

Case Study Title: Google Fiber Kansas City
Client: Bernstein Research
Staff: Mike Wilson, Jim Stegeman
Date: 2014
Model: Gigabit Cities Model (GBCM)

This study, commissioned by Bernstein Research discusses how Google is building a fiber network in Kansas City to offer consumers broadband Internet access and pay TV services. In this report CostQuest data metrics are used to discuss the demographic characteristics of the area covered by Google's build out, estimate the cash costs Google will incur to build its network, passing 149K homes at about \$84 million, and give investors a sense of how much it would cost Google to extend its footprint. The following are some high level findings of the report:

Highlights:

- One key objective for Google in Kansas City is to determine whether or not it can profitably become a facilities-based provider of broadband and pay-TV services. As we have written recently, we believe Google Fiber has two related objectives: first, Google is seeking to figure out whether or not, or under what conditions, it can make money as a facilities-based provider of broadband and pay TV services; second, it is an opportunity for Google to test new applications, new ad formats and delivery models (e.g., targeted TV ads) and to get further insight into consumer behavior. We do not believe this effort will have any significant impact on regulation or legislation.
- Google is building a fiber network in Kansas City covering 149 thousand homes in neighborhoods with very different demographic characteristics. In the first phase of its build out, Google will pass 149 thousand households, 57 thousand in Kansas City, KS and 92 thousand households in Kansas City, MO. The demographic make-up of the neighborhoods targeted by Google varies significantly, with some neighborhoods with annual median income well above \$100K, while others have median income below \$40K.
- Google has three differentiated consumer offers including pay TV and broadband. Google has three service offers in Kansas City. A high-speed broadband offer at \$70/month plus a \$300 install fee (waived for customers signing a 2-year contract) for 1Gbps symmetric² broadband Internet service. A \$120/month double-play bundle including the 1Gbps and pay-TV with a linear content line-up very similar to what incumbent providers offer, and a low-speed broadband offer supporting download speeds of 5 Mbps and upload speeds of 1 Mbps for a one-time installation fee of \$300.
- They estimate that Google will spend \$84 million to pass (without connecting) the 149 thousand households in its first-phase build out area, with \$38 million in Kansas City, KS and \$46 million in Kansas City; our estimate is based on a detailed, street-by-street network design analysis of both areas. This network will include an estimated total of 7.2 million plant feet. Exhibit 7 and Exhibit 8 provide a visual representation of the custom-designed Kansas City network we have used as a proxy for the Google build out. Because Kansas City, MO has higher linear density of homes, or more homes per miles of plant, we estimate that the cost per home passed in Kansas City, MO will be lower, or \$500, compared to Kansas City, KS, which we estimate at \$674.

Further details can be found in the following report.

Google Fiber - How Much Will Google Spend to Overbuild Kansas City? How Much Would it Cost to Expand?

Ticker	Rating	CUR	5 Apr 2013 Closing Price	Target Price	TTM Rel. Perf.	EPS			P/E			Yield
						2012A	2013E	2014E	2012A	2013E	2014E	
GOOG	O	USD	783.05	1000.00	12.7%	32.32	46.68	48.37	24.2	16.8	16.2	NA
SPX			1553.28			102.83	110.61	123.10	15.1	14.0	12.6	2.1%

O – Outperform, M – Market-Perform, U – Underperform, N – Not Rated

Highlights

Google is building a fiber network in Kansas City to offer consumers broadband Internet access and pay TV services. In this report we discuss the demographic characteristics of the area covered by Google's build out, estimate the cash costs Google will incur to build its network, passing 149K homes at about \$84 million, and give investors a sense of how much it would cost Google to extend its footprint.

- One key objective for Google in Kansas City is to determine whether or not it can profitably become a facilities-based provider of broadband and pay-TV services.** As we have written recently¹, we believe Google Fiber has two related objectives: first, Google is seeking to figure out whether or not, or under what conditions, it can make money as a facilities-based provider of broadband and pay TV services; second, it is an opportunity for Google to test new applications, new ad formats and delivery models (e.g., targeted TV ads) and to get further insight into consumer behavior. We do not believe this effort will have any significant impact on regulation or legislation.
- Google is building a fiber network in Kansas City covering 149 thousand homes in neighborhoods with very different demographic characteristics.** In the first phase of its build out, Google will pass 149 thousand households, 57 thousand in Kansas City, KS and 92 thousand households in Kansas City, MO (**Exhibit 1** and **Exhibit 2**). The demographic make-up of the neighborhoods targeted by Google varies significantly, with some neighborhoods with annual median income well above \$100K, while others have median income below \$40K (**Exhibit 3** and **Exhibit 4**).
- Google has three differentiated consumer offers including pay TV and broadband.** Google has three service offers in Kansas City (**Exhibit 5**). A high-speed broadband offer at \$70/month plus a \$300 install fee (waived for customers signing a 2-year contract) for 1Gbps symmetric² broadband Internet service. A \$120/month double-play bundle including the 1Gbps and pay-TV with a linear content line-up very similar to what incumbent providers offer, and a low-speed broadband offer supporting download speeds of 5 Mbps and upload speeds of 1 Mbps for a *one-time* installation fee of \$300.
- We estimate that Google will spend \$84 million to pass (without connecting) the 149 thousand households in its first-phase build out area,** with \$38 million in Kansas City, KS (**Exhibit 6**) and

¹ [Weekend Media Blast: Google Fiber - Is Kansas City the Prelude to a Broader Roll Out?](#)

² Symmetric broadband means that the data speed to download and upload content is the same. Most consumer broadband access offers in the market today offer highly asymmetrical speeds, with download speeds much higher than uploads, in large part because of significant and likely insurmountable technological limitations of the technologies used today to support consumer broadband access.

\$46 million in Kansas City; our estimate is based on a detailed, street-by-street network design analysis of both areas. This network will include an estimated total of 7.2 million plant feet. **Exhibit 7** and **Exhibit 8** provide a visual representation of the custom-designed Kansas City network we have used as a proxy for the Google build out. Because Kansas City, MO has higher linear density of homes, or more homes per miles of plant, we estimate that the cost per home passed in Kansas City, MO will be lower, or \$500, compared to Kansas City, KS, which we estimate at \$674 (**Exhibit 9**, **Exhibit 10**).

