 37)



Based on survey responses, AT&T and Charter/Spectrum appear to have a presence in all three of the major commercial areas, as well as among home businesses and other

[10] Site Server is a Simi Valley-based small, independent internet service provider (ISP)

business locations that fall outside of the large business parks. The table below details service providers and connection types of respondent by their location in the City.

Table 3-3. Provider by Location (n = 47)

Provider	Eastern	Central	Western	Home-based	Other
AT&T	2	11	5	4	0
Charter/Spectrum	2	1	3	4	2
Other - Write in	0	1	1	0	0
TPX	0	0	1	0	0

Fiber and cable were reported as the most widespread types of connection, each with ten respondents. Eight respondents were unsure of their connection type, three had dedicated lines, and two had fixed wireless connections. None indicated that they had DSL.

Based on the figure below, it appears that fiber connections were present in all three business parks. Adoption of fiber was highest in the western business park, where five of 13 respondents indicated they have fiber connections. Only one of the two respondents outside of the three business parks indicated having a fiber connection, and none of the home-based responses had fiber.

Table 3-4. Connection Type by Location (n = 38)

Connection Type	Eastern	Central	Western	Home-based	Other
Don't know or not sure	3	1	1	3	0
Fiber-optic cable	1	3	5	0	1
Coaxial cable	0	2	3	4	1
Fixed wireless antenna	0	0	1	1	0
DSL	0	4	0	0	0
Dedicated line or enterprise network (T-1 or similar, Metro Ethernet, etc.)	0	3	0	0	0

Of these ten fiber connections, eight were AT&T fiber and one was TPX; the other respondent did not provide information about which company provided service. AT&T fiber subscriptions occurred in all three business parks, and the single TPX subscriber was located in the western business park. There was also a single respondent outside of the three business parks that reported having a fiber connection from Charter/Spectrum.

Table 3-5. Reported Fiber Connections in Business Parks

	Eastern	Central	Western
AT&T Fiber	1	3	4
TPX Fiber	0	0	1

It should be noted that based on the speed test results of these survey responses, Magellan concludes that some respondents may have mistakenly chosen fiber as their connection type. More details on this conclusion are provided below.

Performance

To gain more insight into how respondents' connections were performing, the survey contained an imbedded speed test. Respondents provided their contracted speeds for comparison to actual speeds. As shown in the table below, actual speeds were far lower than contracted speeds.

Table 3-6. Contracted and Actual Speeds (mb/s) (n = 35)

	Contracted Download	Actual Download	Contracted Upload	Actual Upload
Maximum	500	325.29	500	111
Minimum	10	2.64	1	1.05
Average	114.8	71.15	79.63	25.24

These data also reveal that although several respondents indicated having fiber connections, they are not seeing speeds that are congruent with dedicated fiber connectivity. Business class fiber speeds provide speeds of up to 1GB, far outpacing the average speeds of survey respondents. Symmetrical speeds of 1GB should be a target for providing a broadband environment to support technology-heavy industry.

Magellan further analyzed the data by focusing on responses that indicated having fiber connections to determine whether the actual speeds confirmed this. Across all responses indicating fiber connections, speeds are much lower than would be typically expected. This discrepancy may be the result of respondents taking the speed test on connections over wi-fi rather than directly connecting to the modem. Observed speeds will decrease quickly with distance on wi-fi networks. In some cases, the issue may also be that the respondent mistakenly indicated having a fiber connection when in fact the connection was via a different, slower technology.

Satisfaction

Overall, respondents were nearly evenly split on their levels of satisfaction with service. The biggest points of dissatisfaction appear to be choice of providers & offerings and performance & speed. Technical support & customer service, reliability, and price all received relatively high satisfaction level rankings.

Other Comments

Finally, respondents were asked to provide comments about what better broadband would mean to their organization and the area. Some indicated that they are happy with current offerings, but many stated a need for greater competition, faster speeds, and lower costs. Below are a few comments from respondents. A complete list of comments has been provided to the City.

> *Choices are limited. Faster speed is needed for VOIP phones and security cameras. – Respondent #37*

Faster and more reliable service. Introduction of competition typically improves performance and price. – Respondent #46

Having remote access to work is becoming more important to everyday life and work, and therefore a better broadband would be better quality of life. – Respondent #48

We are happy with our current offering. – Respondent #27

The location of our building required us to get the broadband from AT&T. We could not get service from Time Warner [now Charter/Spectrum] without extraordinarily high install costs. ($25,000) – Respondent #15

3.4 GAP ANALYSIS

As noted from the price, rate, and availability charts above, the broadband service for small and medium business in the three business parks as quoted by the providers themselves is sparse, particularly in the central business park near Science Drive. AT&T covered 6 of the 7 business addresses but only 1 was fiber and met the FCC definition of broadband (minimum of 25 Mbps download / 3 Mbps upload). Spectrum/Charter provided service at only 2 of the 7 locations but did quote speeds that would meet FCC definition of broadband. Although Crown Castle could provide dedicated service to the western and eastern business parks at around $2,000 per month, costs are higher than most small or medium businesses may be able to pay.

The eastern and western business parks seem to have access to broadband, but the choice of providers is limited to one or two options. In the central business park near Patriot Drive and Science Drive, broadband may not be available in all locations.

The availability of fiber is somewhat less conclusive as the speed test results do not indicate widespread adoption of fiber. We surmise that AT&T fiber is available to businesses in some of these areas, although the costs for installation are unclear. We also know that Spectrum/Charter has fiber infrastructure in the region based on its agreement with the City itself; however, the exact location of these assets are unclear and offerings as quoted by the company's sales team indicate that most of the business parks are unserved by it.

The City of Moorpark has recently learned that AT&T is continuing to deploy fiber upon request from businesses in the Patriot Drive area and the eastern business park. However, the challenges of crossing major roadways and the on-demand nature of these builds make it unlikely that fiber will be ubiquitously available among businesses in the central business park.

Outside of these business parks, fiber is only available in select locations from two fiber infrastructure owners, as shown in the fiber database maps. Additionally, while

larger businesses may have the means to pay for their own fiber connections, small to medium sized businesses are likely priced out of that option.

Overall, competition and choice of providers are other concerns. AT&T seems to be the only fiber-based broadband provider in many areas, and, although Charter/Spectrum is offering broadband speeds, the actual performance of these offerings may not be enough to attract tech-focused businesses. Many comments from respondents reflect the need for increasingly high speeds and performance as the economy continues to digitize.

4. 5G Readiness and Broadband Policies

4.1 5G DEPLOYMENT

Deployment of "5G" is distinguished from the present "4G" based wireless service by use of low power transmitters with coverage radius of approximately 400 feet; 5G thus requires closer spacing of antennas and more of them. Small cells bring the network "closer" to wireless service users to deliver greatly increased data capacity, faster connectivity speeds and an overall better wireless service; however, the density of wireless attachments must be greater. As stated by the FCC,

> *The wireless industry is currently deploying and planning for additional construction of large numbers of small cells – the number of these facilities is expected to grow rapidly over the next decade. S&P Global Market Intelligence estimates that between 100,000 and 150,000 small cells will be constructed by the end of 2018, and that small cell deployments are expected to reach 455,000 by 2020 and nearly 800,000 by 2026. AT&T has reported that a substantial majority of its infrastructure deployments over the next five years will be small cell sites. In addition, Verizon is deploying small cells in several urban areas, including New York, Chicago, Atlanta, and San Francisco. Sprint announced last year a goal of deploying 70,000 small cells within two years.*[11]

In the years following this FCC pronouncement all wireless providers did indeed begin deployment of 5G (during 2019), and the deployment continues in the US with three wireless carriers (given the recent merger of T-Mobile and Sprint) but perhaps at a reduced pace given financial and business impacts of the COVID-19 pandemic. However, both AT&T and T-Mobile are on target to offer "nationwide" 5G using low-band spectrum by mid-year.[12]

[11] Streamlining Deployment of Small Cell Infrastructure by Improving Wireless Facilities Siting Policies; Mobilitie, LLC Petition for Declaratory Ruling, WT Docket No. 16-421, Public Notice, 31 FCC Record 13360, December 22, 2016, at page 3-4 (citations omitted). ("Improving Wireless Facilities Siting Policies Public Notice"*).*

[12] AT&T "plans to reach nationwide coverage this summer" (2020). https://about.att.com/newsroom/2020/5g_announcements.html (viewed on May 27, 2020). "T-Mobile has launched nationwide 5G: Here is what that means." https://www.cnn.com/2019/12/03/tech/tmobile-5g/index.html (viewed

Just as in other cities, in the City of Moorpark, requests to encroach on public rights-of-way and attach small cell antennas to City-owned streetlights, for example, will be accompanied by requests to place fiber optic cable for backhaul and network connection, whether via boring, trenching, or other placement technique. The City needs to have appropriate administrative practices and policies in place to address these requests for encroachment permits and placement of antennas on City-owned structures when they come. In addition, the City may consider policy steps such that the City benefits from future fiber deployments in the public rights-of-way.

4.2 FEDERAL AND STATE BROADBAND POLICY ENVIRONMENT

Federal Policy

The placement of wireless facilities is governed by an interrelated legal framework characterized by shared jurisdiction between state (e.g., the California Public Utilities Commission) and federal authorities (the Federal Communications Commission, or FCC).[13] But in the past two decades the Federal Communications Commission (and Congress) has preempted the authority of state and local jurisdictions, most recently in its "Small Cell Order".[14] The FCC's Small Cell Order (currently under appeal in the Ninth Circuit) limits local authority in many areas include fees (most notably the annual fee limit of $270 per pole), requirements and criteria that may be used, time frames, and provisions of state laws where the FCC claims the ability to preempt local authority. The Order permits fees only to the extent they are non-discriminatory ("no higher than the fees charged to similarly-situated competitors in similar situations"), and are a "reasonable approximation" the government entity's "objectively reasonable costs" specifically related to the deployment.[15]

The Order sets out fee levels which are "presumptively reasonable" are $270 per small wireless facility per year, $500 application fee for up to five facilities, plus $100 for each facility beyond five.[16] Higher fees can be charged if the state or local government entity can show the higher fees are a reasonable approximation of cost and the costs themselves are reasonable and being assessed in an non-discriminatory manner.[17]

Beyond fees, the Small Cell Order also addressed state and local requirements in the areas of aesthetic requirements, undergrounding requirements, and minimum spacing requirements using the "materially inhibits" standard created by the FCC in its Small Cell Order. According to the Order, these requirements are not federally preempted if

on May 27, 2020). See also, "What is 5G? The definitive guide to the 5G network rollout"; https://www.tomsguide.com/us/5g-release-date,review-5063.html (viewed on May 27, 2020).

[13] The following discussion does not constitute a legal opinion and should not be construed as such. Questions about interpretation or applicability of these or other provisions of federal or California law should be referred to legal counsel.

[14] Declaratory Ruling and Third Report and Order; In the Matter of Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment; WT Docket No. 17-79; In the Matter of Accelerating Wireline Broadband Deployment by Removing Barriers to infrastructure Investment; WC Docket No. 17-84; Released by the Federal Communications Commission, September 27, 2018. ("Small Cell Order" or "Order".)

[15] Small Cell Order, at paragraph 50.

[16] *Id.*, at paragraphs 78-79.

[17] *Id.*, at paragraph 80.

they are 1) reasonable, 2) no more burdensome than those applied to other types of infrastructure deployments, and 3) objective and published in advance. This leaves open the specter of federal preemption of local authority in these and other areas.

