XO Communications

13865 Sunrise Valley Drive
Herndon, VA 20171

REDACTED – FOR PUBLIC INSPECTION

November 4, 2009

FILED/ACCEPTED

NOV – 4 2009

Federal Communications Commission
Office of the Secretary

VIA HAND DELIVERY

Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street SW
Washington, DC 20554

Re: *Comments of XO Communications, LLC in Response to NBP Public Notice #11,* GN Docket Nos. 09-47, 09-51, and 09-137

Dear Ms. Dortch:

Enclosed for filing please find the public version of the Comments of XO Communications, LLC ("XO") in response to the FCC's NBP Public Notice #11 in the above-referenced proceeding.

XO's Comments contain Highly Confidential information subject to a request for confidential treatment pursuant to 47 C.F.R. §§ 0.457 and 0.459, a copy of which is attached, and is also subject to the the FCC's October 8, 2009 Protective Order in GN Docket No. 09-51 (DA 09-2187). Therefore, the confidential information has been redacted in the enclosed public version of the Comments. An unredacted, confidential version is being concurrently filed, under seal, with the Secretary's office in Washington, DC, together with the request for confidential treatment.

If you have any questions, please do not hesitate to call.

Sincerely,

Heather Burnett Gold/SJB

Heather Burnett Gold
Senior Vice President
heather.b.gold@xo.com

Enclosures

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XO Communications

13865 Sunrise Valley Drive
Herndon, VA 20171

REDACTED – FOR PUBLIC INSPECTION
REQUEST FOR HIGHLY CONFIDENTIAL TREATMENT
PURSUANT TO PROTECTIVE ORDER IN GN DOCKET NO. 09-51
AND 47 C.F.R. §§ 0.457 AND 0.459

November 4, 2009

VIA HAND DELIVERY

Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street SW
Washington, DC 20554

Re: *Request for Confidential Treatment of Information Submitted by XO Communications, LLC in Response to NBP Public Notice #11*
GN Docket Nos. 09-47, 09-51, and 09-137

Dear Ms. Dortch:

Pursuant to Exemption 4 of the Freedom of Information Act ("FOIA"),[1] and the rules of the Federal Communications Commission ("FCC" or "Commission"),[2] XO Communications, LLC ("XO") hereby requests highly confidential treatment for the information that has been redacted from the attached Comments of XO Communications, LLC – NBP Public Notice #11[3] ("XO Comments") that are being filed today in the above-referenced proceeding. A confidential, unredacted version is being filed under seal by hand delivery to the FCC Secretary's Office. Two copies of the redacted version for public inspection are being delivered for filing in each of the above-referenced dockets. Copies of the highly confidential version are being hand delivered to Elvis Stumbergs, Room 2-C125, or Simon Banyai, Room 4-C458, Media Bureau, FCC, 445 12th Street SW, Washington, DC, pursuant to the Protective Order in GN Docket No. 09-51.[4]

Specifically, XO requests highly confidential treatment of the information that has been redacted from the public version of the XO Comments (the "XO Information"). The XO

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1 5 U.S.C. § 552(b)(4).

2 47 C.F.R. §§ 0.457(d), 0.459.

3 *See* Public Notice, *Comment Sought on Impact of Middle and Second Mile Access on Broadband Availability and Deployment, NBP Public Notice # 11*, DA 09-2186, at 8 (rel. Oct. 8, 2009) ("*NBP Public Notice #11*").

4 *A National Broadband Plan for Our Future*, GN Docket No. 09-51, Protective Order, DA 09-2187 (rel. Oct. 8, 2009).

Information contains detailed, company-specific, confidential and/or proprietary commercial information protected from disclosure by FOIA Exemption 4 and the Commission's rules protecting information that is "not routinely available for public inspection" and that "would customarily be guarded from competitors."[5]

1. *Identification of the specific information for which highly confidential treatment is sought.* XO requests that all of the XO Information be treated as highly confidential pursuant to Exemption 4 of FOIA and Sections 0.457(d) and 0.459 of the Commission's rules, which protect commercial, financial, and other information not routinely available for public inspection. The XO Information contains detailed, company-specific, competitively-sensitive, business confidential and/or proprietary, commercial data concerning XO's operations, equipment, vendors, costs, and required investments that would not routinely be made available to the public, and customarily would be guarded from competitors. If such information were disclosed, XO's competitors could use it to determine aspects of XO's business operations, strategies, and finances, and could use that information to gain a competitive advantage over XO.

