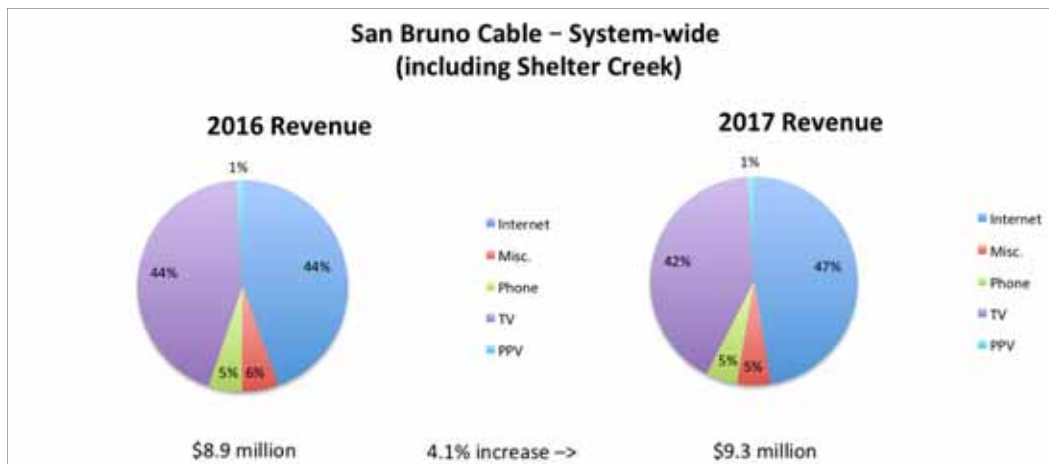


**To:** Connie Jackson, City of San Bruno  
**From:** Steve Blum, Tellus Venture Associates  
**Date:** 6 April 2018  
**Subject:** San Bruno Fiber to the Home upgrade analysis

In 2017, San Bruno Cable completed a fiber-to-the-home (FTTH) upgrade in the Shelter Creek complex, replacing hybrid fiber coaxial cable (HFC) plant with a fiber optic-based system. This upgrade was carried out over the first half of the year, with full FTTH service, and billing practices, commencing in August. Tellus Venture Associates analyzed the business metrics from Shelter Creek in 2017, and compared them with the 2017 metrics from the remainder of the San Bruno Cable system, and with the prior year's metrics from Shelter Creek. The results were then used to do a "what if" analysis of the potential benefits and drawbacks of upgrading the entire San Bruno Cable system to full FTTH capability.