The Small Cell Order is under broadscale legal challenge in the Ninth Circuit Court of Appeals at present. Among the challenges is that the FCC had no basis for the $270 per pole limit which would make it arbitrary and capricious, and that the FCC wrongly infringed on local authority over placement of wireless facilities. But pending those appeals the Order is enforceable. Many cities have chosen in the meantime not to take new actions that are in significant contradiction of the FCC Order. Other cities have chosen to recognize that the FCC's Small Cell Order is under appeal and not in effect, and either set fees/terms and conditions as they would have otherwise, and/or incorporated provisions in ordinances and agreements that have "change of law provisions" with the current appeal in mind. Such "change of law provisions" allow changes to fees (i.e., the FCC annual fee "limit" of $270 per pole), agreements and other regulations in the event the FCC Order is substantially upheld. (Moorpark Council had approved $270 annual pole attachment fee in mid-2019.)

The FCC recently made another ruling which attempts to preempt local authority regarding placement of wireless facilities. The FCC issued a Declaratory Ruling[18] on June 10, 2020, which also has been (or will be) appealed by numerous parties including state and local government organizations and entities. In particular, the League of California Cities, the League of Oregon Cities, and the cities of Glendora, Rancho Palos Verdes and Torrance in California were among those appealing the FCC preemption almost immediately (on June 22nd). Among other things the Declaratory Ruling purports to "clarify" existing FCC rules originally adopted in 2014 to implement the Spectrum Act. The cities challenge the FCC's ruling on the basis that it violates federal requirements for rulemakings, and is arbitrary, capricious and an abuse of discretion in seeking to change existing FCC rules regarding applicability of "eligible facilities requests" (below).

Prior to the Small Cell Order, the "Spectrum Act" enacted by Congress in 2012[19] added new requirements and directives to the Federal Communications Commission (FCC) for processing and approval of wireless deployments. Following the Spectrum Act, the FCC issued new regulations to interpret and implement the Section 6409(a) requirements and directives of the Act related to local authorities processing of applications for wireless communications facilities. In brief, the Act tightens the application of "shot clock" timelines, and requires local jurisdictions to approve certain collocations and modifications to existing wireless communications facilities under shortened explicit deadlines, if it is an "eligible facilities request" – any request for modification of an existing tower or base station that does not substantially change the physical dimensions of such tower or base station, involving (1) collocation of new

[18] In the Matter of Implementation of State and Local Governments' Obligation to Approve Certain Wireless Facility Modification Requests Under Section 6409(a) of the Spectrum Act of 2012, WT Docket No. 19-250 and RM-11849, FCC 20-75 (released Jun. 10, 2020)

[19] See Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156, § 6409(a) (2012) ("Spectrum Act"), codified at 47 U.S.C. § 1455(a).

transmission equipment; (2) removal of transmission equipment; or (3) replacement of transmission equipment. The new FCC regulations established defined standards for what for "substantial change" and implemented the statutory changes to "shot clock" regulations.

The basis for federal preemption is that Federal law allows cities and counties to regulate the "placement, construction, and modification" of wireless communications facilities but subject to certain limitations.[20] Those limitations include:

- City regulations may not "prohibit or have the effect of prohibiting the provision of personal wireless services"[21];
- City regulations may not "unreasonably discriminate among providers of functionally equivalent services"[22];
- Any denial of an application to place, construct, or modify a personal wireless facility must be based on "substantial evidence contained in a written record"[23]; and,
- City regulations may not "regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions."[24]

Also, the Federal Communications Commission (FCC) has regulatory jurisdiction over transmission of radio frequencies (RF), since the 1996 Telecommunications Act preempted local regulation of RF safety standards in favor of a uniform national RF safety standard under FCC jurisdiction.[25] "The FCC's limits for maximum permissible exposure (MPE) to RF emissions depend on the frequency or frequencies that a person is exposed to. Different frequencies may have different MPE levels."[26] Local authorities can require compliance with FCC RF standards be demonstrated in evaluating 5G siting applications. Applicants often make this demonstration part of the application package. Local authorities may not however deny wireless communications facilities siting applications based on RF emissions – Congress has preempted local authority on this subject.

State and Local Policy

The urgency of state and local policy considerations for small wireless facilities stems from the fact that many carriers consider streetlights and utility poles to be "ideal" supporting structures for placement of small cell antennas and equipment. Cities and counties often prefer installation of small cell wireless facilities on streetlights owned by the local authority based on the positive visual qualities of these facilities when

[20] 47 U.S.C. § 332(c)(7)(A).
[21] 47 U.S.C. § 332(c)(7)(B)(i)(I).
[22] 47 U.S.C. § 332(c)(7)(B)(i)(II).
[23] 47 U.S.C. § 332(c)(7)(B)(iii).
[24] 47 U.S.C. § 332(c)(7)(B)(iv).
[25] 47 U.S.C. § 332(c)(7).
[26] A Local Government Official's Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance; Local and State Government Advisory Committee, Federal Communications Commission, June 2, 2000, at page 3.

built in conformance with design standards and guidelines, efficient use of assets and the public rights-of-way, as well as in support of Smart City initiatives as described throughout this Plan.

Wireless providers are advocating for their preferred form of legislation in state legislatures as well as at the federal level (especially the FCC), designed to preempt and limit local authority over matters pertaining to small cell deployment. Specifically, in California, SB 649 was presented to the State Legislature and passed the State Senate and Assembly in September 2017. However, it was ultimately vetoed by Governor Brown. The bill would have significantly reduced local authority over small cell pole attachments in the public right-of-way, including aesthetics, safety and revenue. Legislation on this subject has evidently paused while the FCC's Small Cell Order is being considered on appeal.

To achieve a City-specific balance between local authority and federal preemption the City adopted a Small Wireless Facilities "Citywide Policy" provision in 2019 in its Buildings and Construction Code (Section 15.44). This Code provision requires all small wireless facilities to comply with the "Citywide Policy Regarding Permitting Requirements and Development Standards for Small Wireless Facilities". That "Citywide Policy" was adopted in Resolution No. 2019-3800 and stated that notwithstanding the FCC's Small Cell Order, "local agencies retain the ability to regulate the aesthetics of small wireless facilities, including location, compatibility with surrounding facilities, spacing, and overall size of the facility, provided the aesthetic requirements are: (i) "reasonable," i.e., "technically feasible and reasonably directed to avoiding or remedying the intangible public harm or unsightly or out-of-character deployments"; (ii) "objective," i.e., they "incorporate clearly-defined and ascertainable standards, applied in a principled manner"; and (iii) published in advance." Similarly, the City also found that "local agencies also retain the ability to regulate small wireless facilities in the public rights- of-way in order to more fully protect the public health and safety, ensure continued quality of telecommunications services, and safeguard the rights of consumers".

Moorpark's "Citywide Policy" was adopted in response to the FCC's Small Cell Order in April 2019 as a "means to accomplish such compliance (with the FCC's Order) that can be quickly amended or repealed in the future without the need to amend the City's municipal code." As permitted by state and federal law, the Citywide Policy is intended to:

> establish reasonable, uniform, and comprehensive standards and procedures for small wireless facilities deployment, construction, installation, collocation, modification, operation, relocation and removal within the City's territorial boundaries

while reflecting and promoting:

> the community interest by (1) ensuring that the balance between public and private interests is maintained; (2) protecting the City's visual character from potential adverse impacts and/or visual blight created or exacerbated by small wireless facilities and

related communications infrastructure; (3) protecting and preserving the City's environmental resources; (4) protecting and preserving the City's public rights-of-way and municipal infrastructure located within the City's public rights-of-way; and (5) promoting access to high-quality, advanced wireless services for the City' s residents, businesses and visitors.

The standards and procedures contained in this Policy are intended to, and should be applied to, protect and promote public health, safety and welfare, and balance the benefits from advanced wireless services with local values, which include without limitation the aesthetic character of the City.[27]

The Citywide Policy addresses all the requirements and conditions for deployment of small cell wireless facilities on a detailed basis consistent with "best practices" emerging in California as cities adopt wireless ordinances and small cell deployment standards and guidelines. In particular, the Citywide Policy addresses:

1. The requirement for a Small Wireless Facilities Permit, and the Application requirements for same;
2. Permit application submittal and completeness review process;
3. Required findings for approval;
4. Standard conditions including permit term and renewal, build out period, site maintenance and landscaping, cost reimbursement, undergrounding and electric meter upgrades;
5. Location requirements and preferences as an ordered hierarchy; and,
6. Design standards addressing concealment, antenna volume, noise, landscape features, site security, signage, pole requirements, utility connections and services, and setbacks.

4.3 POLICIES AND ACTIONS NEEDED FOR 5G DEPLOYMENT

Standards and Guidelines

An emerging best practice for management of small cell deployments by cities and counties is the use of small cell design standards and guidelines. These Standards and Guidelines are administered by the relevant City department (e.g., Public Works and/or Community Development) under authority included in the wireless ordinance. This best practice avoids embedding specific terms, guidelines and procedures in ordinances and allows the City to be more flexible over time in how it administers wireless facilities placement requirements and adapts to rapid change in technology.

Magellan Advisors provided sample Small Cell Deployment Standards and Guidelines which have been recently adopted by other cities in California to illustrate the approach to managing small cell deployments through such practices. The Citywide Policy adopted by the City addresses most if not all of the subjects addressed in these Small Cell Deployment Standards and Guidelines. So the Citywide Policy would

[27] Citywide Policy, Section 1.1.(b).

transition very well to a policy document administered by Public Works at the point the City was ready to make that transition.

Master License Agreement

Use of Master License Agreements ("MLA") has emerged as a key practice for cities and counties to deal with the large number of pole attachments that are associated with 5G deployment. An MLA establishes the procedures, terms and conditions under which licensees may request individual pole licenses. The MLA is a comprehensive document that contains uniform terms and conditions applicable to all wireless facilities installed on City-owned poles. Individual pole licenses identify the licensed pole and contain detailed exhibits for the site plans, permits, fee schedules, insurance documentation, and other materials that are unique to each site. When the City grants a pole license, that pole license (together with all the plans, equipment specifications and fee schedules) become integrated with the MLA.

Use of an MLA framework provides for a level playing field since the MLA format remains essentially the same regardless of licensees. Each wireless service provider executes a separate MLA with the City that entitles them to obtain pole licenses on a first come, first- served basis for a specific time period. Thus, one set of rules is used for all wireless service providers which in turn reduces the administrative burden on the City and promotes a level playing field among competitive licensees.

The wireless service providers benefit from use of an MLA to license existing City–owned infrastructure to install small cell facilities rather than bearing the time and cost of negotiating individual pole licenses. This more streamlined process accelerates the deployment of advanced wireless facilities. The City benefits from use of an MLA as well by establishing more robust wireless broadband networks available to the City's residents and businesses, maintaining greater control over aesthetics and potential liability from wireless facilities on City-owned poles, and earning license revenues which help defray the costs of managing and administering access to the public rights-of-way and recognize the value of attaching to City assets.

The City recognizes the importance of the MLA concept, and has been working on such an agreement with AT&T. Development of an MLA is of heightened importance given the City's acquisition of 2,229 streetlights from Southern California Edison. Magellan Advisors has provided the City with sample MLA drafts as refined and used by other cities in California for its consideration.