- **We estimate the incremental cost to acquire and connect each broadband-only home at \$464, and at \$794 for each double play (broadband and pay TV) home (Exhibit 11 and Exhibit 12).** To reduce labor costs, Google will connect homes in waves within each neighbourhood, taking advantage of the pre-subscription process it ran asking customers to express interest in its services as it deployed the network. There has been wide variability in the pre-registration rates across neighbourhoods (**Exhibit 13** and **Exhibit 14**), partially explained by increased demand for services by higher income households (**Exhibit 15** and **Exhibit 16**).
- **We estimate that Google will invest a total of \$94 million to connect approximately 12,000 households on "day one."** Under plausible assumptions about the portion of pre-registered homes that will indeed take the service from the outset, and based on data from our proprietary door-to-door survey in the Google footprint in Kansas City to estimate the mix between broadband-only and double play (broadband and video) subscribers on day one, we forecast a total investment of \$42 million required in Kansas City, KS, and \$52 million in Kansas City, Missouri (**Exhibit 17**).
- **If Google were to reach 8% penetration on "day one" after deploying the network and converting pre-subscribed users, contribution from the user base could fund growth to 18% penetration with relatively small incremental cash investment, if our churn and acquisition costs assumptions are close to reality.** If Google reaches 8% penetration of homes passed on "day one" as a result of pre-subscriptions, the incremental cash investment to grow to 18% penetration in the first year will be of approximately \$2 million, with \$15 million in incremental cash costs offset by \$13 million of contribution from users (**Exhibit 18**). We believe each double play customer will generate \$64/month in contribution and each broadband only customer \$47/month (**Exhibit 19** and **Exhibit 20**).
- **Google has already announced it will expand the build out to other areas around the current Kansas City footprint.** We believe Google has obtained licenses to overbuild in a footprint including about 300 thousand homes in Kansas City. It has already announced it will expand the Kansas City build out beyond the footprint we have analyzed (**Exhibit 21**). We have not done analysis at the same level of detail for the incremental areas, which have not yet been disclosed publicly in enough detail for us. That said, we believe they are less dense and may as a consequence be more expensive to build out (on a per home passed basis). Extrapolating the analysis focused on the first phase of the build out, we estimate that the capital investment required to pass (and not acquire and connect) all 300K homes would be \$170 million.
- **We think Google sees the Kansas City effort as successful so far and think it is highly likely that we will see the effort expanded to other metro areas such as Austin, TX.** While we believe it is definitely too early to judge either way, we think Google perceives the current effort in Kansas City as (so far) successful and is likely to announce it will build fiber networks in (parts of) other metro areas. Recent news flow (from Austin's ABC news affiliate and other sources) has suggested that Austin, TX could be the next market to get Google Fiber. The city of Austin, TX has roughly the same population as Kansas City, KS and Kansas City, MO combined, but preliminary analysis suggests that Austin's population density is materially higher than Kansas City's and hence could yield a cost per home passed (and hence total cost to pass) that is lower or similar to KC's even if the network build out requires a larger portion of (usually more expensive to deploy) buried or underground infrastructure.

- We remain skeptical that Google will find a scalable and economically feasible model to extend its build out to a large portion of the US, as costs would be substantial, regulatory and competitive barriers material, and in the end the effort would have limited impact on the global trajectory of the business. For example, making the far from trivial assumption that Google can identify 20 million homes in relatively contiguous areas with (on average) similar characteristics as Kansas City when it comes to the most important drivers of network deployment cost, homes per mile of plant and the mix of aerial, buried and underground infrastructure, and that Google decides to build out a fiber network to serve them over a period of 5 years, we estimate the annual capex investment required to be in the order of \$11 billion to pass the homes, before acquiring or connecting a single customer. At the end of this hypothetical 5-year period Google would have a fiber network passing roughly 15% of US homes, which would make it a medium-to-large domestic access and pay-TV provider (Comcast passes 53 million homes, TWC 30 million, and Charter 12 million), but would have limited impact on the global broadband access industry beyond these 20 million homes.

Investment Conclusion

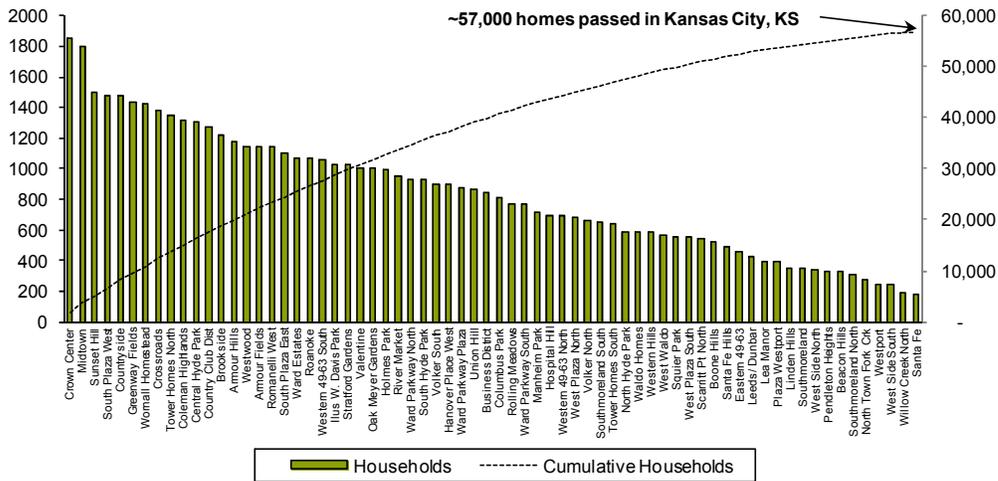
We rate Google outperform with a 12-month target-price of \$1,000.

Details

Exhibit 1

In the first phase of its Kansas City fiber build-out Google will pass 57,000 homes in Kansas City (KS)...

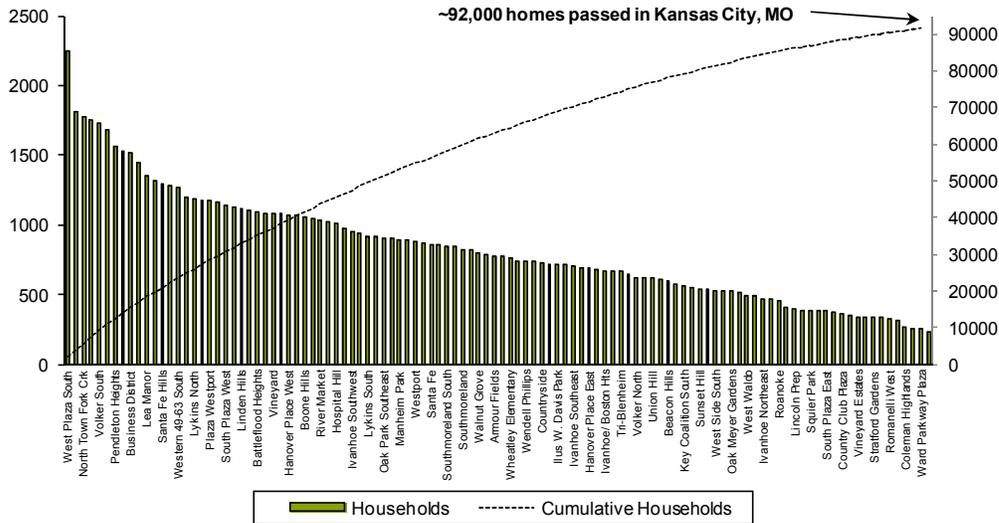
Total Households and Cumulative Households in Kansas City, KS by Neighborhood



Source: CostQuest and Bernstein analysis

Exhibit 2
...and 92,000 homes in Kansas City (MO)

