



Arlington Public Schools

Procurement Office
2110 Washington Blvd., Arlington, VA 22204 • Phone: (703) 228-6123 • Fax: (703) 841-0681
www.apsva.us

July 27, 2021

Via Email

Crown Castle Fiber LLC
Attn: Robert Bempohl
1220 Augusta Drive, Suite 600
Houston, TX 77057
robert.bempohl@crowncastle.com

Subject: E-Rate Internet Access – Contract 28FY16 Amendment No. 5

Dear Mr. Bempohl:

Attached is Amendment No. 5 to revise Exhibit B – Scope of Services to revise the Internet Services from 10GB to 40GB, and to revise Exhibit C – Fees for Services to add a line for 40GB Internet Services. All other terms and conditions shall remain unchanged.

Please indicate your acceptance by having an officer of your firm sign and return the acceptance portion attached. Upon receipt, this office will sign and execute the Amendment and return one copy to your office.

Sincerely,

Kimberly Young, CPPB
Senior Procurement Specialist

Enclosure



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Amendment No. 5

Subject: E-Rate Internet Access – Contract 28FY16 Amendment No. 5

Contractor:
Crown Castle Fiber LLC
Attn: Robert Bempohl
1220 Augusta Drive, Suite 600
Houston, TX 77057
robert.bempohl@crowncastle.com

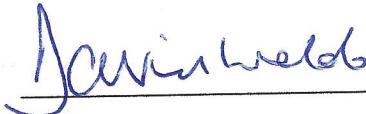
Contract:
28FY16

By mutual agreement, Contract No. 28FY16 is hereby amended to revise Exhibit B – Scope of Services to reflect 40GB Internet Services and to revise Exhibit C – Fees for Services to add line 3a. for 40GB Internet Services effective July 1, 2021, as well as, revising the name Washington and Lee to reflect Washington-Liberty at line 4. A revised Exhibit B – Scope of Services and Exhibit C – Fees for Services are attached with the changes reflected in red.

All other terms and conditions shall remain unchanged.

Arlington Public Schools

Authorized
Signature:

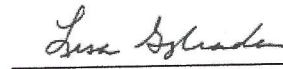


Printed Name: David J. Webb, C.P.M.
Procurement Director /
Title: Procurement Agent

Date: July 28, 2021

Crown Castle Fiber LLC

Authorized
Signature:



Printed Name: Lisa Gugliada
Associate General Counsel
Title: Deputy General Counsel - Fiber

Date: 1/27/2021

Contract 28FY16
Amendment No. 5

Scope of Services

Fiber Optic Connectivity

Lighttower's proposed network solution for Arlington Public Schools will interconnect multiple APS sites with the Equinix data center complex at Filigree Ct, Ashburn, VA. The Equinix data center complex on Filigree Ct. encompasses Equinix Data Centers #1, 2,4,5,6 & 11.

The two (2) APS sites to be connected will be:

- 1301 N. Stafford St., 2nd Floor, Arlington, VA 22201
- 2770 S Taylor St, Arlington VA 22206 (a.k.a. "The NOC")

The physical routes between each of these two APS sites to Equinix @Filigree have been designed to be mutually exclusive of each other (as depicted in logical Diagram) in order to increase the resiliency and reliability of the connection to Equinix.

Lighttower solution will provide Dark Fiber connections which are capable of simultaneously supporting at least 26 ITU-T G.694.1 channels.

The termination of the provided fiber-optic connections will be within the two APS data centers (at one end) and within the provided co-location space within Equinix (at the other). Lighttower will be the responsible for provisioning and maintaining all necessary Equinix interconnects required to extend the fiber-optic connections to the required termination points.

Lighttower will work with APS on additional or alternate termination points at some point in the future if needed.

Lighttower has provided monthly recurring cost for right of use, for each site connection:

- 1301 N. Stafford St., 2nd Floor, Arlington, VA 22201
- 2770 S Taylor St, Arlington VA 22206 --> Equinix @Filigree

Lighttower has attached its Dark Fiber Supplement form which targets reliability metrics for end-to-end continuity and reliability, including:

- Service Availability
- Time to Repair
- Service downtime policies and service level agreement (SLA), including refund or service credit policies for failure to meet targeted reliability and performance metrics.

Co-Location Services

Lighttower's proposed solution includes co-location services within the Equinix data center complex on Filigree Ct, Ashburn VA. which will house the termination points of the provided fiber-optic connections, as well as active networking equipment (e.g. switches, routers), service equipment (e.g. servers), and peering interconnects with other Equinix tenants.

