# City of San Luis Obispo, California

# Broadband Plan

## SUMMARY REPORT

June 11, 2023

**Magellan**
An ENTRUST Solutions Group Company

www.MagellanBroadband.com

# Summary Report

## I.    OVERVIEW

The transition to a digital world has accelerated, spurred by the shift to online learning, remote work, e-commerce, the increase in the automation of services, and advances in technology.  The foundation enabling this transformation are fiber optic networks that can provide the high-speed, low latency connectivity required for advanced applications and uses. An engaged community with a shared technology vision and data driven mindset will enable the City of San Luis Obispo to drive innovation, economic benefits, and overall wellbeing for the City.

Magellan was contracted by the City to undertake a Broadband Plan to help improve access and affordability to high-speed internet service for community members, businesses, and efficient delivery of City services. Magellan's scope of work included:

(1)  an *asset inventory* of both public and private broadband infrastructure;

(2)  a *market analysis* that evaluated the incumbent Internet Service Providers (ISPs) and their rates, services tiers and speeds;

(3)  a *needs assessment* that analyzed data sets and indicators of broadband need, including conducting a community survey and stakeholder focus group interviews;

(4)  a *review of the City's Capital Improvement Program* (CIP) and opportunities for alignment with broadband expansion through utility and development coordination and broadband-friendly policies;

(5)  developing a *conceptual network design* that ensured a redundant city-wide backbone fiber loop and maximized connectivity and reach into residential neighborhoods and business corridors;

(6)  a *financial analysis* of the initial construction costs, start-up capital to serve retail subscribers, and ongoing operational expenses and revenue projections;

(7)  an evaluation of the different *business and service models* the City could consider, including public-private partnerships;

(8)  identification of eligible *grant funding opportunities* and other financing mechanisms; and

(9)  outlining *key recommendations* that would implement the Broadband Plan.

# II. SUMMARY OF FINDINGS

## A. Asset Inventory

Magellan identified significant public and private infrastructure within San Luis Obispo that can be leveraged to expand community broadband access – whether as locations in the public sphere or right-of-way to host distribution equipment, conduit and fiber pathways to connect facilities and neighborhoods, opportunities to deploy smart city devices and applications, or integration of public and private networks through innovative partnerships.
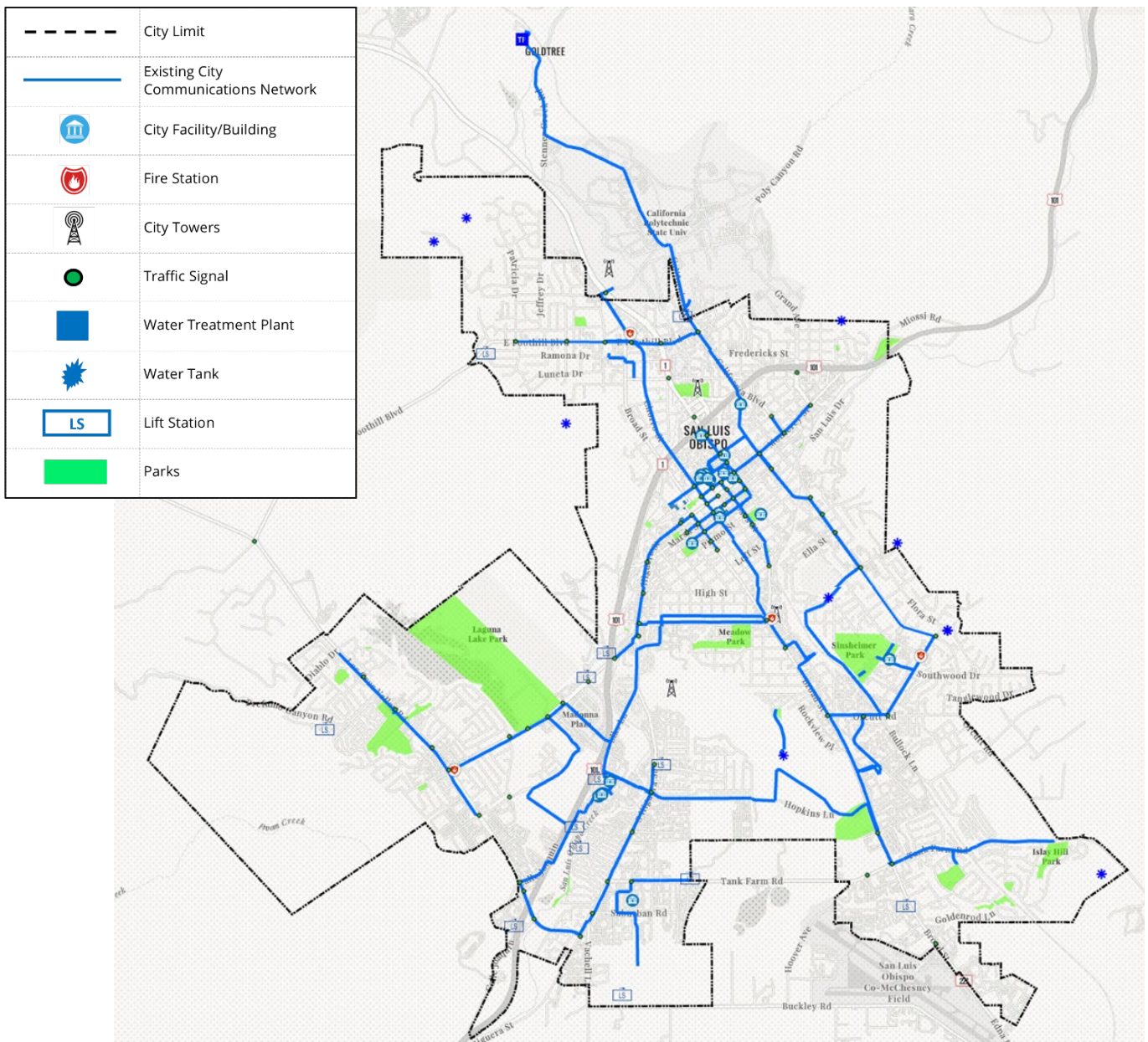