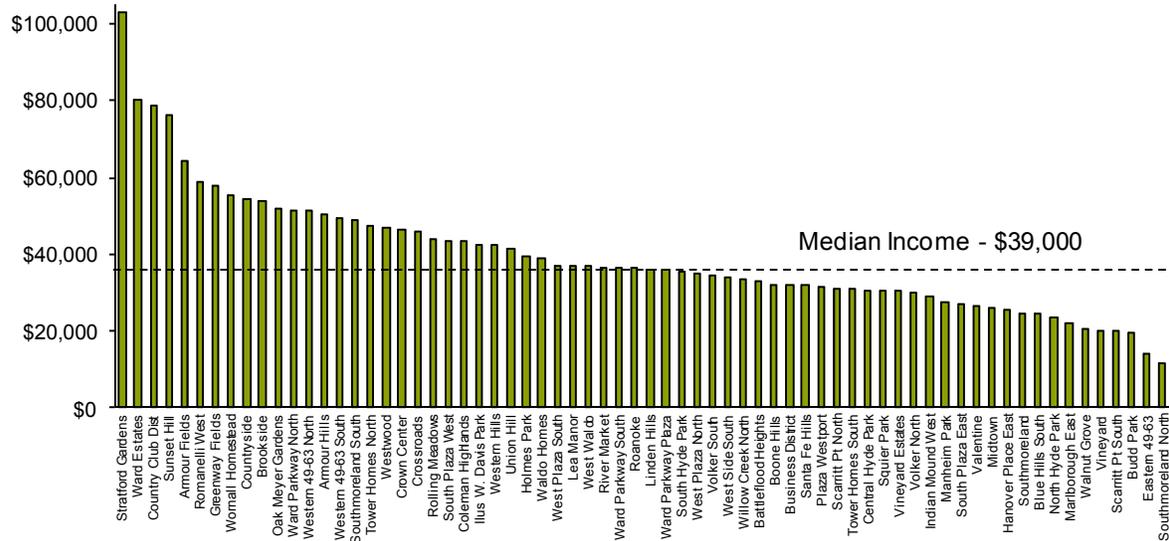
Total Households and Cumulative Households in Kansas City, MO by Neighborhood



Source: CostQuest and Bernstein analysis

Exhibit 3
There is a Wide Variation in The Median Annual Household Income for Kansas City (KS)

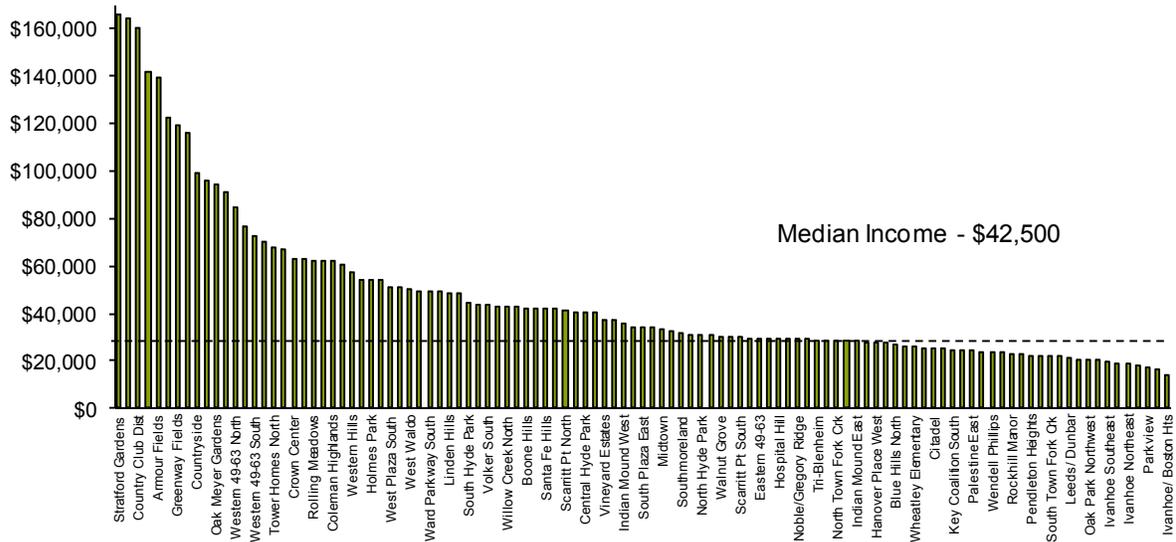
Annual Median Household Income by Neighborhood for Kansas City (KS) (\$)



Source: CostQuest and Bernstein analysis

Exhibit 4
 ...and Variation in Median Annual Household Income in Kansas City (MO) is Even Greater

Annual Median Household Income by Neighborhood for Kansas City (MO) (\$)



Source: CostQuest and Bernstein analysis

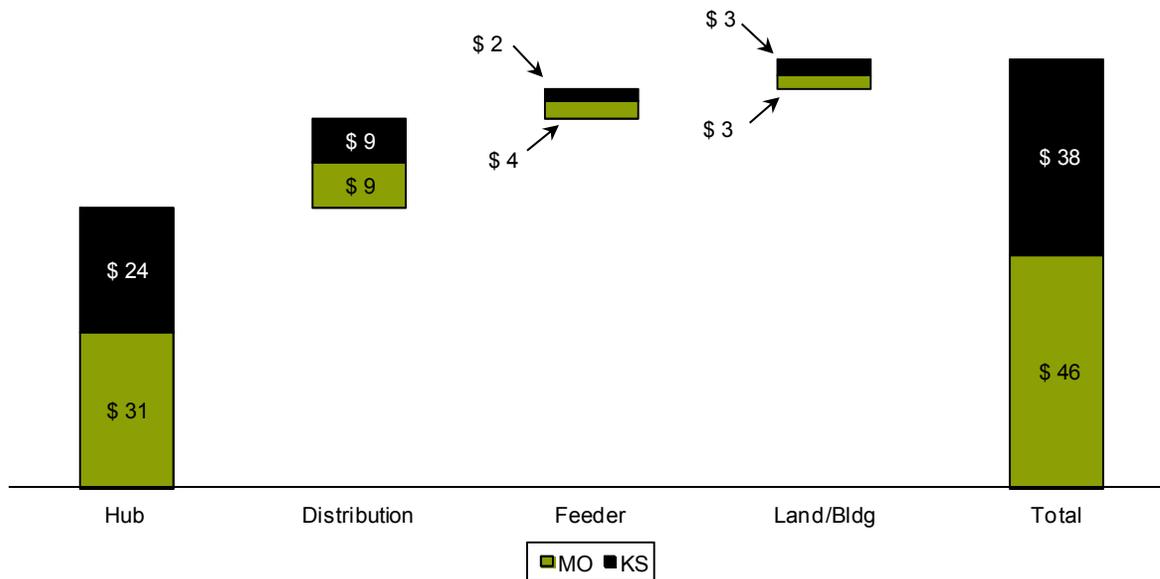
Exhibit 5
 Google Has Three Service Offers in Kansas City