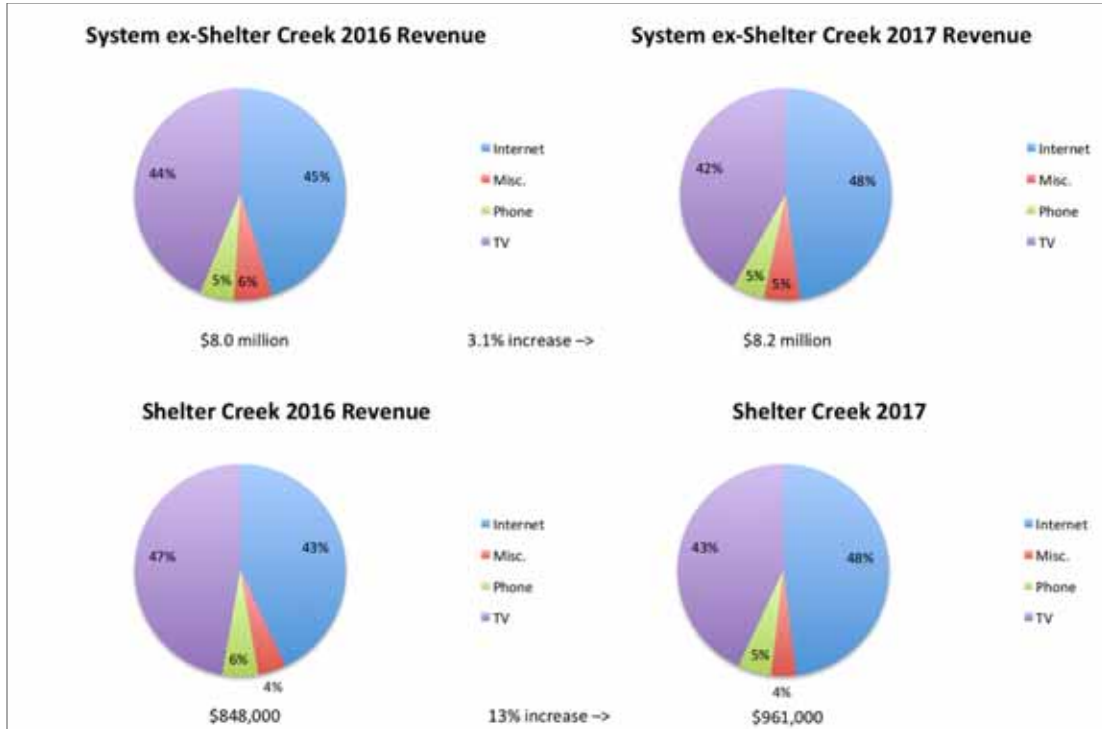
### Total Revenue

System-wide, including Shelter Creek, San Bruno Cable's total annual revenue increased 4.1% from 2016 to 2017, growing from \$8.9 million to \$9.3 million. This growth includes a 5% systemwide rate increase introduced in August 2017. Virtually all of the growth can be attributed to Internet service subscriptions. Television subscription, telephone service and miscellaneous revenue all declined slightly, while pay per view television review was up slightly.



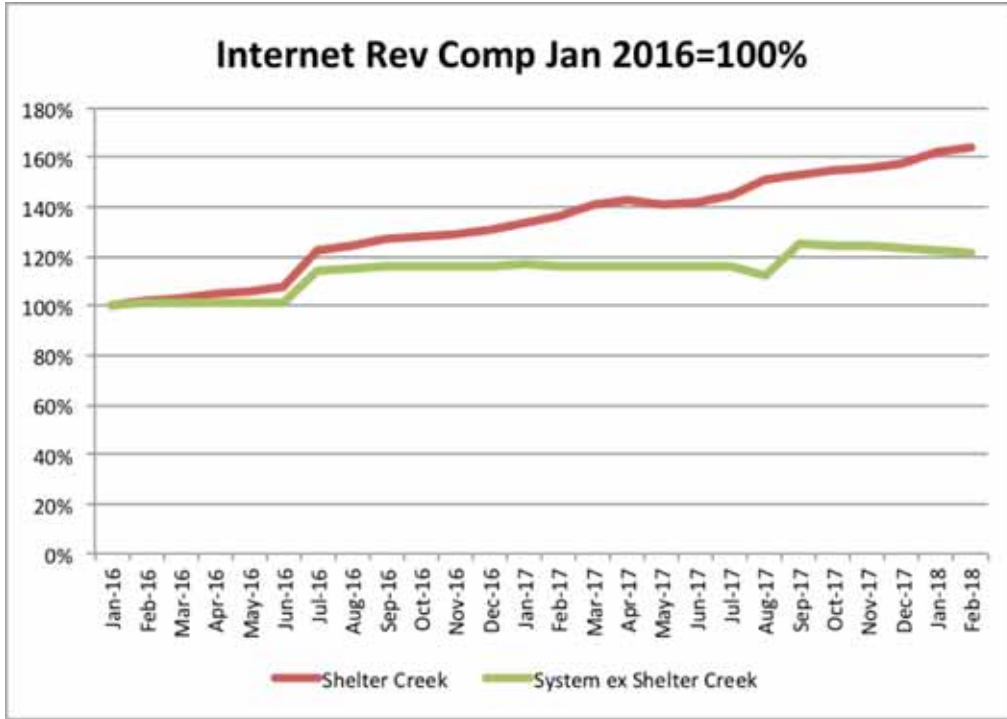
There was a significant difference, however, between the revenue trends in Shelter Creek and the remainder of the system. Total revenue increased 13% in Shelter Creek in 2017, versus only a 3.1% increase in the rest of the system. Internet service revenue increased everywhere, although Shelter Creek's gains were proportionately greater. Television service revenue decreased slightly in the rest of the system, but grew in Shelter Creek.

On a monthly basis, Shelter Creek subscription revenue (everything except pay-per-view) has grown steadily since January 2016, with only a couple of down months. Gains from annual rate increases have been retained. The rest of the system shows a much different pattern, however. Revenue increased sharply in the months following annual rate increases, and then slowly declined afterwards. Over the two year period, total monthly revenue at Shelter Creek increased 30%, while the remainder of the system saw only a 7% increase, which is less than the total of the two rate increases during the period.



Monthly television service revenue increased 7% in Shelter Creek since January 2016, with little change since the completion of both the FTTH upgrade and the general rate increase in August 2017. The rest of the system experienced a 4% decline in monthly television subscription revenue over the same period, with gains from annual rate increases offset by overall revenue declines in both 2016 and 2017.

Monthly Internet service revenue increased 64% since January 2016 in Shelter Creek and continues to grow steadily. It is a different story in the remainder of the system, where monthly Internet service revenue grew 21% over the same period, but has shown a steady decline since July 2017, except for August 2017 when an annual rate increase came into effect.