*Figure 1 - Existing City Facilities & Broadband Assets*

The City owns and manages a 35.5-mile communications network of conduit, fiber, and some copper cables, largely along major arterials and corridors (Figure 1), portions of which are jointly owned by the City and Cal Poly. This public network is augmented through a non-exclusive agreement with Digital West/Astound to utilize their privately-owned fiber network. However, this network does not provide full redundancy through a backbone loop architecture.

The City's 2,742 street lights can provide the requisite vertical infrastructure to deploy wireless communication, particularly in residential neighborhoods. The City's 10 water tanks can also be interconnected and could serve as a distribution point.

There are also significant private broadband assets within San Luis Obispo. The City has two internet service providers that cover 100% of the City – Spectrum and AT&T – that operate their networks from significant fiber backbones. However, neither has ubiquitous fiber-to-the-premises availability. Digital West has a substantial private fiber network that was historically targeted to commercial and business enterprises. However, with their acquisition by Astound in 2021, they are now undertaking significant expansions into the residential market. The City has significant metro and long-haul private fiber networks, as well as five neutral data centers that provide connectivity with the rest of the state. The City's has ubiquitous 4G/LTE mobile coverage by AT&T, Verizon, and T-Mobile, provisioned through 119 towers and 280 antennas in the City.

## B. Market Analysis

The City historically has been subject to the common telecom duopoly with limited competition: Charter/Spectrum is the legacy cable provider with near-ubiquitous gigabit offerings to residential addresses, and AT&T offering Digital Subscriber Lines (DSL) service over their legacy copper (maximum speed of 70 Mbps, which is below the California minimum standard of 100 Mbps), and limited fiber-to-the-premises (FTTP) gigabit services.

Astound (formerly Digital West) provides businesses fiber services, and with the Astound acquisition is now beginning to move into the residential market providing a third option. All three ISPs offer gigabit services (if available) at $80 or $90 per month.

T-Mobile and Verizon offer fixed wireless services over their LTE and 5G networks, with maximum speeds between 180-300 Mbps at monthly rates of $50-60.  Peak Wi-Fi offers a wireless service, but their speeds (50-100 Mbps) and pricing ($70-150) cannot compete with T-Mobile and Verizon.

*Table 1 - Facilities-Based Broadband Providers in San Luis Obispo*

| ISP | Network | Max Download Speed | Max Upload Speed | Contract Term | Monthly Rate |
|---|---|---|---|---|---|
| Charter / Spectrum | Cable | 200 Mbps | 10 Mbps | 1 year | $ 40 |
| | | 500 Mbps | 10 Mbps | | $ 70 |
| | | 1 Gbps | 25 Mbps | | $ 90 |
| AT&T | DSL | 5 - 70 Mbps | 250 - 500 Kbps | None | $ 45 |
| | Fiber | 300 Mbps | 300 Mbps | None | $ 55 |
| | | 500 Mbps | 500 Mbps | | $ 65 |
| | | 1 Gbps | 1 Gbps | | $ 80 |
| | | 2 Gbps | 2 Gbps | | $ 110 |
| | | 5 Gbps | 5 Gbps | | $ 180 |
| Astound (Digital West) | Fiber | 100 Mbps | 100 Mbps | 2 years | $ 25 |
| | | 500 Mbps | 500 Mbps | | $ 45 |
| | | 940 Mbps | 940 Mbps | | $ 65 |
| | | 1 Gbps | 1 Gbps | | $ 80 |
| T-Mobile | Wireless | 182 Mbps | 35 Mbps | None | $ 50 |
| Verizon | Wireless | 50 Mbps | 10 Mbps | None | $ 25 |
| | | 300 Mbps | 50 Mbps | | $ 60 |
| Peak Wi-Fi | Wireless | 50 Mbps | 10 Mbps | None | $ 70 |
| | | 100 Mbps | 20 Mbps | | $ 150 |
| | | 100 Mbps | 100 Mbps | | $ 200 |

# C. Needs Assessment

Databases utilized by the California Public Utilities Commission (CPUC) to identify households in the City that have no (or insufficient) broadband access shows a significant number of un-served locations[1] across the City, with particularly high concentrations in the southwest along Tank Farm Road and South Higuera Street and the southeast along Orcutt Road and Tank Farm Road. There are also large swaths of the City that fall under the 50-75% Most Disadvantaged category in environmental and socio-economic vulnerability

[1] The CPUC defines "unserved" as locations where access to broadband services does not exceed 25 Mbps download and 3 Mbps upload.

indices and low-income areas (below 80% of area median income), and more than 7,100 households qualify for the federal Affordable Connectivity Program (ACP) that subsidizes monthly internet (only 25% of eligible households are currently receiving the benefit).