	Double Play	High Speed Data	Low end Data
Broadband Access	1 Gbps Symmetric	1 Gbps Symmetric	5 Mbps download, 1 Mbps upload
PayTV	172 channels		
Hardware	Nexus 7 tablet remote control, TV Box, Storage Box (DVR), Network Box (Router)	Network Box (Router)	Network Box (Router)
Monthly Price	\$120/home Starz, Showtime for \$10 Hispanic, ESPN 3D for \$5	\$70/home	Free for 7 years guaranteed
Installation	Free with 2 year contract \$300 install fee without contract	Free with 2 year contract \$300 install fee without contract	\$300 install fee Can be paid in 12 installment of \$25 each

Source: fiber.google.com

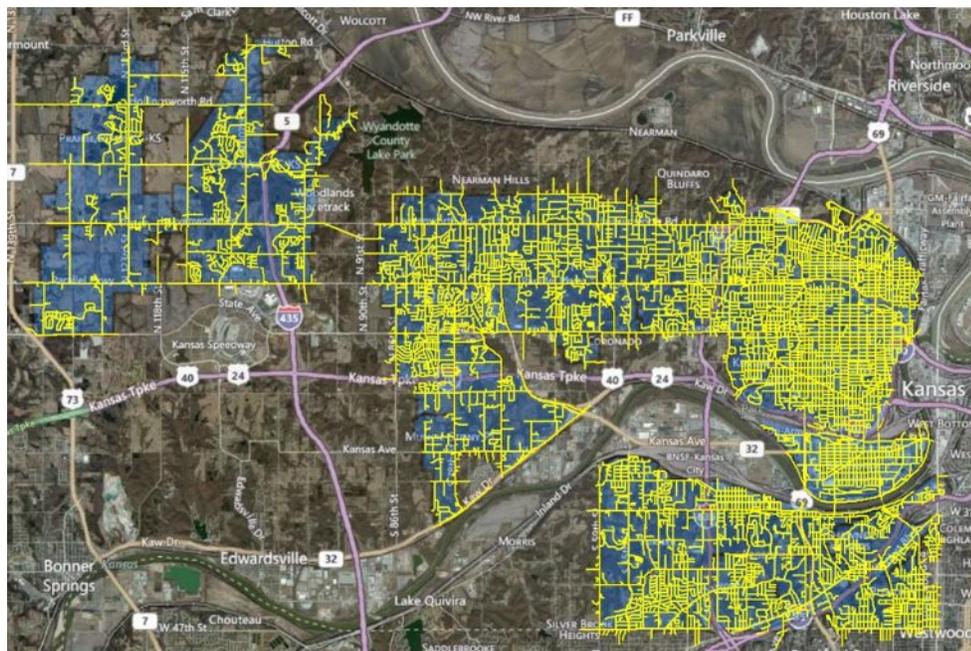
Exhibit 6
Total Capex to Pass 149,000 Households in Kansas City (KS and MO) will Be Nearly \$84 Million

Capex to Pass 149,000 Households in Kansas City (\$ millions)



Source: Costquest, Bernstein analysis

Exhibit 7
Model Fiber Network in Google Footprint in Kansas City (KS)



Source: Google Maps (2013), Bernstein analysis

U.S. Internet

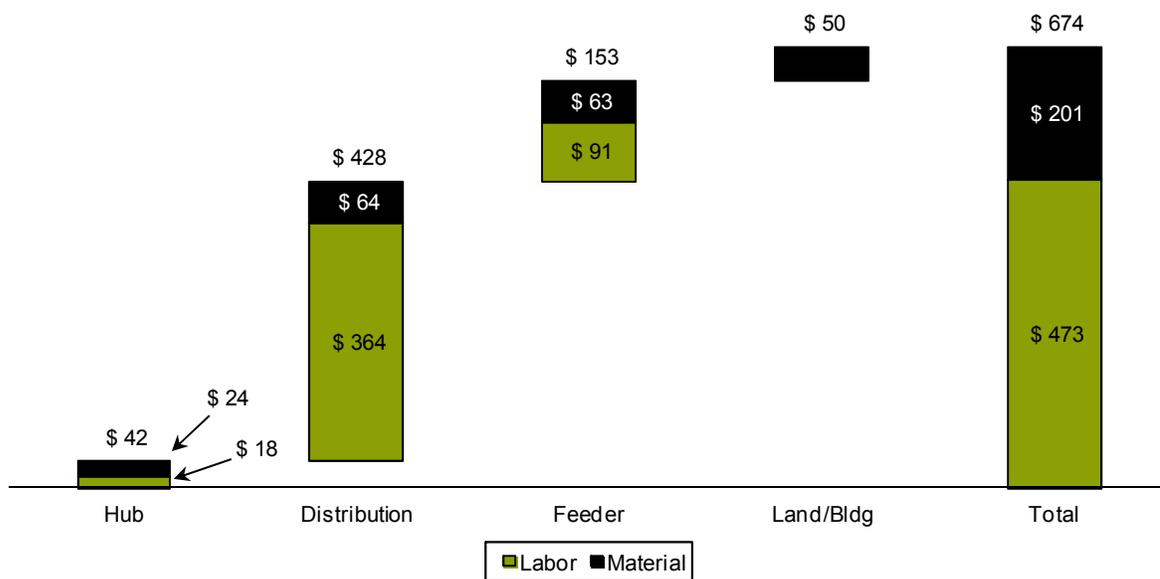
Exhibit 8
Model Fiber Network in Google Footprint in Kansas City (MO)



Source: Google Maps (2013), Bernstein analysis

Exhibit 9
Cost Per Home Passed in Kansas City, KS is \$674

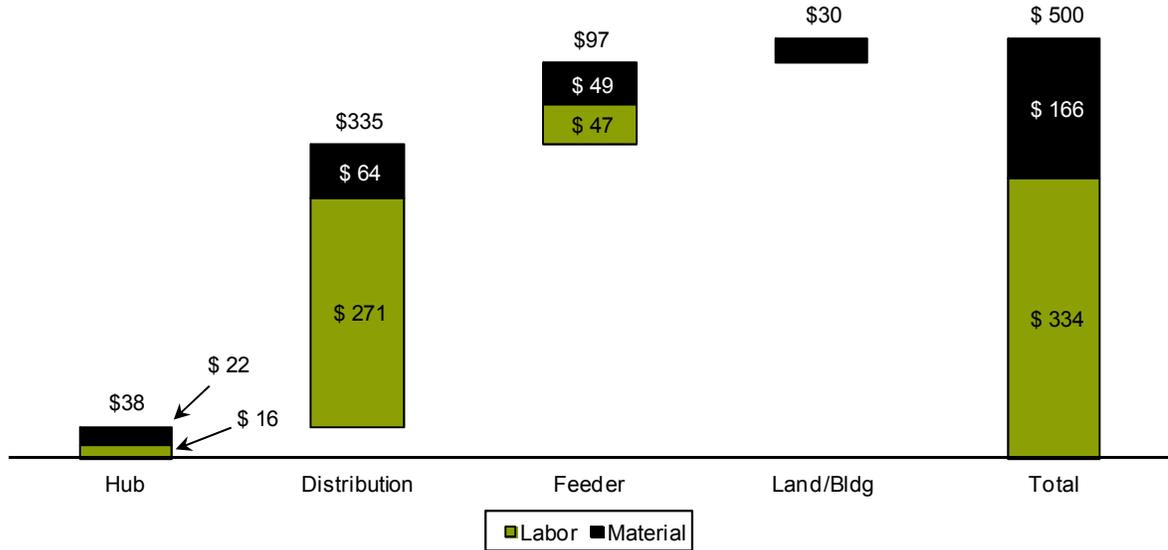
Components of Cost per Home Passed (\$)