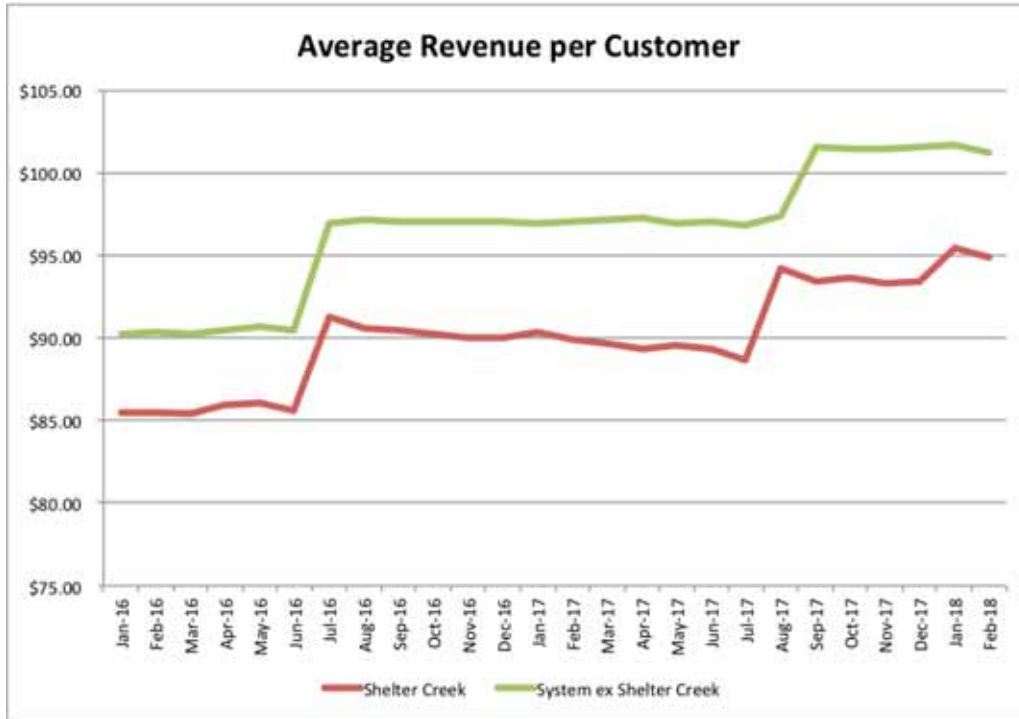


Some of the Internet service revenue increase in Shelter Creek is attributable to subscribers taking advantage of the higher service levels made possible by the FTTH upgrade. In August 2017, the Internet 3 (300 Mbps) and Internet 4 (1 gigabit) packages accounted for 0.2% of Internet service revenue in Shelter Creek. That percentage has grown at an accelerating rate, reaching 3.2% of revenue in February 2018.

**Average Revenue per Customer**

Following completion of the FTTH upgrade, the monthly average revenue per customer (ARPC), excluding pay per view revenue, grew in Shelter Creek from \$88.70 in July 2017 to \$94.82 in February 2018, with a slight upward trend since the August 2017 rate increase. The rest of the system has an even greater ARPC – \$101.26 in February 2018 – but has seen a slight downward trend over the same period.

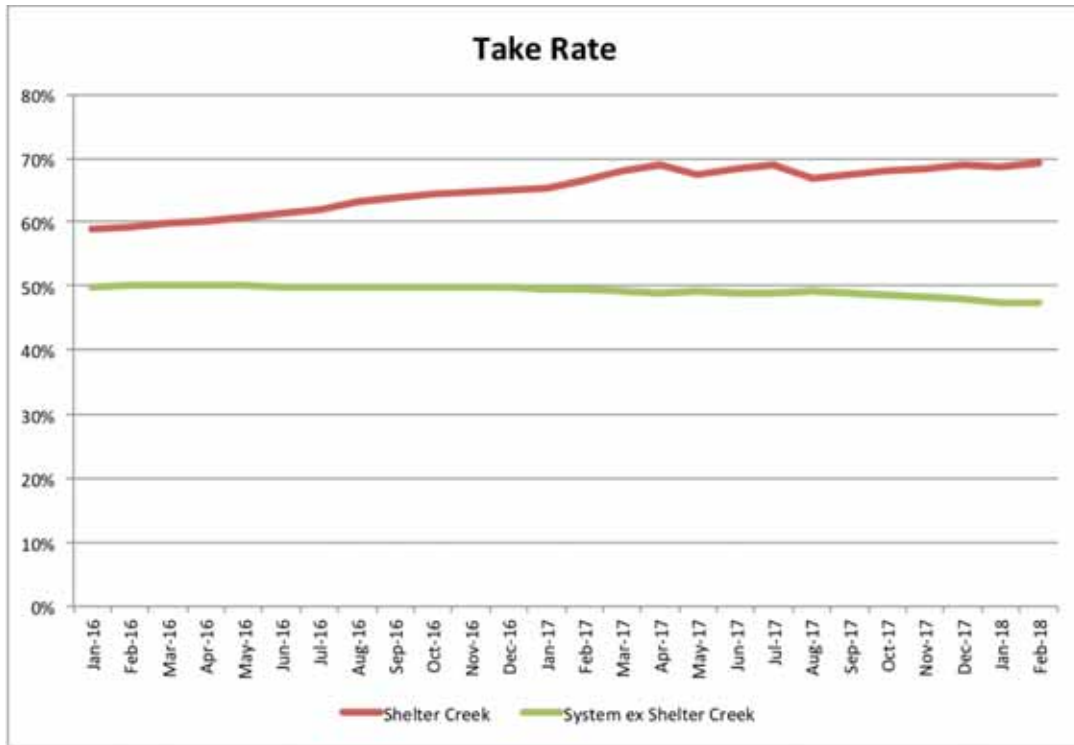
Both Shelter Creek and the rest of the system have seen a marked shift in the proportion of ARPC that is attributable to Internet service, and a corresponding decrease in the share that is attributable to television service.



