UNITED STATES OF AMERICA
SECURITIES AND EXCHANGE COMMISSION
Washington, D. C. 20549

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2019

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from__________ to __________

Commission File No.: 000-09881

SHENANDOAH TELECOMMUNICATIONS COMPANY

(Exact name of registrant as specified in its charter)

Virginia	**54-1162807**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

500 Shentel Way, Edinburg, Virginia 22824
(Address of principal executive offices) (Zip Code)

(540) 984-4141 (Registrant's telephone number, including area code)

SECURITIES REGISTERED PURSUANT TO SECTION 12(B) OF THE ACT:

Common Stock (No Par Value)	SHEN	NASDAQ Global Select Market	49,783,639
(Title of Class)	(Trading Symbol)	(Name of Exchange on which Registered)	(The number of shares of the registrant's common stock outstanding on February 19, 2020)

SECURITIES REGISTERED PURSUANT TO SECTION 12(G) OF THE ACT: NONE

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange Act. Yes ☐ No ☒

Note - Checking the box above will not relieve any registrant required to file reports pursuant to Section 13 or 15(d) of the Exchange Act from their obligations under those Sections.

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller reporting company,” and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

The aggregate market value of the registrant’s voting stock held by non-affiliates of the registrant at June 30, 2019 based on the closing price of such stock on the Nasdaq Global Select Market on such date was approximately $1.8 billion.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant’s definitive proxy statement relating to its 2020 annual meeting of shareholders (the “2020 Proxy Statement”) are incorporated by reference into Part III of this Annual Report on Form 10-K where indicated. The 2020 Proxy Statement will be filed with the U.S. Securities and Exchange Commission within 120 days after the end of the fiscal year to which this report relates.

SHENANDOAH TELECOMMUNICATIONS COMPANY

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PART I

CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS:

This annual report includes forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), regarding, among other things, our plans, strategies and prospects, both business and financial including, without limitation, the forward-looking statements set forth in Part I. Item 1, under the heading "Business" and in Part II. Item 7, under the heading "Management's Discussion and Analysis of Financial Condition and Results of Operations" in this annual report. Although we believe that our plans, intentions and expectations reflected in or suggested by these forward-looking statements are reasonable, we cannot assure you that we will achieve or realize these plans, intentions or expectations. Forward-looking statements are inherently subject to risks, uncertainties and assumptions, including, without limitation, the factors described in Part I. Item 1A, under "Risk Factors" and in Part II. Item 7, under the heading, "Management's Discussion and Analysis of Financial Condition and Results of Operations" in this annual report. Many of the forward-looking statements contained in this annual report may be identified by the use of forward-looking words such as "believe," "expect," "anticipate," "should," "planned," "will," "may," "intend," "estimated," "aim," "on track," "target," "opportunity," "tentative," "positioning," "designed," "create," "predict," "project," "initiatives," "seek," "would," "could," "continue," "ongoing," "upside," "increases" and "potential," among others. Important factors that could cause actual results to differ materially from the forward-looking statements we make in this annual report are set forth in this annual report and in other reports or documents that we file from time to time with the SEC, and include, but are not limited to:

- our ability to sustain and grow revenues and cash flow from operations by offering wireless, broadband, video, voice, cell tower space, fiber optic network services and other services to residential and commercial customers, to adequately meet the customer demands in our service areas and to maintain and grow our customer base, particularly in the face of increasingly aggressive competition, the need for innovation and the related capital expenditures;
- the impact of competition from other market participants, including but not limited to incumbent telephone companies, direct broadcast satellite ("DBS") operators, wireless broadband and telephone providers, digital subscriber line ("DSL") providers, fiber to the home providers, video provided over the Internet by (i) market participants that have not historically competed in the multichannel video business, (ii) traditional multichannel video distributors, and (iii) content providers that have historically licensed cable networks to multichannel video distributors, and providers of advertising over the Internet;
- any adverse change to Sprint's business, liquidity, financial condition or the potential merger with T-Mobile may materially adversely affect the market price of our common stock or on our operating results;
- the pending dispute with Sprint over the resetting of the travel fee could have a material adverse effect on our financial and operating results in our Wireless segment;
- general business conditions, economic uncertainty or downturn, unemployment levels and the level of activity in the housing sector;
- our ability to obtain programming at reasonable prices or to raise prices to offset, in whole or in part, the effects of higher programming costs;
- our ability to develop and deploy new products and technologies including mobile products and any other consumer services and service platforms;
- any events that disrupt our networks, information systems or properties and impair our operating activities or our reputation;
- the ability to retain and hire key personnel;
- the availability and access, in general, of funds to meet our debt obligations prior to or when they become due and to fund our operations and necessary capital expenditures, either through (i) cash on hand, (ii) cash flow, or (iii) access to the capital or credit markets; and
- our ability to comply with all covenants in our credit facility, any violation of which, if not cured in a timely manner, could trigger an event of default.

All forward-looking statements attributable to us or any person acting on our behalf are expressly qualified in their entirety by this cautionary statement. We are under no duty or obligation to update any of the forward-looking statements after the date of this annual report.

Unless we indicate otherwise, references in this report to "we," "us," "our," "Shentel" and "the Company" means Shenandoah Telecommunications Company and its subsidiaries.

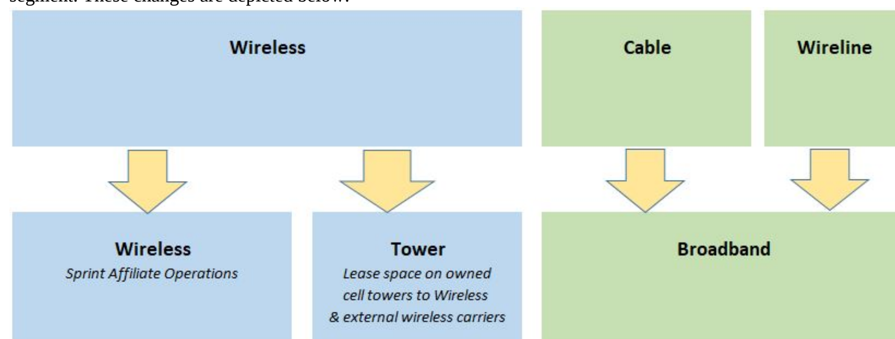
ITEM 1. BUSINESS

Our Company

Shenandoah Telecommunications Company (“Shentel”, “we”, “our”, “us”, or the “Company”), together with our consolidated subsidiaries, is a provider of a comprehensive range of wireless and broadband communication products and services in the Mid-Atlantic portion of the United States (“U.S.”).

Effective November 30, 2019, we realigned our reporting segment structure to align with how our CEO and chief operating decision maker (“CODM”) allocates resources and evaluates operating performance. These changes follow an organizational shift during 2019 from a business line to a functional structure, to better delineate between our key products, and better enable peer comparisons by both our CODM and our investors.

As a result of these changes, we have combined our legacy Cable and Wireline segments into a new Broadband segment and also bifurcated a Tower segment from our legacy Wireless segment. These changes are depicted below:



Each of our new segments is discussed further in the “Description of Business” section below. All current and prior period financial and operating statistics presented in this Annual Report have been recast accordingly for comparability.

Description of Business

Wireless

Our Wireless segment has been an affiliate of Sprint Corporation ("Sprint") since 1995. Under our affiliate agreement, we are Sprint's exclusive provider of wireless mobility communications network products throughout the Mid-Atlantic region of the U.S., including large portions of central and western Virginia, south-central Pennsylvania, West Virginia, and portions of Maryland, Kentucky, and Ohio ("Sprint Affiliate Area"). The Company is licensed to use the Sprint brand names in our Sprint Affiliate Area and we are licensed to operate on FCC spectrum licenses that Sprint owns within the 800 megahertz (MHz), 1900 MHz and 2.5 gigahertz (GHz) bands. Our current Sprint Affiliate Area covers an estimated population of approximately 6.3 million ("Covered POPS").

Sprint provides the Company significant support services, such as customer service, billing, collections, long distance, national network operations support, inventory logistics support, use of the Sprint brand names, national advertising, national distribution and product development.

Sprint is our customer under the affiliate agreement, and all of the revenue that we earn from providing wireless network service to Sprint is variable based on the amount that Sprint bills its subscribers within our Affiliate Area. Sprint also retains certain applicable fees from these billings, namely, an 8% Management Fee and an 8.6% Net Service Fee on postpaid revenues and a 6% Management Fee on prepaid wireless revenues. The Company is also charged for the costs of subsidized handsets sold through Sprint’s national sales channels as well as commissions paid by Sprint to third-party postpaid sales dealers in our Sprint Affiliate Area. Sprint also charges the Company separately to acquire and

support prepaid customers. These charges are calculated based on Sprint's national averages for its prepaid programs, and are billed per user or per gross additional customer, as appropriate.

At December 31, 2019 the Company provided network service to 844,194 postpaid Sprint PCS subscribers and 274,012 prepaid Sprint PCS subscribers, representing increases of 6.2% and 5.9%, respectively, compared with December 31, 2018. Of the Company's total consolidated revenues, approximately 70% in 2019, 71% in 2018, and 72% in 2017 were generated by our relationship with Sprint.

Broadband

Our Broadband segment provides broadband, video and voice services to residential and commercial customers in portions of Virginia, West Virginia, Maryland, and Kentucky, via fiber optic and hybrid fiber coaxial ("HFC") cable. The Broadband segment also leases dark fiber and provides Ethernet and Wavelength fiber optic services to enterprise and carrier customers throughout the entirety of our service area. The Broadband segment also provides voice and digital subscriber line ("DSL") telephone services to customers in Virginia's Shenandoah County as a Rural Local Exchange Carrier ("RLEC"). These integrated networks are connected by an approximately 6,000 fiber route mile network. This fiber optic network also supports our Wireless segment operations and these intercompany transactions are reported at their market value. The Broadband segment served 191,227 Revenue Generating Units ("RGUs") at December 31, 2019, representing an increase of 1.5%, from December 31, 2018.

Tower

Our Tower segment leases space on 225 owned cell towers to the Company's Wireless segment at market prices and to other wireless communications providers.

Competition

Wireless competition

The telecommunications industry is highly competitive. We compete primarily on the basis of price, network coverage and reliability, quality of wireless data speed service, phone and other device availability, distribution and quality of our customer service. Our ability to compete effectively depends on our ability to maintain high-quality services at prices competitive with those charged by our competitors. In particular, price competition in the wireless services markets generally has been intense and is expected to continue. Our competitors include, among others, larger national facilities-based providers such as AT&T Inc., Verizon Communications Inc. and T-Mobile USA, Inc. and regional facilities-based providers such as U.S. Cellular Corp. and Mobile Virtual Network Operators ("MVNOs") such as Comcast Corporation and Altice USA. Our primary competitors have substantially greater infrastructure, financial, personnel, technical, marketing and other resources, and also have larger numbers of established customers and more prominent name recognition than the Company.

Competition is intense in the wireless communications industry. Competition has caused the market prices for wireless products and services to decrease. This has resulted in some carriers introducing pricing plans that are structurally different and often more aggressively priced than in the past. Wireless providers are upgrading their wireless services to better accommodate real-time and downloadable audio and video content as well as Internet browsing capabilities and other services. Our ability to compete effectively will depend, in part, on our ability to anticipate and respond to various competitive factors affecting the wireless industry.

Broadband competition

As the incumbent cable provider passing over 200,000 homes, we compete directly against the incumbent local telephone companies such as CenturyLink, Inc., Frontier Communications Corp. and Verizon, who are generally provisioning broadband services over hybrid fiber and copper-based networks, and indirectly from wireless substitution as the bandwidth speeds from wireless providers have increased with network upgrades to 4th and 5th generation technology. Our recently launched Fiber to the Home ("Glo Fiber") service is competing against the incumbent local telephone company such as Verizon with hybrid fiber and copper-based networks and the incumbent cable company such as Comcast utilizing HFC networks.

Competition is also intense and growing in the market for video services. Incumbent cable television companies, which have historically provided video service, face competition from direct broadcast satellite providers such Dish and DirecTV and on-line video services, such as Netflix, Hulu, Disney and Amazon. Our ability to compete effectively

with our competitors in video will depend, in part, on price, content cost and variety and the convenience of our service offerings.

A continuing trend toward consolidation, mergers, acquisitions and strategic alliances in the telecommunications industry could also increase the level of competition we face by further strengthening our competitors.

Tower competition
We compete with other public tower companies, such as American Tower Co., Crown Castle International Corp., SBA Communications Corporation, and private tower companies, private equity sponsored firms, carrier-affiliated tower companies, and owners of other alternative structures. We believe that site location and capacity, network density, price, quality and speed of service have been, and will continue to be, significant competitive factors affecting owners, operators and managers of communications sites.

Regulation

Our operations are subject to regulation by the Federal Communications Commission ("FCC"), the Virginia State Corporation Commission ("VSCC"), the West Virginia Public Service Commission, the Maryland Public Service Commission, the Pennsylvania Public Utility Commission, the Kentucky Public Service Commission and other federal, state, and local governmental agencies. The laws governing these agencies, and the regulations and policies that they administer, are subject to constant review and revision, and some of these changes could have material impacts on our revenues and expenses.

Regulation of Telecommunication Services

We operate our wireless business using radio spectrum made available by Sprint under the Sprint Management Agreement. Our wireless business is directly or indirectly subject to, or affected by, a number of regulations and requirements of the FCC and other governmental authorities that apply to providers of commercial mobile radio services ("CMRS").

Interconnection. Federal law and FCC regulations impose certain obligations on CMRS providers to interconnect their networks with other telecommunications providers (either directly or indirectly) and to enter into interconnection agreements ("ICAs") with certain types of telecommunications providers. Interconnection agreements typically are negotiated on a statewide basis and are subject to state approval. If an agreement cannot be reached, in certain cases parties to interconnection negotiations involving CMRS providers can submit unresolved issues to federal or state regulators for arbitration. In addition, FCC regulations previously required that local exchange carriers ("LECs") and CMRS providers establish reciprocal compensation arrangements for the termination of traffic to one another. Disputes regarding intercarrier compensation can be brought in a number of forums (depending on the nature and jurisdiction of the dispute) including state public utility commissions ("PUCs"), the FCC and the courts. The Company does not presently have any material interconnection or intercarrier compensation disputes with respect to its wireless operations.

On December 18, 2014, the FCC issued a declaratory ruling that provides additional guidance concerning how the agency will evaluate the reasonableness of data roaming agreements. The agency clarified that it will consider the reasonableness of data roaming rates based upon, in part, whether such rates exceed retail, international and resale rates, as well as how such rates compare to other providers' rates. The ruling also clarifies other aspects of the FCC's 2011 data roaming order concerning the appropriate presumptions applied to certain contract terms and the inclusion of build-out terms when considering the reasonableness of roaming rates and terms. The ruling is expected to provide improved negotiating leverage to Sprint, and other providers, in negotiating new data roaming agreements with AT&T and Verizon. It is unclear whether such leverage will result in lower data roaming rates for Sprint, or whether such reduced rates will accrue to the benefit of our operations. There is also a possibility that the ruling could provide a basis for smaller wireless providers to seek more beneficial terms in their roaming agreements with Sprint, which may impact roaming costs in our territory.

Universal Service Contribution Requirements. Consistent with the terms of our affiliate agreement, Sprint is required to contribute to the federal universal service fund (the "USF") based in part on the revenues it earns in connection with our wireless operations. The purpose of this fund is to subsidize telecommunications and broadband services in rural areas, for low-income consumers and for schools, libraries and rural healthcare facilities. Sprint is permitted to, and does, pass through these mandated payments as surcharges paid by its subscribers.

Transfers, Assignments and Changes of Control of Spectrum Licenses. The FCC must give prior approval to the assignment of ownership or control of a spectrum license, as well as transfers involving substantial changes in such ownership or control. The FCC also requires licensees to maintain effective working control over their licenses. Our affiliate agreement reflects an alliance that the parties believe meets the FCC requirements for licensee control of licensed spectrum. If the FCC were to determine that the affiliate agreement should be modified to increase the level of licensee control, we have agreed with Sprint to use our best efforts to modify the affiliate agreement as necessary to cause it to comply with applicable law and to preserve to the extent possible the economic arrangements set forth in the affiliate agreement. If the affiliate agreement cannot be modified, it may be terminated pursuant to its terms. The FCC could also impose sanctions on the Company for failure to meet these requirements.

Spectrum licenses are granted for ten-year terms. Sprint's spectrum licenses for our service area are scheduled to expire on various dates throughout the term of our affiliate agreements. Pursuant to recently adopted changes concerning wireless license renewals, spectrum licensees have an expectation of license renewal if they can satisfy three "safe harbor" certifications which, if made, will result in routine processing and grant of the license renewal application. Those certifications require the licensee to certify that it has satisfied any ongoing provision of service requirements applicable to the spectrum license, that it has not permanently discontinued operations (defined as 180 days continuously off the air), and that it has substantially complied with applicable rules and policies. If for some reason a licensee cannot meet these safe harbor requirements, it can file a detailed renewal showing based on the actual service provided by the station. All of the PCS licenses used in our wireless business have been successfully renewed since their initial grant.

Construction and Operation of Wireless Facilities. Wireless systems must comply with certain FCC and Federal Aviation Administration ("FAA") regulations regarding the registration, siting, marking, lighting and construction of transmitter towers and antennas. The FCC also requires that aggregate radio frequency emissions from every site meet certain standards. These regulations affect site selection for new network build-outs and may increase the costs of improving our network. We cannot predict what impact the costs and delays from these regulations could have on our operations.

The construction of new towers, and in some cases the modification of existing towers, may also be subject to environmental review pursuant to the National Environmental Policy Act of 1969 ("NEPA"), which requires federal agencies to evaluate the environmental impacts of their decisions under some circumstances. FCC regulations implementing NEPA place responsibility on each applicant to investigate any potential environmental effects of a proposed operation, including health effects relating to radio frequency emissions, and impacts on endangered species such as certain migratory birds, and to disclose any significant effects on the environment to the agency prior to commencing construction. In the event that the FCC determines that a proposed tower would have a significant environmental impact, the FCC would require preparation of an environmental impact statement, which would be subject to public comment.

In addition, tower construction is subject to regulations implementing the National Historic Preservation Act. Compliance with FAA, environmental or historic preservation requirements could significantly delay or prevent the registration or construction of a particular tower or make tower construction more costly. On July 15, 2016, Congress enacted new tower marking requirements for certain towers located in rural areas, which may increase our operational costs. However, statutory changes adopted by Congress in the 2018 FAA Reauthorization Act may ameliorate or mitigate some of those costs. In some jurisdictions, local laws or regulations may impose similar requirements.

Wireless Facilities Siting. States and localities are authorized to engage in forms of regulation, including zoning and land-use regulation, which may affect our ability to select and modify sites for wireless facilities. States and localities may not engage in forms of regulation that effectively prohibit the provision of wireless services, discriminate among functionally equivalent services or regulate the placement, construction or operation of wireless facilities on the basis of the environmental effects of radio frequency emissions. Courts and the FCC are routinely asked to review whether state and local zoning and land-use actions should be preempted by federal law, and the FCC also is routinely asked to consider other issues affecting wireless facilities siting in other proceedings. We cannot predict the outcome of these proceedings or the effect they may have on us.

Communications Assistance for Law Enforcement Act. The Communications Assistance for Law Enforcement Act ("CALEA") was enacted in 1994 to preserve electronic surveillance capabilities by law enforcement officials in the face of rapidly changing telecommunications technology. CALEA requires telecommunications carriers and broadband providers, including the Company, to modify their equipment, facilities and services to allow for authorized electronic surveillance based on either industry or FCC standards. Following adoption of interim standards and a lengthy rulemaking proceeding, including an appeal and remand proceeding, all carriers were required to be in compliance

with the CALEA requirements as of June 30, 2002. The FCC extended CALEA obligations to VoIP and broadband services in 2005. We are currently in compliance with the CALEA requirements.

Local Number Portability. All covered CMRS providers, including the Company, are required to allow wireless customers to retain their existing telephone numbers when switching from one telecommunications carrier to another. These rules are generally referred to as wireless local number portability ("LNP"). The future volume of any porting requests, and the processing costs related thereto, may increase our operating costs in the future. We are currently in compliance with LNP requirements. The FCC has selected a new Local Number Portability Administrator, and the transition to a new Local Number Portability Administrator may impact our ability to manage number porting and related tasks, or may result in additional costs related to the transition.

Number Pooling. The FCC regulates the assignment and use of telephone numbers by wireless and other telecommunications carriers to preserve numbering resources. CMRS providers in the top 100 markets are required to be capable of sharing blocks of 10,000 numbers among themselves in subsets of 1,000 numbers ("1000s-block number pooling"); the FCC considers state requests to implement 1000s-block number pooling in smaller markets on a case-by-case basis, and has granted such requests in the past. In addition, all CMRS carriers, including those operating outside the top 100 markets, must be able to support roaming calls on their network placed by users with pooled numbers. Wireless carriers must also maintain detailed records of the numbers they have used, subject to audit. The pooling requirements may impose additional costs and increase operating expenses on us and limit our access to numbering resources. We are currently in compliance with the FCC number pooling requirements.

Telecommunications Relay Services ("TRS"). Federal law requires wireless service providers to take steps to enable the hearing impaired and other disabled persons to have reasonable access to wireless services. The FCC has adopted rules and regulations implementing this requirement to which we are subject, and requires that we pay a regulatory assessment to support such telecommunications relay services for the disabled. The Company is in compliance with these requirements.

Consumer Privacy. The Company is subject to various federal and state laws intended to protect the privacy of end-users who subscribe to the Company's services. For example, the Communications Act of 1934, as amended (the "Communications Act"), limits our ability to collect, use, and disclose customers' personally identifiable information for our cable television/video, voice, and Internet services. We are subject to additional federal, state, and local laws and regulations that impose additional restrictions on the collection, use and disclosure of consumer information. Further, the FCC, the Federal Trade Commission ("FTC"), and many states regulate and restrict the marketing practices of communications service providers, including telemarketing and sending unsolicited commercial emails. The FCC also has regulations that place restrictions on the permissible uses that we can make of customer-specific information, known as Customer Proprietary Network Information ("CPNI"), received from telecommunications service subscribers, and that govern procedures for release of such information in order to prevent identity theft schemes. Other laws impose criminal and other penalties for the violation of certain CPNI requirements and related privacy protections.

As a result of the FCC's December 2017 decision to reclassify broadband Internet access service as an "information service," the FTC has the authority to enforce against unfair or deceptive acts and practices, to protect the privacy of Internet service customers, including our use and disclosure of certain customer information.

After the repeal of the FCC's 2016 privacy rules through the Congressional Review Act, many states and local authorities have considered legislative or other actions that would impose additional restrictions on our ability to collect, use and disclose certain information. Despite language in the FCC's December 2017 decision reclassifying broadband Internet access service as an "information service" that preempts state and local privacy regulations that conflict with federal policy, we expect these state and local efforts to regulate online privacy to continue in 2020. California's Consumer Privacy Act, scheduled to take effect in January 2020, will, under certain circumstances, regulate the sale and disclosure of the personal information of California residents, grants California residents certain rights to, among other things, access and delete data about them in certain circumstances, and authorizes enforcement actions by the California Attorney General and certain private class actions. Proposed rules issued by the California Attorney General are scheduled to go into effect in July 2020. Compliance with the CCPA may increase the cost of providing our services to customers who may be residents in California. Additionally, several state legislatures are considering the adoption of new data security and cybersecurity legislation that could result in additional network and information security requirements for our business. There are also bills pending in both the U.S. House of Representatives and Senate that could impose new privacy and data security obligations. We cannot predict whether any of these efforts will be successful or preempted, or how new legislation and regulations, if any, would affect our business. These efforts have the potential

to create a patchwork of differing and/or conflicting state and/or federal regulations, and to increase the cost of providing our services.

Our operations are also subject to federal and state laws governing information security. In the event of an information security breach, such rules may require consumer and government agency notification and may result in regulatory enforcement actions with the potential of monetary forfeitures.

In addition, restrictions exist, and new restrictions are considered from time to time by Congress, federal agencies and states, on the extent to which wireless customers may receive unsolicited telemarketing calls, text messages, junk e-mail or spam. Congress, federal agencies and certain states also are considering, and may in the future consider imposing, additional requirements on entities that possess consumer information to protect the privacy of consumers. The Company is required to file an annual certification of compliance with the FCC's CPNI rules. Complying with these requirements may impose costs on the Company or compel the Company to alter the way it provides or promotes its services.

Consumer Protection. Many members of the wireless industry, including us, have voluntarily committed to comply with the Cellular Telecommunication and Internet Association ("CTIA") Consumer Code for Wireless Service, which includes consumer protection provisions regarding the content and format of bills; advance disclosures regarding rates, terms of service, contract provisions, and network coverage; and the right to terminate service after a trial period or after changes to contract provisions are implemented. The FCC and/or certain state commissions have considered or are considering imposing additional consumer protection requirements upon wireless service providers, including billing-related disclosures and usage alerts, as well as the adoption of standards for responses to customers and limits on early termination fees. On December 12, 2013, CTIA filed a letter with the FCC detailing voluntary commitments by large wireless providers, including Sprint, which will permit subscribers and former subscribers to unlock their mobile devices, subject to contract fulfillment time frames for postpaid plans, or after one year for prepaid plans. The carriers have agreed to fully implement the voluntary commitments within 12 months of adoption. Subsequently, on February 11, 2014, CTIA-The Wireless Association adopted six standards on mobile wireless device unlocking into the CTIA Consumer Code for Wireless Service. Finally, on August 1, 2014, the Unlocking Consumer Choice and Wireless Competition Act was enacted to make it easier for consumers to change their cell phone service providers without paying for a new phone. This new statute reverses a decision made by the Library of Congress in 2012 that said it was illegal for consumers to “unlock” their cell phones for use on other networks without their service provider’s permission. Adoption of these and other similar consumer protection requirements could increase the expenses or decrease the revenue of the Company's wireless business. Courts have also had, and in the future may continue to have, an effect on the extent to which matters pertaining to the content and format of wireless bills can be regulated at the state level. Any further changes to these and similar requirements could increase our costs of doing business and our costs of acquiring and retaining customers.

Broadband Regulation. For information concerning the FCC’s non-discrimination requirements for wireless broadband providers, see the discussion under “Regulation of Broadband Services”.

Radio Frequency Emission from Handsets. Some studies (and media reports) have suggested that radio frequency emissions from handsets, wireless data devices and cell sites may raise various health concerns, including cancer, and may interfere with various electronic medical devices, including hearing aids and pacemakers. Most of the expert reviews conducted to date have concluded that the evidence does not support a finding of adverse health effects but that further research is appropriate. Courts have dismissed a number of lawsuits filed against other wireless service operators and manufacturers, asserting claims relating to radio frequency transmissions to and from handsets and wireless data devices. However, there can be no assurance that the outcome of other lawsuits, or general public concerns over these issues, will not have a material adverse effect on the wireless industry, including us.

Accessibility. The FCC imposes obligations on telecommunications service providers intended to ensure that individuals with disabilities are able to access and use telecommunications services and equipment. FCC rules require telecommunications service providers, including wireless providers, to be capable of transmitting 911 calls from persons who are deaf, hard of hearing or speech disabled, including through text telephone ("TTY") capability over the public switched telephone network ("PSTN"), various forms of PSTN-based and internet protocol ("IP")-based TRS, and text-to-911 (where available). The FCC rules allow wireless telecommunications service providers to transition to use of real time text ("RTT") in lieu of TTY technology for communications using wireless IP-based voice services. In addition, telecommunications services, including Voice over Internet Protocol ("VoIP"), and advanced communications services ("ACS") (such as email and text messaging) must be accessible to and usable by disabled persons, including by ensuring that email and texts are compatible with commonly used screen readers, unless doing so is not achievable.

FCC rules require that customer support for covered telecommunications and ACS services (including website based) is accessible and also imposes extensive recordkeeping for both telecommunications services and ACS, and subject providers to significant penalties for non-compliance with accessibility requirements as well as for falsely certifying compliance with recordkeeping obligations. Existing FCC rules also require us to offer a minimum number of hearing aid-compatible ("HAC") handsets to consumers. The FCC recently adopted rules that update technical specifications for HAC handsets and extend HAC compatibility requirements to VoIP handsets.

911 Services. We are subject to FCC rules that require wireless carriers to make emergency 911 services available to their subscribers, including enhanced 911 services that convey the caller's telephone number and detailed location information to emergency responders. The FCC has also sought public comment to investigate further requirements regarding the accuracy of wireless location information transmitted during an emergency 911 call. Additionally, the FCC adopted rules requiring all wireless carriers to support the ability of consumers to send text messages to 911 in all areas of the country where 911 Public Safety Answering Points ("PSAP") are capable of receiving text messages. Also, in May 2013, the FCC adopted rules which require CMRS providers to provide an automatic "bounce-back" text message when a subscriber attempts to send a text message to 911 in a location where text-to-911 is not available. In August 2014, the FCC ordered that all CMRS and interconnected text providers must be capable of supporting text-to-911 by December 31, 2014. Such covered text providers had until June 30, 2015, to begin delivering text-to-911 messages to PSAPs that have submitted requests for such delivery by December 31, 2014, unless otherwise agreed with the PSAP, and six months to begin delivery after any such request made after December 31, 2014. We are not able to predict the effect that these, or any other, changes to the 911 service rules will have on our operations.

Regulation of Broadband Services

We provide cable and fiber services to customers in franchise areas covering portions of Virginia, West Virginia, western Maryland and eastern Kentucky.

The provision of cable service generally is subject to regulation by the FCC, and cable operators typically also must comply with the terms of the franchise agreement between the cable operator and the local franchising authority. Some states, including Virginia and West Virginia, have enacted regulations and franchise provisions that also can affect certain aspects of a cable operator's operations. Our business can be significantly impacted by changes to the existing regulatory framework, whether triggered by legislative, administrative, or judicial rulings.

The FCC originally classified broadband Internet access services, such as those we offer, as an information service, which by law exempts the service from traditional common carrier communications laws and regulations. In 2015, the FCC determined that broadband Internet access services, such as those we offer, were a form of telecommunications service under the Communications Act and, on that basis, imposed rules (commonly referred to as "Net Neutrality" rules) banning service providers from blocking access to lawful content, restricting data rates for downloading lawful content, prohibiting the attachment of non-harmful devices, giving special transmission priority to affiliates, and offering third parties the ability to pay for priority routing. The 2015 rules also imposed a transparency requirement, *i.e.*, an obligation to disclose all material terms and conditions of our service to consumers.

In December 2017, the FCC adopted an order repudiating its treatment of broadband as a telecommunications service, reclassifying broadband as an information service, and eliminating the 2015 rules other than the transparency requirement, which it eased in significant ways. The FCC also ruled that state regulators may not impose obligations similar to federal obligations that the FCC removed. Various parties have challenged the FCC's December 2017 ruling in court, but we cannot predict how any such court challenges will be resolved. Moreover, it is possible that the FCC might further revise its approach to broadband Internet access, or that Congress might enact legislation affecting the rules applicable to the service.

Numerous challenges to the FCC's 2017 reclassification order were filed seeking reinstatement of the FCC's 2015 rules. In 2019, the U.S. Court of Appeals for the District of Columbia upheld the information service reclassification, denied reinstatement of the 2015 rules, but vacated the FCC's blanket prohibition of state utility regulation of broadband services. The court left open the possibility that individual state laws could still be deemed preempted on a case-by-case basis if it is shown that they conflict with federal law. At the same time, several states (including California) adopted state obligations replacing the Internet access ("net neutrality" type) obligations that the FCC removed, and we expect that additional states will consider the imposition of new regulations on our Internet services. California's legislation has been challenged in court and the litigation is stayed pending a final resolution of the D.C. Circuit's 2019 decision, which is subject to petitions for rehearing and possible review in the U.S. Supreme Court. We cannot predict how any such state legislation and court challenges will be resolved. Various governmental jurisdictions are also

considering additional regulations in these and other areas, such as privacy, pricing, service and product quality, imposition of local franchise fees on Internet-related revenue and taxation. The adoption of new Internet regulations or the adaptation of existing laws to the Internet, including potential liability for the infringing activities of Internet subscribers, could adversely affect our business.