The City is currently drafting an MLA template. At the request of the City, Magellan reviewed that draft "Municipal Facilities License Agreement" and compared it to other MLAs in California with which Magellan is familiar. Magellan identified certain elements in were missing or addressed differently, and the City has incorporated this feedback into the ongoing negotiations. Specifically, Magellan found the following:

1. The definition of "municipal facilities" in the draft MLA is all-inclusive and appears to include some structures that are commonly excluded from being used for attachment of small cell antennas. Examples include:

   a. "traffic control structures" which many cities exclude from availability for small cell attachment for safety reasons, and to preserve future availability for the City's own "Smart City" or other sensors;
   b. Decorative poles;
   c. Wood poles, except on a case-by-case basis;
   d. Any pole in an underground district where the Licensee does not propose undergrounding all non-antenna equipment; or,
   e. Any pole in or near a residential district or residential use.
2. The draft MLA at section 2.1 provides for automatic renewal upon expiration of the initial term. Other MLAs in California address this subject by expiring automatically and allowing renewal absent written notice six months prior to expiration of intent not to renew. A total maximum term with renewals (e.g., 25 years) is also set out in other MLAs. The intent is to maximize within reason the City's control over its own assets.
3. The process for permitted assignments and "change of control" provisions could be considered less than adequate since important conditions are omitted such as the Licensee is in good standing, and information (e.g., financial and operating) is provided that establishes the proposed assignee is appropriately qualified to install, operate and maintain equipment under the MLA. Adequate provisions for change of control and permitted assignments is important given the general level of sales and acquisitions in the telecommunications industry.
4. The draft MLA appears to provide for above ground electric meters when other MLAs in California require use of flat rate electric service to the extent offered by the electric utility for aesthetic and safety reasons.
5. The draft MLA does not contain explicit contractor specifications, qualifications or requirements as is contained in other MLAs in California. These requirements require the use of contractors possessing all necessary licenses and the use of only qualified and trained persons and contractors for work performed in the license area. Also required prior to commencement of work is schedule of activities to be performed and listing of contractors, license numbers and business addresses of those who will do the work.
6. The draft MLA has good provisions regarding "cost of living" adjustments to the license fees (c 4% annual increase) and "change of law" provisions applicable to the annual license fee such that an alternate annual fee of $1270 is included in the event the FCC's Small Cell Order is reversed by the 9th Circuit Court of Appeals (which order is sustained under any subsequent appeal).

The City of Moorpark has incorporated Magellan's findings and recommendations into its draft MLA and Magellan finds the document to be consistent with best practices and with other MLAs around California and the US.

Dig Once Practices

"Dig Once" can be defined as policies and/or practices that foster cooperation among entities (especially utilities) that occupy public rights-of-way, to minimize the number

and scale of excavations when installing infrastructure (especially telecommunications[28]) in public rights-of-way. Dig Once has numerous substantial benefits, including promoting and supporting the placement of broadband infrastructure (e.g., fiber-optic cable and conduit), reducing the consequences and disruptions of repeated excavations (traffic disruption, road deterioration, service outages, and wasted resources), and enhancing service reliability and aesthetics.

Dig Once accomplishes the goal of minimizing costs of constructing separate trenches and facilities – via shared costs of construction. The cost savings are significant. The Federal Highway Administration estimates it is ten times more expensive to dig up and then repair an existing road to lay fiber, than to dig support structure for fiber (e.g., conduit) when the road is being fixed or built. According to a study by the Government Accountability Office, "dig once" policies can save from 25-33% in construction costs in urban areas and approximately 16% in rural areas.[29] In addition, development of Dig Once standards and guidelines for deployment of conduit and fiber will facilitate economic development and growth, as it enables cost-effective staged or gradual deployment of broadband infrastructure by local authorities.

Dig Once implementation requires revision to the planning and coordination process for construction projects in the public rights-of-way. When subsurface utility work occurs, it presents opportunities for the City to install new fiber in the right-of-way at reduced costs via coordination of work. Dig once and joint trench policies allow the City to take advantage of other subsurface utility projects for the installation of fiber. This enables the City to expand its ownership of fiber anytime subsurface utility work occurs, at preferential costs to new construction. Dig Once should be applied with discretion so as to not hold up project schedules and should be used for projects of a significant nature as determined by the Public Works Director or his or her designee. Other cities have chosen to use the practice only in cases of "major" construction, which may be determined by thresholds of the number of blocks or linear feet of the project area, or a project's cost.

The concept can also extend to required placement of conduit for fiber-optic conduits whenever the ground is opened, as expressed in recent Congressional legislation. This concept was embodied in the Broadband Conduit Deployment Act of 2018, which required the inclusion of broadband conduit during construction of any road receiving federal funding.[30]

Magellan Advisors provided sample Dig Once ordinances which have been recently adopted by California cities for Moorpark's consideration in implementing such practices.

4.4 RECOMMENDED ACTIONS

[28] Many utilities are "monopolistic" providers (such as gas, water/sewer and electric) but there are a number of telecommunications providers that seek permission to encroach on public rights-of-way, including cable TV companies, competitive telecommunications companies, and wireless communications companies.

[29] https://eshoo.house.gov/issues/economy/eshoo-walden-introduce-dig-once-broadband-deployment-bill

[30] The Broadband Conduit Deployment Act of 2018, H.R. 4800, January 16, 2018.

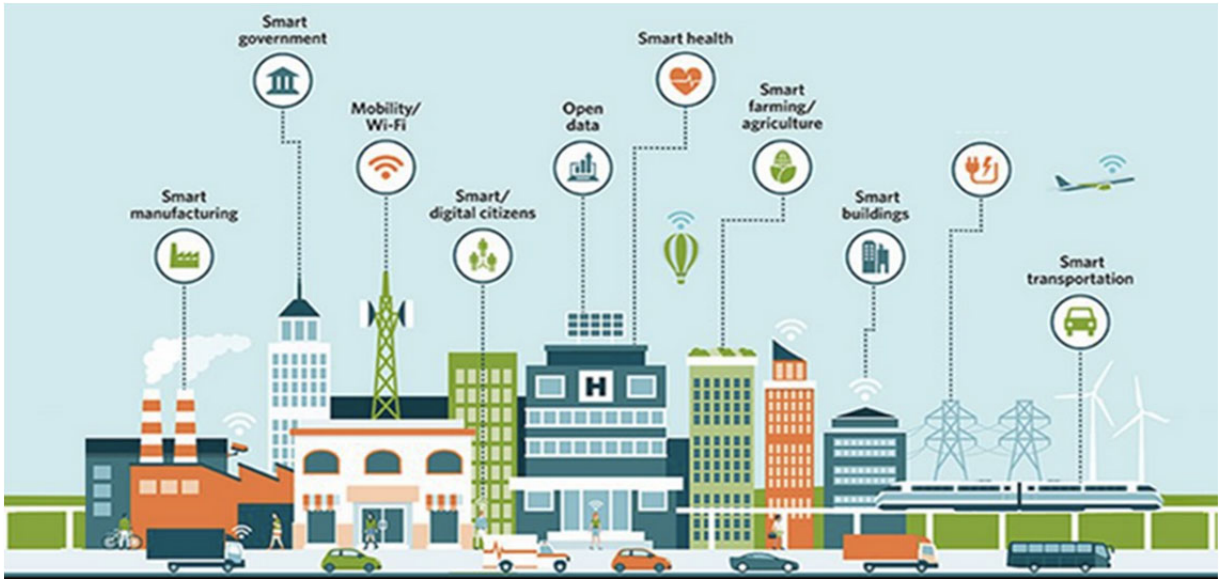
1. Develop Small Cell Deployment Design Standards and Guidelines: Magellan Advisors recommends that in the event that the FCC's Small Cell Order is overturned on appeal, the City should consider transitioning relevant portions of the Citywide Policy to a "Standards and Guidelines" document administered by Public Works, with any necessary updates and modifications. This will have the advantage of providing greater flexibility to deal with market and technological change, without any appreciable downside given what will have been learned about small cell technology by that time.
2. Consider and adopt Dig Once Practices: Magellan Advisors recommends further exploration with relevant departments of the City's informal processes for noticing intent to work on streets, and how it may be extended to a fuller Dig Once practice which includes coordination of work in public rights of way when any occupant plans to open the ground for their purposes, regular (e.g., quarterly) meetings of occupants of the public rights-of-way to share plans and coordinate work, and continued enforcement of the City's 5-year excavation moratorium on work in the public rights-of-way to minimize public inconvenience, achieve efficiencies from coordinated work and protect public investment in the streets. As stated above, Dig Once practices should be used at the discretion of the Public Works Director to ensure that project schedules, budgets, and other considerations are not negatively impacted.
3. Set aside funding to capitalize on joint trench opportunities: In addition to continuing the use of Dig Once practices, Moorpark should ensure that funds are available to allow the City to capitalize on joint trench opportunities. These opportunities may arise both internally (between the City's departments) and externally (with other utilities and/or developers working in the public right-of-way). In order to ready itself for taking advantage of joint trenching, the City should set aside funds to be available when these opportunities occur.
4. Develop standard Master Licensing Agreement (MLA): Magellan Advisors recommends prompt finalization of a Master License Agreement along the lines of the sample documents which have been provided. The MLA will be for the City's use in managing increasing requests for small cell attachments to City property. The volume of these attachment requests will depend on the number of streetlights the City owns (which is significant), and the suitability of other City property for antenna attachment. The MLA should include a "change of law" provision and alternate rates for use in the event the FCC's Small Cell Order is struck down on appeal.
5. Review the Citywide Policy for transition to the municipal code: Magellan Advisors recommends that in the event that the FCC's Small Cell Order is overturned on appeal, the City should consider transitioning relevant portions of the Citywide Policy into municipal code provisions where appropriate. The intent would be to strike the right balance and division of the current Citywide Policy between the Code and a Standards and Guidelines document.

5. Smart City Applications

Broadband infrastructure such as fiber can accommodate smart and connected technologies as more municipal and community functions are carried out online. Smart City technologies and the Internet of Things ("IoT") are two growing ecosystems of devices that will change the way that local governments carry out their missions. More devices, sensors, and people will be interconnected than ever before. IoT uses IP networking to connect devices other than computers to the Internet. A confluence of trends allows interconnection of more and smaller devices cheaply and easily:

- Licensed and unlicensed wireless services and technology – everything is connectable, especially given the deployment of 5G wireless networks
- IP is dominant networking standard, which is well defined
- Moore's law[31] is still working
- Manufacturing advances permit miniaturization
- Rise of cloud computing
- New algorithms and rapid increases in computing power, data storage, and cloud services enable the aggregation, correlation, and analysis of vast quantities of data.

Figure 5-1. The Smart City[32]



By encouraging a more robust fiber environment in Moorpark, the City will be prepared to accommodate these emerging trends. The existence of fiber infrastructure puts communities at the leading edge of innovation and supports a range of municipal, community, and wireless/broadband applications. Without it, the City cannot consider the vast majority of Smart City technologies and IoT.

[31] Moore's Law states that the processing speeds of computers will continue to double every two years, resulting in faster technologies becoming more affordable.

[32] Source: Smart Cities Library. www.smartcitieslibrary.com.

Smart cities capitalize on smart IoT devices to make their organizations more efficient and effective, while gathering data from devices to make better informed decisions regarding operations.

> The key to Smart City devices is that, rather than deploying technology just for its own sake, each application used should be purposefully chosen to solve community issues. Therefore, becoming a Smart City will take on a different meeting for each unique community.

The City of Moorpark is already on its way to becoming a Smart City. The City has recently purchased approximately 2,229 streetlight poles from Southern California Edison and is in the process of retrofitting them. The new Siemens fixtures will include the ANSI 7-pin receptacle and dimming driver. Siemens will install a standard photocell, which, according to Siemens, can be upgraded to a "smart" node that connects to a control system in the future.

This smart lighting system is one of many Smart City applications the City can consider implementing to enhance services delivered to the community through technology. Other opportunities range from connected Supervisory Control and Data Acquisition (SCADA) networks, electric grids, traffic cameras and signalization systems, smart light pole grids for monitoring and control, smart trash cans, smart park benches, smart parking and wayfinding, smart irrigation systems, and IoT systems within government buildings.

As Moorpark becomes more connected, the City should weight the benefits of each of these technologies and decide which are most important based on their perceived impact and ability to address community issues. Based on Magellan's findings, the following are Smart City applications that the City could consider.