The community survey received more than 280 partial or full responses, and included an embedded speed test to determine actual speeds of the survey respondent; nearly 45% of respondents failed to achieve the California minimum standard throughput (download + upload) of 125 Mbps. While respondents indicated reliability was the most important factor, they there was clear dissatisfaction with costs and ambivalence about customer service.
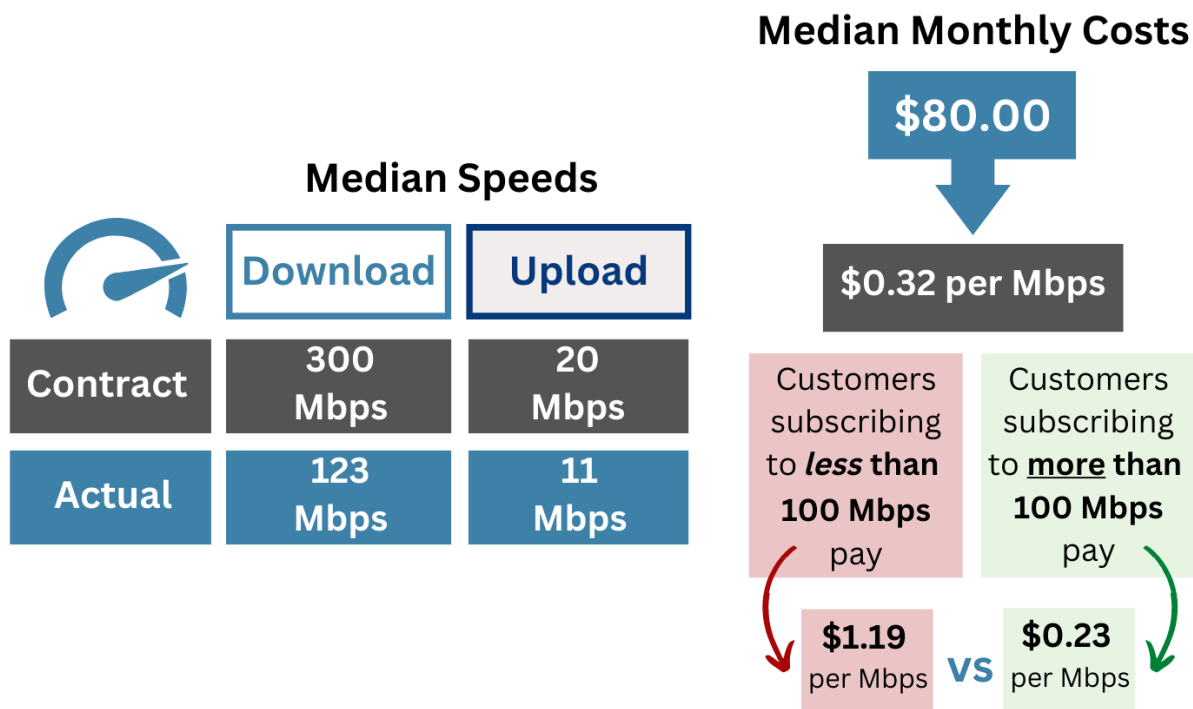
**Median Monthly Costs**

**$80.00**

**$0.32 per Mbps**

**Median Speeds**

| | Download | Upload |
|---|---|---|
| **Contract** | 300 Mbps | 20 Mbps |
| **Actual** | 123 Mbps | 11 Mbps |

| Customers subscribing to *less* than 100 Mbps pay | Customers subscribing to **more** than 100 Mbps pay |
|---|---|
| **$1.19** per Mbps | **$0.23** per Mbps |

VS

*Figure 2 - Median Speeds & Pricing Based on Survey Results*

The median price per megabyte (MB) of data per month was $0.32 – an amount competitive with other urban areas within California. However, breaking down the price per MB between subscribers who purchase lower-bandwidth packages (<100 Mbps) and those customers who purchase higher-end packages (>100 Mbps) illustrates how conventional telecom duopolies and data packages reinforce the Digital Divide by providing sub-par speeds and higher pricing for households with lower discretionary income.

Magellan also conducted a series of community stakeholder focus groups to solicit input and first-hand experiences. Especially for social services and workforce development, more economical, flexible options are required to deliver services and support disadvantaged populations. However, downtown businesses, research activities, tech companies, and

tourism all reported limited connectivity options, low speeds, uneven coverage, and unreliable services.