In the rest of the system, the share of ARPC attributable to Internet service grew from 43% in January 2016 to 49% in February 2018, while television service's share decreased from 45% to 41%. This pattern was even more pronounced in Shelter Creek, where the share of ARPC attributable to Internet service grew from 40% to 51% and television service's share decreased from 50% to 41% over the same period.

**Market Share**

Since January 2016, San Bruno Cable increased its reach in Shelter Creek from 59% to 69% of total homes (subscribing to any kind or level of service), with this "take rate" flat since the completion of the 2017 FTTH upgrade. In the rest of the system, this share has declined from 50% to 47% over the same period.

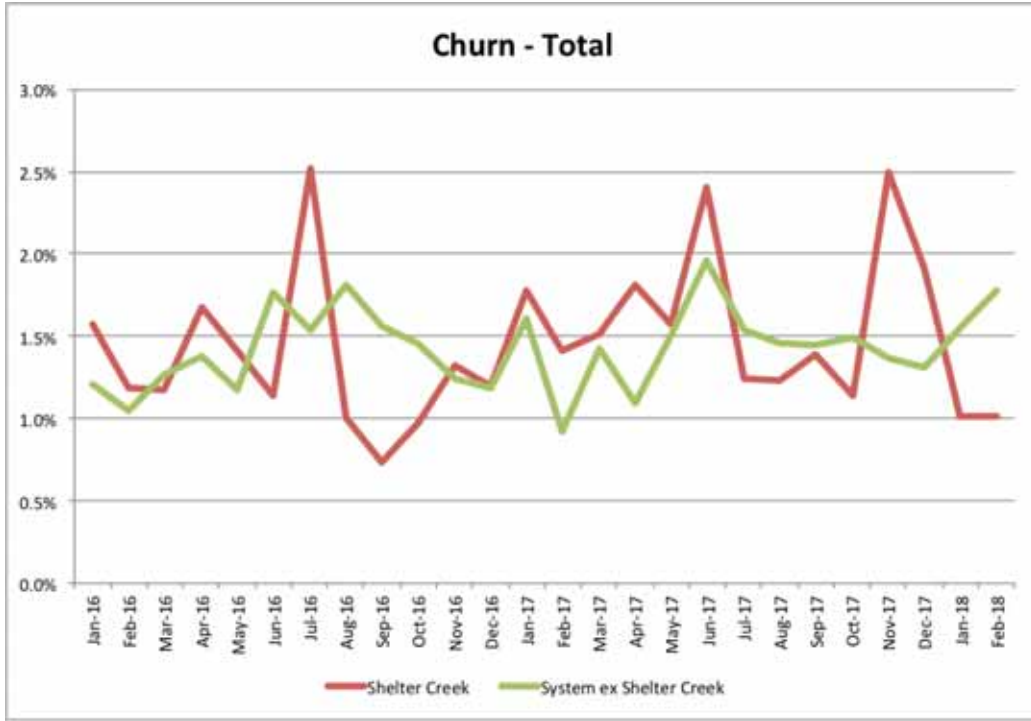


## Churn

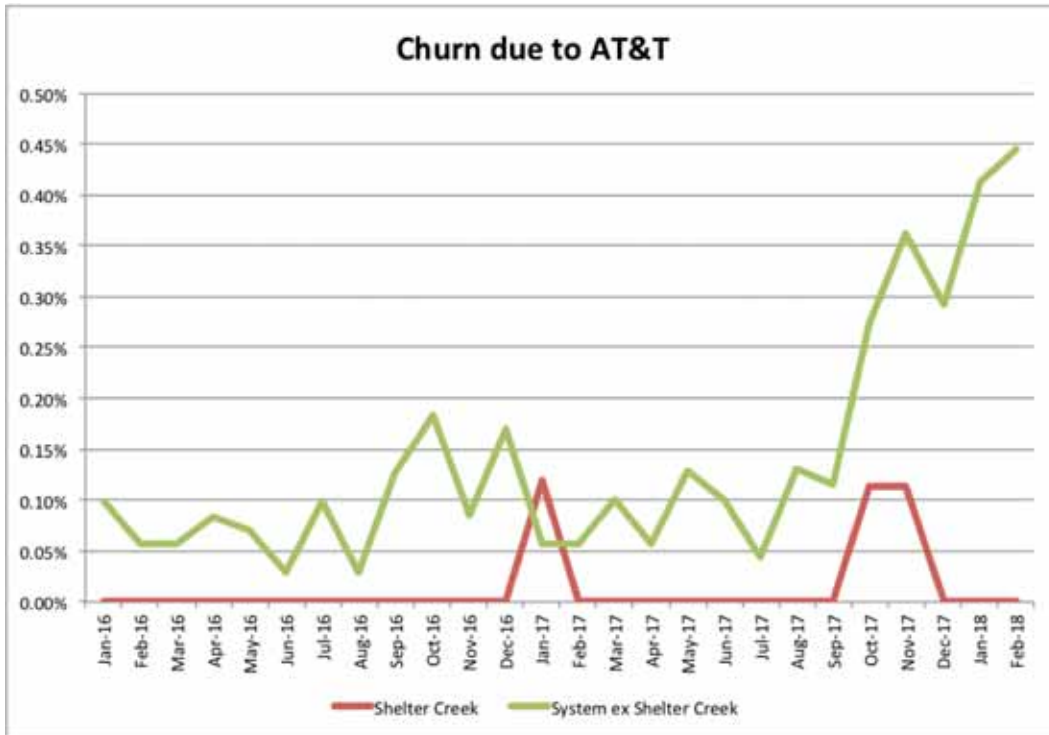
Churn is the percentage of subscribers who disconnect service in a given period. It is one of the key indicators of a subscription-based business' health. Some churn is normal and unavoidable. There is a natural churn rate – usually reckoned in the 1.0% to 1.5% per month range – that can be attributed to unavoidable disconnects due to significant life events such as moving to a new home or losing a job. When the churn rate climbs above that level, there is cause for concern. It indicates that either the service provided is perceived as less valuable or the level of competition is higher, or both. In either case, it is a red flag that the business is deteriorating.

The churn rate in Shelter Creek has varied greatly since January 2016. This high level of variance can be largely attributed to the relatively low number of total subscribers – small changes in absolute subscriber numbers, for example due to seasonal effects, can produce larger percentage changes. Overall, however, the churn rate in Shelter Creek has decreased from 1.6% in the January-February 2016 period to 1.0% in the January-February 2018 period. Prior to the full implementation of FTTH service, the churn rate in Shelter Creek was generally higher than that experienced in the rest of the system, but has trended generally lower since then.