5.1 SMART CITY APPLICATIONS FOR MOORPARK

Traffic Cameras and Signalization: Connecting traffic cameras and allowing for signalization control can assist municipalities in managing traffic congestion and public safety issues. Some police, sheriff and fire departments have monitored their roads with cameras, allowing for preparation when responding to traffic accidents or issues. Traffic signal controlling and automation aids in managing traffic congestion and getting public safety officials where they need to be quickly and safely. Public safety vehicles would have controls on board to allow for light changes in a safe and easy manner.

The City of Moorpark is already considering plans to run fiber for traffic signalization to manage congestion along State Highway 118 (Los Angeles Avenue) in coordination with Caltrans. Doing so could increase the efficient flow of traffic, reducing travel time for motorists. Such a project would go a long way in alleviating one of the major concerns of the community, as well as providing the City opportunities to support additional Smart City applications along one of its key corridors. Magellan recommends

that Moorpark continue its conversations with Caltrans about this important Smart City possibility.

Smart Light Pole Grids: By establishing a grid for smart light poles, municipalities can automate and control their lighting effectively and efficiently. These streetlights have LED lighting saving in recurring costs, although by allowing for dimming and brightening when vehicles and pedestrians come near saves additional cost.

Smart Irrigation Systems: Smart irrigation systems utilize sensors that monitor rainfall to determine when the landscape needs watering. Most systems allow for scheduling of irrigation, however, if scheduled and raining or wet the systems will delay or cancel deployment. This alleviates over-watering of landscapes and saves water, which in many drought-ridden areas is a precious resource.

IoT Systems Within "Smart Buildings": In an effort to save energy costs, public agencies and businesses are installing connected thermostats, lighting controls and automation, and smart building strategies such as installing intelligent windows and facades and smarter HVAC systems that save energy by reacting to environmental conditions in real time with features such as automated tinting, shading and controlling indoor air conditions. Smart buildings reduce water and energy consumption, increase positive occupant experience, and create sustainable structures. The City of Moorpark could consider implementing some of these technologies as a it builds out its new Civic Center campus.

Public Wi-fi: In response to the connected nature of citizens' daily lives, many cities have begun to provide access to public Wi-Fi in locations such as downtown commercial and shopping districts, public parks, and other gathering spaces. This connectivity allows users the convenience of using their mobile devices to find services near them, connect with others via social media, and even share live video streams of activities such as youth sporting events. At the same time, public Wi-Fi allows local businesses opportunities to advertise to the community, promoting "buy local" campaigns that can be a boon to economic development.

Public parks such as Arroyo Vista are a prime location for providing public Wi-Fi. Although there is some sentiment that Moorpark's residents should use their time in parks to put down their devices and connect with nature, providing connectivity for visitors to rent equipment via online applications, stream video of their children playing sports, or find a local restaurant might be beneficial to the community.

Smart Parking and Wayfinding: Many cities struggle with location of parking, especially in particularly dense cities. Through the use of a network of sensors and applications, drivers can be notified via phone applications or wayfinding signage of open parking. Cities such as Santa Monica, CA have decreased parking location from 20 minutes to 3 minutes saving motorist time, fuel, frustration and carbon footprint through implementation of this type of system.

As Moorpark's downtown area becomes more pedestrian-friendly, the City could consider using such technologies to allow visitors to easily locate parking and to navigate their surroundings. These applications could also be considered at high-traffic parks such as Arroyo Vista.

Smart Park Benches: Smart park benches can serve citizen and municipal issues such as charging stations for electronic devices and sensors designed to count people (or the number of wireless connected devices) in the vicinity. By understanding the number of people there are in an area, the public agency can communicate this information to public safety or access historical data to plan for future events. As with public Wi-Fi and smart parking, smart benches might be desirable at some public locations such as Arroyo Vista Park.

5.2 CONNECTED AND AUTONOMOUS VEHICLES

Autonomous vehicles could fundamentally revamp our transportation systems and infrastructure and the way we all get around. Autonomous vehicles or "driverless cars" technology is present today on the streets in our cities and towns, but the full functionality is not yet activated. The science and technology is in place for connected and autonomous vehicles, and large companies (e.g., Intel, Uber, Waymo, auto manufacturers) are "all in". Connected vehicles exchange digital information between vehicle and the world, e.g., another vehicle (V2V) or infrastructure (V2I).

Autonomous vehicles contain systems that influence the lateral or longitudinal operation – or both – of a vehicle. An SAE International Standard has been defined for automation levels. Using five levels, this "standard defines vehicle capabilities, how people can use them, and to what extent they can rely on the technologies."[33] Many vehicles currently have partial autonomous capabilities such as autonomous cruise control, brake, and lane control.

Autonomous vehicles clearly are on the horizon, and cities and municipalities need to be ready to support them, whether through policy and ordinances, technology to support their functionality, and electric charging stations to keep them running. The most likely connectivity options are 4G and 5G wireless networks and 5.9 GHz Dedicated Short-Range Communication (DSRC). DSRC is only in pilot environments, and 5G is still in development with ongoing standards activity. 4G of course has been deployed.

While the communications infrastructure is being deployed to support connected and autonomous vehicles, there are a number of other decisions and actions that need to be taken beyond communications infrastructure/broadband deployment, including:

- Include mobility in the planning process, by including connected and autonomous vehicle expertise in city departments, using public engagement on the topic and developing a vision for future mobility, analyzing the impact of innovative mobility, and using incentive zones to encourage/enable use of innovative mobility and shared automated vehicles
- Provide new or improved transportation services, including partnering with Innovative Mobility providers and hosting pilot tests

[33] Future Cities: Navigating the New Era of Mobility; Center for Automotive Research, 2017. https://planetm.michiganbusiness.org/globalassets/pdf/future-cities_final-report_30-october-2017.pdf?rnd=1522511866020

- Update Transportation policies, including development of policies for multimodal integration, and update parking to capitalize on benefits of innovative mobility and connected and autonomous vehicles
- Update and prepare the road infrastructure for innovative mobility, by allocating right of way for innovative mobility, building infrastructure to enable Innovative Mobility using Complete Streets design principles[34], maintaining reflective lane markings and rumble strips, and supporting DSRC based V2I communication (roadside units, traffic signal controllers, traffic management centers, and user/vehicle-based equipment).

5.3 SMART CITY POLICY ISSUES

The Internet of Things and Smart City opens the door to a vast array of new technology applications and opportunities but also creates several issues which must be considered by policymakers. These issues must be addressed in an environment where the pace of change is perhaps exceeding our collective ability to fully understand the changes and implications.

Perhaps first and foremost is that IoT/Smart Cities creates a firehose of data, massive amounts that must be collected, processed and managed. The data management issues include where and how is it stored, processed and used – and critically, how privacy concerns are addressed.

Another big issue is security. The dispersion of billions of smart devices permits problems and crimes from poorly protected IoT devices "attacking" infrastructure, distributed denial of service attacks (DDOS), "Botnet" problems, malware in interactions with artificial intelligence, and cybercrime including attacks on IoT data in the cloud.

Further issues include the potential use of IoT data as evidence, pervasiveness of data monitoring vs. privacy expectations, discriminatory use of IoT data, where in the IoT system it may be appropriate to place regulation, cross border flows of data, and the environmental concern over how are these billions of devices disposed of. These issue areas can be monitored through the various national and international policy groups, research groups, and businesses that are actively working on them.

5.4 PREPARING MOORPARK FOR SMART CITY

Smart Cities are not exclusively technological; organizational and human factors must be provided for to foster the necessary collaborations and investment in human capital. Cities serve communities and Smart Cities must be designed with public benefits in mind. Additionally, cybersecurity and data privacy are ever more important in maintaining a healthy Smart City strategy. Ultimately Smart Cities initiatives are layered, involving network facilities infrastructure, with connected devices (cameras, sensors, Wi-Fi, etc.), and the data from these devices which allows capabilities to be embedded in daily practices based on collaboration among organizations and departments.

[34] National Association of City Transportation Officials, https://nacto.org/.

The Smart Cities Council is a network of leading companies advised by top universities, laboratories and standards bodies that develops and advocates for Smart City policies.[35] They have published a "Smart Cities Readiness Guide" that includes detailed information on Smart City drivers and barriers, benefits, beyond "silos," and City responsibilities.

Based on these guidelines, some responsibilities and opportunities Moorpark should consider for its Smart City readiness are outlined as follows:

- Built Environment: The City should plan for "smart buildings" powered by IoT, using sensors, meters, systems and software to monitor and control a wide range of building functions including lighting, energy, water, HVAC, communications, video monitoring, intrusion detection, elevator monitoring, and fire safety.
- Digital City Services: Moorpark should consider switching to digital delivery of City services to increase citizen engagement, increase employee productivity, increase competitiveness, increase citizen satisfaction, and reduce cost. Services are delivered via the web, smartphones and kiosks, which can require implementation of new technologies, and attitudes or approaches.
- Energy: Smart energy is a priority for Smart Cities, which start with the City implementing smart energy systems.
- Health and Human Services: Moorpark should prioritize Smart City uses that transform the delivery of essential health and education services including support for telehealth and remote learning.
- Ideas to Action: A "roadmap" linked to Moorpark's vision document and comprehensive plan is necessary to turn ideas to action, and make technology serve the City's larger goals. The path to a Smart City is not quick, and targets are needed for clear goals to motivate citizens and permit any required course corrections.
- Mobility and Logistics: Population growth and wasteful congestion make this a critical area for the Smart City. Traffic congestion is a notable concern in Moorpark and is wasteful and costly to the economy – both directly and indirectly. Moorpark should prioritize applications that provide safer, more efficient transportation, including accommodating electric and autonomous vehicles and smart parking.
- Smart Payments and Finance: Digitalizing both disbursements and collections generates significant savings and increases operational efficiency. The City should consider providing these options to residents and businesses across the board for all City services.
- Smart People: Implementing Smart City initiatives requires a collective mindset at City Hall that is open, transparent and inclusive to build two-way communications and create stronger initiatives.

[35] https://smartcitiescouncil.com/article/about-us-global

- Telecommunications: An adequate telecommunications infrastructure as detailed in this Plan is vital for business and community development and underlies the Smart City.

6. Asset Inventory

City assets are important in a design for broadband. Existing city owned fiber can be used as a starting point to for cost effective broadband. Buildings, towers, conduits, utility poles, and streetlights can be used to mount fiber or fixed wireless equipment used for expanded broadband service.