While the survey suggests that connectivity is adequate throughout most of the City, stakeholder inputs indicate that "adequate" is not sufficient. The City needs multiple providers offering a wide range of technological solutions throughout the City and beyond. The City itself needs the infrastructure to operate and maintain quality of life but also for making visitors feel comfortable, safe, and welcomed.

# D. CIP Analysis

The City's CIP Committee reviews projects for alignment with City infrastructure needs that align with community goals and objectives. Historically, this has not included consideration of opportunities for new broadband assets and where they might be deployed through joint trenching or coordination with other CIP projects. Similarly, utility coordination with the private sector is limited only to notification that a utility line (including broadband) must be relocated prior to a major City CIP project (e.g., a new bridge that requires moving an existing private fiber line), and IT has limited review and input.

Entitlement applications for large private projects through Community Development/Planning undergo a review by various City departments, but have no outside organizational input (e.g., PG&E, Charter, AT&T, Astound) nor from the City's Administration and IT Department. Each of these processes – CIP projects, utility coordination, and private project development – is an opportunity to deploy public and private broadband infrastructure at a fraction of the cost through effective joint trench/dig once policies.

Moreover, the City's Administration and IT Department does not currently have a long-term funding source from which to cover marginal expenses if a joint trench opportunity were to arise. The remaining State and Local Fiscal Recovery Funds (SLFRF) could be used for this purpose, but is not a long-term solution.

A Broadband Infrastructure Fund, with recurring revenues contributed via street light licensing fees for privately-placed small cell antennas, other lease of land or towers to telecom, or dark fiber/conduit occupancy lease revenues could ensure a rolling fund that could be utilized if/when a joint trenching project outside of the biennial budget process is identified. The City's existing revenues from these sources are already part of the General Fund, so the City should consider allocations toward the Broadband Infrastructure Fund from new or future leases and licensing fees.

An initial review of the City's current 5-Year CIP Plan identified more than 50 projects with potential opportunities to expand broadband (see Appendix B), which should be further

reviewed for specific applicability for broadband expansion, especially as it relates to the proposed Conceptual Network Design and the Broadband Plan.

## E. Conceptual Network Design

In order to create a redundant backbone loop that prevents service interruptions, connects all City facilities, buildings, parks and assets, and expands opportunities for greater community broadband access, the existing City communications network would require 18.4 miles of new backbone fiber and 5 miles of laterals, as well as upgrading 120,000+ feet of existing City network with new, higher-capacity fiber. The Conceptual Network Design (Figure 3) can be implemented in phases in order to prioritize immediate needs and provide flexibility relative to grant availability and resource constraints.
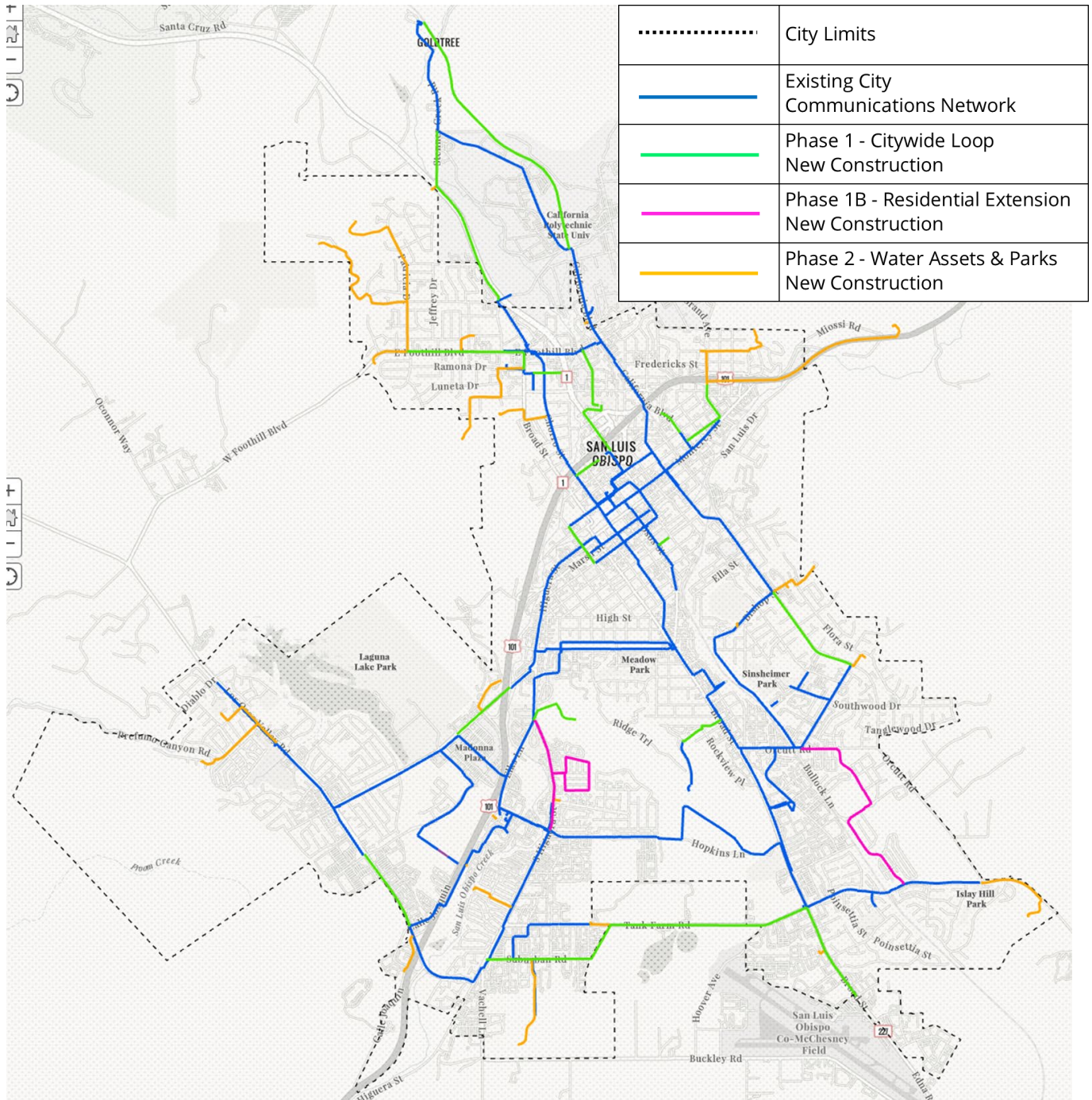
*Figure 3 - Conceptual Network Design*