2. *Identification of the Commission proceeding in which the information was submitted or a description of the circumstance giving rise to the submission.* The attached XO Information is submitted voluntarily in response to questions posed by the Commission in its *NBP Public Notice #11*.

3. *Explanation of the degree to which the information is commercial or financial, or contains a trade secret or is privileged.* The XO Information contains detailed, company-specific, competitively-sensitive, confidential and/or proprietary, commercial, operational, and financial information, all of which is highly confidential. The XO Information discloses information that competitors could exploit regarding XO's equipment, vendors, costs, business models, operations and strategies.

This information would not customarily be made available to the public and customarily would be guarded from all others, especially competitors. This company-specific data has never been made available to the public, and XO only provides it to the Commission in an effort to ensure it has all the information it needs to craft a National Broadband Plan. If this information were not protected, XO's competitors could use it in an effort to determine how best to undercut XO's business.

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[5] 5 U.S.C. § 552(b)(4); 47 C.F.R. §§ 0.457(d) and 0.459; *see also* 18 U.S.C. § 1905 (prohibiting disclosure "to any extent not authorized by law" of "information [that] concerns or relates to the trade secrets, processes, operations, style of work, or apparatus, or to the identity, confidential statistical data, amount or source of any income, profits, losses, or expenditures of any person, firm, partnership, corporation, or association").

4. *Explanation of the degree to which the information concerns a service that is subject to competition.* The highly confidential information at issue relates directly to the provision of voice and information services, which are subject to vigorous competition. If the information is not protected, XO's competitors will be able to use it to their competitive advantage.

5. *Explanation of how disclosure of the information could result in substantial competitive harm.* Since this type of information generally would not be subject to public inspection and would customarily be guarded from competitors, the Commission's rules recognize that release of the information is likely to produce competitive harm. Disclosure could cause substantial competitive harm because XO's competitors could assess aspects of XO's finances, business operations and strategies, and use that information to undermine XO's competitive position.

6.-7. *Identification of any measures taken by the submitting party to prevent unauthorized disclosure, and identification of whether the information is available to the public and the extent of any previous disclosure of the information to third parties.* The XO Information is not available to the public, and has not otherwise been disclosed previously to third parties. XO routinely treats this information as confidential and/or proprietary. XO assiduously guards against disclosure of this information to others.

8. *Justification of the period during which the submitting party asserts that the material should not be available for public disclosure.* XO requests that the XO Information be treated as highly confidential indefinitely, as it is not possible to determine at this time any date certain by which the information could be disclosed without risk of harm.

9. *Any other information that the party seeking confidential treatment believes may be useful in assessing whether its request for confidentiality should be granted.* The XO Information would, if publicly disclosed, enable XO's competitors to gain an unfair competitive advantage. Under applicable Commission and federal court precedent, the information provided by XO on a highly confidential basis should be shielded from public disclosure. Exemption 4 of FOIA shields information that is (1) commercial or financial in nature; (2) obtained from a person outside government; and (3) privileged or confidential. The information in question clearly satisfies this test.

Additionally, where disclosure is likely to impair the government's ability to obtain necessary information in the future, it is appropriate to grant confidential treatment to that information. *See National Parks and Conservation Ass'n v. Morton*, 498 F.2d 765, 770 (D.C. Cir. 1974); *see also Critical Mass Energy Project v. NRC*, 975 F.2d 871, 878 (D.C. Cir. 1992) (*en banc*) (recognizing the importance of protecting information that "for whatever reason, 'would customarily not be released to the public by the person from whom it was obtained.'")

(citation omitted). Failure to accord confidential treatment to this information is likely to dissuade providers from voluntarily submitting such information in the future, thus depriving the FCC of information necessary to evaluate facts and market conditions relevant to policy issues under its jurisdiction.

If a request for disclosure occurs, please provide sufficient advance notice to the undersigned prior to any such disclosure to allow XO to pursue appropriate remedies to preserve the confidentiality of the information.

If you have any questions or require further information regarding this request, please do not hesitate to contact me.