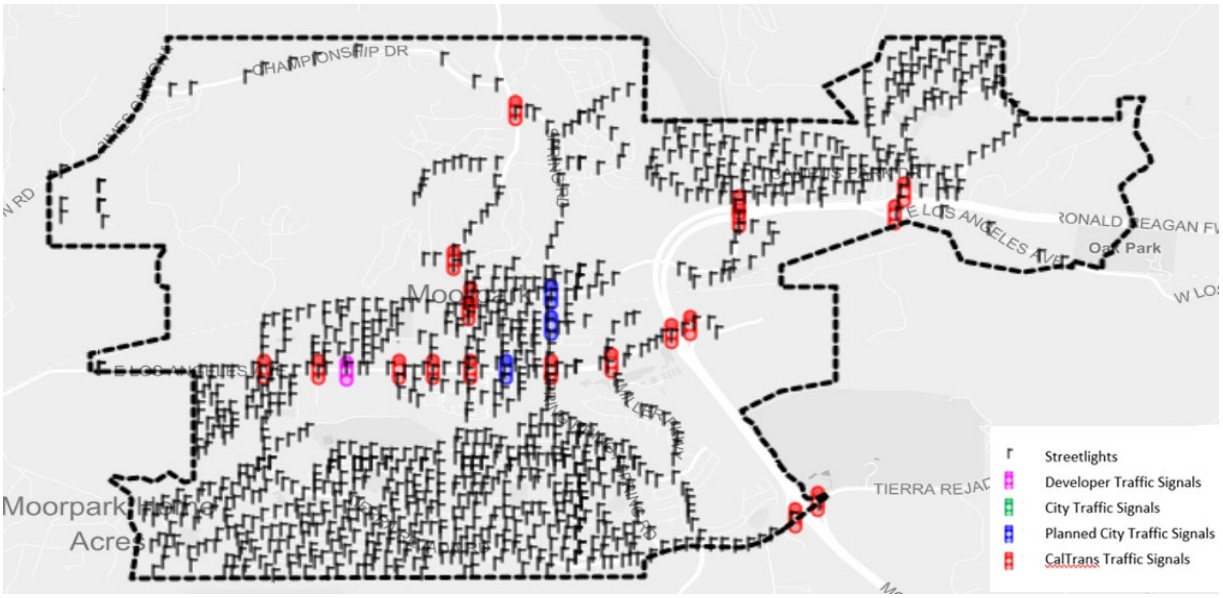
Although Moorpark does not currently own any fiber, it recently acquired approximately 2200 streetlights from Southern California Edison, Moorpark and Caltrans traffic signals and capital improvement project plans are assets that should be considered for connecting public safety police and fire locations, City buildings, and underserved business parks as determined the needs assessment and gap analysis.

6.1 VERTICAL ASSETS

City vertical assets should be made available where appropriate under Master License Agreements (see Policy section of this report) for use as support structures for small cell wireless facilities. MLAs define the terms, conditions, fees, and assets eligible for small cell wireless facility attachment. City-owned streetlights and utility poles are viewed by service providers as valuable assets in the public rights-of-way and easements for attachment of small wireless facilities. While traffic light poles and standards are similarly sought by wireless providers for small cell attachments, many cities do not consider them to be eligible facilities for attachment due to their importance for public safety and also potential future use by the City for Smart City applications.

Assets in locations such as along High Street and in Arroyo Vista Community Park could be particularly useful for deploying these facilities, as well as for the deployment of Smart City technologies such as public wi-fi, sensors, and cameras. Moorpark should include these considerations during MLA negotiations with wireless carriers to leverage the use of City-owned vertical assets for increased broadband deployment. In some cases, cities have been able to negotiate in-kind considerations such as the ownership or use of designated fiber strands to connect City facilities and/or carriers providing community services such as free public wi-fi in commercial corridors in exchange for carriers having access to City-owned infrastructure to house wireless facilities.

Figure 6-1. City of Moorpark Vertical Assets



6.2 OTHER ASSETS

Other broadband assets to consider include water and gas lines, which are underground and can, when abandoned, be used to deploy fiber. The use of these lines is not recommended in Moorpark since all known water and gas lines are still active and may be pressurized.

Additionally, Moorpark's schools and college are served by existing broadband infrastructure. However, these institutions are served by the FCC's E-Rate Universal Service Program, whose guidelines dictate that only schools and libraries may use the networks. Similarly, public safety agencies in Moorpark have their own communications networks that operate through Ventura County. Due to the critical nature of these networks, they may not be used for the purposes of expanding broadband to the community at large.

Ventura County is currently engaged in developing a Countywide middle-mile backbone network to connect County facilities and cities. Although the County project is still in the early planning phases, it is likely that the network will include design considerations that could enable shared use of network assets with Moorpark. The City should continue to watch the Ventura County project evolve and staff should play a role in development of this middle mile network that will bring wholesale broadband into the City. Moorpark should be prepared to build out last mile connections that serve the community from the County's network by using recommendations in this report.

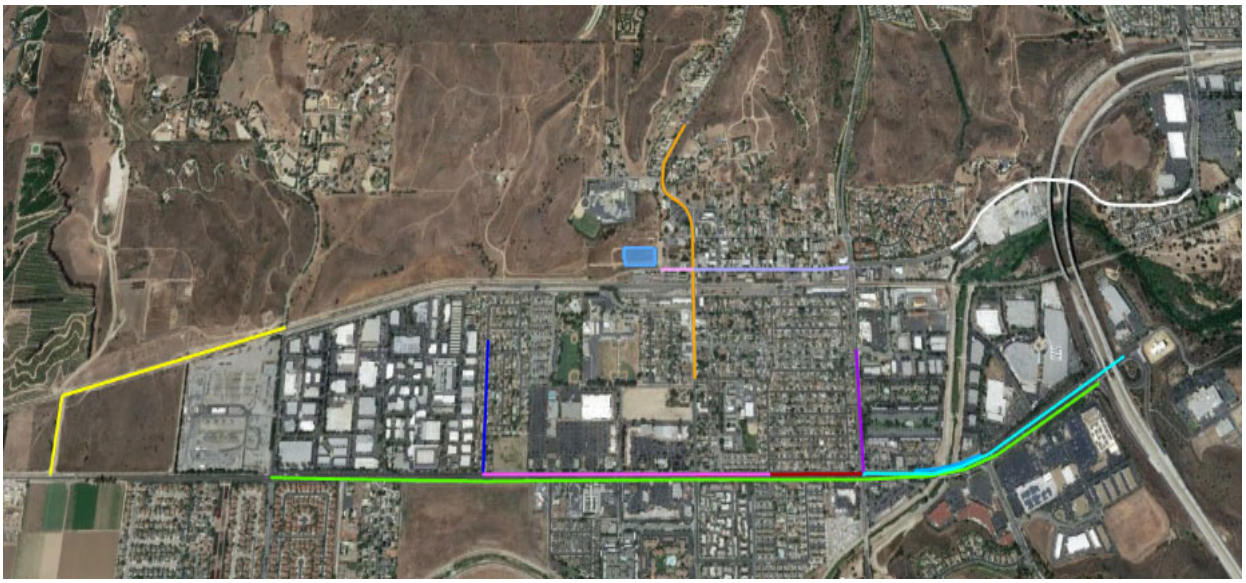
6.3 CAPITAL IMPROVEMENT PROJECTS

In addition to existing assets, the City of Moorpark's planned projects should be leveraged to deploy additional broadband assets including conduit and fiber. Magellan reviewed the City of Moorpark's Fiscal Year 2020-21 – 2024-25 Capital Improvement Projects (CIP) plan as approved by Council on June 17, 2020 to identify projects that presented opportunities to install additional infrastructure. Our team also evaluated

Ventura County's planned projects that are anticipated to occur within the City. Projects that constitute major work in the public right-of-way including roads, sidewalks, and bike or pedestrian paths, as well as those that involve underground activities such as drainage and water projects and the ungrounding of power poles at Science Drive and State Highway 118, were considered. The selected projects were also vetted with the City of Moorpark's team to gain an understanding of the anticipated scheduling and likelihood that they will proceed as planned.

As marked by the green lines on the map below, there are several projects planned along key corridors over the coming years that present opportunities to install broadband infrastructure, many of which at least partially overlap with the gaps in broadband availability, especially the central business park and the connection between the Civic Center campus, PD, and Arroyo Vista Community Park.

Figure 6-2. Moorpark Capital Improvement Plan Projects for Broadband Infrastructure Deployment



For each of these projects, Magellan recommends that the City of Moorpark include the deployment of conduit and/or fiber along these paths to begin building infrastructure that the City could use to connect its own facilities and to lease to third parties interested in using them to deliver internet services across the City. This strategy would allow the City of Moorpark to invest incrementally and opportunistically, taking advantage of cost savings afforded by joint build.

The City should set aside funds that would be used to lay two 2" conduits in these locations while the ground is being excavated for other purposes. Magellan estimates

that the total length of conduit and/fiber that could be deployed in correspondence with these CIP projects is 37,335 feet. The current estimate for laying fiber and conduit in California is between $30-40 per linear foot. Therefore, we estimate that running fiber and conduit through the entire set of projects would cost the City between $1.1 and 1.5 million. However, because the ground is already being excavated in these locations, costs could be reduced by up to 33%, bringing costs closer to $739k-985k.

Note that the estimates are high-level in nature and should be further explored once detailed design engineering is done.

Table 6-1. CIP Projects Estimated Lengths for Broadband Infrastructure Deployment

PROJECT	CITY OR COUNTY	LENGTH (FEET)
C0004: Moorpark Avenue Widening	City	3,359
C0009: High Street Improvements	City	2,120
C0020: Princeton Drive Widening	City	3,970
C0021: Los Angeles Avenue Widening	City	2,250
C0022: Spring Road Widening	City	1,395
C0027: Los Angeles Avenue Widening	City	3,860
C0031: North Hills Parkway	City	4,090
C0035: Arroyo Drive Overlay	City	3,322
M0040: Replace Conduit w Fiber	County	11,470
Shasta Drain (Future)	City	1,499
TOTAL		**37,335**

6.4 DEVELOPMENT PROJECTS

In addition to CIP projects, the City has many proposed development agreements underway. As the developers plan to build residentially and commercially, the City should consider including mitigations in development agreements to allow for the installation of conduit and/or fiber infrastructure.

To the west of the current Civic Center location, for example, the Hitch Ranch Development is proposed. The City could request that the developer of this area install at least two 2” conduits to along the mapped portions of North Hills Parkway, Gabbert Road, and Casey Road and at least two 4” conduits at the southern end of that

development, between West High Street and either the newly built north-south road or Gabbert Road, and over the rail crossing to Poindexter. These areas will be key to creating a redundant citywide fiber network, as well as equipping those locations with a broadband utility that can be used for future development.

Below is a map indicating the recommended location for placing this infrastructure, followed by a table detailing their estimated lengths, totaling 11,622 feet. Applying the estimate of $30-40 per linear foot to deploy fiber and conduit, the approximate cost is $349k-465k. Much of this cost could be negotiated during development agreements. The costs associated with integration of fiber into the project must be considered as part of the larger strategy for community benefits to be provided in conjunction with this project, as many competing priorities likely exist.

Figure 6-3. Development Projects for Broadband Infrastructure Deployment



Table 6-2. Development Projects with Estimated Lengths for Broadband Infrastructure Deployment

PROJECT	LENGTH (FEET)
North Hills Parkway East of Gabbert	3,359
Casey Road to Meridian Hills	5,682
West High Street to Shasta (along rail alignment)	2,581
TOTAL	**11,622**

6.5 IDENTIFICATION OF ANCHORS

Magellan conducted a survey which included businesses and anchor institutions, especially targeted toward organizations in the City's three business parks. Results of the survey do not directly identify anchors that were unserved or underserved. Moorpark's schools and Moorpark College are served by E-Rate, securing them sufficient bandwidth at wholesale pricing. Public safety is connected and served by the County's communications systems, except for Moorpark's Police Department, which is included as a City facility and accounted for in the recommended design of the network.

6.6 BUILDING ADDITIONAL ASSETS INCREMENTALLY & OPPORTUNISTICALLY

In addition to placing conduit and/or fiber in coordination with these CIP and development projects, the City of Moorpark should make incremental investments in additional segments to create a resilient backbone network that connects all City facilities and passes all three business parks. These short segments would connect the conduit and/or fiber assets along the CIP project routes to develop a network that would be capable of connecting all City facilities, serving all three business parks, and supporting Smart City applications along major corridors including High Street, the middle section of Spring Road, and Los Angeles Avenue.

The map below displays these additional segments using blue lines, as well as their proximity to City facilities and the three business parks. These additional segments constitute a total of approximately 10,726 linear feet, as detailed in the table below the map. Using the estimated $30-40 per foot estimate to install fiber, the cost would likely be between $321,780 and $429,040. As previously stated, both the design and the estimates are high-level and conceptual; detailed low-level design engineering would need to be performed to properly vet both the network's design and its cost.