The upgrades to the existing City network and new construction of all phases of the Conceptual Design are estimated at $13.5 million, as shown in Table 2.

*Table 2 - Estimated Construction Costs of Conceptual Network Design*

| | Length (feet) | Price per Foot | Estimated Cost |
|---|---|---|---|
| **Phase 1 – City Backbone Loop & Critical City Sites** | | | |
| **Design & Engineering** | | | |
| Design & Engineering (New Construction) | 57,739 | $ 1.75 | $ 101,044 |
| As-Builts (Existing City Network Upgrades) | 120,198 | $ 0.20 | $ 24,040 |
| Fielding Survey | -- | -- | $ 50,000 |
| Public Engineering Stamps | -- | -- | $ 50,000 |
| *Phase 1 Design & Engineering Subtotal* | | | *$ 225,084* |
| **Construction** | | | |
| Existing City Network Upgrades | 120,198 | $ 5.00 | $ 600,990 |
| New Backbone Construction | 52,348 | $ 110.00 | $ 5,758,280 |
| New Lateral Construction (City Assets) | 5,391 | $ 80.00 | $ 431,280 |
| *Phase 1 Total* | *177,937* | *--* | *$ 7,015,634* |
| **Phase 1B – Residential Backbone Extension** | | | |
| **Design & Engineering** | | | |
| Design & Engineering (New Construction) | 13,801 | $ 1.75 | $ 24,152 |
| As-Builts (Existing City Network Upgrades) | -- | $ 0.20 | -- |
| Fielding Survey | -- | -- | $ 15,000 |
| Public Engineering Stamps | -- | -- | $ 20,000 |
| *Phase 1 Design & Engineering Subtotal* | | | $ 59,152 |
| **Construction** | | | |
| Existing City Network Upgrades | -- | $ 5.00 | -- |
| New Backbone Construction | 13,801 | $ 110.00 | $ 1,518,110 |
| New Lateral Construction (City Assets) | - | $ 80.00 | -- |
| *Phase 1B Total* | 13,801 | | $ 1,577,262 |
| **Phase 2 – Water Assets & Parks** | | | |
| **Design & Engineering** | | | |
| Design & Engineering (New Construction) | 48,139 | $ 1.75 | $ 84,243 |
| As-Builts (Existing City Network Upgrades) | -- | $ 0.20 | -- |
| Fielding Survey | -- | -- | $ 25,000 |
| Public Engineering Stamps | -- | -- | $ 35,000 |
| *Phase 2 Design & Engineering Subtotal* | | | $ 144,243 |
| **Construction** | | | |
| Existing City Network Upgrades | -- | $ 5.00 | -- |
| New Backbone Construction | 31,149 | $ 110.00 | $ 3,426,390 |
| New Lateral Construction (City Assets) | 16,990 | $ 80.00 | $ 1,359,200 |
| *Phase 2 Total* | *48,139* | *$ 1.75* | *$ 84,243* |
| **TOTAL – ALL PHASES** | **239,877** | | **$ 13,522,728** |

Phase 1 would create the looped architecture and connect critical City facilities; Phase 1B would further extend the backbone into residential areas identified by the City; and Phase 2 would connect the remaining water assets and City parks while further penetrating residential areas for greater community access. Each of these can be further broken down into sub-phases, or built incrementally and opportunistically through effective CIP and utility coordination.

The City could reduce these estimated costs by $3 million if it were to continue and expand its use of third-party fiber (private and/or County of San Luis Obispo). Costs would be expected to be further reduced through the design engineering process, utility coordination, and alignment with other CIP projects through an effective joint trench/dig once process. See Table 18, Page 71 of the full plan document for estimated costs.