Sincerely,

Heather Burnett Gold /SJB

Heather Burnett Gold
Senior Vice President
heather.b.gold@xo.com

Attachments

REDACTED – FOR PUBLIC INSPECTION
REQUEST FOR CONFIDENTIAL TREATMENT
PURSUANT TO 47 C.F.R. §§ 0.457 AND 0.459

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Impact of Middle and Second Mile Access on Broadband Availability and Deployment: NBP Public Notice #11	)	GN Docket No. 09-47
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act	)	GN Docket No. 09-137

COMMENTS OF XO COMMUNICATIONS, LLC – NBP PUBLIC NOTICE #11

XO COMMUNICATIONS, LLC

Heather Burnett Gold
Senior Vice President

Lisa R. Youngers
Vice President, Federal Affairs

13865 Sunrise Valley Drive
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703-547-2000

November 4, 2009

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FOR PUBLIC INSPECTION

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REDACTED –
FOR PUBLIC INSPECTION

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
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COMMENTS OF XO COMMUNICATIONS, LLC – NBP PUBLIC NOTICE #11

XO Communications, LLC ("XO") hereby comments on the Federal Communications Commission's ("FCC's" or "Commission's") NBP Public Notice #11 ("*Public Notice*") seeking comment on the impact of "middle mile" and "second mile" access on broadband availability and deployment. In response to the FCC's request for data, XO provides the Commission with detailed information and analysis on such issues as transport network capacity requirements and deployment costs, incumbent LEC pricing for special access services, and competition in the transport marketplace. Equipped with such data from XO and other commenters, the Commission should move forward expeditiously to promote broadband competition, deployment, and availability throughout the United States.

REDACTED –
FOR PUBLIC INSPECTION

I. INTRODUCTION AND SUMMARY

XO commends the Commission for issuing its *Public Notice* concerning the backhaul marketplace and its role in development of broadband in the United States. With its request for systematic, granular information, the FCC appears to appreciate the importance of a fully competitive and efficient market for transport services to the future of broadband.

XO urges the FCC to make pro-competitive policies the centerpiece of its national broadband strategy, since robust competition among providers of broadband Internet access service is essential to achieving high broadband penetration levels, promoting the efficient deployment of high-quality services, ensuring affordable broadband rates, and generating dramatic innovation. Unfortunately, as the record in this and other proceedings demonstrates, the development of vigorous broadband competition continues to be impeded by incumbent LECs' supracompetitive prices and anticompetitive terms and conditions for their special access offerings, which XO and other competing LECs require in order to link their end user customer locations with XO's network.[1] Clearly, regulatory reform for backhaul services is needed.

Because there rarely are alternatives to the incumbent LECs' special access services, competitive broadband Internet access providers like XO are effectively captive

[1] *See* Comments of XO Communications, LLC, GN Docket No. 09-51, at 22-28 (June 8, 2009); Comments of Free Press, GN Docket No. 09-51, at 119-127 (June 8, 2009); Comments of T-Mobile USA, Inc., GN Docket No. 09-51, at 18-20 (June 8, 2009); Comments of XO Communications, LLC, Covad Communications Group, Inc., and NuVox Communications, WC Docket No. 05-25 (Aug. 8, 2007).

customers – to offer retail broadband products XO must pay the excessive rates and seek to recover the costs from its service offerings. Moreover, because competitive LECs typically compete with incumbent LECs to serve downstream retail customers, incumbent LECs can use their control over special access, a vital input to the competitive LECs' products, to gain an unfair competitive advantage.

XO's response to the *Public Notice* contains data on incumbent LECs' special access pricing, including, in particular, pricing information that covers several different carriers, geographic areas, and purchasing approaches. XO's response compares the prices available through month-to-month and term plan tariffs to those that would be available if the transport facilities were offered on an unbundled network element ("UNE") basis. XO's response also includes information regarding incumbent LEC practices that tend to lock customers in to those accounts and to deter them from using alternative providers in the rare instances when they might be available. In addition, this response provides the FCC with data regarding the bandwidth requirements and deployment costs for different backhaul segments and its assessment of various backhaul technologies.

In the *Public Notice*, the FCC defines "second mile transport" as "transport and transmission of data communications from the first point of aggregation (such as a remote terminal, wireless tower location, or HFC node) to the point of connection with the middle mile transport," and "middle mile transport" as "the transport and transmission of data communications from the central office, cable headend, or wireless

switching station to an Internet point of presence."[2] While the FCC may view this distinction as a useful analytical tool, this definition of the "second mile" is largely irrelevant to the functioning of the backhaul market for wireline networks.[3] Incumbent LECs do not provide competitive carriers with access to their remote terminals,[4] and they do not make a separate, discrete "second mile" transport service from these remote terminals available to these carriers.[5] It is XO's hope that the record in response to the *Public Notice* eliminates this and any other misconception that the FCC may hold regarding the backhaul marketplace.[6] Most importantly, as the Commission completes its national broadband plan, commenters' input should give the FCC the empirical support and analytical tools necessary to reform the backhaul marketplace, bolster broadband competition, and promote the future of broadband.