As with the yellow segments that correspond with CIP projects and the orange segments that correspond with development projects, conduit and/or fiber along these routes could be leased by a third party to connect businesses in the commercial areas. City-owned conduit could be leased at an average of between $2.00 and $2.20 per foot, or, if there is room for more than one occupant, could be shared among many entities at an average of $.45 to $.50 per foot each. Lease rates for dark fiber vary widely, but the City could expect between $225-300 per fiber from entities leasing less than three miles of fiber or between $70 and $90 per fiber mile from entities leasing more than three miles of fiber[36]. The connections between City facilities could either be managed by the City itself or could be contracted out to a third party.

[36] Based on dark fiber lease rates from nearby City of Anaheim.

Figure 6-4. Conceptual Citywide Network

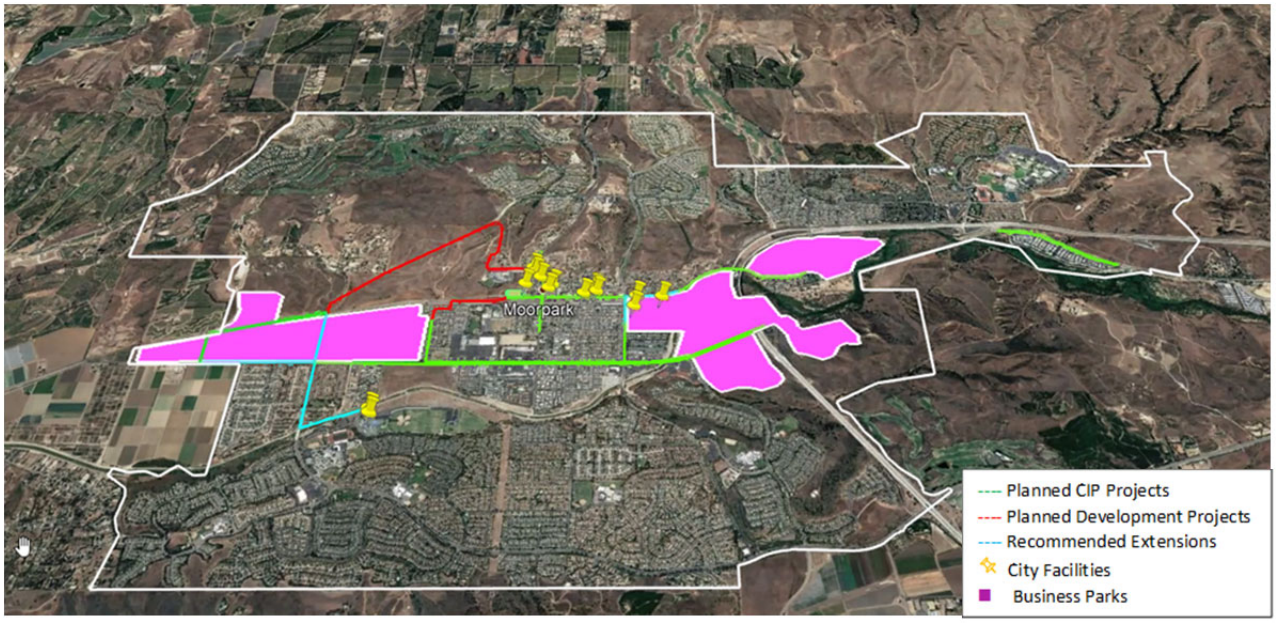


Table 6-3. Additional Segments to Build a Resilient Network w Corresponding Estimates

PROJECT	LENGTH (FEET)
South on Spring from High Street	878
West on Princeton from High Street	1458
Los Angeles Ave from Gabbert to N Hills Pkwy	2920
Gabbert from LA Ave to N Hills Pkwy	1725
South on Tierra Rejada Road from LA Ave to Arroyo Vista Park	3745
TOTAL FEET	**10,726**

6.7 CONDUIT CONSTRUCTION SPECIFICATIONS

During all planned CIP projects that call for excavation at a depth of at least 24", the City of Moorpark should install, at minimum, two 2" conduits. Magellan estimates the cost of installing conduits at approximately $39 per linear foot. Should the City elect to install a meet-me room in the library, 4" conduits should be used to make connections from the building's entries to carrier locations on Poindexter (see figure below). Additional detail about the types of conduit that should be installed are specified below. All conduit turns should be made with 45-degree bends or sweeps.

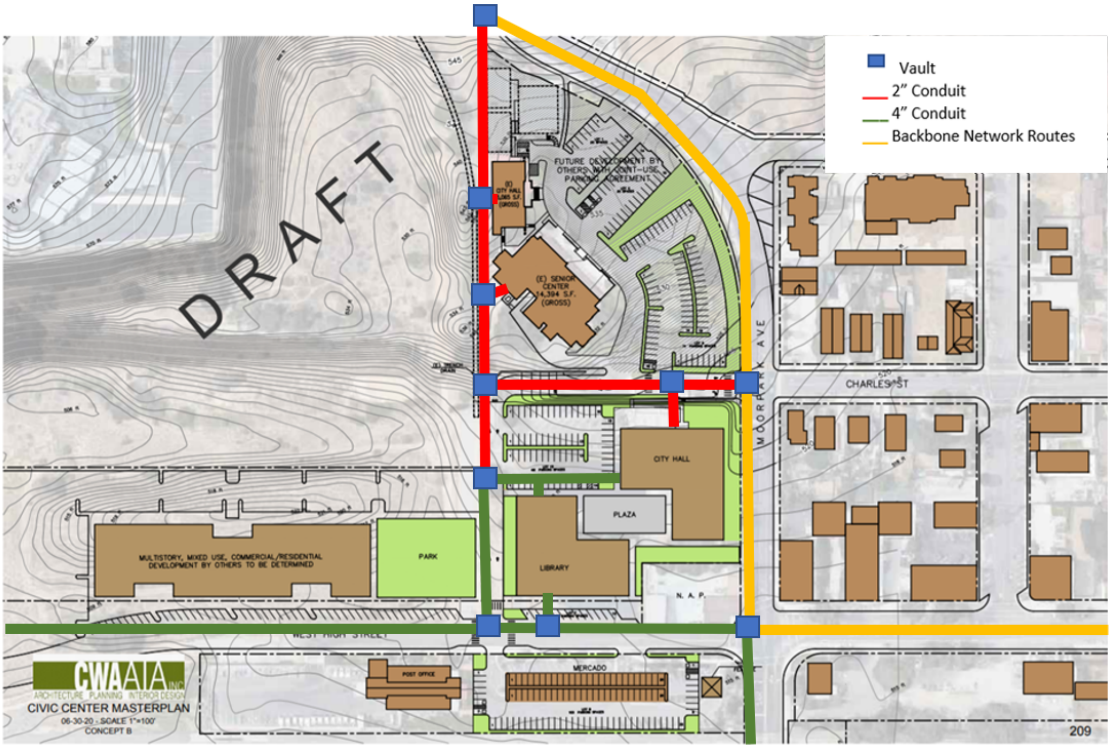
Directional Boring/Plowing: Conduit for directional boring should be HDPE with a minimum rating of SDR 11 type.

Trenching: Conduit type for open trench should be PVC with a minimum rating of Schedule 40.

6.8 CITY CIVIC CENTER DESIGN CONSIDERATIONS

Moorpark's location along the rail alignment and at the center of Ventura County make it an ideal location for a meet-me room (MMR) in which carriers can connect to one another to share data, interconnect fiber and deploy metro based fiber services to businesses and institutions. Placing an MMR in Moorpark would be a strategy for encouraging more providers to bring fiber into the area. Because the City of Moorpark is currently in the process of designing its new Civic Center and Library campus, the timing is also ideal; an MMR could be built in the new library building.

Figure 6-5. Civic Center Design with Conduit and Vaults



The map above displays a recommeded conceptual design for a conduit network that would branch off the backbone network along Moorpark Avenue and High Street. To ensure redundant connections, dual entry routes were designed for both the library and for City Hall. 4" conduits would only be put in if MMR is put into the library. Otherwise, 2" conduit can be used and the redundant connection to the library could be eliminated.

Should the City decide to house an MMR, connections to the carriers will need to be made at a connection point slightly southwest of the campus along Poindexter Avenue. The most feasible route to get there is to follow Moorpark Avenue south and turn west on Poindexter. Ideally, a second connection could be made by traveling west along High Street and crossing over the rail alignment north of Shasta Avenue. It appears that some development is taking place in this area, including a possible new road that

would allow that connection. If that route becomes a possibility, Magellan recommends that the City pursue the option to have two diverse connections to the carriers.

The City of Moorpark should have discussions with each carrier about their willingness to use the City's MMR. These conversations may reveal that the carriers are willing to come to the library rather than the City having to come to them. Other requirements may also be specified during these conversations. The City should also consider releasing an RFI or RFP to gain a better understanding of the feasibility and return on investment for the MMR.

Below are some additional considerations for housing a MMR within the City's new Library and Civic Center campus.

- **Dimensions**: The dimensions required for an MMR vary based on how many carriers' equipment will be housed, but Magellan recommends a minimum of 400 square feet. Generally, each carrier will need at least two 2 four-post, 84" (45U) high cabinets. The more space that can be made available for equipment, the more opportunity for expansion as new carriers request space. Ideal dimensions should be approximately 800 square feet.
- **Below Grade**: Most MMRs are below grade, often in a basement. Whether at ground level or below grade, the room must be waterproof.
- **Dual Route**: Conduits should be installed in at least two entries, creating dual routes for entry to the building. The diagram above suggests entries on the north side of the building through the parking lot and on the south side of the building along High Street.
- **Conduit**: At least two 4" conduits, each with innerduct, should be constructed to the MMR in order to house multiple cables from carriers.
- **Power**: The MMR should have dual routes for power connectivity and should be located near the utility room for ease of access to power sources. It will require backup power and an uninterruptable power supply. Ideally, the MMR should offer both AC and DC power options to carriers. If only AC power is offered, the carriers will require more space to house additional equipment such as rectifiers and batteries.
- **Structured Cabling:** Should be placed above server cabinets and away from power sources.
- **Cooling**: The room should be air conditioned and high-performance cooling equipment will be needed to ensure an appropriate climate. The basic principle behind the cooling system design must ensure that the proper amount of air is delivered to every device in the server cabinet. The cooling air must be drawn in the front and discharged out the back of the equipment mounted in the server cabinet. A design with air intakes or exhausts that is either lateral (side to side) or vertical (bottom to top or top to bottom) is not acceptable. The cooling system design must be scalable, adaptable, and fail-safe.

- **Fire Suppression:** The fire suppression system design should meet the requirements of the National Fire Protection Association (NFPA) and the City's building and safety codes. The proposed system must be both environmentally and people safe.
- **Security**: The MMR should be access-controlled and in a secure part of the building.

7. Recommendations & Next Steps

7.1 INCORPORATING BROADBAND AND SMART CITY INTO PLANNING PROCESSES

Becoming a Smart City means much more than just connecting a network of devices. A fundamental aspect of cities that the most successful in broadband planning is that the City itself demonstrates its commitment to connectivity by incorporating the use of technology into its existing processes. The City of Moorpark should come to think of broadband as another utility, as necessary to its businesses and residents as gas, water, or sewer.

In that spirit, broadband, and Smart City should be championed in all of Moorpark's planning processes including the City's Design Review Committee. The City could consider implementing a Broadband Task Force with representatives from Public Works, IT, Planning, and the City Manager's Office to perform such reviews.

Moorpark's 2050 General Plan should also include considerations for broadband. Magellan recommends that the General Plan include a goals and policies section that deals specifically with technology. The section may include findings and recommendations directly from this report and other pertinent information about the deployment and use cases of broadband and Smart City in the years to come.