Placing a 750-foot buffer around the backbone network and cross-referencing the residential address database and the City's current business license list provides the ability to quantify those potential subscribers that can be economically connected into the City's network. The Conceptual Design would offer greater community access to broadband for more than 27,000 households, nearly 1,800 businesses, and 99 public and/or affordable housing sites.

## F. Financial Analysis

Operating a public-facing fiber network – whether as a transport-only network or as a retail fiber-to-the-premises service provider – will necessarily entail significant start-up and operational costs that can be challenging for organizations without access to investment capital. In addition to core network equipment costs and customer premises equipment and service drop construction costs, a serviceable network carries significant administrative and staffing costs in order to operate effectively. Many municipalities solicit private ISP partners to assume the liability of start-up and operational costs, in exchange for the ability to charge retail rates and recoup a return on their investment.

Conservative projections that utilize industry-accepted take rates and pricing tiers suggest that the City's Conceptual Network Design that passes 27,000 households and 1,800 businesses would require approximately $13-14 million in start-up capital, but could generate positive operational revenues by Year 8, and could achieve enough cash flow to provide an acceptable return to private investment over a 20-year period. This internal rate of return that private equity might seek in exchange for providing the start-up capital would be the subject of City-ISP partnership negotiations.

Importantly, these projections <u>exclude</u> the $13.5 million construction costs under the assumption that the Conceptual Network Design would be constructed through state and federal broadband grants, City General Fund contributions, or a combination thereof – and <u>not</u> incur any additional debt or need for additional private investment.

## G. Business & Service Models

The various business models involve different levels of investment and control that come with varying risks and rewards. The City of San Luis Obispo has numerous options – from a laissez-faire, public policy-only approach all the way across the spectrum to the City owning and operating a full retail internet business.
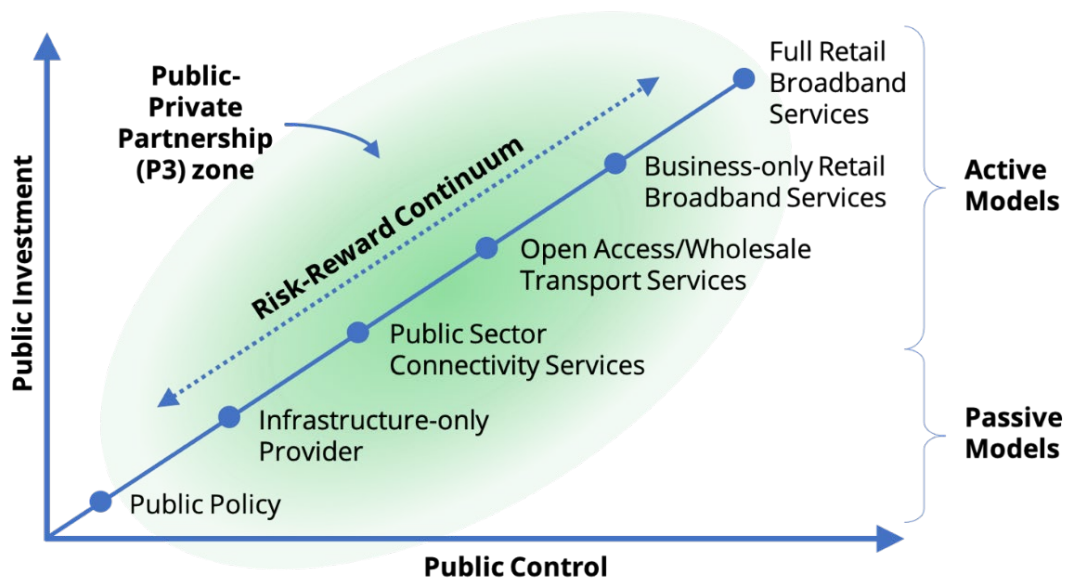


*Figure 4 - Broadband Business Models Spectrum*

Public-private partnerships (P3s) are an emerging business model that provides an innovative solution to broadband expansion. The key factors that define a public-private partnership, as opposed to simply a customer-vendor relationship, are that: (a) all parties contribute, (b) each party's benefits are shared based on their contributions, and (c) one partner does not pay another; there are few or limited transactions between partners.

Generally, P3s create a cooperative platform for a local government and one or more private organizations to plan, fund, build, and maintain a broadband network within the municipality's jurisdiction.

The City could consider a public-private partnership model to implement the Broadband Plan in which the City could publicly solicit and select a private ISP to operate, manage, and sell retail internet services over publicly-owned fiber in exchange for lease payments,

revenue share, new City network construction, or a combination thereof. Additionally, an experienced private ISP partner will be required if the City were to apply for SB 156 Last Mile grant funding, as the City cannot currently demonstrate experience and capacity to operate and maintain a retail internet service network.

## H. Funding Options

There are several grant programs through the state and federal government that could fund broadband expansion.

However, two grant opportunities stand out that the City should aggressively pursue to assist with construction costs of building and implementing its expanded fiber network and Broadband Plan: 1) The Senate Bill 156 Last Mile Federal Funding Account (one-time county-wide allocation of $22.3 million) and 2) the California Advanced Service Fund (CASF) Broadband Infrastructure Account (statewide annual allocation of $150 million through 2032).

