

**Fiber Optic Master Plan:
Response to Comments & Report Change Log**

Work Session Comment	Response
<p>1. <u>Add lateral connections to BART.</u> As I mentioned yesterday, BART runs an extensive railside dark fiber network throughout the Bay Area. They already lease excess capacity to telecommunications providers, so connecting the new Hayward fiber backbone to one or both BART stations would be a very beneficial resource that would enable your private partners to connect the Hayward fiber network to the global internet. I believe BART's rates may potentially be more competitive than rates from carriers located at the proposed 25070 O'Neil Ave site. Having both connections (25070 O'Neil and BART) would add a lot of flexibility and redundancy to the Hayward fiber network.</p>	<p>The cost to connect BART is approximately \$60,000 (similar distance as to 25070 O'Neil).</p> <p>The reference to the O'Neil connection was the first connection to complete in order to allow early dark fiber connections with the existing fiber before the proposed FTTP in the business park is implemented.</p> <p>This information and explanation has been added to the report.</p>
<p>2. <u>Lack of Clarify in the Report.</u> While the report was chocked full of great information, it's not structured in a way that makes it clear what projects are being proposed. It appears that there are three elements - 1. existing City-owned fiber, 2. the new EDA-funded backbone fiber construction in 2017, and 3. a potential FTTP deployment to reach each business. The report should be structured in a way that makes it very clear that the recommended FTTP project is separate from the EDA-funded backbone project which will likely happen later this year.</p>	<p>The FTTP is incremental to the EDA-funded backbone, as is clearly stated in the executive summary, sidebars, and throughout the report. We have made efforts to clarify this further.</p>

<p>3. <u>Streamline Permitting Processes.</u> I recommend adding a review and streamlining of the existing City permitting processes and requirements for fiber construction in Hayward. Ensure that the process is quick and predictable for outside providers who want to build fiber networks in Hayward. Doing so would benefit carriers who are considering deploying additional fiber in any area in Hayward - not just within the Industrial Corridor. One key point would be the adoption of a Master Encroachment Permit program for communications providers deploying fiber optic networks within the City. MEP programs tend to fit communications deployments well due to the frequent nature of these smaller repetitive projects spread throughout the City.</p>	<p>This is part of an overall dig-once policy, and we have added a statement.</p> <p>We advise being cautious of requests to have a master permit for any provider to install fiber.</p>
<p>4. <u>Additional Fiber Strands.</u> Consider constructing the potential FTTP network to support more than 1 fiber strand per subscriber. Doing so would enable businesses to subscribe to more than one carrier at a time (perhaps purchase internet from one carrier and phone from another). The cost to add additional strands of glass is minimal.</p>	<p>The design is for an FTTP GPON network with a 16-1 splitter that will support a 100 percent take rate with strand capacity to provide direct connections to some businesses.</p> <p>Having a dedicated stand or multiple strands to each business does not make sense, as the network would then be required to have a few thousand stands along some routes.</p> <p>The model is not one that any ISP can lease point-to-point fiber to all businesses.</p>