7.2 BUILDING AND OPERATING A CITYWIDE NETWORK

As detailed in Section 6, the City of Moorpark should incrementally invest in expanding its broadband assets including conduit and fiber. The conceptual routing provided by Magellan is based on incrementally, opportunistically deploying assets as CIPs are executed and on strategically connecting all City facilities and providing opportunities for expanded service into Moorpark's commercial areas.

Using current estimate for laying fiber and conduit in California of between $30-40 per linear foot, we estimate the total cost of building such a network at between $1.80 million and $2.39 million, not including any costs for engineering, permitting, or other considerations. This is only provided as a high-level estimate; detailed engineering would need to be performed to create a more accurate cost analysis. It should also be noted that these costs may be reduced by requiring developers to install infrastructure in the locations indicated by the map in Figure 6-3 and by using joint trench strategies in the locations where CIP projects are already planned.

The connections between Moorpark's City facilities could be handled by the City's staff if desired. Alternatively, a third-party ISP could be engaged to manage and maintain operations of the network.

Additionally, the network's design passes all three of Moorpark's business parks, which would allow for additional broadband options to be provided in those areas. The Los Angeles Avenue bridge over the Arroyo Simi is the most critical for connectivity. We recommend that the City of Moorpark partner with an experienced ISP to offer services using City-owned infrastructure. An agreement could be made between the City and one or multiple parties to lease assets or to pass through a portion of the revenue to the City in exchange for the use of conduit and/or fiber. This scenario would be beneficial to all parties:

1. the businesses in these locations would have more options for service, driving competition
2. the internet service providers get access to a new market without having to spend capital to build additional assets
3. the City owns a valuable asset for which it receives compensation from the partner or partners.

The terms of such agreements would need to be negotiated with each prospective partner, likely through Request for Information ("RFI") or Request for Proposals ("RFP") process as deemed appropriate by City procurement policies.

7.3 PROVIDER INVESTMENT/PARTNERSHIP OPPORTUNITIES

A key objective for ensuring widespread access to affordable, reliable broadband in Moorpark is for the City to attract investment from ISPs. To achieve this, strategic partnerships such as agreements for use of City owned conduit, fiber, light poles and public rights-of-way are key. Several internet service providers, including incumbents that already have a presence in Moorpark, were engaged to understand other partnership opportunities that could enhance the City's broadband environment. The findings from each of these conversations are detailed below and should be used as background for the City to continue exploring how to attract investment and build partnerships.

AT&T

AT&T has been engaged in ongoing conversations with the Moorpark team about their current network and any plans to expand assets and services in the City, primarily focused on the wireless and mobility aspects of their services.

The City and AT&T have been working on an MLA regarding pole attachments and streetlights. Availability of infrastructure is a consideration for how AT&T plans its network expansion and upgrades, so until that agreement is resolved, AT&T states it has not planned expansion in Moorpark.

AT&T expressed openness to connecting Moorpark with its wireline team to discuss current availability to service business parks. Discussions arose about wireline working with the City's Economic Development team to ensure they had accurate and up to

date understanding of where fiber is available, so site selectors and businesses are aware able to connect where they need to.

AT&T and Moorpark are continuing discussions around the MLA and questions were submitted to the Moorpark team for review in hopes to wrap up an agreement.

CenturyLink

CenturyLink is a nationwide internet service provider that delivers last mile services to residents and businesses in the City of Moorpark. CenturyLink representatives have been following the broadband planning in the region and have been engaged in the Ventura County Broadband Consortium meetings, and therefore understand the goals of the region to expand broadband and fiber infrastructure to attract new tech-based employers and develop a tech ecosystem. They noted that their fiber in the region is mostly is long-haul.

CenturyLink believes they can assist the city with the right business model and ability to bring in last mile partners that can "Smartify" the City. The question was asked on what it would take to get CenturyLink to invest in Moorpark. Discussions included bringing together the entire team from the education and government side, to business development and commercial and building a strong business case that encourages participation and even expansion as regional and countywide.

GeoLinks

Geolinks is a Southern California based Competitive Local Exchange Carrier (CLEC), GeoLinks delivers Enterprise-Grade Internet, Digital Voice, SD-WAN, Cloud On-ramping, Layer 2 Transport, and both Public and Private Turnkey Network Construction expertly tailored for businesses and Anchor Institutions nationwide.[37] GeoLinks maintains a local presence as Ventura County is where the company originated. Their service now expands from the Mexican border to the Oregon border. GeoLinks serves layer 2 transport to a few neighborhoods to anchor institutions including schools and some healthcare organizations where they have launched multi gigabit networks to some of these organizations.

Geolinks maintains a 50/50 split of leased towers to owned towers. They use solar panels, battery backup and small wind turbines and relay wireless signals down into valleys. The company emphasizes it to specify and craft solutions for last mile delivery that provides redundancy, low latency, and symmetrical fiber quality circuits. The company focuses on line-of-sight solutions and does not express interest in deployment of 5G.

Geolinks has partnership agreements with long-haul fiber companies including Crown Castle and states that they have at least one customer in Moorpark via an AT&T circuit that connects to the POP at One Wilshire in Los Angeles. It also has lease

[37] https://geolinks.com/innovative-telecom-solutions/

arrangements in locations throughout the state with Southern California Edison, AT&T, and Frontier, which range from 10G to dark fiber.

GeoLinks emphasized the importance of Moorpark adopting a dig once policy to reduce overall project costs. They emphasized that permitting processes can be the most expensive and time consuming parts of a project. For example, even if the company has a CUP on file for an overall structure, they are required to obtain a new permit for the collocation, which creates permit costs and extends time lines and delays connecting customers. The company stated they are able to build in two days but it can take 45-60 days for permitting even when there's already a tower.

GeoLinks did not state any immediate opportunities in the City of Moorpark or opportunities to leverage assets for a partnership.

Spectrum/Charter

Spectrum/Charter currently has an agreement with the City of Moorpark to provide the City fiber connections between five facilities for its internal use. The company reports that it has invested millions of dollars in capital to its fiber-based broadband infrastructure throughout all residential areas of the City. Services offered include Spectrum Internet Gig, video, internet, and phone services. The company states that only in rare exceptions does the company not currently offer services.

Spectrum/Charter is working closely with developers and neighborhoods to address new-build developments and any reports of unavailable service. It is in the process of expanding service areas, especially to small and medium sized businesses and states that in addition to the 1Gbps business offering, more tailored solutions can be arranged for faster speeds as required by businesses.

The company expressed a willingness to discuss opportunities to streamline regulatory processes that would allow Spectrum/Charter and other providers to expand service areas by providing faster, less expensive access to public rights-of-way. Spectrum/Charter states that the City could best encourage investment through transparent review and permit approval processes that treat all providers equally. The City of Moorpark previously provided a letter of support for Spectrum/Charter to pursue grant funding through the CPUC to expand service to an area within the City. They are open to continued partnership opportunities with the City and are open to signing a non-disclosure agreement ("NDA") to share network maps and further plans for expansion.

Zayo

The Zayo Group is a nationwide fiber infrastructure company with long haul, middle mile and last mile fiber infrastructure throughout the US and the state of California. Zayo provides communications infrastructure services, including fiber and bandwidth connectivity, collocation and cloud infrastructure to its customers. Zayo considers themselves a "Tier 1 ISP." Their customers or "partners" range from large communications companies such as Verizon and AT&T, to community stakeholders, local governments and large bandwidth consumption businesses.

Representatives from Zayo were engaged and interested in the goals of the City and how they might be able to meet them, longer term. Zayo's infrastructure does not reach to Moorpark today and is more concentrated around the LA metropolitan area. Based on two sample addresses in the underserved areas, Zayo will work with their outside plant team to get an understanding of what the costs may be to build from their nearest splice points. Zayo, like most ISP's, will need to build a business case in order to deploy new infrastructure into Moorpark, to prepare to make investment recommendations internally. To develop a business case, the first step is to gather initial cost estimates based on two addresses in the central business parks as a possible starting point for negotiations.

The conversations concluded with the plan that Zayo would go back to their outside plant team and build cost estimates to the business park addresses of 200 Science Park Drive and 14501 Princeton Avenue. Zayo will also provide the City with dark fiber leasing rates per mile, and cost estimates for offering lit bandwidth services.

Partnership Recommendations

The City should continue discussions with each of these potential partners as the network develops. In particular, Moorpark should follow up with Spectrum/Charter about entering a non-disclosure agreement to obtain maps of their current assets and plans for deployment. The City should also follow up on Zayo's willingness to provide pricing to serve Science Drive and estimates for dark fiber and lit service offerings.

7.4 FUNDING OPPORTUNITIES

Moorpark should consider pursuing state and federal funding to leverage its capital expenditures to build out additional broadband assets. Generally, the City should be monitoring broadband funding opportunities and be prepared to apply for them quickly by having staff available to review notices of funding opportunities ("NOFOs") and to participate in grant writing.

The City should also track regional opportunities through continued participation organizations such as the Broadband Consortium of the Pacific Coast ("BCPC"), as well as closely monitoring the County's broadband project. Moorpark should continue engaging with the County's project team about possible grant funding sources for the MMR. Although the MMR is unlikely to meet funding requirements on its own, the project may be eligible for funding through organizations such as the California Public Utilities Commission ("CPUC") as a part of the larger middle mile network.

Several funding programs are being defined now for next year. We expect new sources of public funding to develop relatively often, especially as the COVID-19 pandemic has emphasized the need for broadband for economic development, telehealth, remote learning, and a digital workforce.

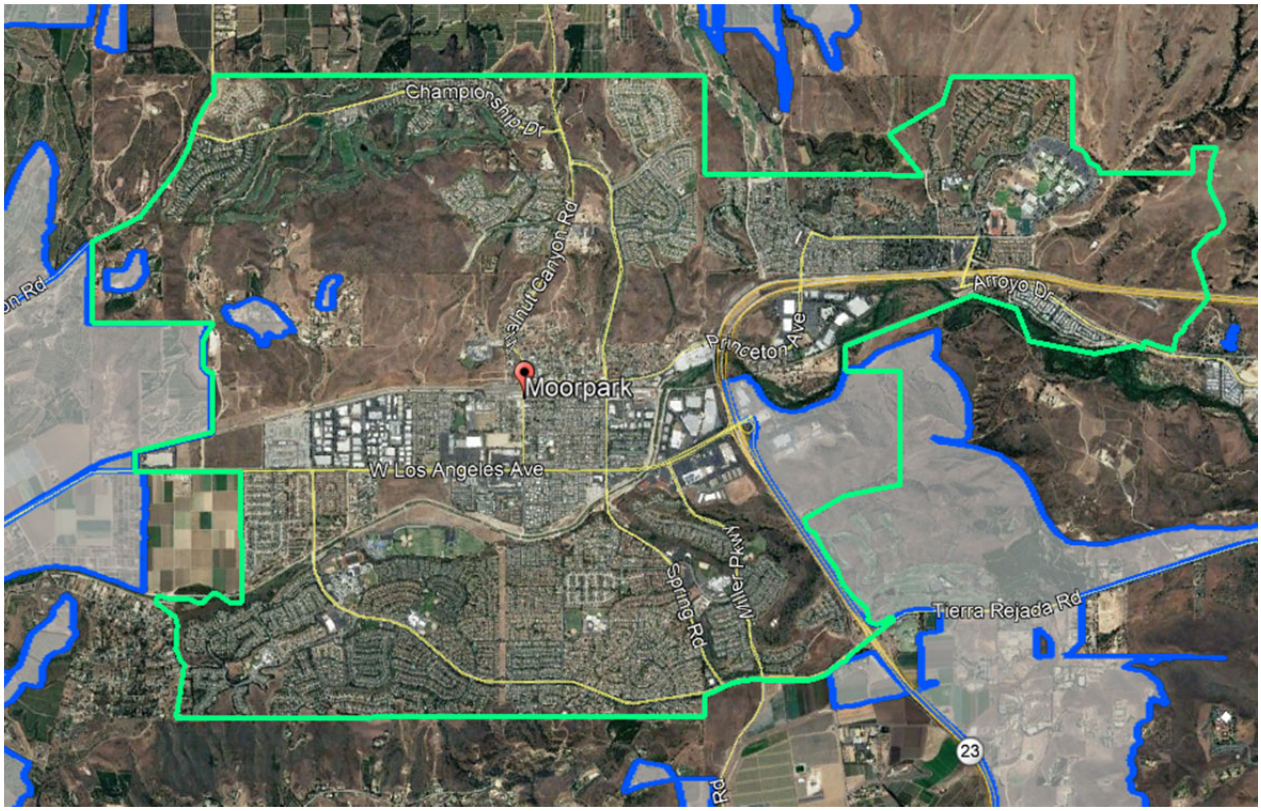
Below are some key grant funding opportunities that Moorpark should consider exploring to help fund broadband expansion within the City.