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[2] *Public Notice* at 1.

[3] On the wireless side, some separate "second mile transport" carries wireless traffic from cell sites to a network aggregation point. XO itself provides this service to some wireless carriers using its fixed wireless spectrum in the Local Multipoint Distribution Service ("LMDS") band.

[4] Various technical constraints in any event would make it extremely difficult for XO and other competitors to place their electronics within these terminals.

[5] In addition, the definitions in the *Public Notice* fail to account for inter-office transport of Internet traffic between two or more incumbent LEC central offices. For instance, Internet traffic from XO customers will often be aggregated at one incumbent LEC central office and then transmitted to another incumbent LEC central office where XO has co-located its facilities. XO believes that this inter-office transport link should be classified as second mile transport. Accordingly, in its response below to question 2(f), XO assigns such inter-office channel mileage costs to the second mile category.

[6] In the *Public Notice*, the FCC also appears to assume the wide and ready availability of Ethernet transport throughout the United States. As explained *infra* at 11, the incumbent LECs have yet to develop a commercially adequate Ethernet transport offering.

II. DISCUSSION: RESPONSES TO QUESTIONS

1. Network Components of Broadband Connectivity. To provide broadband service to consumers and small businesses in an area, a broadband Internet service provider needs to have adequate, reasonably priced, and efficiently provided access to both second mile and middle mile connectivity.

> **a. On a per-end user connection basis, how much middle mile capacity is needed to provide adequate broadband Internet access to that end user connection? How does the needed capacity for middle mile connectivity vary by the number of customers or usage characteristics of the customer base in a particular location? How does this capacity vary based upon the usage patterns or demands of particular end user customer segments?**

In order to project how much middle mile capacity will be needed to provide adequate broadband Internet access on a per-end user connection basis over the next decade, it is first necessary to estimate the Internet bandwidth requirements of the two primary classes of wireline users, residential and business users, over that period. First, as described in the Declaration of Randy Nicklas (attached at Appendix A), use of the Internet for video content will drive the bandwidth requirements for residential users. This video content will include high definition ("HD") video programming that may require 8-20 Mbps per video stream or channel. Assuming 20 Mbps per video channel and the simultaneous use of three channels per residence at any given time, 60 Mbps of video-related bandwidth will be required per residential subscriber. Accounting for standard non-video applications such as web surfing, e-mail, VPN access to corporate

intranets, and VoIP-based telephony, XO estimates a bandwidth requirement of 100 Mbps per residential subscriber in the downstream direction for terminating traffic.[7]

The Internet access bandwidth requirements of business users will depend on the nature of their Internet usage and the number of employees served by business Internet connections. As described in the Nicklas Declaration, even with video conferencing increasing, business users are unlikely to download as much video content as residential users. Moreover, the bandwidth needs of individual employees are likely to be "burstier" than the needs of residential users; an employee's typical Internet usage features the sporadic downloading of large documents, with less active periods in between as those documents are reviewed. Besides video conferencing, the only other common streaming application for business users is VoIP-based telephony, which today requires no more than roughly 100 kbps per conversation. Overall, XO believes that, for business users, the required Internet access bandwidth per employee will be approximately 0.5-1.0 Mbps.

According to the U.S. Census Bureau's 2004 data, firms with 100 or more employees in the United States typically have roughly 50 employees at each of their operational locations.[8] Assuming each of these business locations is independently connected to the Internet, it appears that 25-50 Mbps of Internet access bandwidth is

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[7] Less bandwidth is likely to be necessary in the upstream direction. To adequately support current and future applications (such as video surveillance camera streams or teleconferencing applications), it is likely that an upstream capacity of 10 Mbps will be sufficient, with greater bandwidth capabilities always desirable.

[8] *See* Nicklas Declaration at 4 ¶ 7.

required per business workplace.[9] To account for future growth, XO estimates a downstream broadband capacity requirement of 50 Mbps per business location over the next decade.

To calculate the bandwidth requirements of the average middle mile transport segment over the next decade, it is necessary to estimate the average number of last mile segments served by each second mile segment, and the average number of second mile segments served by each middle mile segment. Based on its understanding of existing network architectures, XO estimates that each second mile segment serves roughly 100 last mile segments, and that each middle mile segment aggregates approximately 10 to 25 second mile segments.