Source: Costquest, Bernstein analysis

Exhibit 10
Cost Per Home Passed in Kansas City, MO \$500, Is Considerably Lower than Kansas City, KS

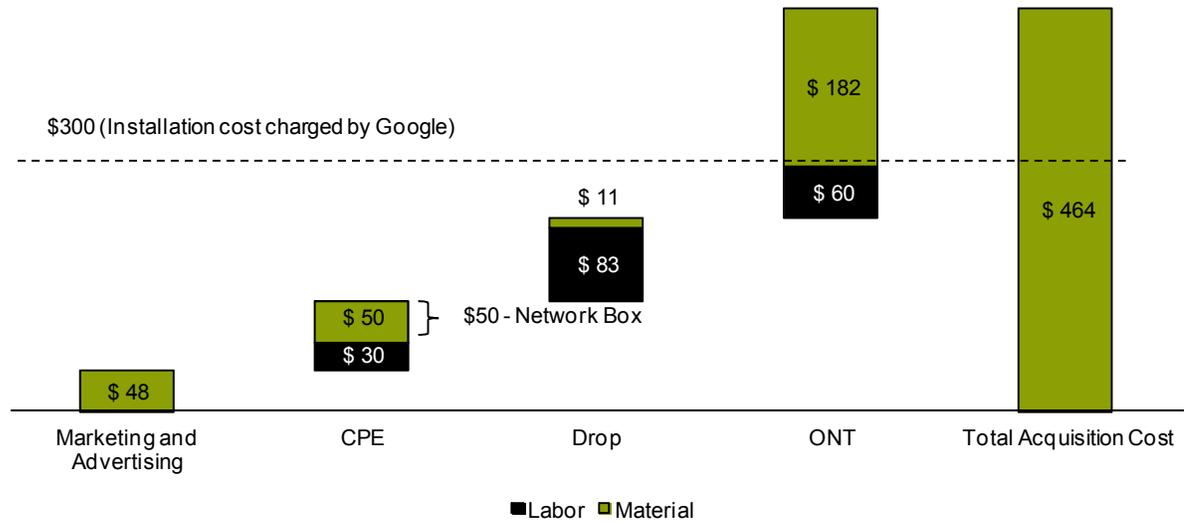
Components of Cost per Home Passed (\$)



Source: Costquest, Bernstein analysis

Exhibit 11
Cash Costs to Acquire and Connect a Broadband Access Customer Will be \$ 464

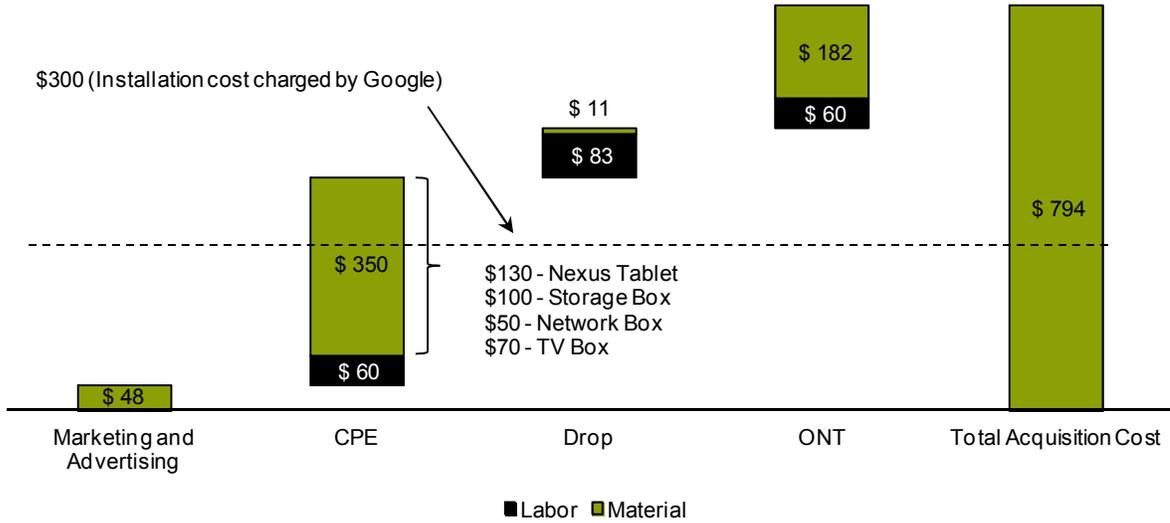
Total Customer Acquisition Cost for Broadband Data Customer (\$)



Source: Costquest, Bernstein analysis, fiber.google.com

Exhibit 12
Cash Costs to Acquire and Connect a Broadband Access Customer Will be \$ 794

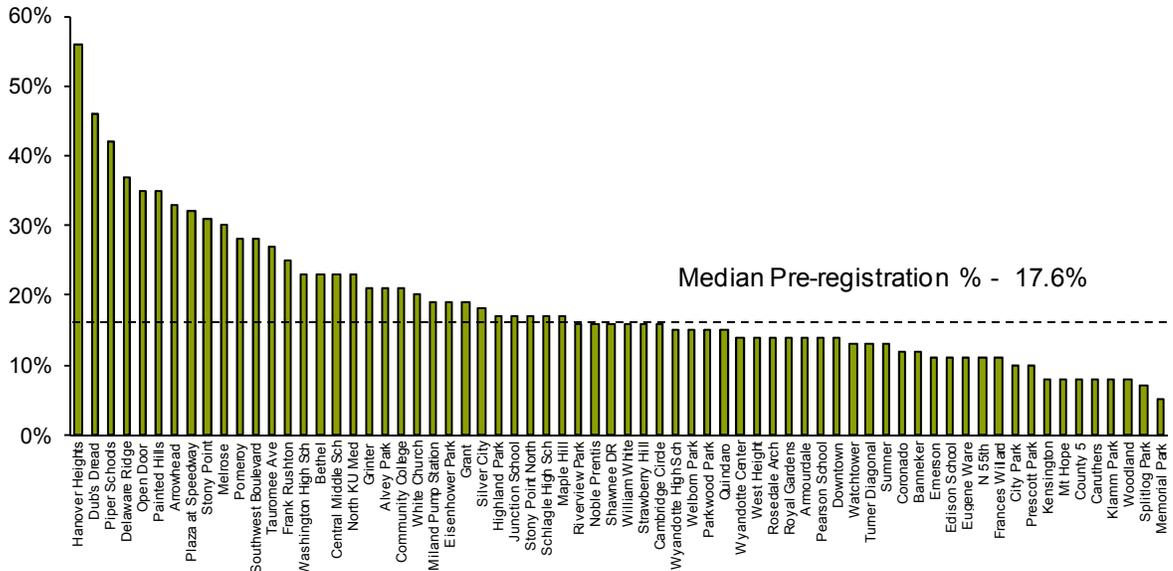
Total Customer Acquisition Cost for a Double Play Customer (\$)