Rural Development Opportunity Fund (RDOF) Grant

The Rural Digital Opportunity Fund (RDOF) offers subsidies to telecommunications companies throughout the U.S. to upgrade and expand their networks as required to provision broadband service at a minimum speed of 25/3Mbps. This program is open to eligible telecommunications carriers (ETCs) and primarily geared toward rural areas, although there are some regions of Moorpark that are eligible, as shown in the map below. Moorpark should track the results of RDOF auctions.

Regions that are outlined in blue are currently eligible.

Figure 7-1. Moorpark RDOF Map



The Phase I auction is scheduled to begin on October 22, 2020 and will target over six million homes and businesses in census blocks that are entirely unserved by voice and broadband with download speeds of at least 25 Mbps. Phase II will cover locations in census blocks that are partially served, as well as locations not funded in Phase I.

Wireline and wireless telephone companies seeking to participate in any of the High Cost Program support components must be designated an eligible telecommunications carrier and meet ongoing requirements by the applicable state or, in cases in which the state does not have jurisdiction over a particular type of provider, the Federal Communications Commission. Therefore, to seek this funding, Moorpark would need to partner with an eligible telecommunications provider.

Economic Development Agency Grants

The Department of Commerce Economic Development Agency's ("EDA") Economic Adjustment Assistance and Public Works programs help distressed communities

revitalize, expand, and upgrade their physical infrastructure. This program enables communities to attract new industry, encourage business expansion, diversify local economies, and generate or retain long-term, private-sector jobs and investment through the acquisition or development of land and infrastructure improvements needed for the successful establishment or expansion of industrial or commercial enterprises.

EDA Public Works program investments help facilitate the transition of communities from being distressed to becoming competitive by developing key public infrastructure, such as technology-based facilities that utilize distance learning networks, smart rooms, and smart buildings, multi-tenant manufacturing and other facilities, business and industrial parks with fiber-optic cable, and telecommunications and development facilities.

In addition, EDA invests in traditional public works projects, including water and sewer systems improvements, industrial parks, business incubator facilities, expansion of port and harbor facilities, skill-training facilities, and brownfields redevelopment. EDA grants are ongoing and range from $100,000 to $3 million.

To qualify, projects must demonstrate:

- Alignment with at least one of EDA's current investment priorities as published on EDA's website at www.eda.gov.
- Potential to increase the capacity of the community or region to promote job creation and private investment in the regional economy.
- The likelihood that the project will achieve its projected outcomes.
- Ability of the applicant to successfully implement the proposed project, including the applicant's financial and management capacity and the applicant's capacity to secure the support of key public and private sector stakeholders.

The CARES Act was passed in 2020 to assist communities with the COVID-19 crisis and appropriated additional funding to the tune of $1.5B for the Federal Economic Development Agencies Economic Adjustment Assistance Program, distributed by region. The funding bill is not an infrastructure bill but includes support and additions to funding for broadband, education, telehealth and tribal entities. No funding deadline exists, and the funding will be highly competitive to local governments and universities. Although this specific program is a short-term opportunity, Moorpark should continue to monitor EDA funding by contacting its regional representative. Additional opportunities may become available pending further action at the Federal level.

California Advanced Services Fund Grant

California Public Utilities Commission ("CPUC") administers California Advanced Services Fund ("CASF") to provide broadband access to no less than 98% of California households in each broadband consortium region by 2022. CASF is funded by a surcharge rate on revenues collected by telecommunications carriers by end users for intrastate telecommunications services. Both private telecommunications companies and local government agencies are eligible to apply for funding.

As of the time of this report, areas where no providers offer 6/1Mbps are eligible for funding. However, a proposed senate bill in the State of California (SB-1130) would make sweeping changes to the definition and funding of broadband infrastructure throughout the state. The proposed legislation deletes the old 6/1 Mbps proposes that now an area that lacks 25/25 Mbps low latency broadband is eligible for funding and only projects that provide future proofed infrastructure at a minimum of 100/100 Mbps low latency can receive state financing. It also would undo the ban on middle mile open access projects receiving funding.

Moorpark should continue to track the status of SB-1130 and whether sections of the City might be eligible for funding.

Impact Fees and Mitigations in Development Agreements

With the new development that is taking place in Moorpark, the City may have an opportunity to fund broadband infrastructure projects by collecting impact fees. Just as these fees can offset costs to manage water and sewer infrastructure, impact fees may be used to support the costs of broadband infrastructure. These fees would be charged to developers as terms of development agreements. The City may also want to consider developing impact fees for construction in the public right-of-way that reduces the longevity of the assets.

Specifically, the City should ask the developers of the area to the west of the current Civic Center location where the Hitch Ranch Development is currently being planned to install conduit as the development is built. To connect the network, North Hills Parkway, Gabbert Road, and Casey Road are key; therefore, the City should request that the developer install at least two 2" conduits in these locations. Additionally, should the City decide to place an MMR in the library as recommended, two 4" conduits should be placed on the southern end of that development, between West High Street and either the newly built north-south road or Gabbert, and then south over the rail crossing to Poindexter.

Moorpark's legal counsel (City Attorney) should be consulted further about how to most effectively implement such fees and mitigations.

7.5 VENTURA COUNTY BROADBAND PROJECT

Ventura County has recently begun efforts to plan for a countywide fiber network that will bring increased connectivity to the entire region. In addition to connecting key county facilities, public safety agencies, and other anchor institutions such as healthcare facilities and schools, the Ventura County network will also interconnect municipal networks, bringing options for wholesale bandwidth. Cities such as Moorpark that participate in the project will be able to use the County's network to connect back to internet points-of-presence (POP), which could save the City the cost of having to lease these connections from a private telecommunications carrier.

Should Moorpark decide to proceed with the recommendation to install an MMR in the new Civic Center and Library campus, that location could play a key role in the development of Ventura County's networks. Regional collaboration with the County and other cities would also provide Moorpark with more leverage for bringing in additional

telecommunications investors. Such collateral efforts are often much more effective means of approaching broadband strategy than are unilateral approaches.

For these reasons, it is vital that the City of Moorpark continue to actively participate in the Ventura County project.

7.6 NEXT STEPS FOR MOORPARK'S BROADBAND STRATEGY

1. Incorporate broadband and technology into all planning considerations, especially the City's 2050 General Plan update. As it looks toward the future, the City of Moorpark should collectively think of broadband as a utility that is necessary for residents, businesses, and the City itself. Moorpark's forthcoming General Plan should include considerations for the broadband infrastructure and Smart City applications addressed in this report, as well as other solutions that address community needs. Magellan recommends that someone represent Smart City devices and broadband networks during the development of the General Plan, as well as on an ongoing basis in other planning and daily permitting and construction approval activities, by assigning a member of the City's Development Review Committee to review projects and write conditions of approval for the purposes of broadband deployment.

2. Implement policies related to the deployment of small cell telecommunications facilities including an MLA, Small Cell Design and Deployment Standards, an updated telecommunications ordinance, and a Dig Once ordinance and practice. Moorpark should develop a Dig Once policy or ordinance, design standards and guidelines for wireless facilities, and a template for future master license agreements. These agreements should all strike a balance between maintaining local control and partnering with providers to lower their barriers to entry in cases where it is beneficial to the community. The City should also track the status of current FCC rulemaking and adjust its policies as appropriate.

3. Include broadband in development agreements with considerations for impact fees and mitigations for the placement of conduit. All development agreements should be reviewed to ensure that the City is not missing opportunities to encourage robust broadband. Requirements for placing conduit and mitigations for deploying infrastructure should be considered on a case by case basis. Most immediately, the City should request the developer of the Hitch Ranch area to install conduit infrastructure according to the map contained in this plan. This could save Moorpark a considerable amount of the costs to deploy broadband infrastructure to complete buildout of a citywide fiber network. Moorpark's legal counsel should be further engaged to discuss how to most effectively implement such fees.

4. Set aside funds to install conduit and/or fiber infrastructure during CIP projects. Magellan recommends setting aside $100-150k to take advantage of opportunities to install infrastructure such as joint build or CIP, keeping the marginal costs low. Adding a conduit in coordination with another project can reduce costs by as much as 33%. Moorpark may consider setting up an enterprise fund that is

funded by fees such as the small cell or conduit lease revenues or the impact fees mentioned above as a reserve for this.

5. Incrementally and opportunistically build connections for a Citywide fiber network. As funds become available, close connections to create a redundant, resilient loop of infrastructure that connect City facilities and that can be used to offer additional services to businesses. These assets can be used for the City to provide its own connections to replace the current Spectrum/Charter connections, lowering telecommunications expenditures. The network assets can also be leased to third party ISPs to provision services to businesses and new developments for economic development.

6. Engage with potential partners about agreements to use City assets for increasing service offerings. The City should continue discussions with incumbents AT&T and Spectrum/Charter as well as other ISPs interested in entering the market to understand how to best attract investment and leverage City assets. If desired, the City could consider issuing an RFP to solicit responses from parties interested in using assets such as conduit and/or fiber once they are built.

7. Track and participate in the Ventura County broadband project and other local initiatives to promote a regional broadband vision and increase interest in the region. Moorpark already plays an active role in participating with other cities in the region on broadband initiatives. The City should continue to track the Ventura County broadband project, as well as any other broadband initiatives occurring within the region. Like many other initiatives, broadband planning is often the most productive when it is approached as a regional effort, and Moorpark's location in the center of Ventura County and along Highway 118 makes its participation in such efforts extremely beneficial for both the City and other stakeholders.

8. Provide space for a meet-me room in the design plans for the new Civic Center. Moorpark should consider releasing an RFI or RFP to determine the feasibility of building an MMR. This meeting point could unlock not only additional investment from broadband providers, but a thriving tech ecosystem that attracts an array of new businesses. Before finalizing the construction plans, ensure that considerations for space, power conditioning, air conditioning, and dual route entry are noted.

9. Continue tracking grant opportunities for funding expansion of broadband assets including EDA, RDOF, and CASF. Be ready to pursue funding opportunities that may have short windows. Working closely with organizations such as the County, other cities, EDA, and the Broadband Consortium of the Pacific Coast will be helpful in keeping track of what is available and how to seek funding.

10. Should the City desire to further understand the cost and revenue potential of the network identified in this Plan, it should perform a full financial analysis based on

further outreach to the business community. Because a full ROI analysis was not performed, detailed revenue projections are not available. For additional financial estimates, Moorpark should conduct detailed design engineering to better understand the cost of building the network and perform additional outreach to businesses and potential partners in order to generate take rate estimates and other key metrics that could input into a pro-forma to provide more detailed return on investment estimates.