As explained in the Nicklas Declaration, XO's analysis must also account for the ability of Internet Protocol ("IP") networks to achieve "oversubscription" of shared link bandwidth. That term refers to the fact that since Internet traffic is packetized and the instantaneous bandwidth demand of any customer is independent of any other customer's demand, the peak aggregate bandwidth requirement of all customers served through a middle mile segment is less than the sum of the peak bandwidth requirements of all of the individual residential and business customers served by that segment. All of the Internet backbones and packet based access networks operated by Internet service providers

[9] Larger enterprises may channel their employees' Internet access through fewer and larger access circuits using their own internal IP networks or intranets to aggregate the traffic. For enterprises that have organized their networks in this manner the estimate of 25-50 Mbps of Internet access per enterprise connection would be too low.

("ISPs") today employ varying degrees of oversubscription.[10] XO estimates that the oversubscription ratio that applies to a given middle mile segment ranges from 4:1 to 10:1, depending on the nature of the customers and the proportion of video in the aggregate traffic. Assuming the bandwidth requirements described above and based on the calculations described in the Nicklas Declaration, XO estimates that the aggregate bandwidth required for a middle mile segment over the next decade will range from 5 Gbps to 62.5 Gbps.

b. On a per-end user connection basis, how much second mile capacity is needed to provide adequate broadband Internet access to that end user connection? How does the needed capacity for second mile connectivity vary by the number of customers or usage characteristics of the customer base in a particular location? How does this capacity vary based upon the usage patterns or demands of particular end user customer segments?

XO's calculation of the second mile capacity needed to provide adequate broadband Internet access relies on the above-described analysis of the Internet bandwidth requirements of residential and business users, as well as on the estimate that each second mile segment serves roughly 100 last mile segments.[11] In addition, assuming that half of the "oversubscription" assumed in the middle mile model is obtained in a packet switch "concentrator" that aggregates last mile segments into a

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[10] The "oversubscription ratio" for a middle mile segment on a given network is equal to the ratio between (1) the sum of the peak bandwidth requirements of the individual residential and business customers served by that middle mile segment and (2) the peak aggregate bandwidth requirement of all customers served through that segment.

[11] XO's analysis of the bandwidth requirements and technology options for second mile transport focuses on the second mile as it is defined in the *Public Notice*, *i.e.*, the connection between the incumbent LEC's remote terminal and the incumbent LEC central office.

second mile segment, XO estimates the oversubscription ratio for the second mile segment to be in a range from 2:1 to 5:1. Based on the calculations in the Nicklas Declaration, XO estimates that the aggregate bandwidth required for a second mile segment over the decade will be between 1 Gbps and 5 Gbps. As noted above, second mile links that interconnect with incumbent LEC remote terminals are not subject to effective competition because competing LECs are not able to co-locate equipment in the remote terminals where they could interconnect their own transmission links.

c. **What are the technology options for providing adequate middle mile connectivity for the next 5-10 years? To what extent are these technologies available in rural or unserved portions of the country? Please explain how the cost and bandwidth capacity of each technology option compares to other technology options and how those factors relate to projected demand for middle mile connectivity in different areas of the country, both rural and urban. For instance, will DS1 and DS3 connectivity over copper wire networks for the middle mile be sufficient for a community's broadband needs over the next 5-10 years? Will microwave or other wireless options be able to provide cost-effective middle mile connectivity to meet those projected needs, and how does spectrum availability impact the cost effectiveness of these wireless options? For fiber optic networks, which technology, such as OCn, Fast Ethernet, or Gigabit Ethernet, offers the most efficient means of providing a middle mile connection to the Internet core network? Does the cost effectiveness of certain middle-mile technologies vary by geographic area, distance, or population density? If so, to what extent?**

XO estimates that, over the next decade, 5-62.5 Gbps of bandwidth will be required to provide middle mile connectivity. Even at the low end of this bandwidth range, fiber optic facilities are the best means of transmitting data over extended distances (greater than 5 kilometers). At the lower bandwidths, single or multiple parallel fixed wireless or microwave links could play a role in implementing middle mile links of

several kilometers or less, particularly where there are fiber construction constraints. Longer fixed wireless links are possible, but they would require one or more signal regeneration sites and would not be cost competitive with fiber.

The cost of fiber-based middle mile links is proportional to their length. In urban or suburban areas, the cost of new fiber network construction varies widely, roughly from $4 to $35 per foot. In urban and suburban areas, the largest cost component for fiber is installation. Where the per-foot cost of a given fiber deployment falls within the $4-$35 range depends on whether the fiber is pole attached or buried, the number of fiber stands in the cable, right-of-way costs, and other factors. In rural areas, fiber construction costs are generally lower than in urban and suburban areas, since aerial fiber is often deployed and trenching costs can be lower.