Moreover, irrespective of these cases, and as recent history has shown, it is possible that the FCC might further revise its approach to broadband Internet access in the future, or that Congress might enact legislation affecting the rules applicable to the service.

Notwithstanding the reclassification of Internet access service as an "information service," cable operators that provide Internet services over their cable plant are subject to the privacy requirements of the Communications Act, as discussed separately.

As the Internet has matured, it has become the subject of increasing regulatory interest. Congress and Federal regulators have adopted a wide range of measures directly or potentially affecting Internet use. The adoption of new Internet regulations or policies could adversely affect our business.

On January 29, 2015, the FCC, in a nation-wide proceeding evaluating whether advanced broadband is being deployed in a reasonable and timely fashion, increased the minimum connection speeds required to qualify as advanced broadband service to 25 Mbps for downloads and 3 Mbps for uploads. As a result, the FCC concluded that advanced broadband was not being sufficiently deployed and initiated a new inquiry into what steps it might take to encourage broadband deployment. This action may lead the FCC to adopt additional measures affecting our broadband business. At the same time, the FCC has ongoing proceedings to allocate additional spectrum for advanced wireless service, which could provide additional wireless competition to our broadband business.

Pricing and Packaging. Federal law limits cable rate regulation solely to communities that lack "effective competition," as defined by federal regulation. Even in the absence of effective competition, federal law circumscribes the scope of permissible cable rate regulation. None of our local franchise authorities presently regulate our rates. Congress and the FCC from time to time have considered imposing new pricing, packaging and consumer protection restrictions on cable operators, including our disclosure and itemization of subscriber fees. We cannot predict whether or when such new marketing restrictions may be imposed on us or what effect they would have on our ability to provide cable service.

Must-Carry/Retransmission Consent. Local broadcast television stations can require a cable operator to carry their signals pursuant to federal "must-carry" requirements. Alternatively, local television stations may require that a cable operator obtain "retransmission consent" for carriage of the station's signal, which can enable a popular local television station to obtain concessions from the cable operator for the right to carry the station's signal. Although some local television stations today are carried by cable operators under the must-carry obligation, popular broadcast network affiliated stations, such as ABC, CBS, FOX, CW and NBC, typically are carried pursuant to retransmission consent agreements. The retransmission consent costs charged by broadcast networks affiliate stations are increasing rapidly. We cannot predict the extent to which such retransmission consent costs may increase in the future or the effect such cost increases may have on our ability to provide cable service.

Copyright Fees. Cable operators pay compulsory copyright fees, in addition to possible retransmission consent fees, to retransmit broadcast programming. Although the cable compulsory copyright license has been in place for more than 40 years, there have been legislative and regulatory proposals to modify or even replace the compulsory license with privately negotiated licenses. We cannot predict whether such proposals will be enacted and how they might affect our business.

Programming Costs. Satellite-delivered cable programming, such as ESPN, HBO and the Discovery Channel, is not subject to must-carry/retransmission consent regulations or a compulsory copyright license. The Company negotiates directly or through the National Cable Television Cooperative ("NCTC") with satellite-delivered cable programmers for the right to carry their programming. The cost of acquiring the right to carry satellite-delivered cable programming can increase as programmers demand rate increases.

Franchise Matters. Cable operators generally must apply for and obtain non-exclusive franchises from local or state franchising authorities before providing video service. The terms and conditions of franchises vary among jurisdictions, but franchises generally last for a fixed term and are subject to renewal, require the cable operator to collect a franchise fee of as much as 5% of the cable operator's gross revenue from video services, and contain certain service quality and customer service obligations. A significant number of states today have processes in place for obtaining state-wide

franchises, and legislation and regulation have been introduced from time to time in Congress, the FCC, and in various states, including those in which we provide some form of video service, that would modify franchising processes, potentially lowering barriers to entry and increasing competition in the marketplace for video services. Virginia's franchising statute largely leaves franchising responsibility in the hands of local municipalities and counties, but it governs the local government entities' award of such franchises and their conduct of franchise negotiations. We cannot predict the extent to which these rules and other developments will accelerate the pace of new entry into the video market or the effect, if any, they may have on our cable operations.

Pole Attachments. The Communications Act requires investor-owned utilities to provide cable systems with access to poles and conduits and simultaneously subjects the rates charged for this access to either federal or state regulation. The FCC rules do not directly affect pole attachment rates in states that self-regulate (rather than allow the FCC to regulate) pole rates, but many of those states have substantially the same rate for cable and telecommunications attachments. We provide broadband services in Pennsylvania where the state is in the process of assuming pole regulation jurisdiction from the FCC. Once Pennsylvania's self-regulation becomes effective as expected, the state Public Utility Commission will generally apply the same rate and other pole rules as the FCC. We also operate cable systems and provide broadband services in West Virginia where the state recently assumed jurisdiction from the FCC over pole regulation and the state Public Service Commission adopted rules that generally conform to the FCC's rate and other pole rules.

In August 2018, the FCC adopted rules to permit a "one-touch" make-ready process for poles subject to its jurisdiction. The "one touch" make-ready rules allow new attachers to alter certain components of existing attachments for "simple make-ready" (i.e. where the alteration of existing attachments does not involve a reasonable expectation of a service outage, splicing, pole replacement or relocation of a wireless attachment). The rules are intended to promote broadband deployment and competition by facilitating communications attachments, although there are concerns regarding potential damage to existing networks by third parties. Utility pole owners have appealed the rules to the United States Court of Appeals for the Ninth Circuit. We cannot predict the effect that these rules will have on our business when they ultimately take effect. As explained above, although West Virginia now self-regulates (with Pennsylvania expected to follow shortly), the FCC's "one touch" rules have been adopted in West Virginia and should soon take effect in Pennsylvania.

Privacy. For information concerning the privacy obligations of our Broadband service, see the discussion under "Regulation of Wireless Operations - Consumer Privacy."

Accessibility. The FCC imposes obligations on multi-channel video programming distributors ("MVPDs"), intended to ensure that individuals with disabilities are able to access and use video programming services and equipment. FCC rules require video programming delivered on MVPD systems to be closed captioned unless exempt and require MVPDs to pass through captions to consumers and to take all steps needed to monitor and maintain equipment to ensure that captioning reaches the consumer intact. Video programming delivered over the Internet must be captioned if it was delivered previously on television with captions. An MVPD must also pass through audio description provided in broadcast and non-broadcast programming if it has the technical capability to do so, unless it is using the required technology for another purpose. FCC rules also require MVPDs to ensure that critical details about emergencies conveyed in video programming are accessible to persons with disabilities, and that video programming guides are accessible to persons who are blind or visually impaired. We cannot predict if or when additional changes will be made to the current FCC accessibility rules, or whether and how such changes will affect us.

VoIP Services. We provide voice communications services over our cable network utilizing interconnected VoIP technology and service arrangements. Although similar to telephone service in some ways, our VoIP service arrangement utilizes different technology and is subject to many of the same rules and regulations applicable to traditional telephone service. The FCC order adopted on October 27, 2011, established rules governing intercarrier compensation payments for the origination and termination of telephone traffic between carriers and VoIP providers. In May 2014 the United States Court of Appeals for the Tenth Circuit upheld the FCC order reducing intercarrier compensation payments. The rules have substantially decreased intercarrier compensation payments we may have otherwise received over a multi-year period. The decreases over the multi-year transition have affected both the amounts that we pay to telecommunications carriers and the amounts that we receive from other carriers. The schedule and magnitude of these decreases, however, has varied depending on the nature of the carriers and the telephone traffic at issue. These changes have had a negative impact on our revenues and expenses for voice services at particular times over this multi-year period.

Further regulatory changes are being considered that could impact our VoIP service. The FCC and state regulatory authorities are considering, for example, whether certain common carrier regulations traditionally applied to incumbent local exchange carriers (including RLECs) should be modified or reduced, and the extent to which common carrier requirements should be extended to VoIP providers. The FCC has already determined VoIP providers must comply with requirements relating to 911 emergency services, CALEA, USF contribution, customer privacy and CPNI issues, number portability, network outage, rural call completion, disability access, battery backup, regulatory fees, and discontinuance of service. In March 2007, a federal appeals court affirmed the FCC's decision concerning federal regulation of certain VoIP services, but declined to specifically find that VoIP service provided by cable companies, such as we provide, should be regulated only at the federal level. As a result, certain states, including West Virginia, began proceedings to subject cable VoIP services to state-level regulation. Although the West Virginia proceeding concluded without any new state-level regulation, it is difficult to predict whether it, or other state regulators, will continue to attempt to regulate our VoIP service. We have registered with, or obtained certificates or authorizations from, the FCC and the state regulatory authorities in those states in which we offer competitive voice services in order to ensure the continuity of our services and to maintain needed network interconnection arrangements. It is not clear how the FCC Order to reclassify wireline and wireless broadband services as Title II common carrier services, and pursuant to Section 706, will affect the regulatory status of our VoIP services. Further, it is also unclear whether and how these and other ongoing regulatory matters ultimately will be resolved.

Prospective competitors of Shenandoah Cable Television, LLC (Shentel Cable), a subsidiary of the Company, may also receive disbursements from the USF. Some of those competitors have requested USF support under the Connect America Fund to build broadband facilities in areas already served by Shentel Cable. Although Shentel Cable has opposed such requests where we offer service, we cannot predict whether the FCC or another agency will grant such requests or otherwise fund broadband service in areas already served by the company.

Other Issues. Our ability to provide video service may be affected by a wide range of additional regulatory and related issues, including FCC regulations pertaining to licensing of systems and facilities, set-top boxes, and equipment compatibility, program exclusivity blackouts, commercial leased access of video channels by unaffiliated third parties, advertising, public files, accessibility to persons with disabilities, emergency alerts, equal employment opportunity, privacy, consumer protection, and technical standards. Further, the FCC is currently considering proposals to reallocate for other purposes certain spectrum currently used by satellite providers to deliver video programming to individual cable systems, which could be disruptive to the satellite video delivery platform we rely upon to provide our video services. We cannot predict the nature and pace of these and other developments or the effect they may have on our operations.

Regulation of Shenandoah Telephone Company ("Shenandoah Telephone")

State Regulation. Shenandoah Telephone Company is a rural local exchange carrier ("RLEC") serving Shenandoah County, Virginia and portions of Rockingham and Augusta County Virginia. Shenandoah Telephone's rates for local exchange service, intrastate toll service, and intrastate access charges are subject to the approval of the Virginia State Corporation Commission, ("VSCC"). The VSCC also establishes and oversees implementation of certain provisions of the federal and state telecommunications laws, including interconnection requirements, promotion of competition, and consumer protection standards. The VSCC also regulates rates, service areas, service standards, accounting methods, affiliated transactions and certain other financial transactions. Pursuant to the FCC's October 27, 2011 order adopting comprehensive reforms to the federal intercarrier compensation and universal service policies and rules (as discussed above and further below), the FCC preempted state regulatory commissions' jurisdiction over all terminating access charges, including intrastate terminating access charges, which historically have been within the states' jurisdiction. However, the FCC vested in the states the obligation to monitor the tariffing of intrastate rate reductions for a transition period, to oversee interconnection negotiations and arbitrations, and to determine the network edge, subject to FCC guidance, for purposes of the new "bill-and-keep" framework. A federal appeals court has affirmed the decision. The outcome of those further challenges could modify or delay the effectiveness of the FCC's rule changes. During 2017 the FCC initiated a further proceeding to consider whether additional changes to interconnection obligations are needed, including how and where companies interconnect their networks with the networks of other providers. Although we are unable to predict the ultimate effect that the FCC's order will have on the state regulatory landscape or our operations, the rules may decrease or eliminate revenue sources or otherwise limit our ability to recover the full value of our network assets.

Interconnection. Federal law and FCC regulations impose certain obligations on incumbent local exchange carriers (including RLECs) to interconnect their networks with other telecommunications providers (either directly or indirectly) and to enter into ICAs with certain types of telecommunications providers. Interconnection agreements typically are

negotiated on a statewide basis and are subject to state approval. If an agreement cannot be reached, parties to interconnection negotiations can submit unresolved issues to federal or state regulators for arbitration. Disputes regarding intercarrier compensation can be brought in a number of forums (depending on the nature and jurisdiction of the dispute) including PUCs, the FCC, and the courts. The Company is working to resolve routine interconnection and intercarrier compensation-related disputes concerning the volume of traffic exchanged between the Company and third parties, appropriate access rates, and terms for the origination and termination of traffic on third-party networks.

Regulation of Intercarrier Compensation. Shenandoah Telephone participates in the access revenue pools administered by the FCC-supervised National Exchange Carrier Association ("NECA"), which collects and distributes the revenues from interstate access charges that long-distance carriers pay us for originating and terminating interstate calls over our network. Shenandoah Telephone also participates in some NECA tariffs that govern the rates, terms, and conditions of our interstate access offerings. Some of those tariffs are under review by the FCC, and we may be obligated to refund affected access charges collected in the past or in the future if the FCC ultimately finds that the tariffed rates were unreasonable. We cannot predict whether, when, and to what extent such refunds may be due.

On October 27, 2011, the FCC adopted a number of broad changes to the ICC rules governing the interstate access rates charged by small-to-mid-sized RLECs such as Shenandoah Telephone. For example, the FCC adopted a national "bill-and-keep" framework, which will result in substantial reductions in the access charges paid by long distance carriers and other interconnecting carriers, possibly to zero, accompanied by increases to the subscriber line charges paid by business and residential end users. In addition, the FCC has changed some of the rules that determine what compensation voice service providers, including but not limited to wireless carriers, competitive local exchange carriers, VoIP providers and providers of other Internet-enabled services, should pay and receive for originating and terminating traffic that is interconnected with RLEC networks.

The FCC's changes to the ICC rules have been affirmed by a federal appeals court. These changes, and potential future changes, to such compensation regulations could increase our expenses and/or reduce our revenues.

The VSCC has jurisdiction over local telephone companies' intrastate access charges, and has indicated in the past that it might open a generic proceeding on the rates charged for intrastate access, although the scope and likelihood of such a proceeding is unclear in light of the FCC's overhaul of the intercarrier compensation rules (discussed above), which affect states' jurisdiction over intrastate access charges.

Universal Service Fund. Shenandoah Telephone receives disbursements from the USF. In October 2011, the FCC adopted comprehensive changes to the universal service program that are intended in part to stabilize the USF, the total funding of which had increased considerably in recent years. Some of the FCC's reforms impact the rules that govern disbursements from the USF to RLECs such as Shenandoah Telephone, and to other providers. Such changes, and additional future changes, may reduce the size of the USF and payments to Shenandoah Telephone, a subsidiary of the Company, which could have an adverse impact on the operating results of the Company. The Company is not able to predict if or when additional changes will be made to the USF, or whether and how such changes would affect the extent of our total federal universal service assessments, the amounts we receive, or our ability to recover costs associated with the USF. We cannot predict the extent to which such access charges may decrease or change in the future or the effect such access charge increases may have on our ability to provide cable service.

If the Universal Service Administrative Company ("USAC") were required to account for the USF program in accordance with generally accepted accounting principles for federal agencies under the Anti-Deficiency Act (the "ADA"), it could cause delays in USF payments to fund recipients and significantly increase the amount of USF contribution payments charged to wireline and wireless consumers. Each year since 2004, Congress has adopted short-term exemptions for the USAC from the ADA. Congress has from time to time considered adopting a longer term exemption for the USAC from the ADA, but we cannot predict whether any such exemption will be adopted or the effect it may have on the Company.

In February, 2012, the FCC released an order making substantial changes to the rules and regulations governing the federal USF Lifeline Program, which provides discounted telephone services to low income consumers. The order imposes greater recordkeeping and reporting obligations, and generally subjects providers of Lifeline-supported services to greater oversight. In 2016, the FCC released a second substantial Lifeline order that amended the program to provide support for broadband services and phase out support for voice services. Included among the new rules was a requirement that any eligible telecommunications carrier ("ETC") which offered broadband service, on its own or through an affiliate, must also offer Lifeline-supported broadband service. Due to this requirement, our Company began offering Lifeline-supported broadband in areas where it operates as an ETC. In 2017, the FCC released a Lifeline

order that included clarifications to the 2016 Lifeline order and proposed reforms aimed at improving program integrity. As a result of our Company providing Lifeline-supported services, we are subject to increased reporting and recordkeeping requirements, and could be subject to increased regulatory oversight, investigations or audits. The FCC, USAC and other authorities have conducted, and in the future are expected to continue to conduct, more extensive audits of USF support recipients, as well as other heightened oversight activities. The impact of these activities on the Company, if any, is uncertain.

Other Regulatory Obligations. Shenandoah Telephone is subject to requirements relating to CPNI, CALEA implementation, interconnection, access to rights of way, number portability, number pooling, accessibility of telecommunications for those with disabilities, protection for consumer privacy, and other obligations similar to those discussed above for our wireless operations.

The FCC and other authorities continue to consider policies to encourage nationwide advanced broadband infrastructure development. For example, the FCC has largely deregulated DSL and other broadband services offered by RLECs. Such changes benefit our RLEC, but could make it more difficult for us (or for NECA) to tariff and pool DSL costs. Broadband networks and services are subject to CALEA rules, network management disclosure and prohibitions, requirements relating to consumer privacy, and other regulatory mandates.

911 Services. We are subject to FCC rules that require telecommunications carriers to make emergency 911 services available to their subscribers, including enhanced 911 services that convey the caller’s telephone number and detailed location information to emergency responders. In December 2013 the FCC adopted a rule requiring all 911 service providers that serve a public safety answering point (a "PSAP") or other local emergency responder, to take reasonable measures to ensure 911 circuit diversity, availability of backup power at central offices that directly serve PSAPs, and diversity of network monitoring links. Further, in August 2019 the FCC adopted new 911-related requirements for service providers offering customers multiline telephone system solutions to business and enterprise customers. These new requirements, which are not yet in effect, will require Shentel to take certain additional action to ensure emergency responders can properly respond to 911 calls, such as the delivery of specific location information and notices.

Long Distance Services. We offer long distance service to our customers through our subsidiary, Shentel Communications, LLC. Our long distance rates are not subject to FCC regulation, but we are required to offer long distance service through a subsidiary other than Shenandoah Telephone, to disclose our long distance rates on a website, to maintain geographically averaged rates, to pay contributions to the USF and make other mandatory payments based on our long-distance revenues, and to comply with other filing and regulatory requirements. In November 2013 the FCC issued an order imposing greater recordkeeping and reporting obligations on certain long distance providers delivering calls to rural areas. The order imposes greater recordkeeping and quarterly reporting obligations on such providers, and generally subjects such providers to greater oversight.

Employees

At December 31, 2019, we had approximately 1,130 employees. None of our employees are represented by a union or covered by a collective bargaining agreement.

Information About Our Executive Officers

The following table presents information about our executive officers who, other than Christopher E. French, are not members of our board of directors. Our executive officers serve at the pleasure of the Board of Directors.

Name	Title	Age	Date in Position
Christopher E. French	President and Chief Executive Officer	62	April 1988
David L. Heimbach	Executive Vice President and Chief Operating Officer	44	May 2018
James J. Volk	Senior Vice President and Chief Financial Officer	56	June 2019
Edward H. McKay	Senior Vice President Engineering and Operations	47	January 2019
Richard W. Mason Jr.	Senior Vice President and Head of Business Operations	46	May 2019
William L. Pirtle	Senior Vice President Sales and Marketing	60	January 2019
Thomas A. Whitaker	Senior Vice President Corporate Development	59	January 2019
Heather K. Banks	Vice President and Chief Human Resources Officer	46	July 2019
Elaine M. Cheng	Vice President and Chief Information Officer	47	March 2019
Raymond B. Ostroski	General Counsel, Vice President Legal and Corporate Secretary	65	January 2013
Chase L. Stobbe	Vice President and Chief Accounting Officer	36	April 2019

Mr. French is President and Chief Executive Officer for Shentel. He is responsible for the overall leadership and strategic direction of the Company. He has served as President since 1988, and has been a member and Chairman of the Board of Directors since 1996. Prior to appointment as President, Mr. French held a variety of positions with the Company, including Vice President Network Service and Executive Vice President. Mr. French holds a bachelor’s degree in electrical engineering and an MBA, both from the University of Virginia. He has held board and officer positions in both state and national telecommunications associations, including service as a director of the Organization for the Promotion and Advancement of Small Telecommunications Companies (OPASTCO), was president and director of the Virginia Telecommunications Industry Association, and is currently a member of the Board of Directors and Leadership Committee of the USTelecom Association.

Mr. Heimbach is Executive Vice President and Chief Operating Officer for Shentel. He joined the Company in May 2018 and has served in a variety of senior management roles with both large corporations and entrepreneurial start-ups. He most recently served as Chief Operating Officer of Rise Broadband, the nation’s largest fixed wireless service provider, with responsibility for sales, marketing, product management, engineering, construction, field and customer operations, and corporate strategy. Prior to joining Rise Broadband, Mr. Heimbach held several executive positions at Cincinnati Bell (NYSE:CBB) over a 14-year period including Chief Operating Officer; Senior Vice President/General Manager, Business and Carrier Markets; Vice President and General Manager of the Evolve Business Solutions subsidiary; Vice President Product Development; Director, Small and Medium Business Strategy; Director of Operations, Extended Territories; and Product Manager. Mr. Heimbach holds a B.S. in Communications from the J. Warren McClure School of Information & Telecommunications Systems from Ohio University and is a board member of the American Cable Association.

Mr. Volk is Senior Vice President and Chief Financial Officer. He joined Shentel in June 2019 and has served in a variety of senior financial management roles with both large corporations and high growth, early stage telecommunication providers. He most recently served as Vice President, Finance and Investor Relations of Uniti Group Inc., a publicly-traded real estate investment trust of telecommunications assets and operating businesses. Prior to joining Uniti Group Inc., he served as CFO of multiple public and private telecommunication companies, including PEG Bandwidth (a fiber to the tower provider), Hargray Communications (a regional rural cable, fiber and telephone company) and UbiquiTel Inc. (a PCS affiliate of Sprint). He previously held senior finance positions with AT&T and Comcast. Mr. Volk holds a Bachelor of Science Degree in Accounting from the University of Delaware and a Master of Business Administration from Villanova University.

Mr. McKay is Senior Vice President Engineering and Operations for Shentel. He is responsible for network planning, engineering, construction and operations for Shentel’s networks. He was promoted to Senior Vice President in September 2015. Previously he was Vice President - Wireline and Engineering. Mr. McKay joined Shentel in 2004, and began his telecommunications industry career in 1996, including previous engineering management positions at UUNET and Verizon. He is a graduate of the University of Virginia, where he earned master’s and bachelor’s degrees in Electrical Engineering. He represents the Company on the Board of ValleyNet.

Mr. Mason is Senior Vice President and Head of Business Operations at Shentel. He joined the Company in May 2019. Mr. Mason’s newly-created department will be accountable for Enterprise Program Management, Performance Management, as well as Operational Excellence across all business segments. He joins Shentel via Google Fiber where he was most recently Head of Install and Repair Operations. Prior to Google, he held a variety of leadership roles over his career with Cincinnati Bell, culminating in Vice President of Field Operations. He received his Bachelor of Science degree in Electrical Engineering from Ohio University and has an MBA from Xavier University.

Mr. Pirtle is Senior Vice President Sales and Marketing. He was promoted to Senior Vice President in September 2015. His previous position was Vice President Wireless, responsible for Shentel’s Wireless segment. He joined the Company in 1992, as Vice President Network Services responsible for Shentel's technology decisions, maintenance and operation of its telephone, cable, cellular, paging and fiber optics networks. He helped launch Shentel's Internet business in 1994, and led its participation in its wireless PCS business and Sprint affiliation beginning in 1995. He is a graduate of the University of Virginia. Mr. Pirtle is a co-founder of the Shenandoah Valley Technology Council and has represented the Company on the Board of ValleyNet. Mr. Pirtle currently serves as chairman of the CCA board.

Mr. Whitaker is Senior Vice President Corporate Development. He was promoted to Senior Vice President in September 2015. Mr. Whitaker joined Shentel in 2004, through the Shentel acquisition of NTC Communications. He previously was COO of NTC Communications, and served as Vice President of Network Operations at Broadslate Networks, Director of Wireless Operations for nTelos, and was Co-Founder and Vice President of Nat-Com, Incorporated. He serves on the Board of Directors of the National Cable Television Cooperative (NCTC) in Lenexa, Kansas. Mr. Whitaker is a graduate of West Virginia Wesleyan College in Buckhannon, WV.

Ms. Banks is Vice President and Chief Human Resources Officer at Shentel. She joined the company in July 2019. Ms. Banks brings extensive experience in leading and managing strategic HR initiatives to Shentel. She most recently was the Chief Human Resources Officer of American Woodmark, headquartered in Winchester, Virginia. Prior to this role, Ms. Banks held numerous HR leadership positions with a variety of organizations across a range of industries, including Carlisle FoodService Products, UTC Aerospace Systems, Goodrich Corporation, Northern Power Systems, and IGT. She holds a Bachelor of Science in Psychology from Florida State University and a Master of Arts in Industrial Organizational Psychology from the University of New Haven.

Mrs. Cheng is Vice President and Chief Information Officer for Shentel. She joined the Company in March 2019 and has extensive experience in diverse business environments across all areas of Information Technology. Prior to joining Shentel, Mrs. Cheng served as Chief Information Officer and Managing Director of Global Strategic Design for CFA Institute in Charlottesville, Va. Prior to her time at CFA Institute, Mrs. Cheng held a number of different roles with M&T Bank in Buffalo, NY, including Group Vice President, Technology Business Services, Vice President of Retail Operations and Assistant Vice President, Web Product Owner. She received her Bachelor of Arts degree from Vassar College and her Masters of Business Administration from the University of Rochester. Mrs. Cheng is a founding board member of Charlottesville Women in Tech, a non-profit organization which encourages women to join and thrive in technology careers. Additionally, Mrs. Cheng serves as Board Vice Chair for the Virginia Institute of Autism in the Charlottesville area.

Mr. Ostroski is General Counsel, Vice President Legal and Corporate Secretary for Shentel. He joined Shentel in 2013 and is responsible for all legal and regulatory compliance matters for the Company. He also acts as Corporate Secretary to the Company’s Board of Directors. Mr. Ostroski began his career in the telecommunications industry in 1985, and has served as Executive Vice President and General Counsel for One Communications, Senior Vice President and General Counsel for Commonwealth Telephone Enterprises, Executive Vice President and General Counsel for RCN Corporation and Senior Vice President and General Counsel of C-TEC Corporation. Mr. Ostroski earned a bachelor’s degree in Social Science from Wilkes University and also earned a Juris Doctor degree from Temple University School of Law.

Mr. Stobbe is Vice President and Chief Accounting Officer at Shentel. Mr. Stobbe is responsible for the leadership of Shentel’s accounting function. He joined Shentel in April 2019. Previously, he was a senior manager at KPMG LLP,

where he focused on serving public telecommunications companies. He has led diverse teams and has extensive knowledge of U.S. GAAP and internal control over financial reporting. He holds both Bachelor and Master degrees in Accounting from the University of Missouri-Kansas City and is a certified public accountant.

Websites and Additional Information

The Company maintains a corporate website at *www.shentel.com*. We make available free of charge, through our website, our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and all amendments to those reports, as soon as reasonably practicable after we electronically file or furnish such reports with or to the Securities and Exchange Commission ("SEC"). The contents of our website are not a part of this report. In addition, the SEC maintains a website at *www.sec.gov* that contains reports, proxy and information statements and other information regarding the Company.

ITEM 1A. **RISK FACTORS**

Our business and operations are subject to a number of risks and uncertainties. The risks set forth under "Part I Item 1. Business" and the following risk factors should be read carefully in connection with evaluating our business. The following risks (or additional risks and uncertainties not presently known to us) could materially affect our financial condition, liquidity, or operating results, as well as the price of our common stock.

Risks Related to Our Business and the Telecommunications Industry

Intensifying competition in all segments of our business may limit our ability to sustain profitable operations.

As new technologies are developed and deployed by competitors in our service area, some of our subscribers may select other providers' offerings based on price, capabilities or personal preferences. Most of our competitors possess greater resources, have more extensive coverage areas and offer more services than we do. If significant numbers of our subscribers elect to move to competing providers, or if market saturation limits the rate of new subscriber additions, we may not be able to sustain profitable operations.

Nationwide, incumbent local exchange carriers have experienced a decrease in access lines due to the effect of wireless and wireline competition. We have experienced reductions in the number of access lines to date, and based on industry experience we anticipate that the long-term trend toward declining telephone subscriber counts will continue. There is a significant risk that this downward trend will have an adverse effect on the Company's landline telephone operations in the future.

The Company's revenue from fiber leases may be adversely impacted by price competition for these facilities.

Alternative technologies, changes in the regulatory environment and current uncertainties in the marketplace may reduce future demand for existing telecommunication services.

The telecommunications industry is experiencing significant technological change, evolving industry standards, ongoing improvements in the capacity and quality of digital technology, shorter development cycles for new products and enhancements and changes in end-user requirements and preferences. Technological advances, industry changes, changes in the regulatory environment and the availability of additional spectrum or additional flexibility with respect to the use of currently available spectrum could cause the technology we use to become obsolete. We may not be able to respond to such changes and implement new technology on a timely basis or at an acceptable cost.

Adverse economic conditions in the United States and in our market area involving significantly reduced consumer spending could have a negative impact on our results of operations.

Sprint's subscribers are individual consumers and businesses. Any national economic weakness, restricted credit markets or high unemployment rates could depress consumer spending and harm our operating performance. In addition, subscribers in our Sprint Affiliate Area are located in a relatively concentrated geographic area; therefore, any material adverse economic conditions that affect our geographic markets in particular could have a disproportionately negative impact on our results.

Regulation by government agencies may increase our costs of providing service or require changes in services, either of which could impair our financial performance.

Our operations are subject to varying degrees of regulation by the FCC, the Federal Trade Commission, the Federal Aviation Administration, the Environmental Protection Agency and the Occupational Safety and Health Administration, as well as by state and local regulatory agencies and franchising authorities. Action by these regulatory bodies could negatively affect our operations and our costs of doing business.

Our access revenue may be adversely impacted by legislative or regulatory actions or by technology developments that decrease access rates or exempt certain traffic from paying for access to our regulated telephone network.

On October 27, 2011, the FCC adopted a number of broad changes to the intercarrier compensation rules governing the interstate access rates charged by incumbent local exchange carriers, including small-to-mid-sized RLECs such as Shenandoah Telephone. For example, the FCC adopted a national "bill and keep" framework, which has resulted in

substantial reductions in the access charges paid by long distance carriers and other interconnecting carriers, eliminating such payments in many instances, accompanied by increases to the subscriber line charges paid by business and residential end users. In addition, the FCC has changed some of the rules that determine what compensation carriers, including but not limited to wireless carriers, competitive local exchange carriers, VoIP providers and providers of other Internet-enabled services, should pay (and receive) for their traffic that is interconnected with RLEC networks. More recently, the FCC initiated a further proceeding to consider whether additional changes to interconnection obligations are needed, including how and where companies interconnect their networks with the networks of other providers. These changes, and potential future changes, to such compensation regulations could increase our expenses or further reduce our revenues. In addition, the Company is working to resolve routine interconnection and intercarrier compensation-related disputes concerning the volume of traffic exchanged between the Company and third parties, appropriate access rates, and terms for the origination and termination of traffic on third-party networks.

Our distribution networks may be subject to weather-related events that may damage our networks and adversely impact our ability to deliver promised services or increase costs related to such events.

Our distribution networks may be subject to weather-related events that could damage our networks and impact service delivery. Some published reports predict that warming global temperatures will increase the frequency and severity of such weather-related events. Should such predictions be correct or if for other reasons there are more weather-related events, and should such events impact the Mid-Atlantic region covered by our networks more frequently or more severely than in the past, our revenues and expenses could be materially adversely impacted.

Our success largely depends on our ability to retain and recruit key personnel, and any failure to do so could adversely affect our ability to manage our business.