Source: Costquest, Bernstein analysis, fiber.google.com

Exhibit 13
Pre-registration Levels in Kansas City (KS) Neighborhoods Have Varied Significantly

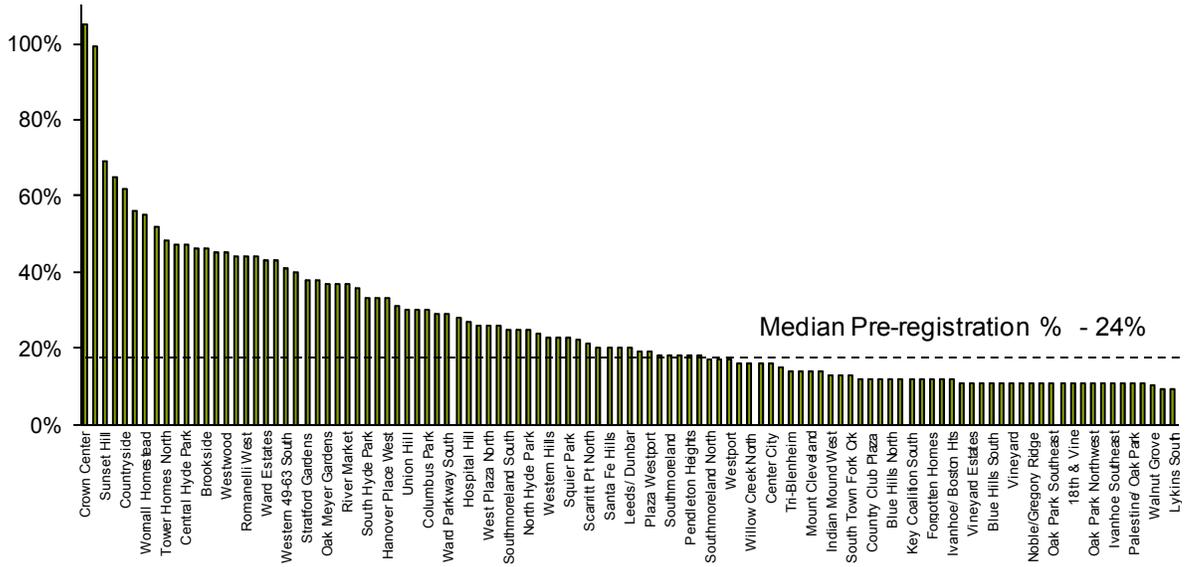
% of Homes Passed That Pre-registered for Service (%)



Source: fiber.google.com and Bernstein analysis

Exhibit 14
Pre-registration Levels in Kansas City (KS) Neighborhoods Have Varied Significantly

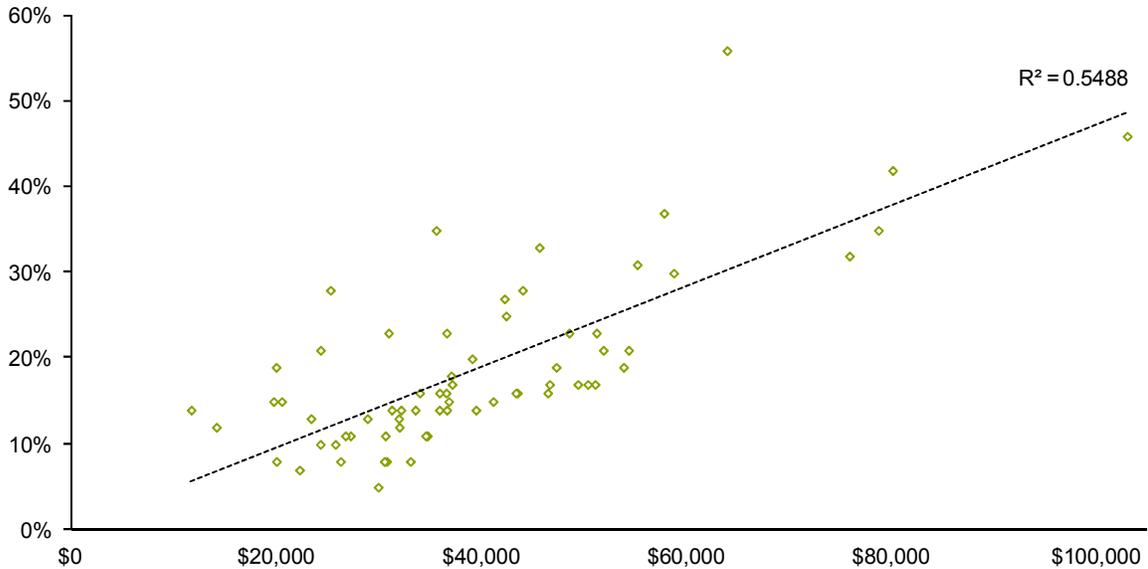
% of Homes Passed That Pre-registered for Service (%)



Source: fiber.google.com and Bernstein analysis

Exhibit 15
Income Variations May Explain Part of The Variation in Pre-registration rates

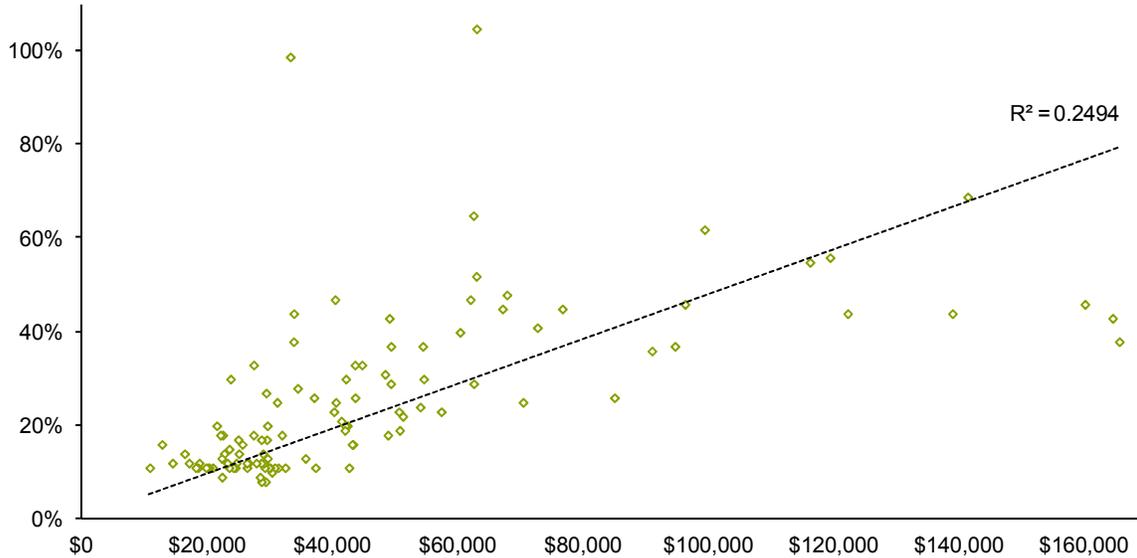
Pre-Registration Rates by Neighborhood for Kansas City (KS)