Figure 5 shows each of these five eligibility indicators within the City of San Luis Obispo, demonstrating areas throughout most of the City with some level of need and eligibility for Last Mile grant funding.
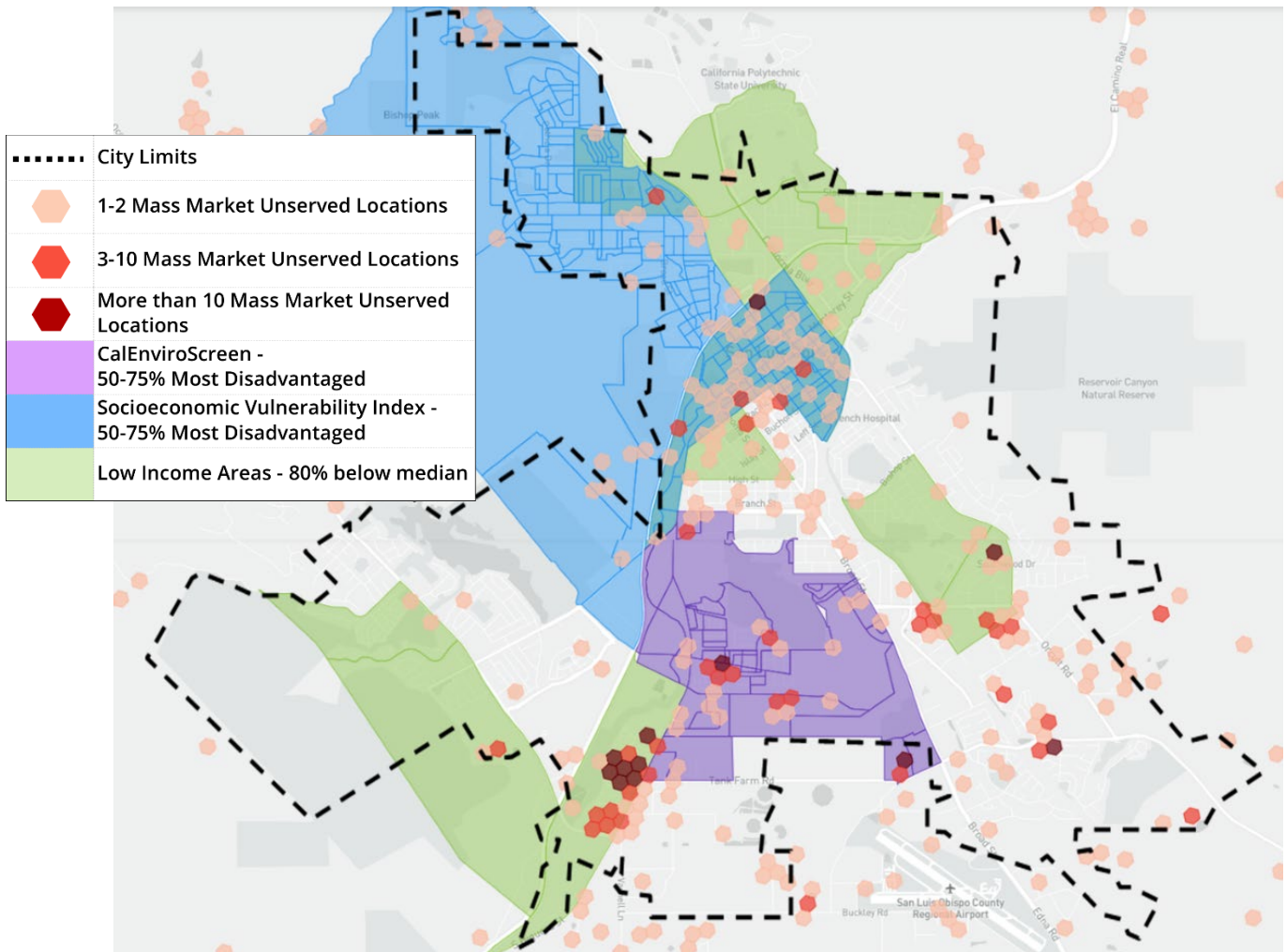
*Figure 5 - Last Mile Federal Funding Account Eligibility Map[2]*

SB 156 Last Mile grant funding does allow for the funding and construction of backbone and middle-mile networks, provided that those are directly supporting last-mile distribution to eligible locations. The City should identify at least a few concentrations of unserved locations along the Conceptual Network Design and include fiber-to-the-premises service drops as part of any SB 156 Last Mile funding application to ensure grant eligibility.

The CPUC is still in process of rolling out the Last Mile grant process: an engineering, economic, and business case tool is expected to be released in June 2023, with the application window now anticipated to open in late June 2023.

The CASF Infrastructure Account largely uses the same CPUC map of "Mass Market Unserved Locations" shown in Figure 5 for grant eligibility.