Our operational results have depended, and our future results will depend, upon the retention and continued performance of our management team. The competitive environment for management talent in our industry could adversely impact our ability to retain and hire new key employees for management positions. The loss of the services of key members of management and the inability or delay in hiring new key employees could adversely affect our ability to manage our business and our future operational and financial results. Moreover, our inability to attract and retain sufficient qualified accounting personnel has adversely affected, and could continue to adversely affect, our ability to maintain an effective system of internal controls or our ability to produce reliable financial reports, which could materially and adversely affect our business and our stock price.

We may not benefit from our acquisition strategy.

As part of our business strategy, we regularly evaluate opportunities to enhance the value of the Company by pursuing acquisitions of other businesses. Although we remain subject to financial and other covenants in our credit agreement that may limit our ability to pursue certain strategic opportunities, we intend to continue to evaluate and, when appropriate, pursue strategic acquisition opportunities as they arise. We cannot provide any assurance, however, with respect to the timing, likelihood, size or financial effect of any potential transaction involving the Company, as we may not be successful in identifying and consummating any acquisition or in integrating any newly acquired business into our operations.

The evaluation of business acquisition opportunities and the integration of any acquired businesses pose a number of significant risks, including the following:

- acquisitions may place significant strain on our management, financial and other resources by requiring us to expend a substantial amount of time and resources in the pursuit of acquisitions that we may not complete, or to devote significant attention to the various integration efforts of any newly acquired businesses, all of which will require the allocation of limited resources;

- acquisitions may not have a positive impact on our cash flows or financial performance;

- even if acquired companies eventually contribute to an increase in our cash flows or financial performance, such acquisitions may adversely affect our operating results in the short term as a result of transaction-related expenses we will have to pay or the higher operating and administrative expenses we may incur in the periods immediately following an acquisition as we seek to integrate the acquired business into our operations;

- we may not be able to realize anticipated synergies or eliminate as many anticipated redundant costs;

- our operating and financial systems and controls and information services may not be compatible with those of the companies we may acquire and may not be adequate to support our integration efforts, and any steps we take to improve these systems and controls may not be sufficient;

- our business plans and projections used to justify the acquisitions and expansion investments are based on assumptions of revenues per subscriber, penetration rates in specific markets where we operate and expected operating costs. These assumptions may not develop as projected, which may negatively impact our profitability or the value of our intangible assets;

- growth through acquisitions will increase our need for qualified personnel, who may not be available to us or, if they were employed by a business we acquire, remain with us after the acquisition; and

- acquired businesses may have unexpected liabilities and contingencies, which could be significant.

Our ability to comply with the financial covenants in our credit agreement depends primarily on our ability to generate sufficient operating cash flow.

Our ability to comply with the financial covenants under the agreement governing our secured credit facilities will depend primarily on our success in generating sufficient operating cash flow. Under our credit agreement, we are subject to a total leverage ratio covenant, a minimum debt service coverage ratio covenant and a minimum liquidity test. Industry conditions and financial, business and other factors, including those we identify as risk factors in this and our other reports, will affect our ability to generate the cash flows we need to satisfy those financial tests and ratios. Our failure to satisfy the tests or ratios could result in a default and acceleration of repayment of the indebtedness under our credit facilities. If the maturity of our indebtedness were accelerated, we may not have sufficient funds to repay such indebtedness. In such event, to the extent permitted by our credit agreement and applicable law, our lenders would be entitled to proceed against the collateral securing the indebtedness, which includes substantially all of our assets and the assets of our subsidiaries.

Our level of indebtedness could adversely affect our financial health and ability to compete.

As of December 31, 2019, we had $732.0 million of total indebtedness. Our level of indebtedness could have important adverse consequences. For example, it may:

- increase our vulnerability to general adverse economic and industry conditions, including interest rate increases, because as of December 31, 2019, a significant portion of our borrowings were, and may continue to be, subject to variable rates of interest;

- require us to dedicate a substantial portion of our cash flow from operations to payments on our indebtedness, thereby reducing the availability of our cash flow to fund working capital, capital expenditures, dividends and other general corporate purposes;

- limit our ability to borrow additional funds to alleviate liquidity constraints, as a result of financial and other restrictive covenants in our credit agreement;

- limit our flexibility in planning for, or reacting to, changes in our business and the industry in which we operate; and

- place us at a competitive disadvantage relative to companies that have less indebtedness.

In addition, our secured credit facilities impose operating and financial restrictions that limit our discretion on some business matters, which could make it more difficult for us to expand, finance our operations and engage in other business activities that may be in our interest. These restrictions limit our ability and that of our subsidiaries to, among other things:

- incur additional indebtedness and additional liens on our assets;

- engage in certain mergers or acquisitions or asset dispositions;

- pay dividends, repurchase our securities or make other distributions;
- voluntarily prepay other indebtedness;
- enter into transactions with affiliated persons;
- make certain investments; and
- change the nature of our business.

In addition to the term loan secured indebtedness we have incurred and the $75 million of revolving credit indebtedness we may draw against from time to time, we may incur additional indebtedness under our credit facilities. Any additional indebtedness we may incur in the future may subject us to similar or even more restrictive conditions.

Our ability to refinance our indebtedness in the future, should circumstances require it, will depend on our ability in the future to generate cash flows from operations and to raise additional funds, including through the offering of equity or debt securities and through our access to bank debt markets. We may not be able to generate sufficient cash flows from operations or to raise additional funds in amounts necessary for us to repay our indebtedness when such indebtedness becomes due and to meet our other cash needs.

Disruptions of our information technology infrastructure could harm our business.

We depend on our information technology infrastructure to achieve our business objectives. A disruption of our infrastructure could be caused by a natural disaster, manufacturing failure, telecommunications system failure, cybersecurity attack, intrusion or incident, or defective or improperly installed new or upgraded business management systems. Portions of our IT infrastructure also may experience interruptions, delays or cessations of service or produce errors in connection with systems integration or migration work that takes place from time to time. In the event of any such disruption, we may be unable to conduct our business in the normal course. Moreover, our business involves the processing, storage and transmission of data, which would also be negatively affected by such an event. A disruption of our infrastructure could cause us to lose customers and revenue, particularly during a period of heavy demand for our services. We also could incur significant expense in repairing system damage and taking other remedial measures.

We could suffer a loss of revenue and increased costs, exposure to significant liability, reputational harm and other serious negative consequences if we sustain cyber-attacks or other data security breaches that disrupt our operations or result in the dissemination of proprietary or confidential information about us or our customers or other third parties.

We utilize our information technology infrastructure to manage and store various proprietary information and sensitive or confidential data relating to our operations. We routinely process, store and transmit large amounts of data for our customers, including sensitive and personally identifiable information. We depend on our information technology infrastructure to conduct business operations and provide customer services. We may be subject to data breaches and disruptions of the information technology systems we use for these purposes. Our industry has witnessed an increase in the number, intensity and sophistication of cybersecurity incidents caused by hackers and other malicious actors such as foreign governments, criminals, hacktivists, terrorists and insider threats. Hackers and other malicious actors may be able to penetrate our network security and misappropriate or compromise our confidential, sensitive, personal or proprietary information, or that of third parties, and engage in the unauthorized use or dissemination of such information. They may be able to create system disruptions, or cause shutdowns. Hackers and other malicious actors may be able to develop and deploy viruses, worms, ransomware and other malicious software programs that attack our products or otherwise exploit any security vulnerabilities of our systems. In addition, sophisticated hardware and operating system software and applications that we procure from third parties may contain defects in design or manufacture, including “bugs,” cybersecurity vulnerabilities and other problems that could unexpectedly interfere with the operation or security of our systems.

To date, interruptions of our information technology infrastructure have been infrequent and have not had a material impact on our operations. However, because technology is increasingly complex and cyber-attacks are increasingly sophisticated and more frequent, there can be no assurance that such incidents will not have a material adverse effect on us in the future. The consequences of a breach of our security measures, a cyber-related service or operational disruption, or a breach of personal, confidential, proprietary or sensitive data caused by a hacker or other malicious actor could be significant for us, our customers and other affected third parties. For example, the consequences could

include damage to infrastructure and property, impairment of business operations, disruptions to customer service, financial costs and harm to our liquidity, costs associated with remediation, loss of revenues, loss of customers, competitive disadvantage, legal expenses associated with litigation, regulatory action, fines or penalties or damage to our brand and reputation.

In addition, the costs to us to eliminate or address the foregoing security challenges and vulnerabilities before or after a cyber incident could be significant. In addition, our remediation efforts may not be successful and could result in interruptions, delays or cessation of service. We could also lose existing or potential customers for our services in connection with any actual or perceived security vulnerabilities in the services.

We are subject to laws, rules and regulations relating to the collection, use and security of user data. Our operations are also subject to federal and state laws governing information security. In the event of a data breach or operational disruption caused by an information security incident, such rules may require consumer and government agency notification and may result in regulatory enforcement actions with the potential of monetary forfeitures as well as civil litigation. We have incurred, and will continue to incur, expenses to comply with privacy and security standards and protocols imposed by law, regulation, industry standards and contractual obligations.

Negative outcomes of legal proceedings may adversely affect our business and financial condition.

We may become involved in legal proceedings from time to time. These proceedings may be complicated, costly and disruptive to our business operations. We might also incur significant expenses in defending these matters or may be required to pay significant fines, awards and settlements. Any of these potential outcomes, such as judgments, awards, settlements or orders could have a material adverse effect on our business, financial condition, operating results or our ability to do business.

We have identified material weaknesses in our internal controls over financial reporting that, if not properly corrected, could materially adversely affect our operations and result in material misstatements in our financial statements.

In accordance with Section 404 of the Sarbanes-Oxley Act, we, along with our independent registered public accounting firm, are required to report on the effectiveness of our internal controls over financial reporting. Failure to design and maintain effective internal controls could constitute a material weakness which could result in inaccurate financial statements, inaccurate disclosures or failure to prevent fraud.

As of December 31, 2019, we did not maintain an effective control environment attributable to certain identified material weaknesses. We describe these material weaknesses in *Item 9A. Controls and Procedures* in this Annual Report on Form 10-K. These control deficiencies create a reasonable possibility that a material misstatement to the consolidated financial statements will not be prevented or detected on a timely basis, and therefore we concluded that the deficiencies represent material weaknesses in the Company’s internal control over financial reporting and our internal control over financial reporting was not effective as of December 31, 2019. We cannot provide any assurance that these weaknesses will be effectively remediated or that additional material weaknesses will not occur in the future. The existence of these or other material weaknesses in our internal controls over financial reporting could also result in errors in our financial statements that could require us to restate our financial statements, cause us to fail to meet our reporting obligations and cause stockholders to lose confidence in our reported financial information, all of which could materially and adversely affect our business and stock price.

We have an underfunded non-contributory defined benefit pension plan.

Through our acquisition of nTelos, we assumed nTelos’ non-contributory defined benefit pension plan and other post-retirement benefit plans, covering all employees who met eligibility requirements and were employed by nTelos prior to October 1, 2003. This pension plan was closed to nTelos employees hired on or after October 1, 2003. As of December 31, 2019, the plan was underfunded by approximately $6.8 million. Refer to Note 2, *Summary of Significant Accounting Policies*, included with the Notes to our consolidated financial statements for additional information regarding the accounting for the defined benefit pension and other postretirement benefit plans. We do not expect that we will be required to make a cash contribution to the underfunded pension plan in 2020, but we may be required to make cash contributions in future periods depending on the level of interest rates and investment returns on plan assets.

Our business may be impacted by new or changing tax laws or regulations and actions by federal, state and/or local agencies, or how judicial authorities apply tax laws.

In connection with the products and services we sell, we calculate, collect and remit various federal, state and local taxes, surcharges and regulatory fees to numerous federal, state and local governmental authorities, including federal USF contributions and common carrier regulatory fees. In addition, we incur and pay state and local taxes and fees on purchases of goods and services used in our business.

Tax laws are subject to change as new laws are passed and new interpretations of the law are issued or applied. In many cases, the application of tax laws (including the recently enacted Tax Cuts and Jobs Act) is uncertain and subject to differing interpretations, especially when evaluated against new technologies and telecommunications services, such as broadband internet access and cloud related services.

In the event that we have incorrectly calculated, assessed or remitted amounts that were due to governmental authorities, we could be subject to additional taxes, fines, penalties or other adverse actions, which could materially impact our business, financial condition and operating results. In the event that federal, state and/or local municipalities were to significantly increase taxes on our network, operations or services, or seek to impose new taxes, it could have a material adverse effect on our business, financial condition, operating results or ability to do business.

Our previously announced stock repurchase program, and any subsequent stock purchase program put in place from time to time, could affect the price of our common stock, increase the volatility of our common stock and could diminish our cash reserves. Such repurchase program may be suspended or terminated at any time, which may result in a decrease in the trading price of our common stock.

We may have a stock repurchase program in place from time to time. Any such stock repurchase program adopted will not obligate the Company to repurchase any dollar amount or number of shares of common stock and may be suspended or discontinued at any time, which could cause the market price of our common stock to decline. The timing and actual number of shares repurchased under any such stock repurchase program depends on a variety of factors including the timing of open trading windows, the price of our common stock, corporate and regulatory requirements and other market conditions. We may affect repurchases under any stock repurchase program from time to time in the open market, in privately negotiated transactions or otherwise. Repurchases pursuant to any such stock repurchase program could affect our stock price and increase its volatility. The existence of a stock repurchase program could also cause our stock price to be higher than it would be in the absence of such a program and could potentially reduce the market liquidity for our stock. There can be no assurance that any stock repurchases will enhance stockholder value because the market price of our common stock may decline below the levels at which we repurchased shares of common stock. Although our stock repurchase program is intended to enhance stockholder value, short-term stock price fluctuations could reduce the program's effectiveness. Additionally, our share repurchase program could diminish our cash reserves, which may impact our ability to finance future growth and to pursue possible future strategic opportunities and acquisitions. Refer to Note 1, *Nature of Operations* of the Notes to the Consolidated Financial Statements included in Part II of this Form 10-K for further information.

Risks Related to our Wireless and Tower Segments and the Wireless Industry

New disclosure or usage requirements could adversely affect the results of our wireless operations.

The FCC may impose additional consumer protection requirements upon wireless service providers, including billing-related disclosures and usage alerts. Such requirements could increase costs related to or impact the amount of revenue we receive from our wireless services.

Regulation by governmental authorities or potential litigation relating to the use of wireless handsets while driving could adversely affect the results of our wireless operations.

Some studies have indicated that some aspects of using wireless handsets while driving may impair driver's attention in certain circumstances, making accidents more likely. These concerns could lead to litigation relating to accidents, deaths or serious bodily injuries, or to new restrictions or regulations on wireless phone use. A number of state and local governments are considering or have enacted legislation that would restrict or prohibit the use of a wireless handset while driving a vehicle or, alternatively, require the use of a hands-free handset. Additionally, certain federal agencies

have adopted rules and proposed guidelines for the use of wireless handsets while operating commercial and non-commercial vehicles. These rules, and any legislation that could be enacted, may require wireless service providers to supply to their subscribers hands-free enhanced services, such as voice-activated dialing and hands-free speaker phones and headsets, in order to continue generating revenue from subscribers, who make many of their calls while on the road. If we are unable to provide hands-free services and products to subscribers in a timely and adequate fashion, the volume of wireless phone usage would likely decrease, and the ability of our wireless operations to generate revenues would suffer.

Our business may suffer as a result of competitive pressures.

Our revenue growth is primarily dependent on the growth of Sprint wireless subscribers and monthly recurring charges to these users. Competitive pressures in the wireless services industry have increased. These competitive pressures in the wireless telecommunications market have caused some major carriers to offer unlimited plans at lower prices. Increased price competition could lead to lower monthly recurring charges or a loss of subscribers in the future. Continued competitive pressures could require Sprint to lower its prices, which will limit growth in monthly recurring charges to subscribers and could adversely affect our revenues, profitability and cash flows from operations.

We may not be able to implement our business plan successfully if our operating costs are higher than we anticipate.

Increased competition may lead to higher promotional costs to acquire Sprint's subscribers. If these costs are more than we anticipate, the actual amount of funds available to implement our operating strategy and business plan may fall short of our estimates.

The dynamic nature of the wireless market may limit management’s ability to correctly identify causes of volatility in key operating performance measures.

Our business plan and estimated future operating results are based on estimates of key operating performance measures, including subscriber growth, subscriber turnover, commonly known as churn, average monthly revenue per subscriber, equipment revenue, subscriber acquisition costs and other operating costs. Continued moves by all carriers to offer installment billing and leasing for wireless handsets will have an effect on revenues, cost of goods sold and churn. The dynamic nature of the wireless market, economic conditions, increased competition in the wireless telecommunications industry, the entry of potential new competitors due to past or future FCC spectrum auctions, new service offerings by Sprint or competitors at lower prices and other issues facing the wireless telecommunications industry in general have created a level of uncertainty that may adversely affect our ability to predict these key measures of performance.

We may experience a high rate of affiliate subscriber turnover, in our territory, which could adversely affect our future financial performance.

Because of significant competition in the industry, the emergence of cable companies as MVNOs, changes to Sprint’s competitive position, the pending merger of Sprint and T-Mobile, and economic uncertainty, among other factors, subscriber turnover or churn has been higher than our competitors and may increase which could cause an adverse impact to our financial results.

A high rate of churn could increase the sales and marketing costs we incur in obtaining new subscribers, especially because, consistent with industry practice, even with the introduction of wireless handset installment billing and leasing, we expect to continue to subsidize a portion of the costs related to the purchases of wireless handsets by some subscribers.

Our business could be adversely affected by customer concerns over radio frequency emissions, findings of product liability for health/safety risks from wireless devices and transmission equipment, as well as by changes to regulations/radio frequency emission standards.

We do not manufacture the devices or other equipment that we sell, and we depend on our suppliers to provide defect-free and safe equipment. Suppliers are required by applicable law to manufacture their devices to meet certain governmentally imposed safety criteria. However, even if the devices we sell meet the regulatory safety criteria, we could be subject to claims along with the equipment manufacturers and suppliers for any harm caused by products we sell if such products are later found to have design or manufacturing defects.

Allegations have been made that certain radio frequency emissions from and the use of wireless handsets and wireless transmission equipment, such as cell towers, may be linked to various health concerns, including cancer and brain tumors. Lawsuits have been filed against manufacturers and carriers in the industry claiming damages for alleged health problems arising from the use of wireless handsets. In addition, the FCC has from time to time gathered data regarding wireless handset emissions and its assessment of this issue may evolve based on its findings. The FCC has in the past commenced rule makings and inquiries that seek public comment on a variety of issues, including whether revisions to the existing radio frequency standards and testing requirements are warranted. The media has also reported incidents of handset battery malfunction, including reports of batteries that have overheated. These allegations may lead to changes in regulatory standards. There have also been other allegations regarding wireless technology, including allegations that wireless handset emissions may interfere with various electronic medical devices (including hearing aids and pacemakers), airbags and anti-lock brakes. Defects in the products of our suppliers or their smartphone devices could have a material adverse effect on our business, financial condition, operating results or ability to do business. Additionally, any decrease in demand for wireless services, increases in the costs of litigation or damage awards resulting from substantiation of harm from such emissions could impair our financial condition and results of operations.

Risks Related to Our Relationship with Sprint

The performance of our Wireless reporting segment may be materially adversely affected by any interruption in, or other adverse change to, Sprint’s business, liquidity or financial condition.

We rely significantly on Sprint’s ongoing operations to continue to offer wireless subscribers in our affiliated service area the seamless national services that Sprint currently provides. Any interruption in, or other adverse change to, Sprint’s business, liquidity or financial condition could materially adversely affect our results of operations, liquidity and financial condition. Our business could also be adversely affected if competing national or regional wireless carriers are able to introduce new products and services or otherwise satisfy customers’ service demands more rapidly or more effectively than Sprint.

The costs associated with our ongoing participation in Sprint’s network upgrade and expansion plans may affect our operating results, liquidity and financial position.

Sprint continues to upgrade and expand its wireless network with the intention of improving voice quality, coverage and data speeds while simultaneously reducing future operating costs. We participate in this plan and, to date, we have made significant upgrades in our service areas, but ongoing modernization efforts are expected to continue.

The continuing success of Sprint’s upgrade and expansion plans will depend on the timing, extent and cost of implementation and the performance of third parties. Should Sprint’s implementation plan be delayed, our margins could be adversely affected and such effects could be material. Should Sprint’s future delivery of services expected to be deployed on the upgraded network be delayed, it could potentially result in the loss of Sprint's subscribers to our competitors and adversely affect our revenues, profitability and cash flows from operations.

Sprint may make business decisions that are not in our best interests, which may adversely affect our business and our relationships with subscribers in our territory, increase our expenses and decrease our revenues.

Under its agreements with us, Sprint has a substantial amount of control over the operations of our wireless business. Accordingly, Sprint may make decisions that could adversely affect our wireless business, such as the following:

- Sprint could price its national plans based on its own objectives and could set price levels or other terms that may not be economically advantageous for us;
- Sprint could develop products and services that could adversely affect our results of operations;
- if Sprint’s costs to perform certain services exceed the costs they expect, subject to limitations under our Sprint Affiliate Agreement, Sprint could seek to increase the amounts charged to us for such services;
- Sprint could make decisions that could adversely affect the Sprint brand names, reputation, or products or services, which could adversely affect our business;

- Sprint could make technology and network decisions that could greatly increase our capital investment requirements and our operating costs to continue offering the seamless service we provide;

- Sprint could restrict our ability to offer new services needed to remain competitive. This could put us at a competitive disadvantage relative to other wireless service providers if those other wireless service providers begin offering those new services in our market areas, increasing our churn, adversely affecting our ability to obtain new subscribers and reducing our revenues and operating income from wireless services; and

- Sprint may not be able to provide the amount of spectrum that is necessary to adequately operate our business.

In addition, if the pending business combination between T-Mobile US, Inc. (T-Mobile) and Sprint is completed, it is possible that the combined company may not want to continue our affiliate services arrangement with Sprint. For additional information, see the risk factor below titled "Some provisions of the Sprint agreements may diminish the value of our common stock and restrict or diminish the value of our business."

The pending dispute with Sprint over the resetting of the travel fee could have a material adverse effect on our financial and operating results in our Wireless segment.

Under our affiliate agreement with Sprint, we have historically earned and recognized monthly revenue of $1.5 million for providing service to Sprint customers who pass through our network area ("travel revenue"). While we continue to provide these services to Sprint, the agreed upon payments were suspended by Sprint on April 30, 2019. Accordingly, we have ceased recognizing revenue for the services provided after that date until a new prospective fee through 2021 can be agreed as outlined in our affiliate agreement. We have triggered the final dispute resolution option of binding arbitration with Sprint which we expect will lead to a resolution for travel fee revenue in the second quarter of 2020. The outcome of the binding arbitration is uncertain and could have a material adverse effect on our financial and operating results.

Our dependence on Sprint for services may limit our ability to forecast operating results.

Our dependence on Sprint injects a degree of uncertainty into our business and financial planning. We may, at times, disagree with Sprint concerning the applicability, calculation approach or accuracy of Sprint-supplied revenue data.

We are subject to risks relating to Sprint's provision of back-office services and to changes in Sprint's products, services, plans and programs.

Any failure by Sprint to provide high-quality back-office services could lead to subscriber dissatisfaction, increased churn or otherwise increased costs or loss of revenue. We rely on Sprint's internal support systems, including customer care, billing and back-office support. Our operations could be disrupted if Sprint is unable to provide or expand its internal support systems while maintaining acceptable service levels, or to efficiently outsource those services and systems through third-party vendors.

In addition, restrictions exist, and new restrictions are considered from time to time by Congress, federal agencies and states. Our reliance on Sprint to perform those functions could subject us to potential liabilities.

The competitiveness of Sprint's wireless products and services is a key factor in our ability to attract and retain subscribers. Changes in Sprint's wireless products and services may reduce subscriber additions, increase subscriber churn and decrease subscriber credit quality.

Sprint's roaming arrangements to provide service outside of the Sprint National Network may not be competitive with other wireless service providers, which may restrict our ability to attract and retain subscribers and may increase our costs of doing business.

We rely on Sprint's roaming arrangements with other wireless service providers for coverage in areas where Sprint wireless service is not available. If customers are not able to roam quickly or efficiently onto other wireless networks, we may lose current subscribers and Sprint wireless services may be less attractive to new subscribers.

The risks related to our roaming arrangements include the following:

- the quality of the service provided by another provider while roaming may not approximate the quality of the service provided by the Sprint wireless network;

- the price of a roaming call off network may not be competitive with prices of other wireless companies for roaming calls, or may not be “commercially reasonable” (as determined by the FCC);

- customers may not be able to use Sprint’s advanced features, such as voicemail notification, while roaming; and

- Sprint or the carriers providing the service may not be able to provide accurate billing information on a timely basis.

Some provisions of the Sprint agreements may diminish the value of our common stock and restrict or diminish the value of our PCS business.

On April 29, 2018, T-Mobile and Sprint entered into a business combination agreement, pursuant to which T-Mobile and Sprint agreed to combine their respective businesses. It is possible that the combined company would not want to continue our affiliate services arrangement with Sprint. If the transaction is completed and we are unable to enter into a mutually acceptable addendum to the Sprint agreements with the combined company, the combined company under certain circumstances may purchase the operating assets of our wireless operations for a price equal to 90% of the entire business value ("EBV") as that term is defined in our agreement with Sprint. EBV is calculated as: (i) the fair market value of a going concern paid by a willing buyer to a willing seller in a change of control transaction; (ii) valued as if the business will continue to utilize existing brands and operate under existing agreements; and, (iii) valued as if we have continued access to the spectrum and the frequencies then in use in the network. Under our agreement with Sprint, the determination of EBV is made by an independent appraisal process using the then-current customary means of valuing a wireless telecommunications business. In addition, under limited circumstances involving non-renewal of the Sprint agreements or a breach by us, Sprint may purchase the operating assets of our wireless operations for a purchase price of 90% of EBV in the event of non-renewal, or 81% in the event that termination is the result of a material breach of the Agreement by Shentel. A sale of the operating assets of our wireless operations could create material income tax liabilities that would adversely affect the value of our common stock.

If the combined company purchases our wireless operating assets, our affiliate services arrangement with Sprint would end, which generated approximately 70% of our total consolidated revenue in 2019, 71% in 2018 and 72% in 2017.

Sprint also must approve any assignment of the Sprint agreements by us and has a right of first refusal to purchase our wireless operating assets if we decide to sell those assets to a third party. These restrictions and other restrictions contained in the Sprint agreements could adversely affect the value of our common stock, may limit our ability to sell our wireless operating assets on advantageous terms, may reduce the value a buyer would be willing to pay to acquire those assets and may reduce the EBV, as described in the Sprint agreements. In addition, the possibility that the combined company may purchase the operating assets of our wireless operations may make it difficult for us to attract or retain employees or subscribers or pursue other business opportunities.

We may have difficulty in obtaining an adequate supply of wireless handsets from Sprint.

We depend on our relationship with Sprint to obtain wireless handsets. Sprint orders wireless handsets from various manufacturers. We could have difficulty obtaining specific types of wireless handsets in a timely manner if:

- Sprint does not adequately project the need for wireless handsets, or enter into arrangements for new types of wireless handsets or other customer equipment, for itself, its wireless affiliates and its other third-party distribution channels, particularly in connection with the transition to new technologies;

- Sprint gives preference to other distribution channels;

- we do not adequately project our need for wireless handsets;

- Sprint modifies its wireless handset logistics and delivery plan in a manner that restricts or delays access to wireless handsets; or

- there is an adverse development in the relationship between Sprint and its suppliers or vendors.

The occurrence of any of the foregoing could result in a decrease in the wireless subscribers in our Sprint Affiliate Area or adversely affect our ability to attract new subscribers.

If Sprint does not continue to enhance its nationwide digital wireless network, we may not be able to attract and retain subscribers in our Sprint Affiliate Area.

Our wireless operations are dependent on Sprint's national network. Sprint's digital wireless network may not provide nationwide coverage nor the most advanced offerings from 5th generation ("5G") technology to the same extent as the networks of its competitors, which could adversely affect our ability to attract and retain subscribers in our Sprint Affiliate Area. Sprint currently covers a significant portion of the population of the United States, Puerto Rico and the U.S. Virgin Islands. Sprint offers wireless services, either on its own network or through its roaming agreements, in every part of the United States.

If Sprint's wireless spectrum licenses are not renewed or are revoked, our wireless business would be harmed.

Wireless spectrum licenses are subject to renewal and revocation by the FCC. There may be opposition to renewal of Sprint's wireless licenses upon their expiration, and Sprint's wireless licenses may not be renewed. The FCC has adopted specific standards to apply to wireless license renewals. Any failure by Sprint to comply with these standards could cause revocation or forfeiture of Sprint's wireless licenses, which would significantly harm us.

If Sprint does not maintain control over its licensed spectrum, our Sprint agreements may be terminated, which would render us unable to continue providing service. Sprint may also need additional spectrum to keep up with customer demands and the availability and cost of this spectrum could impact our wireless business.

Risks Related to Our Broadband Services

Our Broadband segment faces risks from increasing competition for the provision of video services, including competition resulting from new technologies.

Incumbent cable companies, which have historically provided video service, face competition from direct broadcast satellite providers, and more recently from large providers of wireline telecommunications services (such as Verizon, CenturyLink and AT&T), which have upgraded their networks in certain markets outside of our cable footprint to provide video services in addition to voice and broadband services. Wireless providers are also entering the market for video services by making such services available on handsets and tablets. In some areas, direct broadcast satellite providers have partnered with large incumbent telecommunications service providers to offer triple-play services. Moreover, consumers are increasingly accessing video content from alternative sources, such as Internet-based “over the top” providers such as Netflix, Amazon, and Hulu, and related platforms. The influx of competitors in this area, together with the development of new technologies to support them, are resulting in significant changes in the video business models and regulatory provisions that have applied to the provision of video and other services. These developments have led to a loss of video subscribers due to "cord cutting" as customers adopt alternative sources and may lead to a decline in the demand, price and profitability of our cable and related video services.

Our programming costs are subject to demands for increased payments.

The cable television industry has continued to experience an increase in the cost of programming, especially sports programming and retransmission fees. In addition, as we add programming to our video services for existing customers or distribute existing programming to more customers, we incur increased programming expenses. Broadcasters affiliated with major over-the-air network services have been increasing their demands for cash payments and other concessions for the right to carry local network television signals on our cable systems. If we are unable to raise our customers' rates, these increased programming costs could have an adverse impact on our results of operations. Moreover, as our programming contracts and retransmission agreements with programming providers expire, there can be no assurance that they will be renewed on acceptable terms which could lead to a loss of video customers.

Changes to key regulatory requirements can affect our ability to compete.

The cable industry is subject to extensive governmental regulation, which impacts many aspects of our operations. Legislators and regulators at all levels of government frequently consider changing, and sometimes do change, existing

statutes, regulations, and interpretations thereof. Future legislative, judicial, or administrative actions may increase our costs or impose additional challenges and restrictions on our business.

Federal law strictly limits the scope of permissible cable rate regulation, and none of our local franchising authorities currently regulate our rates. However, as the rates charged to cable consumers have increased, Congress and the FCC have expressed concern about the impact on consumers, and they could impose restrictions affecting cable rates and programming packages that could adversely impact our existing business model.

The Company operates cable television systems in largely rural areas of Virginia, West Virginia, Maryland and Kentucky pursuant to local franchise agreements. These franchises are not exclusive, and other entities may secure franchise authorizations in the future, thereby increasing direct competition to the Company.

Many franchises establish comprehensive facilities and service requirements, as well as specific customer service standards and monetary penalties for non-compliance. In many cases, franchises are terminable if the franchisee fails to comply with significant provisions set forth in the franchise agreement governing system operations. Franchises are generally granted for fixed terms and must be periodically renewed. Franchising authorities may resist granting a renewal if either past performance or the prospective operating proposal is considered inadequate. Franchise authorities often demand concessions or other commitments as a condition to renewal. Our local franchises may not be renewed at expiration in which case we would have to cease operations or, operate under either temporary operating agreements or without a franchise while negotiating renewal terms with the local franchising authorities. We cannot offer assurance that we will be able to comply with all significant provisions of our franchise agreements. Additionally, although historically we have renewed our franchises without incurring significant costs, we cannot offer assurance that we will be able to renew, or to renew as favorably, our franchises in the future. A termination of or a sustained failure to renew a franchise in one or more key markets or obtaining such franchise on unfavorable terms could adversely affect our business in the affected geographic area.