Copper-based technologies such as DS1 and DS3 circuits will play a transitional role in supplying the Internet bandwidth required for the middle mile. As demand for bandwidth increases, however, DS1 and DS3 transport circuits are likely to be replaced by bigger "pipes," since one mid-sized customer can easily consume the entire 45 Mbps of bandwidth of a DS3 circuit.[12] SONET-based circuits such as OC-3c (155 Mbps), OC-

[12] While not necessarily playing a primary role in future middle mile deployments, the existing, ubiquitously deployed copper infrastructure is in place as a solution for the last-mile delivery of broadband services to end users throughout the United States. As XO has explained in previous filings with the Commission, copper facilities can be used for faster and more cost-effective deployment of broadband than other technologies, including the fiber facilities that currently extend to less than twenty percent of the nation's business locations. In particular, advances in copper technology have enabled the deployment of "Ethernet Over Copper" ("EoC") technology, which supports data speeds up to 45 Mbps today and possibly greater than 100 Mbps in the future. *See, e.g.,* Comments of XO Communications, LLC, GN Docket No. 09-51, at 8-12 (June 8, 2009).

12c (622 Mbps), OC-48c (2.5 Gbps) and OC-192c (10 Gbps) are broadly deployed in Internet networks today, but, going forward, only OC-192c or multiple OC-48c links have sufficient bandwidth to meet even the lower end of the required 5-62.5 Gbps middle mile bandwidth range. In any event, SONET links and router ports will not be cost competitive with Ethernet-based links and routers, with SONET technology being anywhere from 2 to 5 times more expensive on a cost-per-bit basis.

XO believes that fiber-based metro Ethernet networks will become the primary means of meeting middle mile bandwidth requirements. XO does note, though, that the incumbent LECs have yet to implement an Ethernet transport offering that is commercially attractive to XO and other wholesale customers. As an initial matter, AT&T and Verizon have not integrated the local access Ethernet services that were offered by AT&T and MCI at the time of their acquisition with their own Ethernet products. As a result, neither AT&T nor Verizon provides a single, uniform Ethernet service with the same technical specifications across its entire regional service area.

Moreover, these incumbent LECs' first-generation Ethernet offerings suffer from a number of technical and operational limitations. Verizon and AT&T cannot guarantee adequate levels of network availability, latency, and throughput on their Ethernet networks, and the cost-per-bit of these services is well above what XO and other competitive LECs need to serve their customers. For these reasons, XO to date has not made significant use of the Ethernet offerings of AT&T and Verizon.

As the Ethernet transport market matures, however, this technology is likely to become the primary transmission medium for middle mile applications. Even with

currently available fiber optic systems, 5 Gbps of middle mile capacity can be provided most cost-effectively by a single 10 Gbps Ethernet (10GE) circuit over a single fiber pair. At the upper end of required middle mile capacity (62.5 Gbps), middle mile bandwidth requirements will be met by using multiple 10GE circuits implemented over multiple fiber pairs, or a combination of wave division multiplexing over a single fiber pair. In 2010, 100 Gbps Ethernet (100GE) capable packet switches are expected to become commercially available and the first 100GE capable metro transport systems are expected to be deployed in the same time frame. In the future, an aggregating Ethernet/Multiprotocol Label Switching ("MPLS") complex in an incumbent LEC's central office will require only a small number of fiber pairs to drive hundreds of Gbps of middle mile capacity.

d. **What are the technology options for providing adequate second mile connectivity for the next 5-10 years? To what extent are these technologies available in rural or unserved portions of the country? Please explain how the cost and bandwidth capacity of each technology option compares to other technology options and how those factors relate to projected demand for second mile connectivity in different areas of the country, both rural and urban. For instance, how close does this first point of aggregation need to be to households and businesses so as to ensure that those households and businesses will have adequate access to broadband both today and over the next 5-10 years? Will DS1 and DS3 connectivity over copper wire networks be sufficient for second mile connectivity over the next 5-10 years? Will microwave or other wireless options be able to provide cost-effective second mile connectivity to meet those projected needs and how does spectrum availability impact the cost-effectiveness of these wireless options? For fiber optic networks, which technology, such as OCn, Fast Ethernet, or Gigabit Ethernet, offers the most efficient means of providing second mile connectivity? Does the cost-effectiveness of certain technologies vary by geographic area, distance, or population density? If so, to what extent?**

As described above, XO estimates that over the next decade 1-5 Gbps of bandwidth will be required to provide second mile connectivity for wireline customers. This second-mile bandwidth requirement can be cost-effectively met through the deployment of either fiber optics or fixed wireless technologies. As in the middle mile context, Ethernet/MPLS metro networks will ultimately be used for second mile transport rather than existing SONET technologies, driven by the significantly lower costs associated with the Ethernet/MPLS approach. A single fiber pair can provide the required second mile bandwidth using a single 1GE or 10GE circuit.