[2] Source: California Public Utilities Commission Last Mile Federal Funding Account, https://federalfundingaccountmap.vetro.io/map#5.65/37.393/-116.87

## D.    KEY RECOMMENDATIONS

### 1) Expand the City's Fiber Backbone Loop to Provide Greater Access for the Community and Businesses.

The City can complete a backbone loop necessary for a qualified operator to provide competitive, reliable retail internet services to the community and business at an estimated cost of $13.5 million. The backbone loop design would also connect remaining City facilities and assets – including parks, water tanks, and lift stations. Construction costs can be further reduced to $10.4 million through lease or use of third-party fiber, or broken into more than two phases, depending on project funding availability.

### 2) Initiate Design & Engineering for Phase 1, 1B, & 2.

Ensuring the City can submit a competitive SB 156 Last Mile grant application and/or a CASF Infrastructure Account grant application will necessitate completing the full design engineering for Phases 1, 1B, & 2. Based on discussions with the City's Public Works Department around staffing capacity, the City should plan to begin with Phases 1 and 1B. This will allow the Cit to use its allocation of SLFRF funds before the statutory deadline for those funds expires.

Design engineering will include field surveying and verification, identifying additional usable assets that may not be recorded in City maps, value engineering to reduce the overall cost, confirming the final routing and design, and compiling a Bill of Materials. This work will demonstrate to the State and the CPUC that the City is "shovel-ready" to begin construction.

### 3) Solicit & Negotiate a Public Private Partnership.

The City is in a favorable position to leverage an expanded, looped backbone network through a public-private partnership, which could secure: (a) the qualified network operator needed for grant eligibility, (b) all or part of the required match funding for SB 156 Last Mile grant funds, (c) a partner willing to construct all or a portion of Phases 1, 1B, & 2 in exchange for rights to sell retail internet services utilizing City fiber, or a combination thereof. The City should publicly solicit ISPs for a partnership through an RFP process, select a qualified partner, and negotiate a partnership agreement in concert with a SB 156 Last Mile grant application. City IT staff should lead this effort, and consult with applicable City departments and Council per City purchasing policies.

# 4) Pursue Competitive Grant Opportunities through SB 156 Last Mile Federal Funding Account and the CASF Broadband Infrastructure Grants.

The State of California and the CPUC have designated more than $22 million in broadband construction grant funding for San Luis Obispo County through the SB 156 Last Mile grant process, and CASF allocates $150 million annually (through 2032) for broadband infrastructure grants, which both aim to connect unserved and disadvantaged households with high-speed fiber services. The City is eligible for both of these funding sources and should pursue these grants to cover the backbone loop design construction costs of $13.5 million and for the marginal costs to connect CPUC-designated unserved households and other at-need neighborhoods. The City should identify which concentrations of unserved locations will be included in the initial grant application based on the CPUC maps and the proximity to the proposed Conceptual Network Design. Other municipalities – and the County itself – will be competing for these grant funds, which will require the City to demonstrate commitment, completed planning, and construction readiness in order to secure a grant award.

# 5) Coordinate Joint Build for CIP and Utility Projects

Coordinating infrastructure expansion through joint utility work is the most cost-effective strategy to expand City broadband assets, particularly into under-served areas and new developments. Effective coordination on all projects that require excavation will ensure that all utilities—public and private—can economically expand their broadband footprint in San Luis Obispo. The City can incrementally and opportunistically build its own fiber network, connect key City facilities, and enable Smart City applications. The full CIP analysis can be found in the full plan document, starting on page 57.

# 6) Apply Development Conditions to new Projects to Expand Public and Private Fiber Assets

The City should implement favorable development conditions through City Council action and ordinance that requires developers on new projects to place fiber/conduit to ensure faster, more efficient provision of fiber-optic based next generation broadband services.

# 7) Explore a Broadband Infrastructure Fund to finance future smart city applications and network expansion

Many cities create dedicated funds for revenues generated from leases of City assets by private telecommunications companies. A dedicated fund with ongoing revenues—separate from the General Fund—prioritizes new City/public technology deployment for future build opportunities (funding for fiber network expansions through incremental builds/joint trench coordination or for locating new smart city devices concurrent with expansion of private wireless connectivity).

Creating a fund helps plan strategically for the years to come when use of public assets/ROW will increase and could create significant new City revenues. The unscheduled nature of joint trench/dig once opportunities means cities need a dedicated funding source outside of the normal budgeting process to take advantage of open trenches.

The City should consider holding revenues generated by the City through lease or other agreements for use of City broadband infrastructure – including cellular antennas on street light poles, placement of cabinets or vaults in the ROW, leasing land or towers for cell tower installation, dark fiber or conduit occupancy leases, or other telecom-related/ROW revenue generating activities – in a separate account to offset maintenance and expansion costs.

# 8) Adopt broadband infrastructure and fiber-optic standards.

The City should adopt standards and industry best practices to ensure City investments are future proof, adaptable, and support multi-vendor interoperability over the expected 30-50 year life cycle. Broadband infrastructure should include strategically placed access points, high-count (288+ strand) fiber optic cable, and installation standards for depth, separation from other utilities, and allowing new installation technologies (e.g., microtrenching) when appropriate to ensure future builds are simple, cost-effective, flexible, and durable.