Pole attachments are wires and cables that are attached to utility poles. Cable system attachments to investor-owned public utility poles historically have been regulated at the federal or state level, generally resulting in reasonable pole attachment rates for attachments used to provide cable service. In contrast, utility poles owned by municipalities or cooperatives are not subject to federal regulation and are generally exempt from state regulation and their attachment rates tend to be higher. Future regulatory changes in this area could impact the pole attachment rates we pay utility companies. In August 2018, the FCC adopted rules, scheduled to become effective 30 days after Office of Management and Budget approval, to permit a “one-touch” make-ready process for poles subject to its jurisdiction. The "one touch" make-ready rules allow third parties to alter certain components of existing attachments for "simple make-ready" (i.e. where the alteration of our components does not involve a reasonable expectation of a service outage, splicing, pole replacement or relocation of a wireless attachment). The rules are intended to promote broadband deployment and competition by facilitating communications attachments, although there are concerns regarding potential damage to existing networks by third parties. Utility pole owners have appealed the rules to the United States Court of Appeals for the Ninth Circuit. We cannot predict the effect that these rules will have on our business when they ultimately take effect.

The FCC has periodically considered proposals for new regulations intended to make our cable set-top boxes open to other service providers. If enacted, such new regulations concerning set-top boxes could increase our cost for equipment, affect our relationship with our customers, and/or enable third parties to try to offer equipment that accesses disaggregated cable content merged with other services delivered over the Internet to compete with our premium service offerings.

Increases in broadband usage may cause network capacity limitations, resulting in service disruptions, reduced capacity or slower transmission speeds for our customers.

Video streaming services, gaming and peer-to-peer file sharing applications use significantly more bandwidth than other Internet activity such as web browsing and email. As use of these newer services continues to grow, our broadband customers will likely use much more bandwidth than in the past. If this occurs, we could be required to make significant capital expenditures to increase network capacity in order to avoid service disruptions, service degradation or slower transmission speeds for our customers. Alternatively, we could choose to implement network management practices to reduce the network capacity available to bandwidth-intensive activities during certain times in market areas experiencing congestion, which could negatively affect our ability to retain and attract customers in affected markets. Competitive or regulatory constraints may preclude us from recovering costs of network investments designed to

address these issues, which could adversely impact our operating margins, results of operations, financial condition and cash flows.

Our broadband services may be adversely impacted by legislative or regulatory changes that affect our ability to develop and offer services or that could expose us to liability from customers or others.

The Company provides broadband Internet access services to its cable and telephone customers through cable modems and DSL. As the Internet has matured, it has become the subject of increasing regulatory interest. Congress and Federal regulators have adopted a wide range of measures directly or potentially affecting Internet use. The adoption of new Internet regulations or policies could adversely affect our business.

In 2015, the FCC determined that broadband Internet access services, such as those we offer, were a form of "telecommunications service" under the Communications Act and, on that basis, imposed rules banning service providers from blocking access to lawful content, restricting data rates for downloading lawful content, prohibiting the attachment of non-harmful devices, giving special transmission priority to affiliates, and offering third parties the ability to pay for priority routing. The 2015 rules also imposed a "transparency" requirement, *i.e.*, an obligation to disclose all material terms and conditions of our service to consumers.

In December 2017, the FCC adopted an order repudiating its prior (2015) treatment of broadband as a "telecommunications service," reclassifying broadband as an "information service," and eliminating the rules it had imposed at that time (other than a transparency/disclosure-requirement, which it eased in significant ways). The FCC also ruled that state regulators may not impose obligations similar to federal obligations that the FCC removed. Various parties have challenged this ruling in court, and, we cannot predict how any such court challenges will be resolved. Moreover, it is possible that the FCC might further revise its approach to broadband Internet access, or that Congress might enact legislation affecting the rules applicable to the service.

On January 29, 2015, the FCC, in a nation-wide proceeding evaluating whether "advanced broadband" is being deployed in a reasonable and timely fashion, increased the minimum connection speeds required to qualify as advanced broadband service to 25 Mbps for downloads and 3 Mbps for uploads. As a result, the FCC concluded that advanced broadband was not being sufficiently deployed and initiated a new inquiry into what steps it might take to encourage broadband deployment. This action may lead the FCC to adopt additional measures affecting our broadband business. At the same time, the FCC has ongoing proceedings to allocate additional spectrum for advanced wireless service, which could provide additional wireless competition to our broadband business.

On January 30, 2020, the FCC adopted an order approving the disbursement of $20.4 billion over the course of ten years to subsidize the deployment of networks for the provision of high-speed broadband internet access and voice services in areas that are otherwise too costly to be adequately serviced by the market (typically, rural areas). Areas without access to broadband service at speeds of at least 25/3 Mbps will be targeted. Competitors may attempt to seek some of the subsidies under this program to compete with our broadband service offerings.

The FCC imposes obligations on telecommunications service providers, including broadband Internet access service providers, and multichannel video program distributors, like our cable company, intended to ensure that individuals with disabilities are able to access and use telecommunications and video programming services and equipment. We cannot predict the nature and pace these requirements and other developments, or the impact they may have on our operations.

Offering voice communications service may subject us to additional regulatory burdens, causing us to incur additional costs.

We offer voice communications services over our broadband network and continue to develop and deploy VoIP services. The FCC has ruled that competitive telephone companies that support VoIP services, such as those we offer our customers, are entitled to interconnect with incumbent providers of traditional telecommunications services, which ensures that our VoIP services can compete in the market. The scope of these interconnection rights are sometimes contested by third-party providers, which may affect our ability to compete in the provision of voice services or result in additional costs. The FCC has also declared that certain VoIP services are not subject to traditional state public utility regulation. The full extent of the FCC preemption of state and local regulation of VoIP services is not yet clear. Expanding our offering of these services may require us to obtain certain additional authorizations. We may not be able to obtain such authorizations in a timely manner, or conditions could be imposed upon such licenses or authorizations that may not be favorable to us. Telecommunications companies generally are subject to other significant

regulation which could also be extended to VoIP providers. If additional telecommunications regulations are applied to our VoIP service, it could cause us to incur additional costs.

The FCC has already extended certain traditional telecommunications carrier requirements to many VoIP providers such as us, including E911, USF collection, CALEA, privacy of CPNI, number porting, rural call completion, network outage reporting, disability access, rural call completion and discontinuance of service requirements. In November 2014, the FCC adopted an order imposing limited backup power obligations on providers of facilities-based fixed, residential voice services that are not otherwise line-powered, including our VoIP services. This became effective for providers with fewer than 100,000 U.S. customer lines in August 2016 and now requires the Company to disclose certain information to customers and to make available back up power at the point of sale.

In November 2011, the FCC released an order significantly changing the rules governing intercarrier compensation payments for the origination and termination of telephone traffic between carriers, including VoIP service providers like us. The Tenth Circuit Court of Appeals upheld the rules in May 2014. The new rules have resulted in a substantial decrease in intercarrier compensation payments over a multi-year period. In addition, the transition of the Local Number Portability Administrator may impact our ability to manage number porting and related tasks, and/or may result in additional costs arising from the transition to a new administrator.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

The Company owns or leases switching and data centers, office and retail space, and warehouses that support its operations located across a multi-state area covering large portions of central and western Virginia, south-central Pennsylvania, West Virginia, and portions of Maryland, Kentucky, and Ohio. The Company also has fiber optic hubs or points of presence in Pennsylvania, Maryland, Virginia and West Virginia. The Company considers the properties owned or leased generally to be in good operating condition and suitable for its business operations.

The Company owns 225 cell site towers on land owned and leased by the Company. The Company's Tower segment leases tower space to its Wireless segment in support of its Wireless operations, as well as leasing space to other wireless carriers. At December 31, 2019, the Company leased colocation space on 1,960 cell towers, including those sites owned by the Company.

ITEM 3. LEGAL PROCEEDINGS

None

PART II

ITEM 5. **MARKET FOR THE REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES**

Market Information

The Company's stock is traded on the Nasdaq Global Select Market under the symbol “SHEN.” The following table indicates the closing high and low sales prices per share of common stock as reported by the Nasdaq Global Select Market for each quarter during the last two years:

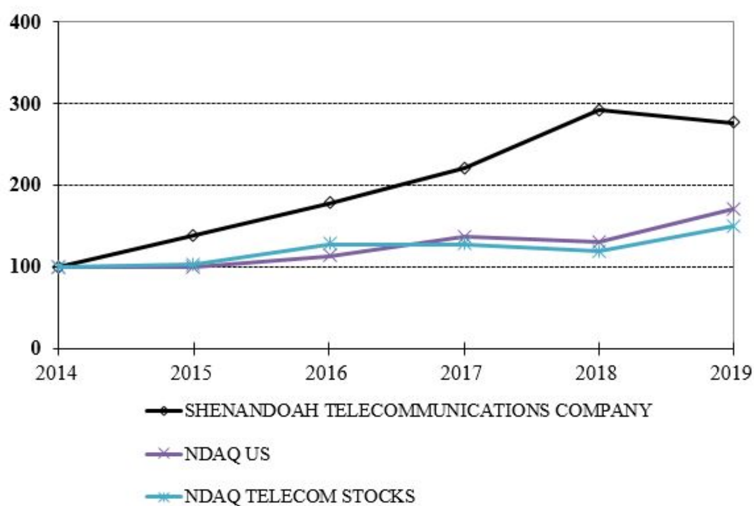
2019	High	Low
Fourth Quarter	$ 41.73	$ 29.61
Third Quarter	41.63	30.70
Second Quarter	45.27	36.40
First Quarter	51.18	43.28

2018	High	Low
Fourth Quarter	$ 51.41	$ 34.74
Third Quarter	39.40	31.10
Second Quarter	39.65	29.93
First Quarter	38.60	30.00

Stock Performance Graph

The following graph and table show the cumulative total shareholder return on the Company’s common stock compared to the Nasdaq US Index and the Nasdaq Telecommunications Index for the period between December 31, 2014 and December 31, 2019. The Nasdaq Telecommunications Index represents a wide mix of telecommunications service and equipment providers and smaller carriers that offer similar products and services and serve similar markets. The graph assumes $100 was invested on December 31, 2014 in the Company’s common stock, and the other two indexes, and that all dividends were reinvested and market capitalization weighting as of December 31, 2015, 2016, 2017, 2018 and 2019.

Our performance graphs use comparable indexes provided by Nasdaq Global Indexes.



	2014	2015	2016	2017	2018	2019
Shenandoah Telecommunications Company	$ 100	$ 139	$ 178	$ 222	$ 292	$ 277
NDAQ US	$ 100	$ 100	$ 114	$ 138	$ 130	$ 171
NDAQ Telecom Stocks	$ 100	$ 104	$ 128	$ 128	$ 119	$ 151

Holders

As of February 21, 2020, there were 4,014 holders of record of the Company's common stock.

Dividend Policy

Dividends are paid to Shenandoah Telecommunications Company shareholders from accumulated dividends paid to it by its operating subsidiaries. Under the Company's credit agreement, the Company is restricted in its ability to pay dividends in the future. So long as no Default or Event of Default, as defined in the credit agreement, exists before or will result after giving effect to such dividends, distributions or redemptions on a pro forma basis, the Company may declare or pay a lawful dividend or other distribution of assets, or retire, redeem, purchase or otherwise acquire capital stock in an aggregate amount which when added to any such dividends, distributions or redemptions of capital stock or other equity interest made, declared or paid from January 1, 2016 to the date of declaration, does not exceed $25 million plus 60% of the Company's consolidated net income (excluding non-cash extraordinary items such as write-downs or write-ups of assets, other than current assets).

The table below sets forth the cash dividends per share of our common stock that our board of directors declared during the following years:

	Years Ended December 31,				
	2015	2016	2017	2018	2019
Cash Dividend	$ 0.24	$ 0.25	$ 0.26	$ 0.27	$ 0.29

Dividend Reinvestment Plan

The Company maintains a dividend reinvestment plan (the "DRIP") for the benefit of its shareholders. When shareholders remove shares from the DRIP, the Company issues whole shares in book entry form, pays out cash for any fractional shares, and cancels the fractional shares. In conjunction with the vesting of shares or exercise of stock options, the grantees may surrender awards necessary to cover the statutory tax withholding requirements and any amounts required to cover stock option strike prices associated with the transaction.

Purchases of Equity Securities by the Issuer or Affiliated Purchasers

The following table provides information about shares repurchased during the fourth quarter ended December 31, 2019, to settle employee tax withholding related to the vesting of stock awards and through the share repurchase program.

($ in thousands, except per share amounts)	Number of Shares Surrendered	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs (1)	Approximate Dollar Value that May Yet be Purchased under the Plans or Programs (1)
October 1 to October 31	—	$ —	N/A	N/A
November 1 to November 30	12	$ 33.66	200,206	$ 72,772
December 1 to December 31	—	—	204	$ 72,765
Total	12		200,410	$ 72,765

(1) On October 29, 2019, the Company's Board of Directors authorized a program to repurchase an aggregate of $80 million of Shentel's outstanding common stock. The Company intends to use a combination of cash on hand and cash generated by operations to fund additional repurchases under this program through open market or privately negotiated transactions.

ITEM 6. **SELECTED FINANCIAL DATA**

The following table sets forth selected consolidated financial data for the years presented and at the dates indicated below. Our historical results are not necessarily indicative of our results in any future periods. The summary of our consolidated financial data set forth below should be read together with our consolidated financial statements and related notes, as well as the sections entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations," included elsewhere in this Annual Report on Form 10-K.

	Years Ended December 31,				
(in thousands, except share and per share amounts)	**2019**	**2018**	**2017**	**2016**	**2015**
Revenue	$ 633,906	$ 630,854	$ 611,991	$ 535,288	$ 342,485
Operating expenses	536,860	537,608	565,481	512,762	268,399
Operating income	97,046	93,246	46,510	22,526	74,086
Interest expense	29,468	34,847	38,237	25,102	7,355
Income tax expense (benefit)	16,104	15,517	(53,133)	2,840	27,726
Net income (loss)	54,935	46,595	66,390	(895)	40,864
Shareholder Information:					
Shares outstanding	49,670,603	49,630,119	49,327,671	48,934,708	48,475,132
Earnings (loss) per share - basic	$ 1.10	$ 0.94	$ 1.35	$ (0.02)	$ 0.84
Earnings (loss) per share - diluted	$ 1.10	$ 0.93	$ 1.33	$ (0.02)	0.83
Cash dividends per share	$ 0.29	$ 0.27	$ 0.26	$ 0.25	$ 0.24

	Years Ended December 31,				
	2019	**2018**	**2017**	**2016**	**2015**
Cash and cash equivalents	$ 101,651	$ 85,086	$ 78,585	$ 36,193	$ 76,812
Accounts receivable	63,541	54,407	54,184	69,789	29,778
Operating lease right-of-use assets	392,589	—	—	—	—
Property, plant and equipment, net	700,114	701,359	686,327	698,122	410,018
Deferred charges and other assets	53,352	49,891	13,690	14,756	11,504
Total assets	1,860,691	1,484,766	1,411,860	1,484,407	627,151
Total debt - including current maturities	720,114	770,242	821,958	829,265	199,661
Operating lease liabilities	395,006	—	—	—	—
Total liabilities	1,391,269	1,042,519	1,061,638	1,188,513	337,213
Total Shareholders' equity	469,422	442,247	350,222	295,894	289,938

ITEM 7. **MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS**

You should read the following discussion and analysis of our financial condition and results of operations in conjunction with our "Selected Financial Data" and our consolidated financial statements and notes thereto appearing elsewhere in this Annual Report on Form 10-K. In addition to historical consolidated financial information, the following discussion and analysis may contain forward-looking statements that involve risks, uncertainties and assumptions. Our actual results could differ materially from those anticipated by forward-looking statements as a result of many factors. We discuss factors that we believe could cause or contribute to these differences below and elsewhere in this Annual Report on Form 10-K, including those set forth under "Part I. Cautionary Statement Regarding Forward-Looking Statements" and "Part I. Item 1A. Risk Factors".

Overview

Shenandoah Telecommunications Company ("Shentel", "we", "our", "us", or the "Company"), is a provider of a comprehensive range of wireless and broadband communications products and services in the Mid-Atlantic portion of the United States.

Management's Discussion and Analysis is organized around our reporting segments. Refer to Item 1 above for our description of our reporting segments and a description of their respective business activities. Also see Note 14, *Segment Reporting*, in our consolidated financial statements for additional information.

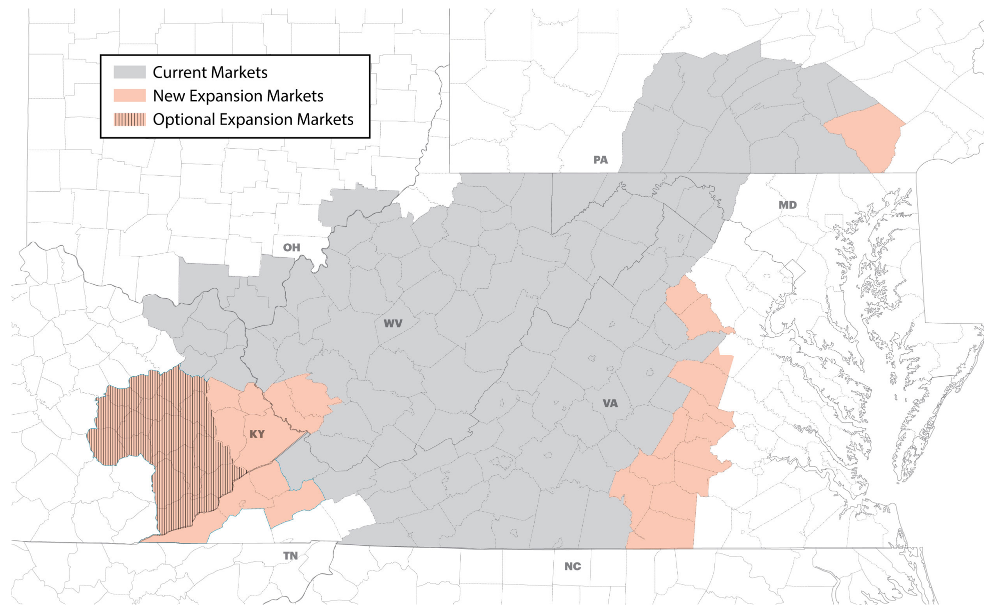
2019 Developments

Glo Fiber: During the second quarter of 2019, we initiated the deployment of our new fiber-to-the-home service, which is marketed by our Broadband segment under the Glo Fiber brand. Glo Fiber leverages our existing, robust fiber network and commercial customer base to target certain residential areas in markets within our region. We launched service in Harrisonburg, Virginia during the fourth quarter of 2019. During 2019, we recognized $19 thousand in revenue and incurred $2.9 million of operating expense. We expect to continue to incur operating losses in a new market for approximately the first two years from the launch of service.

Big Sandy Broadband, Inc. Acquisition: On February 28, 2019, the Company paid $10.0 million to acquire the assets of Big Sandy Broadband, Inc. ("Big Sandy"), a small regional provider of cable television, telephone and high speed internet services in eastern Kentucky.

Other Events

Sprint Affiliate Area Expansion: Effective February 1, 2018, we signed the expansion agreement with Sprint to expand our wireless network coverage area to include certain portions of Kentucky, Pennsylvania, Virginia and West Virginia, (the "Expansion Area"), effectively adding a population (POPs) of approximately 1.1 million. The agreement includes certain network build out requirements, and the ability to utilize Sprint's spectrum in the Expansion Area along with certain other amendments to the Affiliate Agreements. Pursuant to the expansion agreement, Sprint agreed to transition the provision of network coverage in the Expansion Area to us. The expansion agreement required a payment of $52.0 million to Sprint for the right to service the Expansion Area pursuant to the Affiliate Agreements plus an additional payment of up to $5.0 million after acceptance of certain equipment at the Sprint cell sites in the Expansion Area. A map of our territory, reflecting the new Expansion Area, is provided below:



Results of Operations

Revenue

As described in Item 1, *Business* we earn revenue primarily through our provision of wireless network services to Sprint under our affiliate agreement, as well as from our provision of broadband services that include fiber, internet, video, voice, and data services. We also lease colocation space on our owned cell towers to external wireless carriers. Our Wireless segment revenue is fully variable and based upon the number of Sprint subscribers that utilize our wireless network, and their respective rate plans with Sprint. Our Broadband segment revenue is driven primarily by the number of our customers that subscribe to our broadband services, and their selection from our respective rate plans. Our Tower segment revenue is driven primarily by the number of cell towers that we own, and our ability to secure colocation leases from wireless carriers.

Operating Expenses

Our operating expenses consist primarily of cost of services, cost of goods sold, selling, general and administrative, acquisition, integration and migration expense in 2017 related to the 2016 acquisition of nTelos, and depreciation and amortization expenses.

Other Income (Expense)

Our other income (expense) consists primarily of interest expense and other income. Our other income primarily represents interest and dividends earned from our investments, including patronage income that is connected with our CoBank loan agreements.

Income Tax Expense

Income tax expense consists of federal and state income taxes in the United States.

2019 Compared with 2018

Results of Operations

The Company’s consolidated results from operations are summarized as follows:

	Year Ended December 31,				Change	
($ in thousands)	2019	% of Revenue	2018	% of Revenue	$	%
Revenue	$ 633,906	100.0	$ 630,854	100.0	3,052	0.5
Operating expenses	536,860	84.7	537,608	85.2	(748)	(0.1)
Operating income	97,046	15.3	93,246	14.8	3,800	4.1
Interest expense	(29,468)	(4.6)	(34,847)	(5.5)	(5,379)	(15.4)
Other income	3,461	0.5	3,713	0.6	(252)	(6.8)
Income before taxes	71,039	11.2	62,112	9.8	8,927	14.4
Income tax expense	16,104	2.5	15,517	2.5	587	3.8
Net income	$ 54,935	8.7	$ 46,595	7.4	8,340	17.9

Revenue
Revenue increased approximately $3.1 million, or 0.5%, in 2019 compared with 2018, driven primarily by Broadband revenue growth of $10.8 million partially offset by Wireless revenue decline of $7.1 million. The Wireless segment recognized $12 million in lower travel revenue in 2019 compared to 2018 due to the ongoing dispute with Sprint over resetting of the travel fee. Refer to the discussion of the results of operations for the Wireless and Broadband segments, included within this annual report, for additional information.

Operating expenses
Operating expenses decreased approximately $0.7 million, or 0.1%, in 2019 compared with 2018. The decrease was primarily due to a decline in Wireless depreciation and amortization expense as certain assets acquired from nTelos became fully depreciated.

Interest expense
Interest expense decreased approximately $5.4 million, or 15.4%, in 2019 compared with 2018. The decrease in interest expense was primarily attributable to the reduction of the applicable base interest rate by 75 basis points and principal repayments on our Credit Facility term loans, combined with the effect of year-over-year declines in LIBOR.

Other income
Other income decreased approximately $0.3 million, or 6.8%, in 2019 compared with 2018. The decrease was primarily due to a decline in the actuarial value of our retirement plan obligations.

Income tax expense
Income tax expense increased approximately $0.6 million, or 3.8%, compared with 2018. The increase was primarily driven by the increase in our income before taxes.

Wireless

Wireless earns postpaid, prepaid and wholesale revenues from Sprint for their subscribers that use our Wireless network service in our Wireless network coverage area. The Company's wireless revenue is variable based on billed revenues to Sprint's customers in the Sprint Affiliate Area less applicable fees retained by Sprint. Sprint retains an 8% Management Fee and an 8.6% Net Service Fee on postpaid revenues and a 6% Management Fee on prepaid wireless revenues. For postpaid, the Company is also charged for the costs of subsidized handsets sold through Sprint's national channels as well as commissions paid by Sprint to third-party dealers in our Sprint Affiliate Area. Sprint also charges the Company separately to acquire and support prepaid customers. These charges are calculated based on Sprint's national averages for its prepaid programs, and are billed per user or per gross additional customer, as appropriate.

The following tables indicate selected operating statistics of Wireless, including Sprint subscribers:

	December 31, 2019	December 31, 2018 (2)	December 31, 2017 (3)
Postpaid:			
Retail PCS total subscribers	844,194	795,176	736,597
Retail PCS phone subscribers	740,958	723,455	678,096
Retail PCS connected device subscribers	103,236	71,721	58,501
Gross PCS total subscriber additions	235,953	190,334	173,871
Gross PCS phone additions	174,237	156,601	150,210
Gross PCS connected device additions	61,716	33,733	23,661
Net PCS total subscriber additions (losses)	49,018	20,236	(5,032)
Net PCS phone additions (losses)	19,846	12,310	(1,414)
Net PCS connected device additions (losses)	29,172	7,926	(3,618)
PCS monthly retail total churn %	1.92%	1.82%	2.04%
PCS monthly phone churn %	1.77%	1.69%	1.88%
PCS monthly connected device churn %	3.21%	3.35%	3.96%
Prepaid:			
Retail PCS subscribers	274,012	258,704	225,822
Gross PCS subscriber additions	152,098	150,662	151,926
Net PCS subscriber additions	15,308	17,191	14,633
PCS monthly retail churn %	4.26%	4.45%	5.07%
PCS market POPS (000) (1)	7,227	7,023	5,942
PCS covered POP (000) (1)	6,324	6,109	5,272
Macro base stations (cell sites)	1,960	1,853	1,623

(1) "POPS" refers to the estimated population of a given geographic area. Market POPS are those within a market area which we are authorized to serve under our Sprint PCS affiliate agreements, and Covered POPS are those covered by our network. The data source for POPS is U.S. census data. Historical periods previously referred to other third party population data and have been recast to refer to U.S. census data.

(2) Acquired the Richmond Expansion Area on February 1, 2018 with market POPs of 1,082,000 and covered POPs of 602,000. 2018 net adds results exclude 38,343 postpaid and 15,691 prepaid subscribers acquired.

(3) Acquired the Parkersburg Expansion Area on April 6, 2017 with market POPs of 511,000 and covered POPs of 244,000. 2017 net adds results exclude 19,067 postpaid and 4,517 prepaid subscribers acquired.

Wireless results from operations are summarized as follows:

	Year Ended December 31,				Change	
($ in thousands)	2019	% of Revenue	2018	% of Revenue	$	%
Wireless revenue:						
Gross postpaid billings	$ 410,532	92.6	$ 405,101	89.9	5,431	1.3
Allocated bad debt	(20,428)	(4.6)	(21,866)	(4.9)	(1,438)	(6.6)
Amortization of contract asset and other	(23,337)	(5.3)	(18,742)	(4.2)	4,595	24.5
Sprint management and net service fee	(64,736)	(14.6)	(63,718)	(14.1)	1,018	1.6
Total postpaid service revenue	302,031	68.1	300,775	66.8	1,256	0.4
Gross prepaid billings	121,604	27.4	111,462	24.7	10,142	9.1
Amortization of contract asset and other	(60,435)	(13.6)	(52,846)	(11.7)	7,589	14.4
Sprint management fee	(7,629)	(1.7)	(7,014)	(1.6)	615	8.8
Total prepaid service revenue	53,540	12.1	51,602	11.5	1,938	3.8
Travel and other	20,160	4.5	30,572	6.8	(10,412)	(34.1)
Wireless service revenue and other	375,731	84.7	382,949	85.0	(7,218)	(1.9)
Equipment revenue	67,659	15.3	67,510	15.0	149	0.2
Total wireless revenue	443,390	100.0	450,459	100.0	(7,069)	(1.6)
Wireless operating expenses:						
Cost of services	131,745	29.7	127,045	28.2	4,700	3.7
Cost of goods sold	65,148	14.7	63,583	14.1	1,565	2.5
Selling, general and administrative	42,225	9.5	46,760	10.4	(4,535)	(9.7)
Depreciation and amortization	115,731	26.1	125,067	27.8	(9,336)	(7.5)
Total wireless operating expenses	354,849	80.0	362,455	80.5	(7,606)	(2.1)
Wireless operating income	$ 88,541	20.0	$ 88,004	19.5	537	0.6

Revenue

Under our affiliate agreement with Sprint, we have historically earned and recognized monthly revenue of $1.5 million for providing service to Sprint customers who pass through our network area. While we continue to provide these services to Sprint, the agreed upon payments were suspended by Sprint on April 30, 2019. Accordingly, we have ceased recognizing revenue for the services provided after that date until a new prospective fee can be agreed. We have triggered the final dispute resolution option with Sprint which we expect will lead to a resolution for travel fee revenue in the second quarter of 2020.

Wireless revenue decreased approximately $7.1 million, or 1.6%, in 2019 compared with 2018. The decrease was primarily attributable to the aforementioned $12.0 million decline in travel revenue, partially offset by $3.2 million increase in postpaid and prepaid revenue from approximately 6% growth in subscribers and $1.6 million increase in roaming and MVNO revenues.

Cost of services

Cost of services increased approximately $4.7 million, or 3.7%, in 2019 compared with 2018, primarily due to higher cell site rent expense related to our network expansion, partially offset by continued network optimization and construction of fiber to our towers which results in more cost effective backhaul circuits.

Cost of goods sold

Cost of goods sold increased approximately $1.6 million, or 2.5%, in 2019 compared with 2018 due to higher volume of equipment sales.

Selling, general and administrative

Selling, general and administrative costs decreased approximately $4.5 million, or 9.7%, in 2019 compared with 2018 primarily due to reduced sales and use and property tax expense of $2.0 million from favorable settlements during 2019. Lower marketing and advertising expenses of approximately $1.8 million, and a $0.7 million decline in store rent expense as we transition stores to Sprint's dealer network also contributed to the overall decrease.

Depreciation and amortization

Depreciation and amortization decreased approximately $9.3 million, or 7.5%, in 2019 compared with 2018. Amortization expense declined primarily because our Sprint affiliate contract expansion asset is amortized under an accelerated method that declines over time. Depreciation expense also declined as certain assets acquired from nTelos in 2016 became fully depreciated.

Broadband

Our Broadband segment provides broadband, video and voice services to residential and commercial customers in portions of Virginia, West Virginia, Maryland, and Kentucky, via fiber optic and hybrid fiber coaxial ("HFC") cable. The Broadband segment also leases dark fiber and provides Ethernet and Wavelength fiber optic services to enterprise and wholesale customers throughout the entirety of our service area. The Broadband segment also provides voice and digital subscriber line ("DSL") telephone services to customers in Virginia's Shenandoah County as a Rural Local Exchange Carrier ("RLEC"). These integrated networks are connected by an approximately 6,000 fiber route mile network. This fiber optic network also supports our Wireless segment operations and these intercompany transactions are reported at their market value.

The following table indicates selected operating statistics of Broadband:

	December 31, 2019	December 31, 2018	December 31, 2017
Broadband homes passed (1)	208,298	201,633	201,410
Broadband customer relationships (2)	100,890	95,328	93,162
Video:			
RGUs (3)	53,673	58,672	62,964
Penetration (4)	25.8%	29.1%	31.3%
Digital video penetration (5)	95.0%	78.8%	76.2%
Broadband:			
RGUs (3)	84,045	75,389	68,379
Penetration (4)	40.3%	37.4%	34.0%
Voice:			
RGUs (3)	31,380	29,474	24,138
Penetration (4)	16.2%	15.9%	13.1%
Total Cable and Glo Fiber RGUs	169,098	163,535	155,481
RLEC homes passed	25,846	26,782	26,707
RLEC customer relationships (2)	10,306	11,226	12,319
RLEC RGUs:			
Data RLEC	7,797	9,104	11,409
Penetration (4)	30.2%	34.0%	42.7%
Voice RLEC	14,332	15,698	16,930
Penetration (4)	55.5%	58.6%	63.4%
Total RLEC RGUs	22,129	24,802	28,339
Total RGUs	**191,227**	**188,337**	**183,820**
Fiber route miles	6,139	5,641	5,429
Total fiber miles (6)	320,444	300,200	276,176

(1) Homes and businesses are considered passed ("homes passed") if we can connect them to our distribution system without further extending the transmission lines. Homes passed is an estimate based upon the best available information. Homes passed have access to video, broadband and voice services.
(2) Customer relationships represent the number of billed customers who receive at least one of our services.
(3) As of September 30, 2019, the Company revised its methodology for counting RGUs associated with hotels, multiple dwelling units ("MDUs") and certain commercial customers. We now count each dwelling or unit of service as a separate RGU. Prior year information has been recast to reflect our revised methodology. Previously we counted RGUs on an equivalent basis consistent with carriage fee practices.
(4) Penetration is calculated by dividing the number of users by the number of homes passed or available homes, as appropriate.
(5) Digital video penetration is calculated by dividing the number of digital video users by total video users. Digital video users are video customers who receive any level of video service via digital transmission. A dwelling with one or more digital set-top boxes or digital adapters counts as one digital video user.