Similarly, one or several parallel fixed wireless links are capable of providing the required second mile bandwidth. In particular, while there are deployment challenges,[13] LMDS spectrum can provide an effective wireless alternative for second mile applications, particularly for cell tower backhaul. (XO holds a large number of LMDS licenses throughout the United States.) Copper-based technologies are likely to have at least a transitional role in future second mile deployment, and in some cases copper circuits could play a long-term role in second mile links.

In addition to their disparate bandwidth requirements, second mile transport generally covers less distance than the middle mile. Existing copper-based second mile segments typically cover less than thirty kilometers for remote terminal-to-central office connections, while current fiber-based middle mile applications can span distances of

[13] *See* Initial Comments of Broadview Networks, Inc., NuVox, and XO Communications, LLC, WC Docket No. 09-135, Appendix B, Declaration of Michael Lasky (Sep. 21, 2009).

tens or even hundreds of kilometers depending on the population density of the areas they serve, although these distances are typically much shorter in metropolitan areas. For this reason, the location-based cost disparities that are common for the middle mile are less of a factor for second-mile transport, meaning that fixed wireless links can be utilized more often for second mile links.

XO notes that the residential and business customer bandwidth requirements described above are likely inapplicable to wireless last mile services. While next generation mobile technologies such as WiMax and LTE should eventually support 50-100 Mbps of bandwidth per subscriber downstream, these technologies will require large per channel allocations of 20 MHz or more of spectrum to support such speeds. Unless substantially more mobile spectrum is allocated, mobile providers will have difficulty supporting streaming video applications such as HD video for large numbers of subscribers. XO believes that, in practice, the second mile bandwidth requirement in the wireless context is likely 1 Gbps or less. Even with this lower bandwidth requirement, fiber-based or fixed wireless technologies such as LMDS are still the most cost-effective options for second mile connectivity.

2. Availability and Pricing of Middle and Second Mile Connectivity

a. What is the price of purchasing middle mile connectivity, broken down by relevant geographic area and technology? How much do these prices vary by length of circuit? Precisely how do these prices for middle mile connectivity vary by category of supplier (e.g., incumbent LECs, competitive access providers, wireless providers, interexchange carriers, Internet backbone providers) and by the different regulatory treatment of that connectivity (e.g., when available as an unbundled network element, when available as a tariffed service subject to rate-of-return or

price cap regulation, when subject to price flexibility, or when subject to no ex ante rate regulation)?

The spreadsheet attached as Table 1 (attached in Appendix B) provides sample information regarding the costs charged by incumbent LECs for Special Access DS1, Special Access DS3, Sonet OC-3, and Sonet OC-12 services.[14] For each type of service, numerous examples illustrate prices across a wide spectrum of providers, geographic areas (including Special Access Zones), and purchasing approaches. In the table, columns within each service type identify the relevant State, Parent Company, LEC, and Zone. Table 1 also shows the prices among the incumbent LECs for transport service based on purchases through month-to-month tariffs, term plan tariffs, and unbundled network element ("UNE")/Expanded Extended Loop ("EEL") rates. For each service from a given vendor in a given geographic area, Table 1 identifies the percentage cost differences depending on whether the service is purchased on a month-to-month basis, under a term plan tariff, or on a UNE basis.[15] Table 1 also sets forth sample provider charges for Ethernet 100 Megabit and Ethernet 1 Gig services.

In Table 2 of these comments (attached in Appendix B), XO provides examples of prices from competitive providers for special access-type service (*i.e.*, private line

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[14] In *Public Notice* questions 2(a) and 2(b), the FCC asks for separate pricing data for the middle mile segment and the second mile segment. As explained *supra* at 3-4, however, the incumbent LECs do not separately offer second mile transport services connecting incumbent LEC remote terminals to incumbent LEC central offices. XO therefore responds here only to question 2(a), identifying the incumbent LEC services as "special access services."