Source: Bernstein analysis

Exhibit 16
 ...A Similar Trend is Seen in Kansas City (MO)

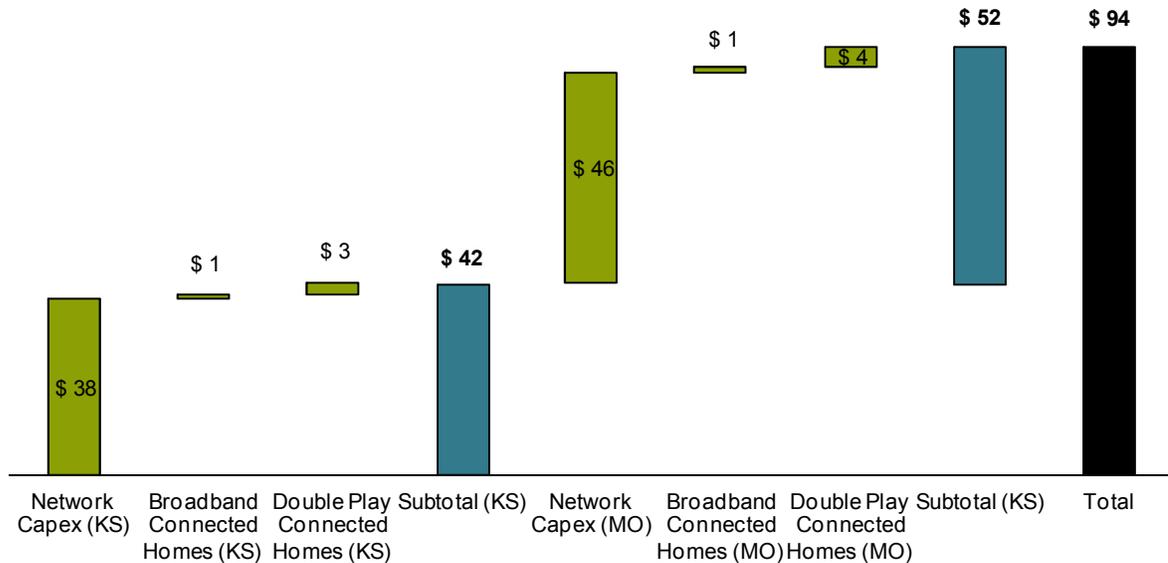
Pre-Registration Rates by Neighborhood for Kansas City (MO)



Source: Bernstein analysis

Exhibit 17
 We estimate that Google will invest a total of \$94 million to connect approximately 12,000 households on "day one."

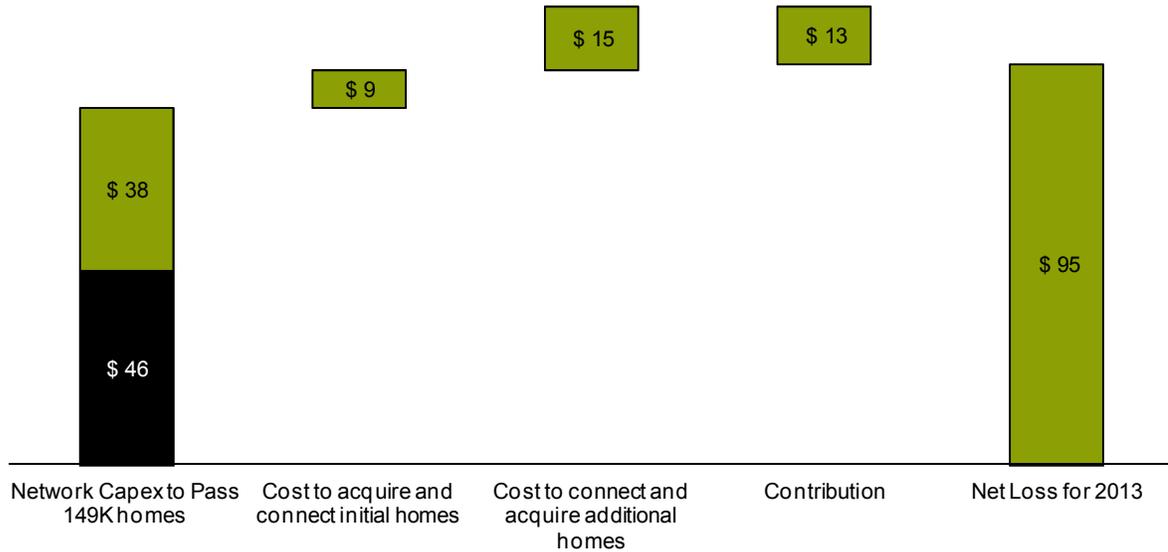
Total Investment to Connect Homes on "Day One" (\$ millions)



Source: Costquest, Spatial insights, Bernstein analysis

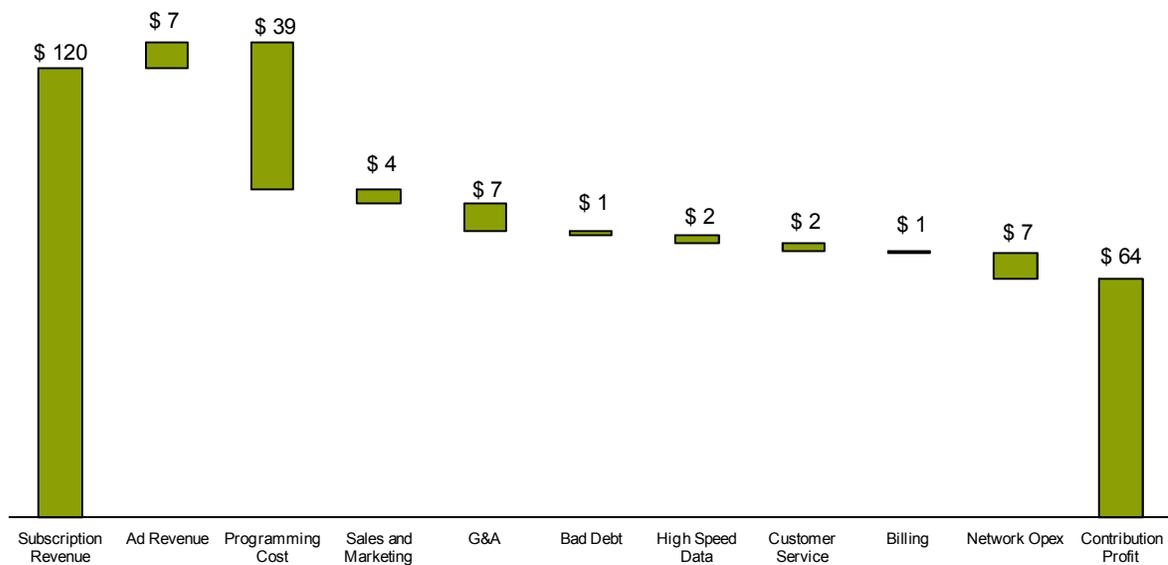
Exhibit 18
Cash Investment in Kansas City Footprint Could Be Nearly \$95 Million in 2013