San Bruno Fiber to the Home Upgrade Analysis



The churn rate in the rest of the system has trended upwards since January 2016, remaining at or above the 1.5% per month range for 8 of the past 14 months.



The most dramatic change has been in the number of former subscribers who have given competition from AT&T as the reason they are disconnecting service. Prior to October 2017, churn attributable to competition from AT&T hovered around the 0.1% per month level. Since October 2017, that figure has ballooned to .45% per month, or roughly one-third of the total churn. On the other hand, churn attributable to AT&T has been negligible in Shelter Creek, with only 3 subscriber disconnects attributable to AT&T between January 2016 and February 2018.

### **Business Metrics Comparison**

Shelter Creek is generating significantly better revenue growth than the rest of the system – 13% versus 3%, year over year. The share of revenue attributable to Internet service is growing throughout the system, but this growth is more pronounced in Shelter Creek, where higher level service packages are available and where new and more modern plant can be expected to provide more reliable service. This superiority in quantity and quality of services appears to explain most, if not all, of the difference in basic business metrics between Shelter Creek and the rest of the system: an increasing market share, an upward trend in ARPC and a downward trend in churn rate in Shelter Creek, versus a decreasing market share, a downward tilt to ARPC and increasing churn elsewhere.

The difference in churn figures are particularly significant. Churn has been reduced to natural levels in Shelter Creek and AT&T has had virtually no competitive impact. This results contrasts sharply with the higher overall churn rate in the rest of the system, and the growing subscriber losses due to competition from AT&T.