[15] These columns are labeled "SA Term Plan vs. SA MTM," "UNE vs. SA MTM," and "UNE vs. SA Term Plan."

services). Table 2 shows examples based on the defined Metropolitan Tier (Tier 1-5) which are defined by population parameters. (In Table 1, XO does not differentiate between Rate of Return and Price Flexibility regulated areas, because such information is not readily available.)

As Table 1 demonstrates, it costs XO and other competitive carriers significantly more to purchase transport as a special access service from incumbent LECs than it would to acquire comparable capability through the purchase of a UNE. These substantial price gaps demonstrate the excessive nature of incumbent LECs' special access rates. For example, for a DS1 connection in Illinois, the month-to-month price per mile is $31.10 with an additional fixed first-mile price of $199.00. If a DS1 connection were purchased as a UNE, the month-to-month price per mile would be $1.88 with an additional fixed first-mile cost of $34.70. Overall, in the examples provided in Table 1, a DS1 connection purchased as a UNE includes variable mileage rates that are 89-99% less than the variable mileage charges for a DS1 connection purchased as a special access service on a month-to-month basis, and features fixed mileage prices that are 20-83% lower than the fixed mileage charges for those month-to-month special access offerings. If these special access services are provided under a term plan, the UNE savings are 82% to 100% for variable mileage charges and as high as 59% for fixed mileage charges.

c. **How large are discounts from tariffed rates for middle mile and second mile connectivity obtains from incumbent local exchange companies? [T]he results of a recent special access buyer and seller survey conducted by the National Regulatory Research Institute regarding incumbent LEC special access services reported discounts from tariff "rack rates" for DS3 connectivity range from 44-68% for channel termination, 7% for fixed dedicated transport, and 68% for variable (e.g., mileage) dedicated**

transport charges. How accurate are these discount estimates? What commitments do customers need to make in order to obtain these discounts? Does the availability of discounts vary by geography or density zone? Do the discounts vary when competitive alternatives are present, and if so, by how much?

As Table 1 demonstrates, carriers that purchase transport on a month-to-month basis pay greater fixed, first-mile rates and greater distance-sensitive mileage charges than carriers purchasing this capacity under a term plan. For example, for a DS1 connection in Illinois, the month-to-month price per mile is $31.10 with an additional fixed first-mile price of $199.00. If a DS1 connection is ordered under the Ameritech 60-month DCP plan in Illinois, the month-to-month price per mile is $12.88 with an additional fixed first-mile rate of $26.45. Overall, the discounts received for purchasing capacity under a term plan rather than on a month-to-month basis are substantial. In the Table 1 data, fixed mileage discounts for DS1 in Table 1 range from 12% to 88%, and variable mileage discounts for DS1 range from 9% to 76%. On the basis of this data, XO believes that the discounts identified by the National Regulatory Research Institute study are reasonable estimates.

Special Access Tariff Term Plan discounts are generally available to any customer subscribing to the plan, and the availability of these discounts does not vary by geography or density zone. Incumbent LECs structure their tariffs differently. For example, one incumbent LEC offers alternative three year, five year, and seven year Commitment Discount Plans ("CDPs") in its individual operating territories. Each of these plans requires the customer to commit to a specific number of DS1 Equivalent Channel Terms and/or separate DS1 Equivalent InterOffice Transport Miles in order to

obtain the discounted rates on the specified rate elements for the term of the agreement. Upon the annual measurement date during the term, the customer must increase its commitment level to meet a specified percentage of its in-service base of circuits.

Based on these terms, a company which is growing must continually increase its special access commitment levels to maintain these discounts. Each of the incumbent LECs requires that the customer's commitment level be at least 90% of the in-service special access circuits at each measurement date. If a customer falls below this minimum, a penalty is incurred (either a loss of discount or a dollar for dollar payment to reach the minimum.) The measurement date varies by vendor, with some incumbent LECs requiring monthly measurements and others requiring an annual measurement.

For example, in one scenario, if a customer has 1000 active special access circuits at the beginning of an agreement, it must commit to 900 active circuits for the entire term of the agreement. If in year two the customer's circuit volume has grown to 1500, it must increase its minimum commitment to 1350 active special access circuits. Most agreements allow a one-time option to reduce the volume commitment (typically in cases where a customer's volume is declining). However, there are large penalties typically associated with exercising this option. In some cases, the customer must pay a percentage of the costs of the reduced volume that would have been paid over the remaining term of the agreement. In other cases, the penalty is a percentage of previously earned discounts.

At the conclusion of the contract term, unless the customer enters a new agreement, the special access circuits revert to month-to-month rates. Therefore, a