<p>5. <u>Additional Conduit.</u> Consider installing extra conduit for leasing to communications providers. When pulling your new conduit underground, pull an additional 2-3 conduits for future use. These conduits are typically 1.25" to 2" in diameter. Future providers would then have the ability to pull their own fiber optic cable through these excess conduits in addition to whatever the city installs for itself, ensuring long-term system flexibility. The cost to pull a few additional conduits during the initial phase is relatively minimal.</p>	<p>The construction method assumed in our engineering design is directional boring, not trenching. With a trench, installing additional conduit does not greatly increase the cost. However, the cost to install additional conduit with a directional boring construction method is not minimal, as the boring size would have to be greatly increased. The design uses two-inch conduit.</p>
<p>6. <u>Contracting Services.</u> Consider contracting all operational and maintenance duties to your private partner and eliminate the proposed city staff requirement (2-3 FTEs) altogether. Your private partner will already be very involved with the daily network operation, and therefore it seems more efficient for the private partner to take responsibility for all operational and maintenance aspects as well. This would lower costs to the City (totaling \$10.5M over 20yrs as included in the models from CTC), and likely allow the City to modify the financial model slightly in favor of lower the per-passing lease rate from \$40/passing/month to \$20-\$25/passing/month.</p>	<p>As indicated in the report, we recommend the City use a combination of internal staff and contracted services. Certain functions, such as recordkeeping, are best kept within the City to ensure quality control.</p> <p>Use of a contractor rather than internal labor merely shifts the costs; it does not eliminate them.</p> <p>Also, expecting multiple parties that lease fiber to manage the fiber maintenance is simply not practical.</p>
<p>7. <u>Contracting for Lateral Construction.</u> The consultant proposed various options for the construction and ownership of lateral connections from the City's network to connect each of the subscribing businesses. I recommend that the City install and own these lateral connections. Doing so will ensure the City's network usability long term. Having a private partner install and own these lateral connections would not make sense. City</p>	<p>The RFI will fine-tune the business model. Either the City or the party that leases the dark FTTP network could own the fiber drop cable.</p> <p>This comment appears to assume that the City will be leasing fiber to many providers. The model is leasing fiber to a single provider that will then lease the FTTP network to serve businesses. Then, on a case-by-case basis, other providers could lease point-to-point</p>

<p>ownership of the fiber end-to-end would be the lowest risk for the City long-term since it would ensure a completely usable network through which it can reach the end users without regard to another entity owning and controlling the last 300ft to reach each customer. This also makes sense given the common multi-tenant nature of businesses in the Industrial Corridor. In an example scenario where one tenant in a building signs up for service initially, we wouldn't want them to have to bear the cost of connecting the building while future tenants in that building would receive their connection for a much lower cost (since we would have already connected their building at that point). Anything other than City-installed lateral connections may slow down the adoption of the service by businesses who wish to wait and let others bear the initial expense of connecting their building to the network. I recommend that the City pre-negotiate a contract with a communications construction company to install these laterals as customers subscribe to the services ("on-demand"). Once a customer orders service, the private network operator would notify the City's construction contractor to connect the subscriber's building to the network. This construction contractor would then install a lateral connection to reach the customer's building, and subsequently provide any necessary documentation to the City.</p>	<p>fiber.</p> <p>The RFI will also fine-tune the business model to encourage or require the provider to offer wholesale services.</p>
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<p>8. <u>Number of Businesses.</u> The consultant mentioned that there are 5,100 businesses in Industrial Corridor and 2,550 passings. Appendix A defined passings as "potential customer address (e.g., an individual home or business)". The definition of "passings" in Appendix A should be corrected to reflect "each building passed" or "each parcel passed".</p>	<p>Appendix A has been updated.</p>
<p>9. <u>Internal City Communications Services.</u> The City should consider procuring its own data and telecommunications services from the private network operator. It's very likely that the City would be able to obtain a much higher speed connection to the internet at a lower rate. These recurring operational expense savings should be taken into consideration when analyzing the business models for this project. In addition, the City would likely benefit from the construction of this network by enabling the use of new technologies for the City that wouldn't have otherwise been implemented. Examples include connecting and coordinating more City traffic lights, adding traffic cameras, etc.</p>	<p>We disagree with this assertion. Based on our experience, we find that—in most cases—the City can meet its own needs over a City-owned fiber network for less cost than obtaining services from a private provider. The savings increases as the required circuit speeds increase for City locations.</p>

<p>10. Expedite Existing Dark Fiber Availability. The City should consider expediting the process of making its <i>existing</i> fiber network assets available for lease. The City's current excess fiber capacity has value and could potentially serve to encourage broadband deployment in Hayward. As the City constructs more fiber assets, these would then also be made available for leasing by private carriers. There is no need to wait for the EDA-funded fiber backbone to be complete before making <i>existing</i> excess fiber capacity available for lease.</p>	<p>The set of recommendations (including the connection to O'Neil) states this. It is important, however, to get the "house in order," including record keeping, clarified and streamlined policies, and so on, before jumping into fiber leasing.</p>
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