(6) Total fiber miles are measured by taking the number of fiber strands in a cable and multiplying that number by the route distance. For example, a 10 mile route with 144 fiber strands would equal 1,440 fiber miles.

Broadband results from operations are summarized as follows:

	Year Ended December 31,				Change	
($ in thousands)	2019	% of Revenue	2018	% of Revenue	$	%
Broadband revenue						
Cable, residential and SMB	$ 134,187	69.2	$ 124,072	67.8	10,115	8.2
Fiber, enterprise and wholesale	27,714	14.3	24,439	13.3	3,275	13.4
Rural local exchange carrier	22,966	11.8	26,196	14.3	(3,230)	(12.3)
Equipment and other	9,077	4.7	8,413	4.6	664	7.9
Total broadband revenue	193,944	100.0	183,120	100.0%	10,824	5.9
Broadband operating expenses						
Cost of services	76,674	39.5	75,066	41.0	1,608	2.1
Cost of goods sold	766	0.4	376	0.2	390	103.7
Selling, general, and administrative	32,679	16.8	27,741	15.1	4,938	17.8
Depreciation and amortization	41,304	21.3	38,317	20.9	2,987	7.8
Total broadband operating expenses	151,423	78.1	141,500	77.3	9,923	7.0
Broadband operating income	$ 42,521	21.9	$ 41,620	22.7	901	2.2

Cable, residential and small and medium business (SMB) revenue
Cable, residential and SMB revenue increased in 2019 approximately $10.1 million, or 8.2%, primarily driven by data revenue growth of $7.6 million from an increase in broadband penetration, video revenue growth of $1.0 million from an increase in ARPU to pass through higher programming costs, and voice revenue growth of $0.9 million from growth in SMB voice RGUs.

Fiber, enterprise and wholesale revenue
Fiber, enterprise and wholesale revenue increased in 2019 approximately $3.3 million, or 13.4%, from a combination of 425 new enterprise connections and intercompany backhaul revenue growth.

Rural local exchange carrier revenue
RLEC revenue decreased approximately $3.2 million, or 12.3%, compared with 2018 due to a decline in residential subscribers and enterprise TDM circuits.

Cost of services
Cost of services increased approximately $1.6 million, or 2.1%, in 2019 compared with 2018. Maintenance costs for our larger network drove $1.1 million of this increase, while a $0.6 million increase in programming and retransmission costs drove the rest.

Cost of goods sold
Cost of goods sold increased approximately $0.4 million on higher volume, consistent with the $0.3 million increase in Broadband equipment revenue.

Selling, general and administrative
Selling, general and administrative expense increased $4.9 million or 17.8% compared with 2018 primarily due to $2.5 million of expenses incurred in the launch of Glo Fiber, $1.5 million in payroll increases and $0.8 million in higher advertising and commissions.

Depreciation and amortization
Depreciation and amortization increased $3.0 million or 7.8%, compared with 2018, primarily due to the expansion of our broadband network footprint.

Tower

Our Tower segment owns 225 cell towers and leases colocation space on those towers to our Wireless segment, as well as to other wireless communications providers. Substantially all of our owned towers are built on ground that we lease from the respective landlords. The colocation space that we lease to our Wireless segment is priced at our estimate of fair market value, which updates from time to time based upon our observation of the market.

The following table indicates selected operating statistics of the Tower segment:

	December 31, 2019	December 31, 2018	December 31, 2017
Towers owned	225	208	192
Tenants (1)	404	367	363
Average tenants per tower	1.8	1.8	1.9

(1) Includes 201, 174 and 171 intercompany tenants for our Wireless segment as of December 31, 2019, 2018 and 2017, respectively.

Tower results from operations are summarized as follows:

	Year Ended December 31,				Change	
($ in thousands)	2019	% of Revenue	2018	% of Revenue	$	%
Tower revenue	$ 12,984	100.0	$ 12,196	100.0%	788	6.5
Tower operating expenses	7,085	54.6	7,353	60.3	(268)	(3.6)
Tower operating income	$ 5,899	45.4	$ 4,843	39.7	1,056	21.8

Revenue
Revenue increased approximately $0.8 million, or 6.5%, in 2019 compared with 2018. This increase was due to 10.1% increase in tenants and 2.5% increase in the lease rate.

Operating expenses
Operating expenses were comparable with the prior year.

2018 Compared with 2017

Results of Operations

The Company's consolidated results from operations are summarized as follows:

	Year Ended December 31,				Change	
($ in thousands)	2018	% of Revenue	2017	% of Revenue	$	%
Revenue	$ 630,854	100.0	$ 611,991	100.0	18,863	3.1
Operating expenses	537,608	85.2	565,481	92.4	(27,873)	(4.9)
Operating income	93,246	14.8	46,510	7.6	46,736	100.5
Interest expense	(34,847)	(5.5)	(38,237)	(6.2)	(3,390)	(8.9)
Other income	3,713	0.6	4,984	0.8	(1,271)	(25.5)
Income before taxes	62,112	9.8	13,257	2.2	48,855	368.5
Income tax expense (benefit)	15,517	2.5	(53,133)	(8.7)	68,650	129.2
Net income	$ 46,595	7.4	$ 66,390	10.9	(19,795)	(29.8)

The Company adopted ASC 606-*Revenue from Contracts with Customers, ("ASC 606")* effective January 1, 2018, using the modified retrospective method as discussed in Note 3, *Revenue from Contracts with Customers.* The following table identifies the impact of applying ASC 606 to the Company for the year ended December 31, 2018:

	Year Ended December 31, 2018				
	ASC 606 Impact - CONSOLIDATED				
($ in thousands, except per share amounts)	Prior to Adoption of ASC 606	Changes in Presentation (1)	Equipment Revenue (2)	Deferred Costs (3)	As Reported 12/31/18
Service revenue and other	$ 632,340	$ (86,637)	$ —	$ 16,753	$ 562,456
Equipment revenue	8,298	—	60,100	—	68,398
Total revenue	**640,638**	**(86,637)**	**60,100**	**16,753**	**630,854**
Cost of services	193,860	—	—	162	194,022
Cost of goods sold	28,377	(24,518)	60,100	—	63,959
Selling, general & administrative	175,753	(62,119)	—	(412)	113,222
Depreciation and amortization	166,405	—	—	—	166,405
Total operating expenses	**564,395**	**(86,637)**	**60,100**	**(250)**	**537,608**
Operating income	**76,243**	**—**	**—**	**17,003**	**93,246**
Other expense	(31,134)	—	—	—	(31,134)
Income tax expense	10,926	—	—	4,591	15,517
Net income	**$ 34,183**	**$ —**	**$ —**	**$ 12,412**	**$ 46,595**
Earnings per share					
Basic	$ 0.69			$ 0.25	$ 0.94
Diluted	$ 0.68			$ 0.25	$ 0.93
Weighted average shares outstanding, basic	49,542				49,542
Weighted average shares outstanding, diluted	50,063				50,063

(1) Amounts payable to Sprint for the reimbursement of costs incurred by Sprint in their national sales channel for commissions and device costs for both postpaid and prepaid, and to provide on-going support to their prepaid customers in our territory were historically recorded as expense when incurred. Under ASC 606, these amounts represent consideration payable to our customer, Sprint, and are recorded as a reduction of revenue. In 2017, these amounts were approximately $44.8 million for the postpaid national commissions, previously recorded in selling, general and administrative, $18.7 million for national device costs previously recorded in cost of goods and services, and $16.9 million for the on-going service to Sprint's prepaid customers, previously recorded in selling, general and administrative.

(2) Costs incurred by the Company for the sale of devices under Sprint's device financing and lease programs were previously recorded net against revenue. Under ASC 606, the revenue and related costs from device sales are recorded gross. These amounts were approximately $63.8 million in 2017.

(3) Amounts payable to Sprint for the reimbursement of costs incurred by Sprint in their national sales channel for commissions and device costs, which historically have been expensed when incurred and presented net of revenue, are deferred and amortized against revenue over the expected period of benefit of approximately 21 to 53 months. In Broadband, installation revenues are recognized over a period of approximately 10-11 months. The deferred balance as of December 31, 2018 was approximately $75.8 million and was classified on the balance sheet as current and non-current assets, as applicable.

Revenue
Revenue increased approximately $18.9 million, or 3.1%, in 2018 compared with 2017. Excluding the impact of adopting ASC 606, revenue increased approximately $28.6 million, or 4.7%, driven by the Wireless and Broadband operations.

Operating expenses
Operating expenses decreased approximately $27.9 million, or 4.9%, in 2018 compared with 2017. Excluding the impact of adopting ASC 606, operating expenses decreased approximately $1.1 million, or 0.2%, primarily due to the absence of acquisition, integration and migration costs related to the completion of the transformation of the nTelos network in 2017 as well as lower depreciation and amortization costs due to the retirement of assets acquired with nTelos, partially offset by increased costs necessary to support our continued growth and expansion.

Interest expense
Interest expense decreased approximately $3.4 million, or 8.9%, in 2018 compared with 2017. The decrease in interest expense was primarily attributable to the 2018 amendments to the Credit Facility Agreement that reduced the applicable base interest rate by 75 basis points, partially offset by the effect of increases in the LIBOR.

Other income
Other income decreased approximately $1.3 million, or 25.5%, in 2018 compared with 2017. The decrease was primarily attributable to a reduction in interest income related to the former nTelos equipment installment plan. The integration of the acquired nTelos business was completed during 2017.

Income tax expense (benefit)
Income tax expense increased $68.7 million from a $53.1 million benefit in 2017 to a $15.5 million expense in 2018. The increase was primarily attributable to growth in our income before taxes during 2018 and the one-time non-cash tax benefit of $53.4 million recorded in 2017 as a result of the reduction in the U.S. corporate income tax rate from 35% to 21% as the 2017 Tax Act became effective. The Company's effective tax rate increased from a benefit of 400.8% in 2017 to an expense of 25.0% in 2018. See Note 11, *Income Taxes* for additional information.

Wireless

The following table identifies the impact of ASC 606 on the Company's Wireless operations for the year ended December 31, 2018:

	Year Ended December 31, 2018				
	ASC 606 Impact - WIRELESS				
($ in thousands)	**Prior to Adoption of ASC 606**	**Changes in Presentation (1)**	**Equipment Revenue (2)**	**Deferred Costs (3)**	**As Reported 12/31/2018**
Service revenue	$ 450,735	$ (86,637)	$ —	$ 16,720	$ 380,818
Equipment revenue	7,410	—	60,100	—	67,510
Other revenue	2,131	—	—	—	2,131
Total revenue	**460,276**	**(86,637)**	**60,100**	**16,720**	**450,459**
Cost of services	127,045	—	—	—	127,045
Cost of goods sold	28,001	(24,518)	60,100	—	63,583
Selling, general & administrative	108,879	(62,119)	—	—	46,760
Depreciation and amortization	125,067	—	—	—	125,067
Total operating expenses	**388,992**	**(86,637)**	**60,100**	**—**	**362,455**
Operating income	**$ 71,284**	**$ —**	**$ —**	**$ 16,720**	**$ 88,004**

(1) Amounts payable to Sprint for the reimbursement of costs incurred by Sprint in their national sales channel for commissions and device costs for both postpaid and prepaid, and to provide on-going support to their prepaid customers in our territory were historically recorded as expense when incurred. Under ASC 606, these amounts represent consideration payable to our customer, Sprint, and are recorded as a reduction of revenue. In 2017, these amounts were approximately $44.8 million for the postpaid national commissions, previously recorded in selling, general and administrative, $18.7 million for national device costs previously recorded in cost of goods and services, and $16.9 million for the on-going service to Sprint's prepaid customers, previously recorded in selling, general and administrative.

(2) Costs incurred by the Company for the sale of devices under Sprint’s device financing and lease programs were previously recorded net against revenue. Under ASC 606, the revenue and related costs from device sales are recorded gross. These amounts were approximately $63.8 million in 2017.

(3) Amounts payable to Sprint for the reimbursement of costs incurred by Sprint in their national sales channel for commissions and device costs, which historically have been expensed when incurred and presented net of revenue, are deferred and amortized against revenue over the expected period of benefit of approximately 21 to 53 months. In Broadband, installation revenues are recognized over a period of approximately 10-11 months. The deferred balance as of December 31, 2018 was approximately $75.8 million and was classified on the balance sheet as current and non-current assets, as applicable.

Wireless results from operations are summarized as follows:

	Year Ended December 31,				Change	
($ in thousands)	2018	% of Revenue	2017	% of Revenue	$	%
Wireless revenue:						
Gross postpaid billings	$ 405,101	89.9	$ 393,571	88.8	11,530	2.9
Allocated bad debt	(21,866)	(4.9)	(21,334)	(4.8)	532	2.5
Amortization of contract asset and other (1)	(18,742)	(4.2)	—	—	18,742	100.0
Sprint management and net service fee	(63,718)	(14.1)	(60,608)	(13.7)	3,110	5.1
Total postpaid service revenue	300,775	66.8	311,629	70.3	(10,854)	(3.5)
Prepaid billings (2)	111,462	24.7	103,161	23.3	8,301	8.0
Amortization of contract asset and other (1)	(52,846)	(11.7)	—	—	52,846	100.0
Sprint management fee	(7,014)	(1.6)	(6,189)	(1.4)	825	13.3
Total prepaid service revenue	51,602	11.5	96,972	21.9	(45,370)	(46.8)
Travel and other (2)	30,572	6.8	24,981	5.6	(267,000)	(11.1)
Wireless service revenue and other	382,949	85.0	433,582	97.9	(50,633)	(11.7)
Equipment revenue	67,510	15.0	9,467	2.1	58,043	613.1
Total wireless revenue	450,459	100.0	443,049	100.0	7,410	1.7
Wireless operating expenses:						
Cost of services	127,045	28.2	125,785	28.4	1,260	1.0
Cost of goods sold	63,583	14.1	22,653	5.1	40,930	180.7
Selling, general and administrative	46,760	10.4	117,561	26.5	(70,801)	(60.2)
Acquisition, integration and migration expenses	—	—	10,793	2.4	(10,793)	(100.0)
Depreciation and amortization	125,067	27.8	137,725	31.1	(12,658)	(9.2)
Total wireless operating expenses	362,455	80.5	414,517	93.6	(52,062)	(12.6)
Wireless operating income	$ 88,004	19.5	$ 28,532	6.4	59,472	208.4

(1) Due to the adoption of ASC 606, costs reimbursed to Sprint for commission and acquisition cost incurred in their national sales channel are recorded as a reduction of revenue and amortized over the period of benefit. Additionally, costs reimbursed to Sprint for the support of their prepaid customer base are recorded as a reduction of revenue. These costs were previously recorded in cost of goods sold, and selling, general and administrative.

(2) The Company includes Lifeline subscribers revenue within travel and other revenue to be consistent with Sprint. The above table reflects the reclassification of the related Assurance Wireless prepaid revenue from prepaid gross billings to travel and other revenue.

Revenue

Wireless revenue increased approximately $7.4 million, or 1.7%, in 2018 compared with 2017. Excluding the impact of ASC 606, wireless revenue increased approximately $17.2 million, or 3.9%. This increase was driven by growth in postpaid and prepaid PCS subscribers, improvements in average monthly churn, and was partially offset by a decline in postpaid average revenue per subscriber primarily related to promotions and discounts.

As a result of the adoption of ASC 606 in 2018, wireless service revenue was reduced by approximately $86.6 million of costs payable to Sprint, our customer, related to the reimbursement to Sprint for costs incurred in their national sales channel for commissions and device costs for both postpaid and prepaid, and to provide ongoing support to their prepaid customers in our territory. Commissions, device costs and costs for ongoing support of Sprint's prepaid customers were previously recorded as operating expenses. Additionally, we recorded $60.1 million of equipment revenue and cost of goods sold for the sale of devices under Sprint’s device financing and lease programs. Prior to the adoption of ASC 606, equipment costs were presented net of equipment revenue.

Cost of services

Cost of services increased approximately $1.3 million, or 1.0%, in 2018 compared with 2017, primarily due to the expansion of our network and wireless network coverage area and was partially offset by repricing Wireless backhaul circuits to market rates and migrating Wireless voice traffic from traditional circuit-switched facilities to more cost effective VoIP facilities.

Cost of goods sold

Cost of goods sold increased approximately $40.9 million, or 180.7%, in 2018 compared with 2017. The increase in costs of goods sold was primarily the result of the reclassification of approximately $60.1 million of expenses for equipment costs, which were previously classified as reductions of revenue, and was partially offset by $24.5 million of costs incurred for subsidy loss reimbursements that are now presented within revenue, driven by the adoption of ASC 606. Excluding the impact of the adoption of ASC 606, cost of goods sold increased approximately $5.3 million, or 23.6% due to an increase in equipment costs primarily related to prepaid handsets.

Selling, general and administrative

Selling, general and administrative costs decreased approximately $70.8 million, or 60.2%, in 2018 compared with 2017. The decrease in selling, general and administrative was primarily attributable to the reclassification of approximately $62.1 million of commissions and subscriber acquisition costs to reductions of revenue as required by the adoption of ASC 606. Excluding the impact of ASC 606, selling, general and administrative costs decreased approximately $8.7 million, or 7.4% primarily due to a reduction of back-office expenses required to support former nTelos subscribers that migrated to the Sprint back-office during 2017.

Acquisition, integration and migration expenses

Acquisition and integration costs were not incurred during 2018, as the completion of integration and migration activities related to the acquisition of nTelos was completed during 2017.

Depreciation and amortization

Depreciation and amortization decreased approximately $12.7 million, or 9.2%, in 2018 compared with 2017, primarily due to the retirement of assets acquired in the nTelos acquisition.

Broadband

Broadband results from operations are summarized as follows:

	Year Ended December 31,				Change	
($ in thousands)	2018	% of Revenue	2017	% of Revenue	$	%
Broadband revenue						
Cable residential and SMB	$ 124,072	67.8	$ 114,122	65.6	9,950	8.7
Fiber, enterprise and wholesale	24,439	13.3	24,795	14.3	(356)	(1.4)
Rural local exchange carrier	26,196	14.3	26,813	15.4	(617)	(2.3)
Equipment and other	8,413	4.6	8,251	4.7	162	2.0
Total broadband revenue	183,120	100.0	173,981	100.0%	9,139	5.3
Broadband operating expenses						
Cost of services	75,066	41.0	73,331	42.1	1,735	2.4
Cost of goods sold	376	0.2	133	0.1	243	182.7
Selling, general, and administrative	27,741	15.1	26,909	15.5	832	3.1
Depreciation and amortization	38,317	20.9	36,797	21.2	1,520	4.1
Total broadband operating expenses	141,500	77.3	137,170	78.8	4,330	3.2
Broadband operating income	$ 41,620	22.7	$ 36,811	21.2	4,809	13.1

Revenue

Revenue increased in 2018 approximately $9.1 million, or 5.3%, compared with 2017. The increase, driven by cable, residential and SMB, was primarily due to growth in our broadband and voice subscribers, video rate increases, and our customers selecting or upgrading to higher-speed data access packages. Fiber, enterprise and wholesale revenue declined $0.4 million due primarily to repricing intercompany backhaul circuits to our Wireless segment to market rates. RLEC revenue decreased approximately $0.6 million, or 2.3%, compared with 2017 due to a decline in residential subscribers.

Operating expenses

Operating expenses increased approximately $4.3 million, or 3.2%, in 2018 compared with 2017, primarily attributable to higher expenses associated with maintaining our growing network and expanding subscriber base.

Tower

Tower results from operations are summarized as follows:

	Year Ended December 31,				Change	
($ in thousands)	2018	% of Revenue	2017	% of Revenue	$	%
Tower revenue	$ 12,196	100.0	$ 12,029	100.0	167	1.4
Tower operating expenses	7,353	60.3	6,422	53.4	931	14.5
Tower operating income	$ 4,843	39.7	$ 5,607	46.6	(764)	(13.6)

Revenue

Revenue was comparable with the prior period.

Operating expenses

Operating expenses increased $0.9 million, or 14.5%, in 2018 compared with 2017, driven by the addition of 16 new tower sites, resulting in higher cost of services and depreciation expense.

Non-GAAP Financial Measures

Adjusted OIBDA

Adjusted OIBDA represents Operating income before depreciation, amortization of intangible assets, stock-based compensation and certain other items of revenue, expense, gain or loss not reflective of our operating performance, which may or may not be recurring in nature.

Adjusted OIBDA is a non-GAAP financial measure that we use to evaluate our operating performance in comparison to our competitors. Management believes that analysts and investors use Adjusted OIBDA as a supplemental measure of operating performance to facilitate comparisons with other telecommunications companies. This measure isolates and evaluates operating performance by excluding the cost of financing (e.g., interest expense), as well as the non-cash depreciation and amortization of past capital investments, non-cash share-based compensation expense, and certain other items of revenue, expense, gain or loss not reflective of our operating performance, which may or may not be recurring in nature.

Adjusted OIBDA has limitations as an analytical tool and should not be considered in isolation or as a substitute for operating income, net income or any other measure of financial performance reported in accordance with U.S. Generally Accepted Accounting Principles ("GAAP").

The following tables reconcile Adjusted OIBDA to operating income, which we consider to be the most directly comparable GAAP financial measure:

Year Ended December 31, 2019

(in thousands)	Wireless	Broadband	Tower	Corporate	Consolidated
Operating income	$ 88,541	$ 42,521	$ 5,899	$ (39,915)	$ 97,046
Depreciation	96,094	40,831	2,025	593	139,543
Amortization of intangible assets	20,062	473	—	—	20,535
OIBDA	204,697	83,825	7,924	(39,322)	257,124
Share-based compensation expense	—	—	—	3,817	3,817
Adjusted OIBDA	$ 204,697	$ 83,825	$ 7,924	$ (35,505)	$ 260,941

Year Ended December 31, 2018

(in thousands)	Wireless	Broadband	Tower	Corporate	Consolidated
Operating income	$ 88,004	$ 41,620	$ 4,843	$ (41,221)	$ 93,246
Depreciation	100,950	38,140	2,454	567	142,111
Amortization of intangible assets	24,117	177	—	—	24,294
OIBDA	213,071	79,937	7,297	(40,654)	259,651
Share-based compensation expense	—	—	—	4,959	4,959
Adjusted OIBDA	$ 213,071	$ 79,937	$ 7,297	$ (35,695)	$ 264,610

Year Ended December 31, 2017

(in thousands)	Wireless	Broadband	Tower	Corporate	Consolidated
Operating income	$ 28,532	$ 36,811	$ 5,607	$ (24,440)	$ 46,510
Depreciation	112,559	36,019	1,885	600	151,063
Amortization of intangible assets	25,166	778	—	—	25,944
OIBDA	166,257	73,608	7,492	(23,840)	223,517
Share-based compensation expense	1,555	1,300	24	701	3,580
Adjusted OIBDA	$ 167,812	$ 74,908	$ 7,516	$ (23,139)	$ 227,097

Financial Condition, Liquidity and Capital Resources

Sources and Uses of Cash: Our principal sources of liquidity are our cash and cash equivalents, cash generated from operations, and proceeds available under our Credit Facility.

As of December 31, 2019 our cash and cash equivalents totaled $101.7 million and the availability under our revolving line of credit was $75.0 million, for total available liquidity of $176.7 million.

The Company generated approximately $259.1 million of net cash from operations in 2019, representing a decrease of $6.5 million or 2.4%, compared with 2018, primarily driven by:
- $11.0 million as the result of a decline in working capital, partially offset by
- a $8.3 million increase in net income.

Net cash used in investing activities decreased $22.5 million in 2019, compared with 2018 due to the following:
- $42.0 million decline in acquisitions. In 2019, the Company acquired Big Sandy Broadband, Inc. for $10.0 million, whereas in 2018 the Company paid $52.0 million to Sprint in order to expand our affiliate area and to acquire certain network assets.
- $16.7 million to purchase FCC spectrum licenses for use in the Broadband segment's fixed wireless initiative; and
- $2.2 million increase in capital expenditures due primarily to Broadband segment's $19.0 million investment in Glo Fiber and fixed wireless, partially offset by lower wireless and tower capital expenditures.

We expect our investments in our networks and infrastructure to expand in support of our continued growth.

Net cash used in financing activities increased $5.9 million, or 8.3%, in 2019 primarily driven by:
- $7.2 million used to repurchase 200,410 shares of our common stock under the repurchase plan that we initiated in 2019
- $1.9 million increase in principal repayments on our term loans
- $1.1 million increase in our annual dividend distribution, and offset by
- $4.0 million decrease in cash used for financing activities because debt issuance costs that we paid in 2018 did not recur.

Indebtedness: As of December 31, 2019, the Company’s indebtedness totaled approximately $720.1 million, net of unamortized loan fees of $11.9 million, with an annualized overall weighted average interest rate of approximately 3.26%. Refer to Note 9, *Long-Term Debt* for information about the Company's Credit Facility and financial covenants.

Borrowing Capacity: As of December 31, 2019, the Company’s outstanding debt principal, under the Credit Facility, totaled $732.0 million, with an estimated annualized effective interest rate of 3.3% after considering the impact of the interest rate swap contracts and unamortized loan costs.

As of December 31, 2019, we were in compliance with the financial covenants in our Credit Facility agreement.

We expect cash flow from operations and our principal sources of funding will be sufficient to meet our anticipated liquidity needs for business operations for the next twelve months, as well as our longer term liquidity needs. There can be no assurance that we will continue to generate cash flows at or above current levels or that we will be able to maintain our ability to borrow under our credit facilities. Thereafter, capital expenditures will likely be required to continue planned capital upgrades to the acquired wireless network and provide increased capacity to meet our expected growth in demand for our products and services. The actual amount and timing of our future capital requirements may differ materially from our estimate depending on the demand for our products and services, new market developments and expansion opportunities.

Our cash flows from operations could be adversely affected by events outside our control, including, without limitation, changes in overall economic conditions, regulatory requirements, changes in technologies, demand for our products and services, availability of labor resources and capital, changes in our relationship with Sprint, and other conditions. The Wireless segment’s operations are dependent upon Sprint’s ability to execute certain functions such as billing, customer care, and collections; our ability to develop and implement successful marketing programs and new products and services; and our ability to effectively and economically manage other operating activities under our agreements with Sprint. Our ability to attract and maintain a sufficient customer base, particularly in our Broadband markets, is also critical to our ability to maintain a positive cash flow from operations. The foregoing events individually or collectively could affect our results.

Contractual Commitments: The Company is obligated to make future payments under various contracts it has entered into, primarily amounts pursuant to its long-term debt facility, and reasonably certain operating lease agreements for retail space, tower space and cell sites. Expected future minimum contractual cash payments, excluding the effects of time value, on contractual obligations, by period are summarized as follows:

Payments due by periods:

(in thousands)	Total	Less than 1 year	1-3 years	4-5 years	More than 5 years
Long-term debt principal (1)	$ 732,040	$ 34,122	$ 71,886	$ 177,503	$ 448,529
Interest on long-term debt (1)	119,273	24,207	45,098	35,830	14,138
"Pay-fixed" obligations (2)	8,514	3,830	4,052	632	—
Leases (3)	497,322	59,964	129,676	116,293	191,389
Purchase obligations (4)	19,405	19,308	97	—	—
Spectrum payments (5)	2,759	108	216	216	2,219
Total	$ 1,379,313	$ 141,539	$ 251,025	$ 330,474	$ 656,275

(1) Includes principal payments and estimated interest payments on the Term Loan Facility based upon outstanding balances and rates in effect at December 31, 2019.
(2) Represents the maximum interest payments we are obligated to make under our derivative agreements. Assumes no receipts from the counterparty to our derivative agreements.
(3) Our existing lease agreements may provide us with the option to renew. Our future lease obligations would change if we entered into additional lease agreements and if we exercised renewal options. Amounts provided above represent undiscounted rent payments.
(4) Represents open purchase orders at December 31, 2019.
(5) Represents expected payments for our spectrum license renewals, which are routinely granted by the FCC.

Contractual commitments represent future cash payments and liabilities that are required under contractual agreements with third parties, and exclude purchase orders for goods and services. The contractual commitment amounts in the table above are associated with agreements that are legally binding and enforceable, and that specify all significant terms, including fixed or minimum services to be used, fixed, minimum or variable price provisions and the approximate timing of the transaction.

Other long-term liabilities have been omitted from the table above due to uncertainty of the timing of payments, refer to Note 7, *Other Assets and Accrued Liabilities*, included with the notes to our consolidated financial statements for additional information. The Company has no other off-balance sheet arrangements and has not entered into any transactions involving unconsolidated, limited purpose entities or commodity contracts.

Capital Commitments: The Company spent $138.8 million on capital projects in 2019, up from $136.6 million in 2018 and down from $146.5 million in 2017. The $2.2 million increase in capital expenditures from 2018 to 2019 was due primarily to Broadband segment's $19.0 million investment in Glo Fiber and fixed wireless, partially offset by lower wireless and tower capital expenditures. The decline of $9.8 million of capital expenditures from 2017 to 2018 was due to the completion of the nTelos network upgrade and expansion.

Critical Accounting Policies

We prepare our consolidated financial statements in accordance with U.S. generally accepted accounting principles ("GAAP"). The preparation of these consolidated financial statements requires us to make estimates and assumptions that affect our reported amounts of assets, liabilities, revenue and expenses, as well as related disclosures. To the extent that there are material differences between these estimates and actual results, our financial condition or operating results would be affected. We base our estimates on past experience and other assumptions that we believe are reasonable under the circumstances, and we evaluate these estimates on an ongoing basis. We refer to accounting estimates of this type as critical accounting policies and estimates, which we discuss further below.

Our significant accounting policies are described in Note 2, *Summary of Significant Accounting Policies* in our consolidated financial statements. The following are the accounting policies that we believe involve a greater degree of judgment and complexity and are the most critical to aid in fully understanding and evaluating our consolidated financial condition and results of operations.

Revenue Recognition

Our Wireless segment is a Sprint affiliate, which is a unique business model that is governed by the terms of our affiliate agreement with Sprint, and which requires accounting judgment. Under the terms of our affiliate agreement, we are the exclusive provider

to build and operate a portion of Sprint’s nationwide wireless network in a contiguous portion of the Mid-Atlantic states and are licensed to use Sprint’s trademark and FCC spectrum licenses in this Sprint Affiliate Area. In return, we receive a substantial portion of Sprint’s net billings to its subscribers in our Sprint Affiliate Area. Our revenue from this agreement is fully variable and thus our economic risks and rewards under this model are very similar to those of any other wireless carrier. Accordingly, management and the users of our financial statements routinely model our Wireless service revenue based on a “look through” to Sprint’s subscriber counts and average revenue per user in our Sprint Affiliate Area. Accordingly, we report these subscriber metrics within the Management’s Discussion & Analysis section of this document.

When we adopted ASC 606, *Revenue from Contracts with Customers*, using the modified retrospective method on January 1, 2018, we concluded that Sprint is our customer, rather than Sprint's subscribers. Our performance obligation to Sprint under this arrangement is to provide Sprint a series of continuous network access services. All of our consideration for this performance obligation is variable based upon Sprint’s net billings to its subscribers who either originated in, or otherwise use our network in the Affiliate Area, less applicable fees retained by Sprint. Our variable revenue from those subscriber billings is further reduced by customer credits, allocated bad debt expense, and management and service fees. In the case of Sprint’s prepaid subscribers, our revenue represents the subscriber’s bill reduced by costs to acquire and support those subscribers, based upon national averages from Sprint’s prepaid programs, and a management fee.