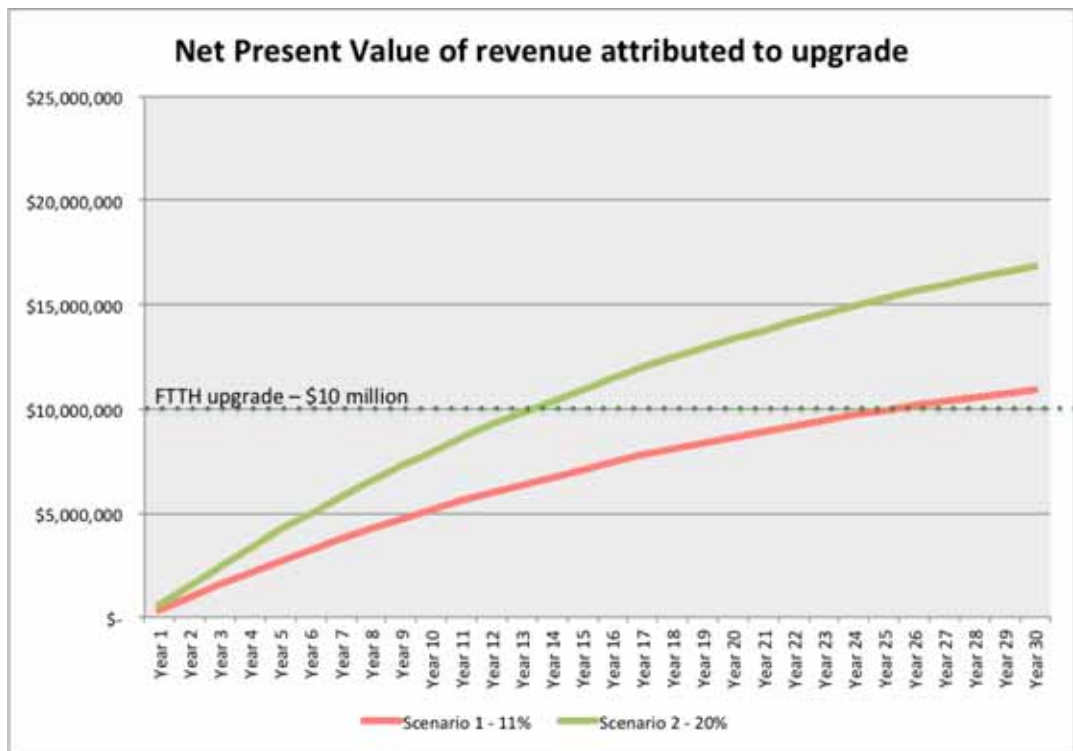
### **FTTH Upgrade Analysis**

According to San Bruno Cable staff, the additional cost of a full, citywide FTTH upgrade is \$10.3 million. The key question is whether this cost can be offset by corresponding gains in net revenue. To answer the question, the following assumptions were made:

1. The percentage gains in Internet revenue experienced in Shelter Creek would be mirrored in the rest of the system.
2. The decline in television revenue in the rest of the system would flatten out within two years, as has been seen in Shelter Creek.
3. Pay per view revenue remains flat.
4. The interest rate either paid or forgone by the City (i.e. the cost of capital) is 4.5%. No assumptions were made about the source of funds.
5. The cost of delivering the increased Internet service sold to subscribers is proportional to revenue, e.g. a 10% increase in retail Internet subscription revenue would result in a 10% increase in wholesale Internet bandwidth expense.
6. Other variable costs would increase at a rate of 5% of revenue.

These assumptions are conservative. Arguably, the cost of Internet bandwidth would not increase as rapidly as Internet revenue. Additionally, no assumptions were made regarding a decrease in operating costs due to the upgrade, which has been estimated at 5% by staff. No assessment was made of the DOCSIS 3.1 alternative either (DOCSIS 3.1 is an advanced hybrid fiber-coax technology that would provide some, but not all, of the benefits of a full FTTH upgrade). All projections were run using constant 2018 dollars. In other words, no assumptions were made regarding inflation rates, except that any inflation experienced would apply equally to revenue and expenses.

Two scenarios were run. In the first, the total (not annual) Internet revenue increase was assumed to be 11% and phased in over two years, equal to the gain experienced in Shelter Creek since the completion of the full FTTH upgrade and the implementation of the annual rate increase in August 2017. In the second, the Internet revenue increase was set at 20%, which relies on an assumption of continued growth in Shelter Creek Internet revenue. This higher figure is less than the 30% increase in Internet revenue experienced in Shelter Creek over the entire upgrade period, and in that regard can be considered conservative.