Components of Cash Investment in Kansas City Fiber Buildout (\$ millions)



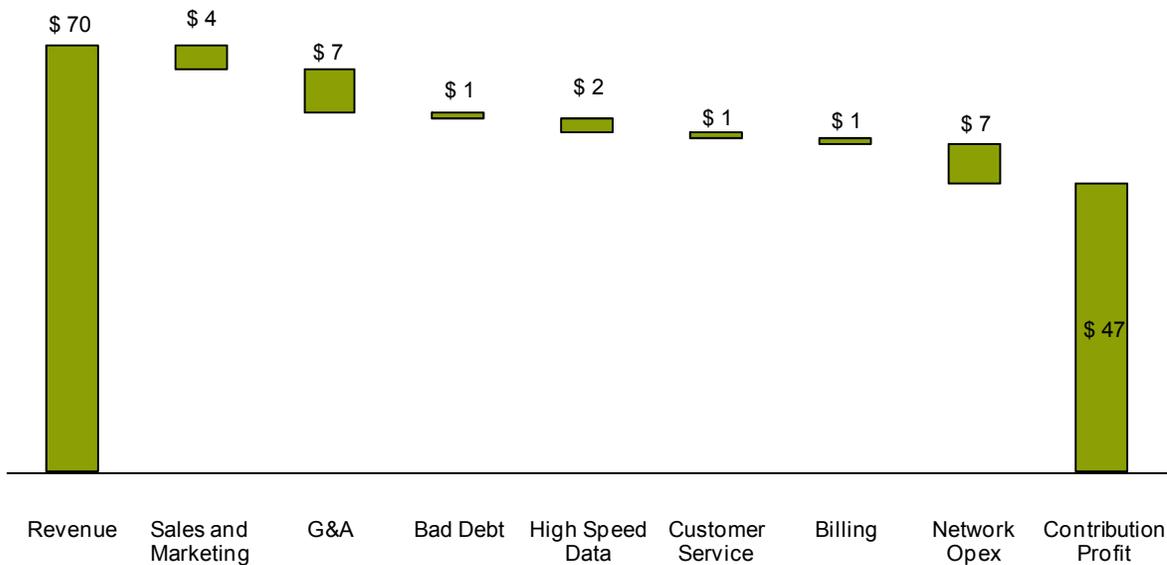
Source: Bernstein analysis

Exhibit 19
Cash Contribution per Month Per DoublePlay Household (\$/month)



Source: Costquest, Bernstein analysis

Exhibit 20
Cash Contribution per Month Per Broadband Household (\$/month)



Source: Costquest, Bernstein analysis

Exhibit 21
Google will be expanding its Buildout in Kansas

Current Cities

- Kansas City, KS
- Kansas City, MO

Coming Next

- Kansas City North, MO
- Kansas City South, MO
- Westwood, KS
- Westwood Hills, KS
- Mission Woods, KS



Source: fiber.google.com

Disclosure Appendix

Valuation Methodology**U.S. Internet****Google Inc**

We value Google based on 2014 EBITDA. We select the multiple based on our long term DCF model for Google.

Risks**U.S. Internet**

Sector risks:

- Global economic conditions: Consumer and advertising spend are the main drivers of revenue for all companies in our coverage, and deterioration of economic conditions could have a material negative impact on revenues and earnings of all companies in our coverage.
- Cyber-security: All companies in our coverage depend on the global Internet. Their data (including user-data), infrastructure, and services could be compromised either by malicious attackers or by an "act of God" that compromises major portions of their Internet infrastructure. This could have a major negative impact on revenues and earnings of all companies in our coverage.
- Network neutrality: Companies in our coverage pay telecommunications service providers for terminating their traffic in accordance to local regulation and business practices, either directly or through third-parties (e.g., CDNs). They do not pay to ensure that their traffic is delivered to the end user with a higher or lower priority than other traffic from the Internet. If fixed or mobile telecommunications service providers were to charge Internet companies for the delivery of bits beyond the usual traffic termination charges, the revenues, earnings and stock prices of companies in our coverage could be negatively affected.
- Privacy: Privacy-related regulation or a major leak of consumer information leading to lower Internet usage could have negative impact on the future revenues, earnings and stock prices of all companies in our coverage.
- Disruptive innovation or global competition: Companies in our coverage derive the majority of their revenues from Internet advertising (GOOG, YHOO), e-commerce and e-commerce related services (AMZN, EBAY), and the delivery of content over the Internet (NFLX). Because of relatively low barriers to entry, they face the risk of increased competition from a new entrant or from a established business in an adjacent space (e.g., Google, Apple or Netflix selling books online); successful entry or even its announcement could have a negative impact on future revenues, earnings and/or stock prices.

Google Inc

- Google is currently a party in multiple regulatory proceedings (including formal investigations by the United States Federal Trade Commission and by the European Union). Actions by these or other agencies seeking to regulate Google's activities could have a negative impact on the company's revenues, earnings, and/or its stock price.
- Android phone manufacturers and Google are involved in a number of law suits related to intellectual property. Unfavorable outcomes related to these lawsuits could have a material impact on Google's future ability to capture mobile search upside.

- If Apple were to remove Google as the default browser on iOS-powered mobile devices, or charge a large incremental amount to keep Google as the default search engine, it could have material negative impact on revenues, earnings and the stock price.
- If consumers' online behavior or preferences were to change significantly, it could have material impact on Google's advertising revenues and the company's performance.
- A negative reaction by other handset manufacturers who distribute the Android operating to the acquisition and integration of MMI could limit Google's upside in mobile online advertising, including search.
- If Google were to pursue another large acquisition or invest a large amount of resources in ventures not directly connected or immediately adjacent to its businesses, financial and stock performance could suffer.

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Underperform: Stock will trail the performance of the market index by more than 15 pp in the year ahead.

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12-Month Rating History as of 04/07/2013

Ticker Rating Changes

GOOG O (IC) 11/04/11

Rating Guide: O - Outperform, M - Market-Perform, U - Underperform, N - Not Rated
 Rating Actions: IC - Initiated Coverage, DC - Dropped Coverage, RC - Rating Change

GOOG / Google Inc

Date	Rating	Target(USD)
11/04/11	O (IC)	743.00
01/20/12	O	727.00
09/12/12	O	850.00
10/22/12	O	820.00

IC - Initiated Coverage



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