We also reimburse Sprint for the cost of subsidized handsets that Sprint sells through its national channel in our Sprint Affiliate Area. Similarly, we also reimburse Sprint for commissions that Sprint pays to third-party dealers in our Sprint Affiliate Area. These reimbursements to Sprint represent consideration payable to a customer, and are thus recorded as a contract asset and then amortized as a reduction of revenue over the estimated life of Sprint's relationship with its subscriber.

Our Wireless segment also sells cell phones and other equipment to Sprint, who in-turn immediately re-sells the equipment to their subscriber, generally under Sprint's equipment financing plan. Shentel is the principal in these transactions, as we control and bear the risk of ownership of the inventory prior to sale. Accordingly, our equipment revenue and cost of equipment sold are presented gross.

We have historically paid certain amounts in order to expand and enhance our rights under the Sprint affiliate agreement and recorded those amounts as an asset. Amounts paid in connection with an acquisition of a business are presented as amortization expense in our income statement. Amounts paid to Sprint outside of an acquisition are accounted for as consideration paid to a customer with amortization presented as a reduction of Service and other revenue in our consolidated statements of comprehensive income.

Our Broadband segment provides broadband, video and voice services to residential and commercial customers in portions of Virginia, West Virginia, Maryland, and Kentucky, via fiber optic and hybrid fiber coaxial (“HFC”) cable. The Broadband segment also provides voice and digital subscriber line (“DSL”) telephone services to customers in Virginia’s Shenandoah County as a Rural Local Exchange Carrier (“RLEC”). These contracts are generally cancellable at the customer’s discretion without penalty at any time. We allocate the total transaction price in these transactions based upon the standalone selling price of each distinct good or service. We generally recognize these revenues over time as customers simultaneously receive and consume the benefits of the service, with the exception of equipment sales and home wiring, which are recognized as revenue at a point in time when control transfers and when installation is complete, respectively. Installation fees are allocated to services and are recognized ratably over the longer of the contract term or the period in which the unrecognized fee remains material to the contract, which we estimate to be about one year. Additionally, the Company incurs commission and installation costs related to in-house and third-party vendors which are capitalized and amortized over the expected weighted average customer life which is approximately four years.

Our Broadband segment also provides Ethernet and Wavelength fiber optic services to enterprise and carrier customers under capacity agreements, and the related revenue is recognized over time under ASC 606. The Broadband segment also leases dedicated fiber optic strands to customers as part of “dark fiber” agreements, which are accounted for as leases under ASC 842 *Leases*.

Our Tower segment leases space on owned cell towers to our Wireless segment, and to other wireless carriers. Revenue from these leases is accounted for under ASC 842.

Recently Issued Accounting Standards

Recently issued accounting standards and their expected impact, if any, are discussed in Note 2, *Summary of Significant Accounting Policies* in our consolidated financial statements.

ITEM 7A. **QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK**

The Company's market risks relate primarily to changes in interest rates. The Company's interest rate risk generally involves two components. The first component is outstanding debt with variable rates. As of December 31, 2019, the Company had $732.0 million of gross variable rate debt outstanding, bearing interest at a weighted average rate of 3.3%. An increase in market interest rates of 1.00% would add approximately $7.2 million to annual interest expense, excluding the effect of our interest rate swaps. The swaps cover notional principal equal to $339.8 million, or approximately 46.4% as of December 31, 2019. The Company is required to pay a combined fixed rate of approximately 1.16% and receive a variable rate based on one month LIBOR (1.70% at December 31, 2019), to manage a portion of its interest rate risk. Changes in the net interest paid or received under the swaps would offset a corresponding portion of the change in interest expense on the variable rate debt outstanding. The swap agreements currently reduce annual interest expense by approximately $1.4 million, based on the spread between the fixed rate and the variable rate currently in effect on our debt.

ITEM 8. **FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA**

Our consolidated financial statements and supplementary data are included as a separate section included within Item 15. of this Annual Report on Form 10-K commencing on page F-1 and are incorporated herein by reference.

ITEM 9. **CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE**

None

ITEM 9A. **CONTROLS AND PROCEDURES**

Evaluation of Disclosure Controls and Procedures

Our Chief Executive Officer, Chief Financial Officer, and Chief Accounting Officer ("certifying officers") have conducted an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rule 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the Exchange Act)) as of December 31, 2019. Our certifying officers concluded that, as a result of the material weaknesses in internal control over financial reporting as described below, our disclosure controls and procedures were not effective as of December 31, 2019.

Per Rule 13a-15(e) and 15d-15(e), the term disclosure controls and procedures means controls and other procedures of an issuer that are designed to ensure that information required to be disclosed by the issuer in the reports that it files or submits under the Exchange Act (15 U.S.C. 78a et seq.) is recorded, processed, summarized, and reported within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by an issuer in the reports that it files or submits under the Exchange Act is accumulated and communicated to the issuer's management, including its Chief Executive Officer and Chief Financial Officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

In light of the material weaknesses described below, management performed additional analysis and other procedures to ensure that our consolidated financial statements were prepared in accordance with U.S. generally accepted accounting principles (GAAP). Accordingly, management believes that the consolidated financial statements included in this Annual Report on Form 10-K fairly present, in all material respects, our financial position, results of operations, and cash flows as of and for the periods presented, in accordance with U.S. GAAP.

Changes in Internal Control over Financial Reporting

As disclosed in our Annual Report on Form 10-K for the fiscal year ended December 31, 2018, the Company previously identified material weaknesses that extended to all process areas and all components of internal control over financial reporting, as defined by the Committee of Sponsoring Organizations of the Treadway Commission. Management believes that a remediation effort of this magnitude will most likely extend over multiple years. We therefore revised our remediation strategy to prioritize a manageable number of process areas, and implemented the following changes and improvements during 2019, including in the fourth quarter, under this phased approach:

- We increased the number of resources with skills and expertise in technical accounting and internal control over financial reporting, and leveraged external consultants to provide needed capacity in these areas.
- Within each priority process area, we performed risk assessment procedures and designed and implemented control activities to address identified risks. The new control activities were designed to address the completeness and accuracy of the data used as well as other information and communication considerations. We further implemented new monitoring controls to verify that new controls in these priority process areas were consistently executed.
- We successfully executed this remediation strategy on the priority process areas of revenue, leases, journal entries, income taxes, segment reporting, impairment, and intangible assets.
- We implemented new software solutions and tools in the areas of leases, customer life estimation, asset capitalization, bank reconciliations, and asset retirement obligations.
- We enhanced our monitoring activities by performing more rigorous period-over-period variance analyses of the Company's financial results.
- We enhanced our information and communication activities by having more frequent discussions with operational personnel regarding significant business transactions and the potential impact of these

transactions on the Company's financial reporting, and improving communication to employees regarding their responsibilities for ensuring that effective internal controls are maintained.

- We performed and documented a detailed review of key accounting policies.

However, resource constraints, as described below, could impact our ability to simultaneously maintain the improvements in our priority process areas and effectively continue our phased remediation strategy.

As a result of the changes described above, management identified various immaterial errors, some of which were corrected during 2019. We also commenced risk assessment activities in other process areas and have designed and implemented new control activities; however, our evaluation and documentation of key accounting policies, risk assessment activities, and related design and implementation of control activities in those processes is on-going. Other than the changes and improvements that occurred in the fourth quarter, which are included among the items discussed above, there have been no other changes in the Company's internal control over financial reporting that occurred during the quarter ended December 31, 2019 that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

Management's Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act). Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions or that the degree of compliance with the policies or procedures may deteriorate.

A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis.

In order to evaluate the effectiveness of internal control over financial reporting, under the direction of our certifying officers, we conducted an assessment using the criteria established in Internal Control - Integrated Framework (2013), issued by the Committee of Sponsoring Organizations of the Treadway Commission.

Based on this assessment, our certifying officers concluded that the Company's internal control over financial reporting was not effective as of December 31, 2019 due to a material weakness in our control environment whereby the Company did not have a sufficient number of trained resources with expertise in technical accounting, internal control over financial reporting, and the design and implementation of information technology solutions. As a result, we were unable to maintain effective risk assessment and information and communication processes, placed excess reliance on third party consultants, and did not have effective process-level control activities over the following areas:

- Property, plant, and equipment and depreciation expense
- Purchasing (current liabilities and operating expenses)
- Treasury (cash, debt, interest expense, derivatives, and benefit obligations)

The control deficiencies described above created a reasonable possibility that a material misstatement to the consolidated financial statements would not be prevented or detected on a timely basis and therefore we concluded that the deficiencies represent material weaknesses in the Company's internal control over financial reporting and our internal control over financial reporting was not effective as of December 31, 2019.

Our independent registered public accounting firm, KPMG LLP, who audited the consolidated financial statements included in this Annual Report on Form 10-K, issued an adverse opinion on the effectiveness of the Company's internal control over financial reporting. KPMG LLP's report appears on page F-3 of this Annual Report on Form 10-K.

Management's Remediation Plan

The Company is committed to making further progress in its remediation efforts during 2020. The following steps will continue to be executed until remediation of the material weaknesses is achieved:

- Hire, train, and retain individuals with the appropriate skills and experience related to technical accounting, internal control over financial reporting, and the design and implementation of information technology solutions.
- Enhance risk assessment and prioritize remediation activities that most significantly reduce the risk that a material misstatement to the consolidated financial statements would not be prevented or detected on a timely basis.
- Implement and monitor our phased approach to remediation of control activities in additional process areas.
- Enhance information and communication processes through information technology solutions to ensure that information needed for financial reporting is accurate, complete, relevant and reliable, and communicated in a timely manner.
- Report regularly to the audit committee on the progress and results of the remediation plan, including the identification, status, and resolution of internal control deficiencies.

ITEM 9B. **OTHER INFORMATION**

None

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

See "Executive Officers of the Registrant" in Part 1, Item 1 of this report for information about our executive officers, which is incorporated by reference in this Item 10. Other information required by this Item 10 is incorporated by reference to the Company's definitive proxy statement for its 2020 Annual Meeting of Shareholders, referred to as the "2020 proxy statement," which we will file with the SEC on or before 120 days after our 2019 fiscal year end, and which appears in the 2020 proxy statement under the captions "Election of Directors" and "Section 16(a) Beneficial Ownership Reporting Compliance."

We have adopted a code of ethics applicable to our chief executive officer and all senior financial officers, who include our principal financial officer, principal accounting officer, and persons performing similar functions. The code of ethics, which is part of our Code of Business Conduct and Ethics, is available on our website at *www.shentel.com*. To the extent required by SEC rules, we intend to disclose any amendments to our code of conduct and ethics, and any waiver of a provision of the code with respect to the Company's directors, principal executive officer, principal financial officer, principal accounting officer, or persons performing similar functions, on our website referred to above within four business days following such amendment or waiver, or within any other period that may be required under SEC rules from time to time.

ITEM 11. EXECUTIVE COMPENSATION

Information required by this Item 11 is incorporated herein by reference to the 2020 proxy statement, including the information in the 2020 proxy statement appearing under the captions "Election of Directors-Director Compensation" and "Executive Compensation."

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Information required by Item 12 is incorporated herein by reference to the 2020 proxy statement appearing under the caption "Security Ownership."

The Company awards stock options to its employees meeting certain eligibility requirements under two shareholder-approved Company Stock Incentive Plans, referred to as the 2005 Stock Incentive Plan and 2014 Equity Incentive Plan. The 2014 Equity Incentive Plan authorizes grants of up to an addition 3.0 million shares over a ten-year period beginning in 2014. As a result of the adoption of the 2014 Equity Incentive Plan, additional grants will not be made under the 2005 Stock Incentive Plan, but outstanding awards will continue to vest and options may continue to be exercised. Outstanding options and the number of shares available for future issuance as of December 31, 2019 were as follows:

	Number of securities to be issued upon exercise of outstanding options	Weighted average exercise price of outstanding options	Number of securities remaining available for future issuance
2005 Stock Incentive Plan	19,164	$ 7.01	—
2014 Equity Incentive Plan	6,864	$ 31.05	2,114,358

ITEM 13. CERTAIN RELATIONSHIPS, RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE

Information required by Item 13 is incorporated herein by reference to the 2020 proxy statement, including the information in the 2020 proxy statement appearing under the caption "Executive Compensation-Certain Relationships and Related Transactions."

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

Information required by Item 14 is incorporated herein by reference to the 2020 proxy statement, including the information in the 2020 proxy statement appearing under the caption "Shareholder Ratification of Independent Registered Public Accounting Firm."

PART IV

ITEM 15. **EXHIBITS AND FINANCIAL STATEMENT SCHEDULES**

The following is a list of documents filed as a part of this report:

(1) Financial Statements
(2) Financial Statement Schedule
(3) Exhibits

The exhibits required to be filed by Item 601 of Regulation S-K are listed in the Exhibit Index directly following Item 16. Form 10-K Summary, within this Annual Report on Form 10-K.

SHENANDOAH TELECOMMUNICATIONS COMPANY
AND SUBSIDIARIES

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Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors

Shenandoah Telecommunications Company:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Shenandoah Telecommunications Company and subsidiaries (the Company) as of December 31, 2019 and 2018, the related consolidated statements of comprehensive income, shareholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2019, and the related notes and financial statement schedule II - Valuation and Qualifying Accounts (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2019, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated February 26, 2020 expressed an adverse opinion on the effectiveness of the Company's internal control over financial reporting.

Changes in Accounting Principles

As discussed in Note 2 to the consolidated financial statements, the Company has changed its method of accounting for leases as of January 1, 2019 due to the adoption of Accounting Standards Update 2016-02, *Leases (Topic 842)*, and all related amendments. Additionally, as discussed in Note 3 to the consolidated financial statements, the Company has changed its method of accounting for revenue from contracts with customers as of January 1, 2018 due to the adoption of Accounting Standards Update 2014-09, *Revenue from Contracts with Customers (Topic 606)*, and all related amendments.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgment. The communication of a critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Determination of costs capitalized into property, plant, and equipment

As discussed in Notes 2 and 5 to the consolidated financial statements, the property, plant, and equipment, net balance as of December 31, 2019 was $700.1 million. The determination to capitalize, rather than expense, costs increases operating income and net income.

We identified the determination of costs capitalized into property, plant, and equipment as a critical audit matter. The nature of evidence provided, such as third-party invoices, can lack specificity of the item acquired or activity performed and required complex judgment to determine that the costs qualified for capitalization.

The primary procedures we performed to address this critical audit matter included the following. For a sample of costs capitalized, we inspected the related invoice. For those invoices lacking specificity, we inspected additional support, such as project documentation or contracts. In certain instances, we also used a firm professional with specialized skills and knowledge to understand the nature of the project. The combination of these procedures was used to independently assess the Company's determination that such costs qualified for capitalization.

/s/ KPMG LLP

We have served as the Company's auditor since 2001.

McLean, VA
February 26, 2020

Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors

Shenandoah Telecommunications Company:

Opinion on Internal Control Over Financial Reporting

We have audited Shenandoah Telecommunications Company and subsidiaries' (the Company) internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, because of the effect of the material weakness, described below, on the achievement of the objectives of the control criteria, the Company has not maintained effective internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2019 and 2018, the related consolidated statements of comprehensive income, shareholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2019, and the related notes and financial statement schedule II - Valuation and Qualifying Accounts (collectively, the consolidated financial statements), and our report dated February 26, 2020 expressed an unqualified opinion on those consolidated financial statements.

A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the company's annual or interim financial statements will not be prevented or detected on a timely basis. The following material weaknesses have been identified and included in management's assessment:

The Company's control environment was not effective, because it did not have a sufficient number of trained resources with expertise in technical accounting, internal control over financial reporting, and the design and implementation of information technology solutions. As a result, the Company was unable to maintain effective risk assessment and information and communication processes, placed excess reliance on third-party consultants, and did not have effective process-level control activities over the following areas:

- Property, plant, and equipment and depreciation expense
- Purchasing (current liabilities and operating expenses)
- Treasury (cash, debt, interest expense, derivatives, and benefit obligations)

The material weaknesses were considered in determining the nature, timing, and extent of audit tests applied in our audit of the 2019 consolidated financial statements, and this report does not affect our report on those consolidated financial statements.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying *Management's Report on Internal Control Over Financial Reporting*. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit

preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ KPMG LLP

McLean, VA
February 26, 2020

SHENANDOAH TELECOMMUNICATIONS COMPANY AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
December 31, 2019 and 2018
(in thousands)

	2019	2018
ASSETS		
Current assets:		
Cash and cash equivalents	$ 101,651	$ 85,086
Accounts receivable, net of allowance for doubtful accounts of $533 and $534, respectively	63,541	54,407
Income taxes receivable	10,306	5,282
Inventory, net of allowances of $66 and $113, respectively	5,728	5,265
Prepaid expenses and other	57,805	60,162
Total current assets	239,031	210,202
Investments	12,388	10,788
Property, plant and equipment, net	700,114	701,359
Intangible assets, net	314,147	366,029
Goodwill	149,070	146,497
Operating lease right-of-use assets	392,589	—
Deferred charges and other assets	53,352	49,891
Total assets	$ 1,860,691	$ 1,484,766
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities:		
Current maturities of long-term debt, net of unamortized loan fees	$ 31,650	$ 20,618
Accounts payable	40,295	35,987
Advanced billings and customer deposits	8,358	7,919
Accrued compensation	10,075	9,452
Current operating lease liabilities	42,567	—
Accrued liabilities and other	14,391	14,563
Total current liabilities	147,336	88,539
Long-term debt, less current maturities, net of unamortized loan fees	688,464	749,624
Other long-term liabilities:		
Deferred income taxes	136,451	127,453
Deferred lease	—	22,436
Asset retirement obligations	36,914	28,584
Benefit plan obligations	12,675	11,519
Noncurrent operating lease liabilities	352,439	—
Other liabilities	16,990	14,364
Total other long-term liabilities	555,469	204,356
Commitments and contingencies (Note 13)		
Shareholders' equity:		
Common stock, no par value, authorized 96,000; 49,671 and 49,630 issued and outstanding at December 31, 2019 and 2018, respectively	—	—
Additional paid in capital	42,110	47,456
Retained earnings	427,004	386,511
Accumulated other comprehensive income, net of taxes	308	8,280
Total shareholders' equity	469,422	442,247
Total liabilities and shareholders' equity	$ 1,860,691	$ 1,484,766

See accompanying notes to consolidated financial statements.

SHENANDOAH TELECOMMUNICATIONS COMPANY AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
Years Ended December 31, 2019, 2018 and 2017
(in thousands, except per share amounts)

	2019	2018	2017
Revenue:			
Service revenue and other	$ 565,063	$ 562,456	$ 601,673
Equipment revenue	68,843	68,398	10,318
Total revenue	633,906	630,854	611,991
Operating expenses:			
Cost of services	198,753	194,022	188,721
Cost of goods sold	65,914	63,959	22,786
Selling, general and administrative	112,540	113,222	165,937
Acquisition, integration and migration expenses	—	—	11,030
Depreciation and amortization	159,653	166,405	177,007
Total operating expenses	536,860	537,608	565,481
Operating income	97,046	93,246	46,510
Other income (expense):			
Interest expense	(29,468)	(34,847)	(38,237)
Other	3,461	3,713	4,984
Income before income taxes	71,039	62,112	13,257
Income tax expense (benefit)	16,104	15,517	(53,133)
Net income	54,935	46,595	66,390
Other comprehensive income:			
Unrealized (loss) gain on interest rate hedge, net of tax	(7,972)	50	1,442
Comprehensive income	$ 46,963	$ 46,645	$ 67,832
Net income per share, basic and diluted:			
Basic net income per share	$ 1.10	$ 0.94	$ 1.35
Diluted net income per share	$ 1.10	$ 0.93	$ 1.33
Weighted average shares outstanding, basic	49,811	49,542	49,150
Weighted average shares outstanding, diluted	50,101	50,063	50,026
Cash dividend declared per share	$ 0.29	$ 0.27	$ 0.26

See accompanying notes to consolidated financial statements.

SHENANDOAH TELECOMMUNICATIONS COMPANY AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY
Years Ended December 31, 2019, 2018 and 2017
(in thousands, except per share amounts)

	Shares of Common Stock (no par value)	Additional Paid in Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Total
Balance, December 31, 2016	48,935	$ 45,482	$ 243,624	$ 6,788	$ 295,894
Net income	—	—	66,390	—	66,390
Other comprehensive gain, net of tax	—	—	—	1,442	1,442
Dividends declared ($0.26 per share)	—	—	(12,809)	—	(12,809)
Dividends reinvested in common stock	15	552	—	—	552
Stock based compensation	154	4,184	—	—	4,184
Stock options exercised	363	2,394	—	—	2,394
Common stock issued	1	21	—	—	21
Shares retired for settlement of employee taxes upon issuance of vested equity awards	(216)	(7,846)	—	—	(7,846)
Common stock issued to acquire non-controlling interest in nTelos	76	—	—	—	—
Balance, December 31, 2017	49,328	44,787	297,205	8,230	350,222
Change in accounting principle - adoption of accounting standard (Note 3)	—	—	56,097	—	56,097
Net income	—	—	46,595	—	46,595
Other comprehensive gain, net of tax	—	—	—	50	50
Dividends declared ($0.27 per share)	—	—	(13,386)	—	(13,386)
Dividends reinvested in common stock	11	520	—	—	520
Stock based compensation	206	5,367	—	—	5,367
Stock options exercised	113	787	—	—	787
Common stock issued	1	26	—	—	26
Shares retired for settlement of employee taxes upon issuance of vested equity awards	(105)	(4,031)	—	—	(4,031)
Common stock issued to acquire non-controlling interest in nTelos	76	—	—	—	—
Balance, December 31, 2018	49,630	47,456	386,511	8,280	442,247
Net income	—	—	54,935	—	54,935
Other comprehensive gain (loss), net of tax	—	—	—	(7,972)	(7,972)
Dividends declared ($0.29 per share)	—	—	(14,442)	—	(14,442)
Dividends reinvested in common stock	14	499	—	—	499
Share repurchases	(200)	(7,231)	—	—	(7,231)
Stock based compensation	184	4,182	—	—	4,182
Stock options exercised	29	81	—	—	81
Common stock issued	—	34	—	—	34
Shares retired for settlement of employee taxes upon issuance of vested equity awards	(62)	(2,911)	—	—	(2,911)
Common stock issued to acquire non-controlling interest in nTelos	76	—	—	—	—
Balance, December 31, 2019	49,671	$ 42,110	$ 427,004	$ 308	$ 469,422

See accompanying notes to consolidated financial statements.

SHENANDOAH TELECOMMUNICATIONS COMPANY AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
Years Ended December 31, 2019, 2018 and 2017
(in thousands)

	2019	2018	2017
Cash flows from operating activities:			
Net income	$ 54,935	$ 46,595	$ 66,390
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation	139,543	142,111	151,063
Amortization of intangible assets	20,535	24,294	25,944
Accretion of asset retirement obligations	1,478	1,045	761
Bad debt expense	1,743	1,983	2,179
Stock based compensation expense, net of amount capitalized	3,817	4,959	3,580
Deferred income taxes	11,644	6,208	(54,055)
Gain from patronage and investments	(4,769)	(3,113)	(3,458)
Amortization of long-term debt issuance costs	3,280	3,666	4,741
Changes in assets and liabilities:			
Accounts receivable	(7,664)	239	16,451
Inventory, net	(463)	439	33,339
Current income taxes	(5,024)	12,029	(19,138)
Operating lease right-of-use assets	51,578	—	—
Waived management fee	38,827	37,763	36,056
Other assets	(18,499)	(16,246)	1,439
Accounts payable	12,821	(1,377)	(36,725)
Lease liabilities	(46,746)	—	—
Deferred lease	—	4,723	327
Other deferrals and accruals	2,109	329	(5,964)
Net cash provided by operating activities	$ 259,145	$ 265,647	$ 222,930
Cash flows from investing activities:			
Capital expenditures	$ (138,792)	$ (136,641)	$ (146,489)
Cash disbursed for acquisitions	(10,000)	(52,000)	(6,000)
Cash disbursed for FCC spectrum licenses	(16,742)	—	—
Proceeds from sale of assets and other	200	841	994
Net cash used in investing activities	$ (165,334)	$ (187,800)	$ (151,495)
Cash flows from financing activities:			
Principal payments on long-term debt	$ (53,197)	$ (51,264)	$ (36,375)
Dividends paid, net of dividends reinvested	(13,943)	(12,866)	(12,257)
Repurchase of common stock	(7,231)	—	—
Proceeds from revolving credit facility borrowings	—	15,000	—
Proceeds from credit facility borrowings	—	—	25,000
Principal payments on revolving credit facility	—	(15,000)	—
Taxes paid for equity award issuances	(2,911)	(3,245)	(5,411)
Payments for debt issuance costs	—	(3,971)	—
Proceeds from exercise of stock options and other	36	—	—
Net cash used in financing activities	$ (77,246)	$ (71,346)	$ (29,043)
Net increase in cash and cash equivalents	$ 16,565	$ 6,501	$ 42,392
Cash and cash equivalents, beginning of period	85,086	78,585	36,193
Cash and cash equivalents, end of period	$ 101,651	$ 85,086	$ 78,585

See accompanying notes to consolidated financial statements.

SHENANDOAH TELECOMMUNICATIONS COMPANY AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Note 1. Nature of Operations

Shenandoah Telecommunications Company and its subsidiaries (collectively, the "Company") is organized into three reporting segments, which provide the following telecommunication services:

– Our Wireless segment operates as a Sprint affiliate. We provide wireless network services to Sprint through our affiliate agreement in the Mid-Atlantic region of the U.S.
– Our Broadband segment provides broadband, video and voice services to residential and commercial customers in portions of Virginia, West Virginia, Maryland, and Kentucky, via fiber optic and hybrid fiber coaxial ("HFC") cable. The Broadband segment also leases dark fiber and provides Ethernet and Wavelength fiber optic services to enterprise and wholesale customers throughout the entirety of our service area. The Broadband segment also provides voice and digital subscriber line ("DSL") telephone services to customers in Virginia's Shenandoah County as a Rural Local Exchange Carrier ("RLEC"). These integrated networks are connected by a fiber network. This fiber optic network also supports our Wireless segment operations and these intercompany transactions are reported at their market value.
– Our Tower segment leases space on 225 owned cell towers to the Company's Wireless segment and to other wireless communications providers.

Refer to Note 14, *Segment Reporting*, for additional information.

Note 2. Summary of Significant Accounting Policies

Principles of consolidation: The accompanying consolidated financial statements include the accounts of Shenandoah Telecommunications Company and all of its wholly owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Use of estimates: The preparation of financial statements in conformity with accounting principles generally accepted in the United States, or the U.S., requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Due to the inherent uncertainty involved in making estimates, actual results to be reported in future periods could differ from our estimates.

Cash and cash equivalents: Cash equivalents may include all investments with an original maturity of three months or less. The Company places its temporary cash investments with high credit quality financial institutions. Generally, such investments are in excess of FDIC or SIPC insurance limits.

Inventories: The Company's inventories consist primarily of items held for resale such as devices and accessories. The Company values its inventory at the lower of cost or net realizable value. Inventory cost is computed on an average cost basis. Net realizable value is determined by reviewing current replacement cost, marketability and obsolescence.

Property, plant and equipment: Property, plant and equipment is stated at cost less accumulated depreciation. The Company capitalizes all costs associated with the purchase, deployment and installation of property, plant and equipment, including interest costs on major capital projects during the period of their construction. Maintenance expense is recognized as incurred when repairs are performed that do not extend the life of property, plant and equipment. Expenses for major renewals and improvements, which significantly extend the useful lives of existing property and equipment, are capitalized and depreciated. Depreciation is calculated on the straight-line method over the estimated useful lives of the assets. Leasehold improvements are depreciated over the lesser of their useful lives or respective lease terms. Refer to Note 5, *Property, Plant and Equipment*, for additional information.

Indefinite-lived Intangible Assets: Goodwill represents the excess of acquisition costs over the fair value of tangible net assets and identifiable intangible assets of the businesses acquired. Cable franchise rights provide us with the non-exclusive right to provide video services in a specified area. Spectrum licenses are issued by the Federal Communications Commission ("FCC") which provide us the exclusive right to utilize designated radio frequency spectrum within specific geographic service areas to provide wireless communication services. While some cable franchises and spectrum licenses are issued for a fixed time (generally ten years and up to fifteen years, respectively), renewals have been granted routinely and at nominal costs. The Company believes it will be able to meet all requirements necessary to secure renewal of its cable franchise rights and spectrum licenses. Moreover, the Company has determined that there are currently no legal, regulatory, contractual, competitive, economic or other factors that

limit the useful lives of our cable franchises or spectrum licenses and as a result, we account for cable franchise rights and spectrum licenses as indefinite-lived intangible assets.

Indefinite-lived intangible assets are not amortized, but rather, are subject to impairment testing annually, in the fourth quarter, or whenever events or changes in circumstances indicate that the carrying amount may not be fully recoverable. These assets are evaluated for impairment based on the identification of reporting units. Our reporting units effectively align with our new reporting segments. We evaluated our reporting units for impairment both before and after our realignment of reporting segments and reporting units during the fourth quarter of 2019 on the basis of qualitative factors. Our consideration of qualitative factors included but was not limited to macroeconomic conditions, industry and market conditions, company specific events, changes in circumstances, after tax cash flows and market capitalization trends. We concluded that there were no indicators that a reporting unit impairment was more likely than not during the years ended December 31, 2019, 2018 or 2017.

Long-lived Assets: Finite-lived intangible assets, property, plant, and equipment, and other long-lived assets are amortized or depreciated over their estimated useful lives, as summarized in the respective footnotes below. These assets are evaluated for impairment based on the identification of asset groups. Our asset groups align with our new reporting segments. We evaluated our asset groups for impairment both before and after our realignment of reporting segments and asset groups during the fourth quarter of 2019. We concluded that there were no indicators that an asset group impairment had been triggered during the years ended December 31, 2019, 2018 or 2017.

Advertising Costs: The Company expenses advertising costs and marketing production costs as incurred and includes such costs within selling, general and administrative expenses in the consolidated statements of operations. Advertising expense for the years ended December 31, 2019, 2018 and 2017 was $14.3 million, $15.2 million and $15.5 million, respectively. The Wireless segment's advertising of Sprint products drove the majority of these advertising expenses, at $10.8 million, $12.6 million and $13.5 million for the years ended December 31, 2019, 2018 and 2017, respectively.

Benefit Obligations: The Benefit obligations caption includes the following plans:

($ in thousands)	December 31, 2019	December 31, 2018
nTelos Pension Plan	$ 6,824	$ 5,131
OPEB Plan	3,573	3,193
SERP Plan	2,278	3,195
Total	$ 12,675	$ 11,519

The nTelos Pension Plan was assumed in the 2016 acquisition of nTelos. This frozen plan covers certain employees who met eligibility requirements and were employed by nTelos prior to October 1, 2003. Benefits under the plan vested after five years of plan service and were based on years of service and an average of the five highest consecutive years of compensation subject to certain reductions if the employee elects to receive the benefit prior to age 65. Effective December 31, 2012, nTelos amended the Pension Plan to freeze future benefit plan accruals for participants.

As of December 31, 2019 and 2018, the fair value of our Pension Plan assets were $24.1 million and $20.7 million, respectively. These investments are held in index funds, and are valued based the net asset value per share. Our Pension Plan's projected benefit obligation was $30.9 million and $25.8 million, at December 31, 2019 and 2018, respectively. The Pension Plan liability was discounted at 3.16% and 4.18% at December 31, 2019 and 2018, respectively.

The nTelos postretirement benefit plan was assumed in the 2016 acquisition of nTelos. This frozen plan covers certain health care benefits for certain nTelos retired employees that meet eligibility requirements. This is a defined benefit plan that is unfunded. Our OPEB Plan liability was discounted at 3.12% and 4.15% at December 31, 2019 and 2018, respectively.