The results of the two scenarios show that, given the assumptions, if systemwide Internet revenue increases by 11%, a \$10.3 million FTTH upgrade would be repaid within 27 years and a 20% Internet revenue increase would result in payback within 14 years. Both of those time spans are less than the expected life of an FTTH system, which can be expected to operate at a level sufficient to meet or exceed market demand for at least 30



years, assuming routine maintenance and replacement of active components continues as it has with the existing HFC system.

### **Risk Factors**

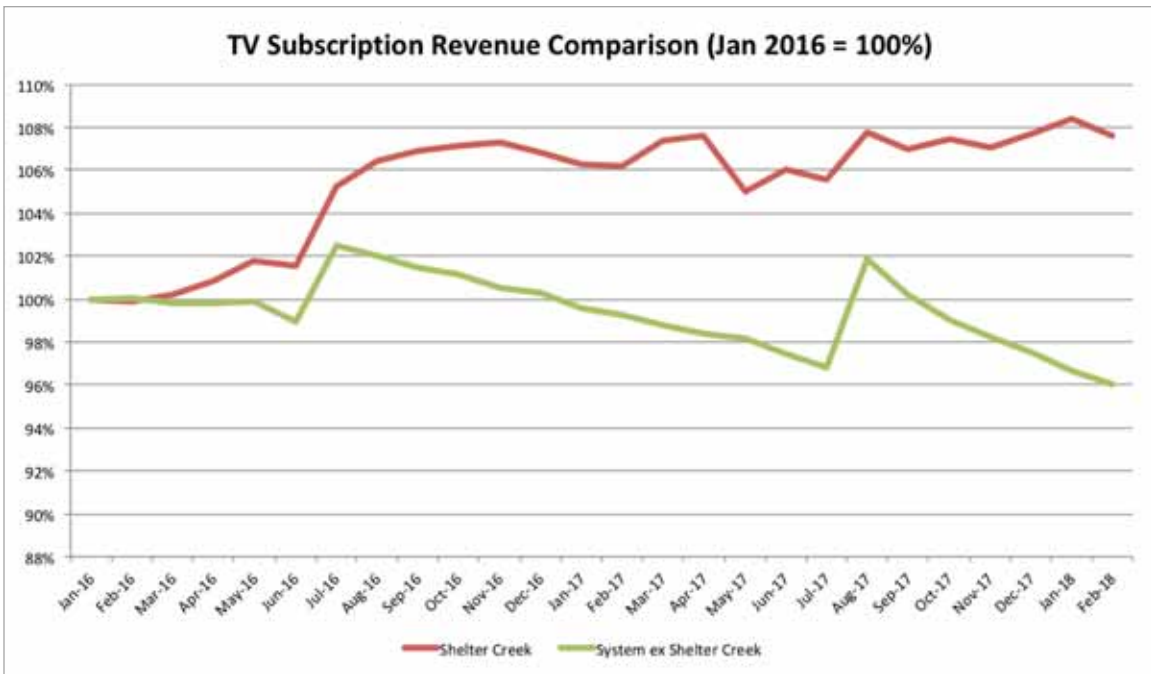
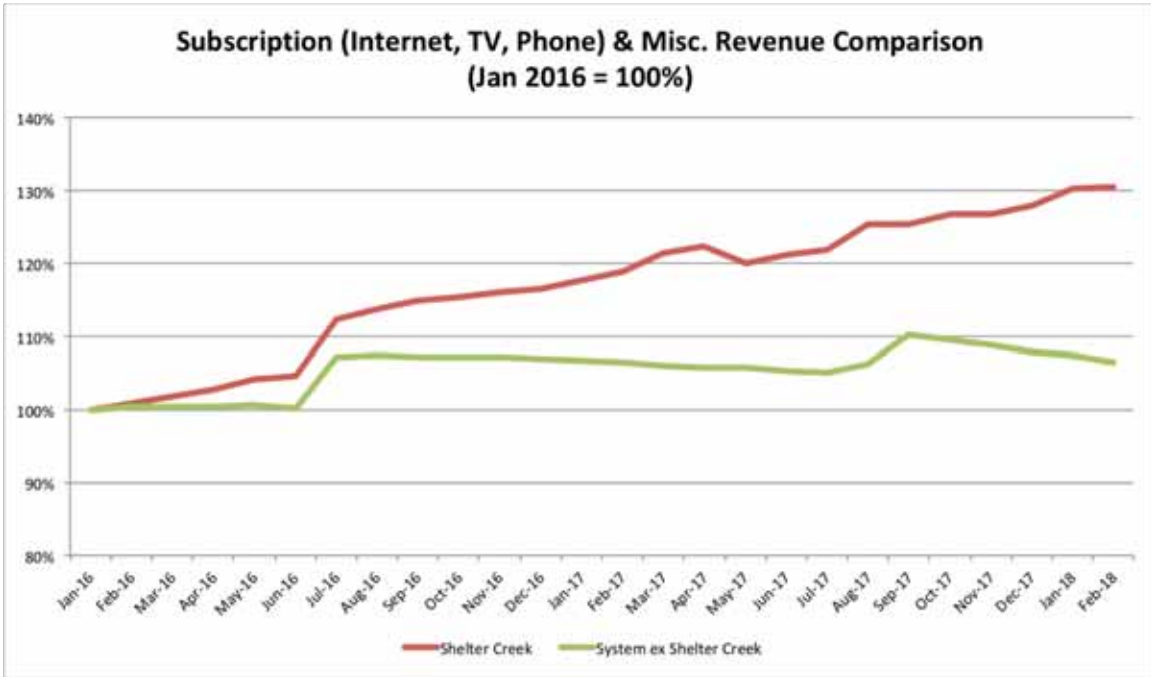
There is no guarantee that an FTTH upgrade will produce any particular result. The decline in traditional subscription television revenue might not be halted, or be offset by gains from new video services made possible by FTTH technology. Although there is clear evidence that an FTTH upgrade can generate increased Internet service revenue, it is also possible that costs will increase faster than anticipated or market forces will drive down the price of Internet subscriptions. An increase in the City's cost of capital could also have a significant negative effect on results.