The service component of defined benefit plan expense is immaterial and is included in selling, general, and administrative expense. Following our adoption of ASU 2017-17, *Compensation—Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost,* on January 1, 2018, all other components of benefit plan expense are presented in Other income (expense) and our policy is to immediately recognize actuarial gains and losses into earnings.

The Supplemental Executive Retirement Plan ("SERP") is a benefit plan that provides deferred compensation to certain employees. The Company holds investments in a rabbi trust as a source of funding for future payments under the plan. The SERP’s investments were designated as trading securities and will be liquidated and paid out to the participants upon retirement. The benefit obligation to participants is always equal to the value of the SERP assets under ASC 710 *Compensation.* Changes to the investments’ fair

value are presented in Other income (expense), while the reciprocal changes in the liability are presented in selling, general and administrative expense

Share Repurchase Program: On November 4, 2019, our program to repurchase up to $80 million of common stock became effective. During the fourth quarter of 2019, we repurchased 200,410 shares under the program at an average price of $36.08.
The program is expected to be executed over a twelve month period subject to market conditions and we are not obligated to repurchase the full amount allowed under the program. Our common shares have zero par value and our policy is to record the entire repurchase as a reduction of additional paid-in capital. Repurchased shares are canceled and revert to a status of “authorized and unissued” under Virginia law.

New Accounting Standards
We implemented Accounting Standards Codification ("ASC") 842-*Leases*, *("ASC 842")*, on January 1, 2019 using the modified retrospective method and thus did not retroactively adjust prior periods. ASC 842 replaced previous leasing guidance with a comprehensive lease measurement and recognition standard and expanded disclosure requirements. The new standard required lessees to recognize most leases on their balance sheet as liabilities, with corresponding right-of-use, or ROU assets. See Note 8, *Leases* for more information.

We adopted ASU No. 2018-02-*Income Statement - Reporting Comprehensive Income*, *("ASC 220")*, as of January 1, 2019. We elected not to reclassify stranded income tax effects from accumulated other comprehensive income (OCI) to retained earnings and have implemented this election as its accounting policy as of January 1, 2019. The Company utilizes the portfolio approach as its policy to release the income tax effects from accumulated OCI as the entire portfolio is liquidated, sold, or extinguished.

We implemented ASC 606-*Revenue from Contracts with Customers*, ("ASC 606"), on January 1, 2018 using the modified retrospective method and thus did not retroactively adjust prior periods. This new pronouncement provided us with a single revenue recognition model for recognizing revenue from contracts with customers and significantly expanded the disclosure requirements for revenue arrangements. We have disclosed our results under both the new and old standards for the first year after adoption. See Note 3, *Revenue from Contracts with Customers* for more information.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments - Credit Losses ("ASC 326"): Measurement of Credit Losses on Financial Instruments*, which requires the application of a current expected credit loss (“CECL”) impairment model to financial assets measured at amortized cost (including trade accounts receivable), net investments in leases, and certain off-balance-sheet credit exposures. Under the CECL model, lifetime expected credit losses on such financial assets are measured and recognized at each reporting date based on historical, current, and forecasted information. Furthermore, the CECL model requires financial assets with similar risk characteristics to be analyzed on a collective basis. ASC 326 is effective for fiscal years beginning after December 15, 2019 and interim periods within those years. The Company intends to adopt this standard as of January 1, 2020. The Company does not expect there to be a significant impact to consolidated financial statements upon the adoption.

Note 3. Revenue from Contracts with Customers

Refer to Note 14, *Segment Reporting*, for a summary of our revenue streams, which are discussed further below.

Wireless Segment Revenue
Under the terms of our affiliate agreement with Sprint, we are the exclusive provider to build and operate a portion of Sprint’s nationwide wireless network in a contiguous portion of the Mid-Atlantic states and are licensed to use Sprint’s trademark and FCC spectrum licenses in this Sprint Affiliate Area. In return, we receive a substantial portion of Sprint’s net billings to its subscribers in our Sprint Affiliate Area. Our revenue from this agreement is fully variable and thus our economic risks and rewards under this model are very similar to those of any other wireless carrier.

Under ASC 606, we concluded that Sprint is our customer, rather than Sprint's subscribers. Our sole performance obligation to Sprint under this arrangement is to provide Sprint a series of continuous network access services. All of our consideration for this performance obligation is variable based upon Sprint’s net billings to its subscribers who either originated in, or otherwise use our network in the Affiliate Area, less the 8% management and 8.6% service fees that are retained by Sprint. Our variable revenue from those subscriber billings is further reduced by customer credits, and write-off of Sprint’s subscriber receivables. In the case of Sprint’s prepaid subscribers, our revenue represents the subscriber’s bill reduced by costs to acquire and support those subscribers, based upon national averages from Sprint’s prepaid programs, and a 6% management fee.

We reimburse Sprint for the cost of subsidized handsets that Sprint sells through its national channel in our Sprint Affiliate Area. Similarly, we also reimburse Sprint for commissions that Sprint pays to third-party dealers in our Sprint Affiliate Area. These

reimbursements to Sprint represent consideration payable to our customer, and are thus recorded as a contract asset that amortizes against revenue over the estimated life of Sprint's relationship with its subscribers in our affiliate area, which ranges from 21 to 53 months. Also included within our contract asset is an allowance for variable consideration, which essentially represents our share of Sprint's allowance for doubtful accounts due from Sprint's subscribers. Below is a summary of the Wireless segment contract asset:

(in thousands)	**2019**	**2018**
Beginning Balance	$ 65,674	$ 51,103
Contract payments	77,371	61,156
Contract amortization against revenue	(58,382)	(46,585)
Ending Balance	$ 84,663	$ 65,674

The Wireless segment also sells cell phones and other equipment to Sprint, who in-turn immediately re-sells this equipment to their subscriber, generally under Sprint's equipment financing plan. Shentel is the principal in these transactions, as we control and bear the risk of ownership of the inventory prior to sale. Accordingly, our equipment revenue and cost of equipment sold are presented gross.

Under our affiliate agreement with Sprint, we have historically earned and recognized monthly revenue of $1.5 million for providing service to Sprint customers who pass through our network area ("travel revenue"). While we continue to provide these services to Sprint, the agreed upon payments were suspended by Sprint on April 30, 2019. Accordingly, we have ceased recognizing revenue for the services provided after that date until a new prospective fee can be agreed. We have triggered the final dispute resolution option with Sprint which we expect will lead to a resolution for travel fee revenue in the second quarter of 2020

Total Wireless revenue resulting from our relationship with Sprint accounted for 70%, 71%, and 72% of our total consolidated revenue for 2019, 2018, and 2017, respectively. Approximately 80% of our accounts receivable were due from Sprint at the end of both 2019 and 2018.

Broadband Segment Revenue
Our Broadband segment's largest source of revenue is the provision of unregulated broadband, video and voice services to residential and small and medium business ("SMB") customers in portions of Virginia, West Virginia, Maryland, and Kentucky, via fiber optic and hybrid fiber coaxial cable. The Broadband segment also provides voice and digital subscriber line ("DSL") telephone services to customers in Virginia's Shenandoah County as a regulated Rural Local Exchange Carrier ("RLEC").

These contracts are generally cancellable at the customer's discretion without penalty at any time. We allocate the total transaction price in these transactions based upon the standalone selling price of each distinct good or service. We generally recognize these revenues over time as customers simultaneously receive and consume the benefits of the service, with the exception of equipment sales and home wiring, which are recognized as revenue at a point in time when control transfers and when installation is complete, respectively. Installation fees are allocated to services and are recognized ratably over the longer of the contract term or the period in which the unrecognized fee remains material to the contract, typically about one year.

The Broadband segment incurs commission and installation costs related to in-house and third-party vendors which are capitalized as contract acquisition and fulfillment costs and recognized in selling, general and administrative expense and cost of services, respectively, on a straight-line basis over the expected weighted average customer life of approximately four years. Below is a summary of Broadband's capitalized contract acquisition costs:

(in thousands)	**2019**	**2018**
Beginning Balance	$ 10,091	$ 9,841
Contract payments	6,518	5,674
Contract amortization	(5,604)	(5,424)
Ending Balance	$ 11,005	$ 10,091

Our Broadband segment also provides Ethernet and Wavelength fiber optic services to enterprise and wholesale customers under capacity agreements, and the related revenue is recognized over time under ASC 606. The Broadband segment also leases dedicated

fiber optic strands to enterprise and wholesale customers as part of “dark fiber” agreements, which are accounted for as operating leases under ASC 842 *Leases*.

Future performance obligations
On December 31, 2019, the Company had approximately $3.4 million allocated to unsatisfied performance obligations that will be satisfied at the rate of approximately $0.8 million per year.

ASC 606 Adoption Impacts
The Company adopted ASC 606 and all related amendments effective January 1, 2018, using the modified retrospective method. The Company recognized the cumulative effect of applying the new revenue recognition standard as an adjustment to the opening balance of retained earnings. The comparative information was not retrospectively modified and the impact of the adoption of ASC 606 on the consolidated statements of comprehensive income was as follows:

	Year Ended December, 31 2018		
(in thousands)	**As Reported**	**Balances without Adoption of ASC 606**	**Effect of Change Higher/(Lower)**
Revenue:			
Service revenue and other	$ 562,456	$ 632,340	$ (69,884)
Equipment revenue	68,398	8,298	60,100
Operating expenses:			
Cost of services	194,022	193,860	162
Cost of goods sold	63,959	28,377	35,582
Selling, general and administrative	113,222	175,753	(62,531)

	As of December 31, 2018		
(in thousands)	**As Reported**	**Balances without Adoption of ASC 606**	**Effect of Change Higher/(Lower)**
Assets			
Prepaid expenses and other	$ 60,162	$ 22,204	$ 37,958
Deferred charges and other assets, net	49,891	12,083	37,808
Liabilities			
Advanced billing and customer deposits	7,919	24,414	(16,495)
Deferred income taxes	127,453	103,404	24,049
Other long-term liabilities	14,364	15,550	(1,186)
Retained earnings	386,511	319,926	66,585

Note 4. Investments

Investments consist of the following:

(in thousands)	**December 31, 2019**	**December 31, 2018**
SERP Investments at fair value	2,278	1,779
Cost method investments	9,497	8,487
Equity method investments	613	522
Total investments	$ 12,388	$ 10,788

SERP Investments at Fair Value: As noted above, the SERP’s investments were designated as trading securities and will be liquidated and paid out to the participants following their retirement. Changes to the investments’ fair value are presented in Other income (expense). The SERP’s investments are held in index funds for which the net asset value is used as a practical expedient for fair value.

Cost Method Investments: Our investment in CoBank's Class A common stock represented substantially all of our cost method investments with a balance of $8.7 million and $7.7 million at December 31, 2019 and 2018, respectively. We invested in the CoBank cooperative in connection with our Credit Facility discussed in Note 9**,** *Long-Term Debt***.** We receive equity-based patronage distributions in the form of both equity and cash, which are recognized in Other income (expense) and totaled $4.2 million in 2019 and $2.8 million in both 2018 and 2017. Historically, approximately 75% of the patronage distributions are received in cash and 25% in additional shares of common stock. Information regarding investments carried at cost is reviewed for evidence of impairment. Impairments, if any, are charged to earnings and a new cost basis for the investment is established.

Equity Method Investments: We hold small investments in certain partnerships and unconsolidated corporations where the Company can exert significant influence. At December 31, 2019, the Company had a 23.2% ownership interest in Virginia Independent Telephone Alliance and a 20.0% ownership interest in Valley Network Partnership ("ValleyNet"). The Company and ValleyNet purchase capacity on one another's fiber network. We recognized revenue of $1.0 million, $1.7 million, and $2.2 million from providing service to ValleyNet during 2019, 2018, and 2017, respectively. We recognized Cost of service of $3.0 million, $3.4 million, and $3.7 million for the use of ValleyNet's network during 2019, 2018, and 2017, respectively.

Note 5. Property, Plant and Equipment

Property, plant and equipment consisted of the following:

($ in thousands)	**Estimated Useful Lives**	**December 31, 2019**	**December 31, 2018**
Land		$ 6,976	$ 6,723
Buildings and structures	10 - 40 years	232,730	213,657
Cable and fiber	15 - 40 years	334,260	309,928
Equipment and software	3 - 20 years	867,898	791,401
Plant in service		1,441,864	1,321,709
Plant under construction		56,827	81,409
Total property, plant and equipment		1,498,691	1,403,118
Less: accumulated amortization and depreciation		798,577	701,759
Property, plant and equipment, net		$ 700,114	$ 701,359

The Company prospectively changed the estimated useful life of certain towers, antenna, and fiber assets during 2019 based on the Company's experience as well as observable examples in the industry. Depreciation expense was approximately $3.0 million lower as a result for the year ended December 31, 2019.

Note 6. Goodwill and Intangible Assets

Goodwill by segment consisted of the following:

(in thousands)	**December 31, 2019**	**December 31, 2018**
Wireless	$ 146,383	$ 146,383
Broadband	2,687	114
Total Goodwill	$ 149,070	$ 146,497

We acquired Big Sandy Broadband, Inc. ("Big Sandy") on February 28, 2019. The $10 million acquisition price was allocated as follows: $4.6 million of property, plant and equipment; $2.8 million of subscriber relationships; and $2.6 million of goodwill.

Other intangible assets consisted of the following:

	December 31, 2019			December 31, 2018		
(in thousands)	Gross Carrying Amount	Accumulated Amortization and Other	Net	Gross Carrying Amount	Accumulated Amortization and Other	Net
Indefinite-lived intangibles:						
Cable franchise rights	$ 64,334	$ —	$ 64,334	$ 64,334	$ —	$ 64,334
FCC spectrum licenses	13,839	—	13,839	—	—	—
Railroad crossing rights	141	—	141	141	—	141
Total indefinite-lived intangibles	78,314	—	78,314	64,475	—	64,475
Finite-lived intangibles:						
Sprint affiliate contract expansion - Wireless	455,305	(226,712)	228,593	455,305	(167,830)	287,475
FCC spectrum licenses	4,659	(97)	4,562	—	—	—
Favorable leases - Wireless	—	—	—	15,743	(1,919)	13,824
Acquired subscribers - Cable	28,065	(25,600)	2,465	25,265	(25,250)	15
Other intangibles	463	(250)	213	463	(223)	240
Total finite-lived intangibles	488,492	(252,659)	235,833	496,776	(195,222)	301,554
Total intangible assets	$ 566,806	$ (252,659)	$ 314,147	$ 561,251	$ (195,222)	$ 366,029

In 2016, we acquired nTelos Holdings Corp. and immediately transferred certain of the acquired assets to Sprint in an interrelated nonmonetary exchange. In the exchange, we received a corresponding expansion of our Sprint Affiliate Area, future billings associated with Sprint subscribers already in that expanded area, and an increase in the price that Sprint would pay to buy our Wireless asset group in the event that either party chooses not to renew the affiliate agreement. Sprint also agreed to waive up to $4.2 million of our monthly management fee, not to exceed $255.6 million in total, over a multi-year period. We accounted for these collective rights as an ACE intangible, which is amortized over the expected benefit period and further reduced as management fees are waived by Sprint. We realized management fee waivers of $38.8 million, $37.8 million and $36.1 million for the years ended December 31, 2019, 2018 and 2017, respectively, and $137.2 million since the date of the business combination.

During 2017 and 2018, we entered into purchase agreements with Sprint to further expand our affiliate territory to include areas around Parkersburg, West Virginia, and Richmond, Virginia, respectively. The relevant portion of these payments were also capitalized as ACE intangible assets.

Amounts paid in connection with the acquisition of a business are presented as amortization expense in our income statement. Amounts paid to Sprint outside of a business combination are accounted for as consideration paid to a customer with amortization presented as a reduction of Service and other revenue in our consolidated statements of comprehensive income.

During the third quarter of 2019, the Company purchased certain indefinite-lived spectrum licenses for $13.8 million and finite-lived spectrum licenses for $4.7 million.

For the years ended December 31, 2019, 2018 and 2017, amortization of intangible assets was approximately $20.5 million, $24.6 million and $27.5 million, respectively.

Our finite-lived intangible assets are amortized over the following estimated useful lives:

	Estimated Useful Life
Affiliate contract expansion - Wireless	4 - 14 years
FCC spectrum licenses	18 - 20 years
Acquired subscribers - Broadband	3 - 10 years
Other intangibles	15 - 20 years

The following table summarizes expected amortization of intangible assets at December 31, 2019:

(in thousands)	Amortization of Intangible Assets (1)
2020	$ 17,857
2021	15,153
2022	13,709
2023	13,499
2024	13,499
Thereafter	43,772
Total	$ 117,489

(1) The Company expects to further reduce affiliate contract expansion by approximately $118.4 million as waived management fees are received from Sprint.

Note 7. Other Assets and Accrued Liabilities

Prepaid expenses and other, classified as current assets, included the following:

(in thousands)	December 31, 2019	December 31, 2018
Prepaid rent	$ —	$ 11,245
Prepaid maintenance expenses	3,329	3,981
Interest rate swaps	1,382	4,930
Wireless contract asset	44,844	33,323
Broadband contract acquisition and fulfillment costs	4,898	4,634
Other	3,352	2,049
Prepaid expenses and other	$ 57,805	$ 60,162

Deferred charges and other assets, classified as long-term assets, included the following:

(in thousands)	December 31, 2019	December 31, 2018
Interest rate swaps	$ 1,252	$ 8,323
Wireless contract asset	39,819	32,351
Broadband contract acquisition and fulfillment costs	6,107	5,457
Prepaid expenses and other	6,174	3,760
Deferred charges and other assets	$ 53,352	$ 49,891

Accrued liabilities and other, classified as current liabilities, included the following:

(in thousands)	December 31, 2019	December 31, 2018
Sales and property taxes payable	$ 3,789	$ 4,281
Asset retirement obligations	148	582
Accrued programming costs	3,023	2,886
Financing leases	94	—
FCC spectrum license obligations	105	—
Other current liabilities	7,232	6,814
Accrued liabilities and other	$ 14,391	$ 14,563

Other liabilities, classified as long-term liabilities, included the following:

(in thousands)	December 31, 2019	December 31, 2018
Noncurrent portion of deferred lease revenue	$ 12,449	$ 12,593
FCC spectrum license obligations	1,699	—
Noncurrent portion of financing leases	1,591	—
Other	1,251	1,771
Other liabilities	$ 16,990	$ 14,364

Asset Retirement Obligations:
Our asset retirement obligations arise from certain of our leases and generally require us to remove our network equipment from colocation sites, and to remove our towers from ground leases. Below is a summary:

	Years Ended December 31,		
(in thousands)	2019	2018	2017
Balance at beginning of year	$ 29,166	$ 21,703	$ 21,507
Additional liabilities accrued	2,741	3,357	2,404
Changes to prior estimates	3,902	3,504	(1,695)
Payments	(224)	(443)	(1,296)
Accretion expense	1,477	1,045	783
Balance at end of year	$ 37,062	$ 29,166	$ 21,703

Note 8. Leases

We adopted ASC 842 on January 1, 2019 using the modified retrospective method. We applied the package of practical expedients and, as a result, did not reassess prior conclusions regarding lease identification, lease classification and initial direct costs under the new standard. In those circumstances where the Company is the lessee, we elected to account for non-lease components associated with our leases (e.g., maintenance costs) and lease components as a single lease component for substantially all of our asset classes.

We lease various cell sites, warehouses, retail stores, and office facilities for use in our business. These agreements include fixed rental payments as well as variable rental payments, such as those based on relevant inflation indices. The accounting lease term includes optional renewal periods that we are reasonably certain to exercise based on our assessment of relevant contractual and economic factors. The related lease payments are discounted at lease commencement using the Company's incremental borrowing rate in order to measure the lease liability and ROU asset.

The incremental borrowing rate is determined using a portfolio approach based on the rate of interest that the Company would have to pay to borrow an amount equal to the lease payments on a collateralized basis over a similar term. The Company uses the observable unsecured borrowing rate and risk-adjusts that rate to approximate a collateralized rate. At December 31, 2019, our operating leases had a weighted average remaining lease term of nine years and a weighted average discount rate of 4.3%. Our finance leases had a weighted average remaining lease term of fifteen years and a weighted average discount rate of 5.1%. Under the new lease standard, leases are remeasured upon certain events or modifications.

Adoption of the new lease standard did not materially impact the Company's consolidated net earnings, cash flows, liquidity, or loan covenants.

The cumulative effect of the changes made to the consolidated January 1, 2019 balance sheet for the adoption of the new lease standard was as follows:

(in thousands)	December 31, 2018 As Previously Reported	Effect of the Adoption of ASC 842 (Leases)	January 1, 2019 As Adjusted
Assets			
Prepaid expenses and other	$ 60,162	$ (11,580)	$ 48,582
Property, plant and equipment, net	701,359	1,789	703,148
Operating lease right-of-use assets	—	369,344	369,344
Intangible assets, net	366,029	(13,828)	352,201
Liabilities			
Current operating lease liabilities	—	38,773	38,773
Accrued liabilities and other	14,563	(412)	14,151
Deferred Lease	22,436	(22,436)	—
Noncurrent operating lease liabilities	—	328,156	328,156
Other liabilities	14,364	1,644	16,008

In addition to recognizing the operating lease liabilities and right-of-use assets, ASC 842 also reclassified prepaid and deferred rent balances, off-market leases, and lease incentives into the right-of-use assets.

During 2019, we recognized $69.2 million of operating lease expense and $0.6 million of interest and depreciation expense on finance leases. Operating lease expense is presented in cost of service or selling, general and administrative expense based on the use of the relevant facility. Variable lease payments and short-term lease expense were both immaterial. We remitted $63.1 million of operating lease payments during 2019. We also obtained $74.8 million of leased assets in exchange for new operating lease liabilities during 2019.

The following table summarizes the expected maturity of lease liabilities at December 31, 2019

(in thousands)	Operating Leases	Finance Leases	Total
2020	$ 59,790	$ 174	$ 59,964
2021	65,556	174	65,730
2022	63,772	174	63,946
2023	60,301	174	60,475
2024	55,644	174	55,818
2025 and thereafter	189,857	1,532	191,389
Total lease payments	494,920	2,402	497,322
Less: Interest	99,914	717	100,631
Present value of lease liabilities	$ 395,006	$ 1,685	$ 396,691

Our commitments under leases existing as of December 31, 2018 were approximately $55.1 million for the year ending December 31, 2019, $104.4 million in total for the years ending December 31, 2020 and 2021, $97.6 million in total for the years ending December 31, 2022 and 2023 and $168.5 million in total for years thereafter.

The Company's finance lease liabilities are presented in the accrued liabilities and other and the other liabilities lines of the consolidated balance sheets. The related finance lease assets are included in the property, plant and equipment line.

We recognized $8.1 million of operating lease revenue during 2019 related to the cell site colocation space and dedicated fiber optic strands that we lease to our customers, which is included in Service and other revenue in the consolidated statements of comprehensive income. Substantially all of our lease revenue relates to fixed lease payments. Below is a summary of our minimum rental receipts under the lease agreements in place at December 31, 2019:

(in thousands)	Operating Leases	
2020	$	7,074
2021		4,914
2022		3,902
2023		2,270
2024		1,245
2025 and thereafter		3,853
Total	$	23,258

Note 9. Long-Term Debt

Our syndicated Credit Agreement includes a $75 million, five-year undrawn revolving credit facility, as well as the following term loans:

(in thousands)	December 31, 2019		December 31, 2018	
Term loan A-1		258,571		287,699
Term loan A-2		473,469		497,537
		732,040		785,236
Less: unamortized loan fees		11,926		14,994
Total debt, net of unamortized loan fees	$	720,114	$	770,242

Term Loan A-1 bears interest at one-month LIBOR plus a margin of 1.50%, while Term Loan A-2 bears interest at one-month LIBOR plus a margin of 1.75%. LIBOR resets monthly. Our cash payments for interest were $27.6 million and $33.0 million during 2019 and 2018, respectively.

The Credit Agreement is fully secured by a pledge and unconditional guarantee from the Company of its wholly owned subsidiaries as collateral, other than Shenandoah Telephone Company. This provides the lenders a security interest in substantially all of the assets of the Company.

The Credit Agreement contains affirmative and negative covenants customary to secured credit facilities, including restrictions on our ability to incur additional indebtedness and additional liens on their assets, engage in mergers or acquisitions or dispose of assets, pay dividends or make other distributions, voluntarily prepay other indebtedness, enter into transactions with affiliated persons, make investments, and change the nature of the Company’s businesses. Total dividends, distributions, and redemptions of capital stock generally cannot exceed the sum of $25 million plus 60% of the Company's consolidated net income from January 1, 2016 to the date of declaration of such dividends, distributions or redemptions.

The financial covenants of the Credit Facility include:

- a limitation on the Company’s total leverage ratio, calculated as Consolidated EBITDA, as defined by the Credit Facility agreement, of less than or equal to 3.50 to 1.00 from December 31, 2018 through December 31, 2019, then 3.25 to 1.00 through December 31, 2021, and 3.00 to 1.00 thereafter;
- a minimum debt service coverage ratio, calculated as Consolidated EBITDA minus certain cash tax payments divided by the sum of all scheduled principal payments on the Credit Facility plus cash payments for interest, greater than or equal to 2.00 to 1.00;
- the Company must maintain a minimum liquidity balance, calculated as availability under the Revolver Facility plus unrestricted cash and cash equivalents, of greater than $25 million at all times.

As shown below, as of December 31, 2019, the Company was in compliance with the financial covenants in its credit agreements.

	Actual	Covenant Requirement
Total leverage ratio	2.4	3.5 or Lower
Debt service coverage ratio	5.8	2.0 or Higher
Minimum liquidity balance (in millions)	$ 176.4	$25.0 or Higher

Term Loan A-1 requires quarterly principal repayments of $7.3 million from December 31, 2019 through September 30, 2022; then increasing to $10.9 million quarterly from December 31, 2022 through September 30, 2023, with the remaining balance due November 8, 2023. Term Loan A-2 requires quarterly principal repayments of $1.2 million through September 30, 2025, with the remaining balance due November 8, 2025. These scheduled payments are also summarized below:

(in thousands)	Amount
2020	$ 34,122
2021	34,122
2022	37,764
2023	172,515
2024	4,988
2025	448,529
Total	$ 732,040

The estimated fair value of our variable-rate Credit Facility approximates its carrying value due to its floating interest rate structure.

Note 10. Derivatives and Hedging

In May 2016, the Company entered into certain pay-fixed (1.16%), receive-variable (one month LIBOR) interest rate swaps that were designated as a cash flow hedge. The Company is hedging approximately 46% of its outstanding debt through these instruments with outstanding notional amounts totaling $339.8 and $384.0 million December 31, 2019 and 2018, respectively.

The hedge was determined to be highly effective and therefore all of the change in its fair value is recognized through Other comprehensive income. The fair value of these instruments was estimated using an income approach and observable market inputs. They were presented as follows:

(in thousands)	December 31, 2019	December 31, 2018
Balance sheet location of derivative financial instruments:		
Prepaid expenses and other	$ 1,382	$ 4,930
Deferred charges and other assets, net	1,252	8,323
Total derivatives designated as hedging instruments	$ 2,634	$ 13,253

The table below summarizes changes in accumulated other comprehensive income (loss) by component:

(in thousands)	Gains (Losses) on Cash Flow Hedges	Income Tax (Expense) Benefit	Accumulated Other Comprehensive Income (Loss), net of taxes
Balance as of December 31, 2018	$ 13,253	$ (4,973)	$ 8,280
Net change in unrealized gain (loss)	(6,540)	1,630	(4,910)
Amounts reclassified from accumulated other comprehensive income (loss) to interest expense	(4,079)	1,017	(3,062)
Net current period other comprehensive income (loss)	(10,619)	2,647	(7,972)
Balance as of December 31, 2019	$ 2,634	$ (2,326)	$ 308

As of December 31, 2019, the Company estimates that $1.4 million will be reclassified as a reduction of interest expense during the next twelve months.

Note 11. Income Taxes

The Company files a consolidated U.S. federal income tax return and various state income tax returns. The provision for the federal and state income taxes attributable to income (loss) consists of the following components:

	Years Ended December 31,		
(in thousands)	**2019**	**2018**	**2017**
Current (benefit) expense			
Federal taxes	$ (1,205)	$ 2,875	$ 1,552
State taxes	5,665	6,434	(630)
Total current provision	4,460	9,309	922
Deferred expense (benefit)			
Federal taxes	12,183	6,708	(52,886)
State taxes	(539)	(500)	(1,169)
Total deferred provision	11,644	6,208	(54,055)
Income tax expense (benefit)	$ 16,104	$ 15,517	$ (53,133)
Effective tax rate	22.7%	25.0%	

A reconciliation of income taxes determined by applying the federal and state tax rates to income (loss) is as follows:

	Years Ended December 31,		
(in thousands)	**2019**	**2018**	**2017**
Expected tax expense at federal statutory	$ 14,918	$ 13,044	$ 4,640
State income taxes, net of federal tax effect	4,709	4,748	(1,129)
Revaluation of U.S. deferred income taxes	—	(760)	(53,449)
Excess tax benefit from share based compensation and other, net	(3,523)	(1,515)	(3,195)
Income tax expense (benefit)	$ 16,104	$ 15,517	$ (53,133)

The effective tax rate in 2019 decreased slightly from 2018, primarily as a result of the larger discrete excess tax benefit from share based compensation and other, net. Deferred taxes were revalued in 2017 to reflect the change from a 35% federal statutory rate to 21% as a result of the 2017 Tax Cut and Jobs Act. As a result, the effective tax rate in 2017 is not meaningful.

The Company's cash payments for income taxes were $9.5 million in the year ended December 31, 2019. The Company received cash refunds for income taxes of $2.7 million in the year ended December 31, 2018.

Deferred tax assets and liabilities are measured using enacted tax rates that are expected to apply in the year of reversal or settlement and arise from temporary differences between the US GAAP and tax bases of the following assets and liabilities:

(in thousands)	December 31, 2019	December 31, 2018
Deferred tax assets:		
Leases	$ 106,564	$ —
Asset retirement obligations	9,957	7,797
Net operating loss carry-forwards	10,071	12,612
Pension liabilities	3,161	2,873
Accruals and stock based compensation	1,935	6,545
Other	1,408	—
Total gross deferred tax assets	133,096	29,827
Less valuation allowance	—	(862)
Net deferred tax assets	133,096	28,965
Deferred tax liabilities:		
Property, plant and equipment	110,297	99,902
Leases	105,475	—
Intangible assets	27,201	32,727
Prepaid assets and other	26,574	23,789
Total gross deferred tax liabilities	269,547	156,418
Net deferred tax liabilities	$ 136,451	$ 127,453

In assessing the ability to realize deferred tax assets, management considers whether it is more likely than not that some portion or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon generating future taxable income during the periods in which those temporary differences become deductible. Management considers the scheduled reversal of deferred tax liabilities, projected future taxable income, taxable income in prior carryback years if available and tax planning strategies in making this assessment. Based upon the level of historical taxable income and projections for future taxable income over the periods for which the deferred tax assets are deductible, the Company believes it more likely than not that the net deferred tax assets will be realized.

The Company has a deferred tax asset of $10.1 million related to federal and various state net operating losses. As of December 31, 2019, the Company had approximately $46.2 million of federal net operating losses expiring through 2027. The Company also had approximately $19.0 million of state net operating losses expiring through 2036.

As of December 31, 2019 and 2018, the Company had no unrecognized tax benefits.

The Company is not currently subject to state or federal income tax audits as of December 31, 2019. The Company's returns are generally open to examination from 2016 forward and the net operating losses acquired from nTelos are open to examination from 2002 forward.

Note 12. Stock Compensation

The Company maintains two shareholder-approved Company Stock Incentive Plans allowing for the grant of equity based incentive compensation to essentially all employees. The 2005 Plan authorized grants of up to 2,880,000 shares over a ten-year period beginning in 2005. The term of the 2005 Plan expired in February 2014; outstanding awards will continue to vest and options may continue to be exercised, but no additional awards will be granted under the 2005 Plan. The 2014 Plan authorizes grants of up to an additional 3,000,000 shares over a ten-year period beginning in 2014. Under these Plans, grants may take the form of stock awards, awards of options to acquire stock, stock appreciation rights, and other forms of equity based compensation; both options to acquire stock and stock awards were granted.

The fair value of each option award is estimated on the grant date using the Black-Scholes option valuation model, based on several assumptions including the risk-free interest rate, volatility, expected dividend yield and expected term.

The fair value of each restricted stock unit award is calculated using the share price at the date of grant. Restricted stock units generally have service requirements only or performance and service requirements with vesting periods ranging from one to four years. Employees and directors who are granted restricted stock units are not required to pay for the shares but generally must remain employed with the Company, or continue to serve as a member of the Company's board of directors, until the restrictions lapse, which is typically four years for employees and one year for directors.

The cost of employee services received in exchange for share-based awards classified as equity is measured using the estimated fair value of the award on the date of the grant, and the related expense is recorded using the straight-line method consistent with the recipient's respective service period.

Stock-based compensation expense was as follows:

	Years Ended December 31,		
(in thousands)	**2019**	**2018**	**2017**
Stock compensation expense	$ 4,182	$ 5,367	$ 4,184
Capitalized stock compensation	365	408	604
Stock compensation expense, net	$ 3,817	$ 4,959	$ 3,580

As of December 31, 2019 and 2018, there was $3.7 million and $2.7 million, respectively, of total unrecognized compensation cost related to non-vested incentive awards that are expected to be recognized over a weighted average period of 2.4 years.

We utilize the treasury stock method to calculate the impact on diluted earnings per share that potentially dilutive stock-based compensation awards have. The following table indicates the computation of basic and diluted earnings per share:

	Years Ended December 31,		
(in thousands, except per share amounts)	**2019**	**2018**	**2017**
Calculation of net income per share:			
Net income	$ 54,935	$ 46,595	$ 66,390
Basic weighted average shares outstanding	49,811	49,542	49,150
Basic net income per share	$ 1.10	$ 0.94	$ 1.35
Effect of stock-based compensation awards outstanding:			
Basic weighted average shares outstanding	49,811	49,542	49,150
Effect from dilutive shares and options outstanding	290	521	876
Diluted weighted average shares outstanding	50,101	50,063	50,026
Diluted net income per share	$ 1.10	$ 0.93	$ 1.33

There were fewer than 110 thousand anti-dilutive awards outstanding during 2019, 2018, and 2017.

Note 13. Commitments and Contingencies

We are committed to make payments to satisfy our lease liabilities and long-term debt. The scheduled payments under those obligations are summarized in the respective notes above. We are also committed to make annual payments of approximately $108.0 thousand on our FCC spectrum license obligation through 2039.

The Company is subject to claims and legal actions that may arise in the ordinary course of business. The Company does not believe that any of these pending claims or legal actions are either probable or reasonably possible of a material loss.

Note 14. Segment Reporting

Effective November 30, 2019, we realigned our reporting segment structure to align with how our CEO and chief operating decision maker ("CODM") allocates resources and evaluates operating performance. These changes follow an organizational shift during 2019 from a business line to a functional structure, better delineate between our key products, and better enable peer comparisons by both our CODM and our investors.

Refer to Note 1, *Nature of Operations* for a description of the business activities pursued by each of our reporting segments.

The tables below reflect the results of operations of the Company's reportable segments consistent with internal reporting used by the Company. The prior year periods have been recast to reflect the segment changes.

Year ended December 31, 2019:

(in thousands)	Wireless	Broadband	Tower	Corporate & Eliminations	Consolidated
External revenue					
Postpaid	$ 302,031	$ —	$ —	—	$ 302,031
Prepaid	53,540	—	—	—	53,540
Tower lease	—	—	6,964	—	6,964
Cable, residential and SMB	—	134,187	—	—	134,187
Fiber, enterprise and wholesale	—	20,187	—	—	20,187
Rural local exchange carrier	—	21,074	—	—	21,074
Travel, installation, and other	20,160	6,920	—	—	27,080
Service revenue and other	375,731	182,368	6,964	—	565,063
Equipment	67,659	1,184	—	—	68,843
Total external	443,390	183,552	6,964	—	633,906
Revenue from other segments	—	10,392	6,020	(16,412)	—
Total revenue	443,390	193,944	12,984	(16,412)	633,906
Operating expenses					
Cost of services	131,745	76,674	3,894	(13,560)	198,753
Cost of goods sold	65,148	766	—	—	65,914
Selling, general and administrative	42,225	32,679	1,166	36,470	112,540
Depreciation and amortization	115,731	41,304	2,025	593	159,653
Total operating expenses	354,849	151,423	7,085	23,503	536,860
Operating income (loss)	$ 88,541	$ 42,521	$ 5,899	$ (39,915)	$ 97,046
Capital expenditures	$ 71,744	$ 60,627	$ 921	$ 5,500	$ 138,792

Year ended December 31, 2018:

(in thousands)	Wireless	Broadband	Tower	Corporate & Eliminations	Consolidated
External revenue					
Postpaid	$ 300,775	$ —	$ —	—	$ 300,775
Prepaid	51,602	—	—	—	51,602
Tower lease	—	—	7,180	—	7,180
Cable, residential and SMB	—	124,072	—	—	124,072
Fiber, enterprise and wholesale	—	18,218	—	—	18,218
Rural local exchange carrier	—	23,485	—	—	23,485
Travel, installation, and other	30,572	6,552	—	—	37,124
Service revenue and other	382,949	172,327	7,180	—	562,456
Equipment	67,510	888	—	—	68,398
Total external	450,459	173,215	7,180	—	630,854
Revenue from other segments	—	9,905	5,016	(14,921)	—
Total revenue	450,459	183,120	12,196	(14,921)	630,854
Operating expenses					
Cost of services	127,045	75,066	4,121	(12,210)	194,022
Cost of goods sold	63,583	376	—	—	63,959
Selling, general and administrative	46,760	27,741	778	37,943	113,222
Depreciation and amortization	125,067	38,317	2,454	567	166,405
Total operating expenses	362,455	141,500	7,353	26,300	537,608
Operating income (loss)	$ 88,004	$ 41,620	$ 4,843	$ (41,221)	$ 93,246
Capital expenditures	$ 80,010	$ 43,197	$ 6,145	$ 7,289	$ 136,641

Year ended December 31, 2017:

(in thousands)	Wireless	Broadband	Tower	Corporate & Eliminations	Consolidated
External revenue					
Postpaid	$ 311,629	$ —	$ —	—	$ 311,629
Prepaid	96,972	—	—	—	96,972
Tower lease	—	—	7,080	—	7,080
Cable, residential and SMB	—	114,122	—	—	114,122
Fiber, enterprise and wholesale	—	16,600	—	—	16,600
Rural local exchange carrier	—	24,052	—	—	24,052
Travel, installation, and other	24,981	6,237	—	—	31,218
Service revenue and other	433,582	161,011	7,080	—	601,673
Equipment	9,467	851	—	—	10,318
Total external	443,049	161,862	7,080	—	611,991
Revenue from other segments	—	12,119	4,949	(17,068)	—
Total revenue	443,049	173,981	12,029	(17,068)	611,991
Operating expenses					
Cost of services	125,785	73,331	3,841	(14,236)	188,721
Cost of goods sold	22,653	133	—	—	22,786
Selling, general and administrative	117,561	26,909	696	20,771	165,937
Integration and acquisition expenses	10,793	—	—	237	11,030
Depreciation and amortization	137,725	36,797	1,885	600	177,007
Total operating expenses	414,517	137,170	6,422	7,372	565,481
Operating income (loss)	$ 28,532	$ 36,811	$ 5,607	$ (24,440)	$ 46,510
Capital expenditures	$ 81,729	$ 57,068	$ 891	$ 6,801	$ 146,489

A reconciliation of the total of the reportable segments' operating income to consolidated income before taxes is as follows:

	Years Ended December 31,		
(in thousands)	2019	2018	2017
Total consolidated operating income	$ 97,046	$ 93,246	$ 46,510
Interest expense	(29,468)	(34,847)	(38,237)
Other	3,461	3,713	4,984
Income before income taxes	$ 71,039	$ 62,112	$ 13,257

The Company's CODM does not currently review total assets by segment since the assets are centrally managed and some of the assets are shared by the segments, accordingly total assets by segment are not provided.

As of January 1, 2018, the Company records stock compensation expense to Corporate. Previously, stock compensation expense was allocated among all segments.

Note 15. Quarterly Results (unaudited)

The following table reflects selected quarterly results for the Company.

(in thousands, except per share data)	Three Months Ended			
	March 31, 2019	June 30, 2019	September 30, 2019	December 31, 2019
Revenue	$ 158,843	$ 158,914	$ 155,152	$ 160,997
Operating income	24,787	24,020	25,359	22,880
Net income	13,910	13,150	14,354	13,521
Net income per share - basic	$ 0.28	$ 0.26	$ 0.29	$ 0.27
Net income per share - diluted	$ 0.28	$ 0.26	$ 0.29	$ 0.27

(in thousands except per share data)	Three Months Ended			
	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018
Revenue	$ 154,138	$ 156,501	$ 158,731	$ 161,484
Operating income	16,754	21,169	28,329	26,994
Net income	6,583	9,626	15,534	14,852
Net income per share - basic	$ 0.13	$ 0.19	$ 0.31	$ 0.31
Net income per share - diluted	$ 0.13	$ 0.19	$ 0.31	$ 0.30

Schedule II
Valuation and Qualifying Accounts

Changes in the Company's allowance for doubtful accounts for accounts receivable for the years ended December 31, 2019, 2018 and 2017 are summarized below:

(in thousands)	Balance at Beginning of Year	Recoveries added to allowance	Bad debt expense	Write-offs	Balance at End of Year
Year Ended December, 31 2019					
Allowance for doubtful accounts	$ 534	$ 649	$ 1,743	$ (2,393)	$ 533
Year Ended December, 31 2018					
Allowance for doubtful accounts	$ 466	$ 631	$ 1,983	$ (2,546)	$ 534
Year Ended December, 31 2017					
Allowance for doubtful accounts	$ 759	$ 616	$ 2,179	$ (3,088)	$ 466

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ITEM 16. **FORM 10-K SUMMARY**

None

Exhibits Index

Exhibit Number	Exhibit Description
2.1	Agreement and Plan of Merger, dated as of August 10, 2015, by and among Shenandoah Telecommunications Company, Gridiron Merger Sub, Inc. and NTELOS Holdings Corp., filed as Exhibit 2.1 to the Company’s Current Report on Form 8-K, dated August 11, 2015.
3.1	Amended and Restated Articles of Incorporation of Shenandoah Telecommunications Company, effective August 31, 2019, filed as exhibit 3.2 to the Company's Quarterly Report on Form 10-Q dated September 30, 2019.
3.2	Amended and Restated Bylaws of Shenandoah Telecommunications Company, effective October 29, 2019, filed as exhibit 3.3 to the Company's Quarterly Report on Form 10-Q dated September 30, 2019.
4.1	Description of the Company's Common Stock Registered Under Section 12 of the Exchange Act of 1934
10.1	Shenandoah Telecommunications Company Dividend Reinvestment Plan filed as Exhibit 4.4 to the Company’s Registration Statement on Form S-3D (No. 333-74297).
10.2	Sprint PCS Management Agreement dated as of November 5, 1999 by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., and Shenandoah Personal Communications Company filed as Exhibit 10.4 to the Company’s Report on Form 10-K for the year ended December 31, 2003.
10.3	Sprint PCS Services Agreement dated as of November 5, 1999 by and between Sprint Spectrum L.P. and Shenandoah Personal Communications Company filed as Exhibit 10.5 to the Company’s Report on Form 10-K for the year ended December 31, 2003.
10.4	Sprint Trademark and Service Mark License Agreement dated as of November 5, 1999 by and between Sprint Communications Company, L.P. and Shenandoah Personal Communications Company filed as Exhibit 10.6 to the Company’s Report on Form 10-K for the year ended December 31, 2003.
10.5	Sprint Spectrum Trademark and Service Mark License Agreement dated as of November 5, 1999 by and between Sprint Spectrum L.P. and Shenandoah Personal Communications Company filed as Exhibit 10.7 to the Company’s Report on Form 10-K for the year ended December 31, 2003.
10.6	Addendum I to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., and Shenandoah Personal Communications Company filed as Exhibit 10.8 to the Company’s Report on Form 10-K for the year ended December 31, 2003.
10.7	Asset Purchase Agreement dated November 5, 1999 by and among Sprint Spectrum L.P., Sprint Spectrum Equipment Company, L. P., Sprint Spectrum Realty Company, L.P., and Shenandoah Personal Communications Company, serving as Exhibit A to Addendum I to the Sprint PCS Management Agreement and as Exhibit 2.6 to the Sprint PCS Management Agreement filed as Exhibit 10.9 to the Company’s Report on Form 10-K for the year ended December 31, 2003.

10.8	Addendum II dated August 31, 2000 to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., and Shenandoah Personal Communications Company filed as Exhibit 10.10 to the Company's Report on Form 10-K for the year ended December 31, 2003.
10.9	Addendum III dated September 26, 2001 to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., and Shenandoah Personal Communications Company filed as Exhibit 10.11 to the Company's Report on Form 10-K for the year ended December 31, 2003.
10.10	Addendum IV dated May 22, 2003 to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., and Shenandoah Personal Communications Company filed as Exhibit 10.12 to the Company's Report on Form 10-K for the year ended December 31, 2003.
10.11	Addendum V dated January 30, 2004 to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., and Shenandoah Personal Communications Company filed as Exhibit 10.13 to the Company's Report on Form 10-K for the year ended December 31, 2003.
10.12	Supplemental Executive Retirement Plan as amended and restated, filed as Exhibit 10.14 to the Company's Current Report on Form 8-K dated March 23, 2007.
10.13	Addendum VI dated May 24, 2004 to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., and Shenandoah Personal Communications Company filed as Exhibit 10.15 to the Company's Report on Form 10-Q for the quarterly period ended June 30, 2004.
10.14	2005 Stock Incentive Plan filed as Exhibit 10.1 to the Company's Registration Statement on Form S-8 (No. 333-127342).
10.15	Addendum VII dated March 13, 2007 to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co., L.P., APC PCS, LLC, Phillie Co, L.P., and Shenandoah Personal Communications Company, filed as Exhibit 10.31 to the Company's Report on Form 10-K for the year ended December 31, 2006.
10.16	Addendum VIII to the Sprint Management Agreement dated November 19, 2007, filed as Exhibit 10.36 to the Company's Current Report on Form 8-K dated November 20, 2007.
10.17	Addendum IX to the Sprint Management Agreement dated as of April 14, 2009, and filed as Exhibit 10.42 to the Company's Annual Report on Form 10-K dated March 8, 2010.
10.18	Addendum X dated March 15, 2010 to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., Sprint Communications Company L.P. and Shenandoah Personal Communications Company, filed as Exhibit 10.44 to the Company's Current Report on Form 10-Q, dated May 7, 2010.
10.19	Addendum XI dated July 7, 2010 to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., Sprint Communications Company L.P. and Shenandoah Personal Communications Company, filed as Exhibit 10.45 to the Company's Current Report on Form 8-K dated July 8, 2010.
10.20	Letter Agreement modifying section 10.2.7.2 of Addendum X dated March 15, 2010 to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., Sprint Communications Company L.P. and Shenandoah Personal Communications Company, filed as Exhibit 10.49 to the Company's Quarterly Report on Form 10-Q dated August 8, 2011.

10.21	Addendum XII dated February 1, 2012 to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., Sprint Communications Company L.P. and Shenandoah Personal Communications Company, filed as Exhibit 10.51 to the Company’s Current Report on Form 8-K dated February 2, 2012.
10.22	Addendum XIII dated September 14, 2012 to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., Sprint Communications Company L.P. and Shenandoah Personal Communications, LLC, filed as Exhibit 10.53 to the Company’s Current Report on Form 8-K dated September 17, 2012.
10.23	Addendum XIV dated as of November 19, 2012, to Sprint PCS Management Agreement by and among Sprint Spectrum L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., Sprint Communications Company L.P. and Shenandoah Personal Communications, LLC, filed as Exhibit 10.42 to the Company’s Annual Report on Form 10-K dated March 5, 2013.
10.24	Addendum XV dated as of March 11, 2013, to Sprint PCS Management Agreement by and among Sprint Spectrum, L.P., WirelessCo, L.P., APC PCS, LLC, PhillieCo, L.P., Sprint Communications Company L.P. and Shenandoah Personal communications, LLC, filed as Exhibit 10.43 to the Company’s Quarterly Report on Form 10-Q dated May 3, 2013.
10.25	Addendum XVI dated as of December 9, 2013 to Sprint PCS Management Agreement by and among Sprint Spectrum, L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., Sprint Communications Company L.P. and Shenandoah Personal Communications, LLC, filed as Exhibit 10.45 to the Company’s Quarterly Report on Form 10-Q dated May 2, 2014.
10.26	Addendum XVII dated as of April 11, 2014, to Sprint PCS Management Agreement by and among Sprint Spectrum, L.P., Wireless Co, L.P., APC PCS, LLC, Phillie Co, L.P., Sprint Communications Company L.P. and Shenandoah Personal Communications, LLC, filed as Exhibit 10.46 to the Company’s Quarterly Report on Form 10-Q dated May 2, 2014.
10.27	2014 Equity Incentive Plan filed as Appendix A to the Company’s Definitive Proxy Statement filed on March 13, 2014 (No. 333-196990).
10.28	Master Agreement dated as of August 10, 2015, by and among SprintCom, Inc. and Shenandoah Personal Communications, LLC, filed as Exhibit 10.1 to the Company’s Current Report on Form 8-K dated August 11, 2015.
10.29	Addendum XVIII dated as of August 10, 2015, to Sprint PCS Management Agreement by and among SprintCom, Inc., Phillie Co, L.P., and Shenandoah Personal Communications, LLC, filed as Exhibit 10.2 to the Company’s Current Report on Form 8-K, dated August 11, 2015.
10.30	Amended and Restated Master Agreement, dated as of May 6, 2016, by and between Shenandoah Personal Communications, LLC and SprintCom, Inc, filed as Exhibit 10.1 to the Company's Current Report on Form 8-K, dated May 6, 2016.
10.31	Addendum XIX to Sprint PCS Management Agreement, dated as of May 6, 2016, by and among Sprint Spectrum L.P., Wireless Co, LLC, APC PCS, LLC, Phillie Co, LLC, Sprint Communications Company L.P., Shenandoah Personal Communications, LLC and SprintCom, Inc, filed as Exhibit 10.2 to the Company's Current Report on Form 8-K, dated May 6, 2016.
10.32	Consent and Agreement, dated as of May 6, 2016, by and among Sprint Spectrum L.P., Wireless Co, LLC, APC PCS, LLC, Phillie Co, LLC, Sprint Communications Company L.P., Shenandoah Personal Communications, LLC and SprintCom, Inc. and CoBank, ACB, filed as Exhibit 10.3 to the Company's Current Report on Form 8-K, dated May 6, 2016.

10.33	Addendum XX to Sprint PCS Management Agreement dated as of March 9, 2017 by and among Sprint Spectrum L.P.; Sprint Communications Company, L.P.; SprintCom, Inc.; Horizon Personal Communications, LLC; and Shenandoah Personal Communications, LLC filed as Exhibit 10. 1 to the Company's Current Report on Form 8-K filed on March 15, 2017.
10.34	Addendum XXI to Sprint PCS Management Agreement dated as of February 1, 2018 by and among Sprint Spectrum L.P; Sprint Communications Company, L.P.; SprintCom, Inc.; and Shenandoah Personal Communications, LLC filed as Exhibit 10.1to the Company's Current Report on Form 8-K filed on February 5, 2018.
10.35	Expansion Agreement dated as of February 1, 2018 by and among Sprint Spectrum L.P.; SprintCom, Inc.; and Shenandoah Personal Communications, LLC filed as Exhibit 10.2 to the Company's Current Report on Form 8-K filed on February 5, 2018.
10.36	Credit Agreement dated as of November 9, 2018, by and among Shenandoah Telecommunications Company, certain of its subsidiaries, CoBank, ACB, as administrative agent, and the other lenders party thereto filed as Exhibit 10.1 to the Company's Current Report on Form 8-K, dated November 9, 2018.
*10.37	Form of Stock Option Awards for Executives under the 2014 Equity Incentive Plan.
*10.38	Form of Restricted Stock Unit Award for Executives under the 2014 Equity Incentive Plan.
*10.39	Form of Performance Share Unit Award for Executives under the 2014 Equity Incentive Plan.
*21	List of Subsidiaries.
*23.1	Consent of KPMG LLP, Independent Registered Public Accounting Firm.
*31.1	Certification of Chief Executive Officer pursuant to Rule 13a-14(a) under the Securities Exchange Act of 1934.
*31.2	Certification of Principal Financial Officer pursuant to Rule 13a-14(a) under the Securities Exchange Act of 1934.
*31.3	Certification of Principal Accounting Officer pursuant to Rule 13a-14(a) under the Securities Exchange Act of 1934.
**32	Certifications pursuant to Rule 13a-14(b) under the Securities Exchange Act of 1934 and 18 U.S.C. § 1350.
(101)	Formatted in XBRL (Extensible Business Reporting Language)

101.INS	XBRL Instance Document - the instance document does not appear in the interactive data filing because its XBRL tags are embedded within the Inline XBRL document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document
104	Cover Page Interactive Data File (embedded within the Inline XBRL document)

* Filed herewith
** This certification is deemed not filed for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (Exchange Act), or otherwise subject to the liability of that section, nor shall it be deemed incorporated by reference into any filing under the Securities Act of 1933, as amended (Securities Act), or the Exchange Act.

SIGNATURES

Pursuant to the requirements of Sections 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

SHENANDOAH TELECOMMUNICATIONS COMPANY

February 26, 2020	/S/ CHRISTOPHER E. FRENCH *Christopher E. French, President & Chief Executive Officer* *(Principal Executive Officer)*

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

/s/CHRISTOPHER E. FRENCH February 26, 2020 Christopher E. French	President & Chief Executive Officer, Director (Principal Executive Officer)
/s/JAMES J. VOLK February 26, 2020 James J. Volk	Senior Vice President – Chief Financial Officer (Principal Financial Officer)
/s/CHASE L. STOBBE February 26, 2020 Chase L. Stobbe	Vice President - Chief Accounting Officer (Principal Accounting Officer)
/s/THOMAS A. BECKETT February 26, 2020 Thomas A. Beckett	Director
/s/TRACY FITZSIMMONS February 26, 2020 Tracy Fitzsimmons	Director
/s/JOHN W. FLORA February 26, 2020 John W. Flora	Director
/s/ RICHARD L. KOONTZ, JR. February 26, 2020 Richard L. Koontz, Jr.	Director
/s/DALE S. LAM February 26, 2020 Dale S. Lam	Director
/s/KENNETH L. QUAGLIO February 26, 2020 Kenneth L. Quaglio	Director
/s/LEIGH ANN SCHULTZ February 26, 2020 Leigh Ann Schultz	Director

Exhibit 4.1

DESCRIPTION OF COMMON STOCK REGISTERED
UNDER SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934

The following description of the common stock, no par value (the "common stock"), of Shenandoah Telecommunications Company ("Shentel", the "Company", "we", "our", or "us") and the related provisions of the Company's Amended and Restated Articles of Incorporation (the "Articles"), the Company's Amended and Restated Bylaws (the "Bylaws") and applicable Virginia law is a summary. The summary does not purport to be complete and is entirely qualified by reference to the Articles, the Bylaws and applicable Virginia law. Copies of the Articles and Bylaws are filed as Exhibits 3.1 and 3.2, respectively, to the Company's Annual Report on Form 10-K to which this description is also an exhibit.

Authorized Capital Stock

Pursuant to the Articles, the Company is authorized to issue up to 96,000,000 shares of common stock.

The common stock is listed on the NASDAQ Global Select Market under the trading symbol "SHEN." All outstanding shares of our common stock are validly issued, fully paid and nonassessable.

Description of Common Stock

Dividend Rights

Holders of common stock are entitled to receive ratably those dividends, if any, as may be declared from time to time by the Board of Directors out of legally available funds.

Voting Rights

Each shareholder shall have one vote for each share of common stock standing in such shareholder's name on the books of the Company on the record date for such shareholder action.

Liquidation Rights

In the event of our liquidation, dissolution or winding up, holders of common stock will be entitled to share ratably in the net assets legally available for distribution to shareholders after the payment of all of our debts and other liabilities.

No Preemptive or Similar Rights

Holders of common stock have no preemptive or other subscription rights or rights to convert their shares of common stock into any other securities, and the common stock is not subject to any redemption or sinking fund provisions.

Anti-Takeover Provisions

Various provisions contained in the Articles, the Bylaws and Virginia law could delay, discourage or limit transactions involving an actual or potential change in control of the Company or change in its management, including transactions in which shareholders might otherwise receive a premium for their shares, or transactions that shareholders might otherwise deem to be in their best interests.

Articles and Bylaws.

Among other things, the Articles and Bylaws:

- divide the Board of Directors into three classes, as nearly equal in number as possible, with each class of directors serving for a term expiring at the third annual meeting following their election;
- provide that any vacancy occurring in the Board of Directors, including a vacancy resulting from an increase in the number of directors, may be filled by the affirmative vote of a majority of the remaining directors of the Board of Directors;
- provide that only the Chairman of the Board of Directors or a majority of the Board of Directors may call a special meeting of shareholders;
- require that shareholders seeking to present proposals before a meeting of shareholders or to nominate candidates for election as directors at a meeting of shareholders provide advance written notice in a timely manner, and also specify requirements as to the form and content of a shareholder's notice; and
- do not authorize cumulative voting in the election of directors.

Virginia Law

Affiliated Transactions Statute. The Company is subject to Article 14 of the Virginia Stock Corporation Act (the "VSCA"), a Virginia statute regulating "affiliated transactions." An affiliated transaction is generally defined as a merger, a share exchange, a material disposition of corporate assets not in the ordinary course of business, any dissolution of the corporation proposed by or on behalf of a holder of more than 10% of any class of the corporation's outstanding voting shares (a "10% holder") or any reclassification, including reverse stock splits, recapitalization or merger of the corporation with its subsidiaries, that increases the percentage of voting shares owned beneficially by a 10% holder by more than five percent. In general, these provisions prohibit a Virginia corporation from engaging in affiliated transactions with any 10% holder for a period of three years following the date that such person became a 10% holder unless (1) the board of directors of the corporation and the holders of two-thirds of the voting shares, other than the shares beneficially owned by the 10% holder, approve the affiliated transaction or (2) before the date the person became a 10% holder, the board of directors approved the transaction that resulted in the shareholder becoming a 10% holder. After three years, any such transaction must be at a "fair price," as described in the VSCA, or must be approved by a majority of the disinterested directors or the holders of two-thirds of the voting shares, other than the shares beneficially owned by the 10% holder.

Control Share Acquisitions Statute. Virginia law also contains provisions relating to "control share acquisitions," which are transactions causing the voting strength of any person acquiring beneficial ownership of shares of a Virginia public corporation to meet or exceed certain threshold percentages (20%, 33⅓% or 50%) of the total votes entitled to be cast for the election of directors. However, the Company has opted out of this Virginia anti-takeover law regulating control share acquisitions.

Transfer Agent and Registrar

The Company serves as the transfer agent and registrar for the common stock]

EXHIBIT 21 LIST OF SUBSIDIARIES

SHENANDOAH TELECOMMUNICATIONS COMPANY AND SUBSIDIARIES

The following are all significant subsidiaries of Shenandoah Telecommunications Company, and are organized in the Commonwealth of Virginia.

Shenandoah Telephone Company
Shenandoah Cable Television, LLC
Shentel Cable of Shenandoah County, LLC
Shenandoah Mobile, LLC
Shentel Communications, LLC
Shenandoah Personal Communications, LLC
Shentel Management Company

Exhibit 23.1

Consent of Independent Registered
Public Accounting Firm

The Board of Directors
Shenandoah Telecommunications Company:

We consent to the incorporation by reference in the registration statements on Form S-3D (No. 333-74297) and Form S-8 (Nos. 333-127342 and 333-196990) of Shenandoah Telecommunications Company of our reports dated February 26, 2020, with respect to the consolidated balance sheets of Shenandoah Telecommunications Company and subsidiaries as of December 31, 2019 and 2018, the related consolidated statements of comprehensive income, shareholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2019, and the related notes and financial statement schedule II - Valuation and Qualifying Accounts, and the effectiveness of internal control over financial reporting included as of December 31, 2019, which reports appear in the December 31, 2019 annual report on Form 10-K of Shenandoah Telecommunications Company.

Our report dated February 26, 2020, on the effectiveness of internal control over financial reporting as of December 31, 2019, expresses our opinion that Shenandoah Telecommunications Company and subsidiaries did not maintain effective internal control over financial reporting as of December 31, 2019, because of the effect of material weaknesses on the achievement of the objectives of the control criteria and contains an explanatory paragraph that states the following material weaknesses have been identified and included in management's assessment:

The Company's control environment was not effective, because it did not have a sufficient number of trained resources with expertise in technical accounting, internal control over financial reporting, and the design and implementation of information technology solutions. As a result, the Company was unable to maintain effective risk assessment and information and communication processes, placed excess reliance on third-party consultants, and did not have effective process-level control activities in the following areas:

- Property, plant, and equipment and depreciation expense
- Purchasing (current liabilities and operating expenses)
- Treasury (cash, debt, interest expense, derivatives, and benefit obligations)

Our report dated February 26, 2020, on the consolidated financial statements, contains an explanatory paragraph that refers to a change in the method of accounting for leases and a change in the method of accounting for revenue from contracts with customers.

/s/ KPMG LLP

McLean, VA
February 26, 2020

EXHIBIT 31.1

CERTIFICATION

I, Christopher E. French, certify that:

1. I have reviewed this annual report on Form 10-K of Shenandoah Telecommunications Company, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant’s other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e**))** and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

/S/ CHRISTOPHER E. FRENCH
Christopher E. French, President and Chief Executive Officer
(Principal Executive Officer)
Date: February 26, 2020

EXHIBIT 31.2

CERTIFICATION

I, James J. Volk, certify that:

1. I have reviewed this annual report on Form 10-K of Shenandoah Telecommunications Company, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/JAMES J. VOLK
James J. Volk, Senior Vice President – Chief Financial Officer
(Principal Financial Officer)
Date: February 26, 2020

EXHIBIT 31.3

CERTIFICATION

I, Chase L. Stobbe, certify that:

1. I have reviewed this annual report on Form 10-K of Shenandoah Telecommunications Company, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

/s/CHASE L. STOBBE
Chase L. Stobbe, Vice President - Chief Accounting Officer
(Principal Accounting Officer)
Date: February 26, 2020

EXHIBIT 32

Written Statement of Chief Executive Officer and Chief Financial Officer
Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002

Each of the undersigned, the President and Chief Executive Officer and the Senior Vice President - Chief Financial Officer, of Shenandoah Telecommunications Company (the "Company"), hereby certifies that, on the date hereof:

(1) The annual report on Form 10-K of the Company for the year ended December 31, 2019 filed on the date hereof with the Securities and Exchange Commission (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) Information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

/S/CHRISTOPHER E. FRENCH
Christopher E. French
President and Chief Executive Officer
(Principal Executive Officer)
February 26, 2020

/S/JAMES J. VOLK
James J. Volk
Senior Vice President – Chief Financial Officer
(Principal Fincncial Officer)
February 26, 2020

The foregoing certification is being furnished solely pursuant to Rule 13a-14(b) under the Securities Exchange Act of 1934 (the "Exchange Act") and 18 U.S.C. Section 1350 and is not being filed as part of the Report or as a separate disclosure document. This certification shall not be deemed "filed" for purposes of Section 18 of the Exchange Act or otherwise subject to liability under that section. This certification shall not be deemed to be incorporated by reference into any filing under the Securities Act of 1933 or the Exchange Act except to the extent this Exhibit 32 is expressly and specifically incorporated by reference in any such filing.