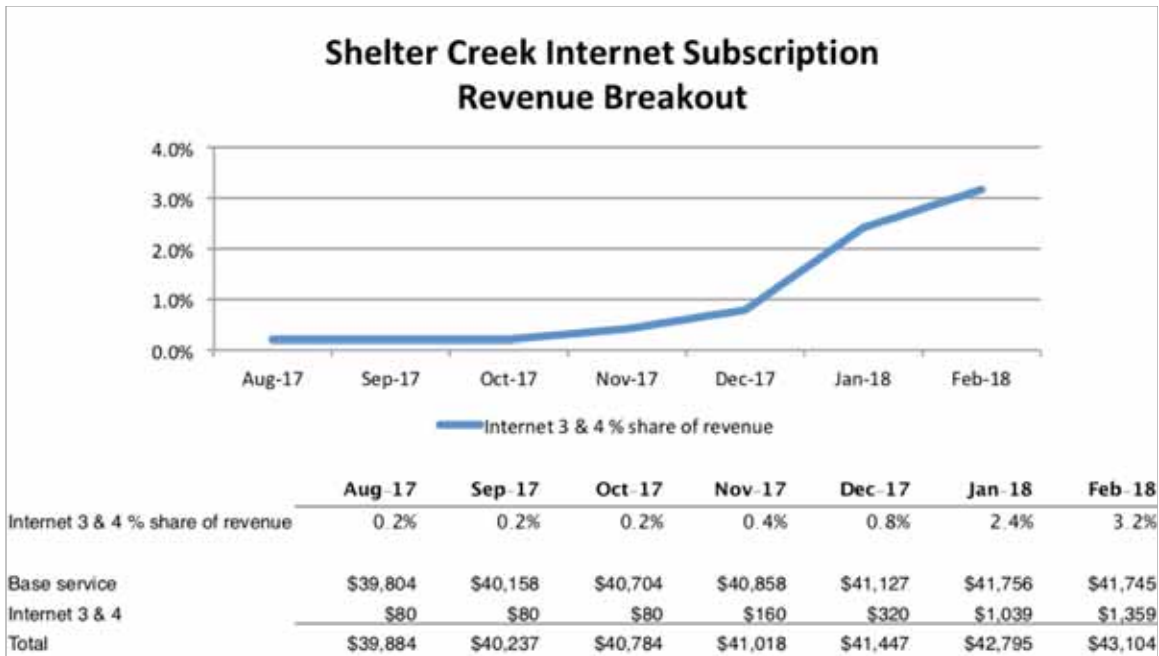
Another risk factor is the competition posed by AT&T, which is also pursuing a fiber upgrade of undetermined magnitude in San Bruno. AT&T will respond to any competitive moves by San Bruno Cable. However, this risk factor is already largely present, as illustrated by the increased churn rate attributable to AT&T. The risk of pursuing a citywide FTTH upgrade should also be weighed against the risk of doing nothing.

### **Conclusion**

Internet service revenue in Shelter Creek has increased 30% over the FTTH upgrade period, and 11% just in the months since the upgrade was completed, while the decline in television revenue has flattened out. Similar results for the system as a whole would generate sufficient net revenue to cover the cost of the upgrade within its lifespan, assuming costs, including the cost of capital, do not rise disproportionately. Based on these results from Shelter Creek, a citywide FTTH upgrade is feasible.

Appendix A – Additional Charts





San Bruno Fiber to the Home Upgrade Analysis