Minimum Specifications:

- 30u of co-location rack space
- 2200VA persistent electrical power

Internet Services

Lighttower has provided cost for ~~10~~ 40 GB/s Tier-1 Internet Access. APS can work with Lighttower to upgrade bandwidth to 50GB over life of contract.

Minimum Specifications:

- Bandwidth will be the effective data rate, not merely the line speed.
- The Internet Access will be provisioned via a ~~10~~ 40 GB/s Ethernet based access port.
- Lighttower will be responsible for provisioning and maintaining all necessary Equinix interconnects required to provide the service.
- Lighttower will provide 254 routable IP address (/24 subnet), including DNS-PTR record delegation for the provided IP subnet, and advertise provided IP space over alternate ISP connections for the purposes of service reliability upon completion of standard IP justification form.
- Lighttower understands that we may be required to advertise (via BGP) other IP subnet routes controlled by APS either via Lighttower ASN or an ASN managed by APS.
- Lighttower is prepared to provide complete BGP routing table exchange with APS equipment.
- Lighttower will make adequate provisions to ensure that the provided Internet Access remains continually operational.
- Lighttower will make adequate provisions to ensure that the provided bandwidth is fully utilizable, within network areas under the contractor's management and control.
- Lighttower will provide APS with a customer portal for monitoring bandwidth and availability of the service (24x7x365).
- Lighttower will NOT monitor the content of the network traffic passed by the service, beyond what is necessary to provide the service.
- Lighttower will provide APS with open, unfiltered Internet access and will not administer any quality of service policies or otherwise interfere with data passed to and from APS in any form.

Lighttower has provided:

- Monthly recurring cost for ~~10~~ 40 Gb/s Internet Access
- Specifications of provided service
- Initialization costs.

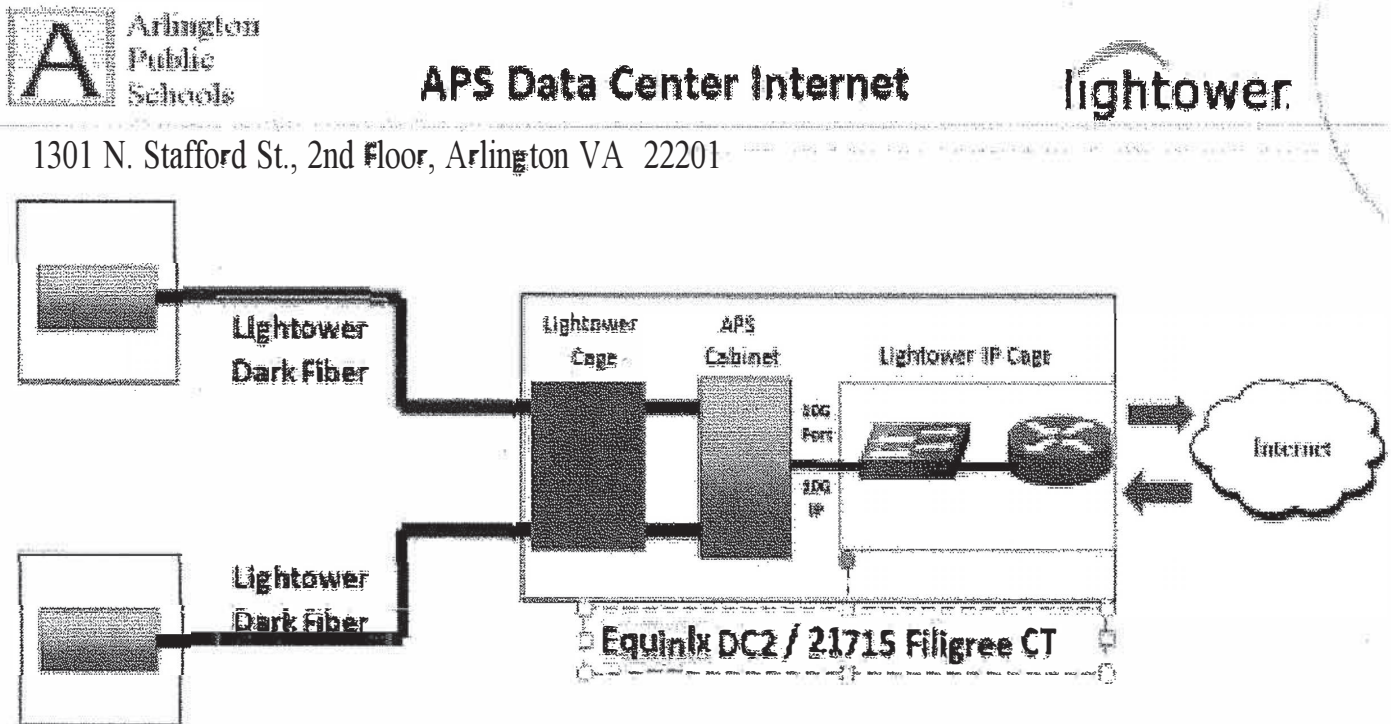
Lighttower has included its Internet Service supplement which includes target reliability and performance metrics for Internet Service, including:

- Service Availability/Uptime
- Packet Forwarding Latency
- Packet Forwarding Reliability
- Provide service downtime policies and service level agreement (SLA), including refund or service credit policies for failure to meet targeted reliability and performance metrics.

Fiber Relocation

Move a location of CID 103749-DF-ARTNVAQI-ASBNVACY from 1426 N. Quincy St., Arlington VA to Washington Lee High School, 1301 N. Stafford, 2nd Floor, Arlington VA 22207.

Logical Diagram



2770 South Taylor

- Lighttower dedicated dark fiber routes are geographically diverse from T30T N. Stafford St. and 2770 S Taylor to the APS provided presence within the Equinix Data Center.
- Lighttower is adding a 1 Gbps port for access to the Equinix Internet Exchange.
- Equinix Internet Exchange™ aggregates thousands of peering sessions onto a shared fabric, connecting peers at 19 Internet Exchange Point (IXP) locations in 17 global metro areas. The service lowers overall IP transit costs and delivers enhanced end-to-end network performance, speed, and reliability.

Project Management

Once an order has been placed Project Managers (PMs) are responsible for managing the delivery of services to Lightower customers. The PM role is comprised of four stages - Order Validation, Order Kickoff, Service Provisioning and Order Completion. The PM is the single point of contact from contract to service turn-up.

Project Managers (PMs) will:

- Coordinate and lead customer meetings, including customer kick-off calls and regularly scheduled customer status update calls.
- Manage the activities of internal Lightower operational and engineering groups to ensure proper planning, communications, and implementation of solutions.
- Communicate customer requirements to other project stake holders to achieve required results.
- Perform critical path analysis for projects to identify, and manage all aspects of the service deployment and mitigate identified risks.
- Develop a relationship with the customer and serve as the primary point of contact for project status and deliverables.
- Resolve issues in a timely fashion as they present themselves during the project interval.
- Upon project completion insure project documents are complete, accurate, and archived appropriately. Deliver all required customer turn-up documentation to identified point of contact.

Account Management

Lightower will provide Arlington Public Schools with a dedicated account team that will support the newly proposed solution from Point of Sale and through Implementation.

- Senior VP of Sales- Douglas Turtz
- Director of Sales – Matt Johns
- Senior Account Executive- John Hogan
- VP of Complex Solutions – Chris Williams
- Complex Solutions Engineer- Andre Rivera
- VP Sales Engineering- Massimo Cardarelli
- VP of Client Services- Michael Nicolosi
- Sales Engineer – Frank Nejako
- Director, E-Rate and Government – Anthony Rasco

NOC Support

NOC Main # - 888-LT-Fiber (888-583-4237)

#	Title	Name	Email	Office #	Cell #
1 st	NOC Technician	On Duty / On Call	Please Call	Main Number Above	N/A
2 nd	Shift Supervisor	On Duty / On Call	Please Call	Main Number Above	N/A
3 rd	Sr. Manager of NCC	Miles O'Shaughnessy	MOShaughnessy@lighttower.com	631-300-3781	631-774-2412
4 th	Director of NCC	Stephen George	SGeorge@lighttower.com	978-264-9370	781-254-8795
5 th	Vice President of Network Assurance	Ravindra Harcharan	RHarcharan@lighttower.com	212-337-4088	917-217-1136
6 th	Chief Operations Officer	Jason Campbell	JCampbell@lighttower.com	978-264-6033	

Lighttower Fiber Networks has two Network Operations Centers that are geographically diverse and act as full service centers for all network services throughout the regions that Lighttower serves. Lighttower has attached its detailed NOC overview presentation to this response.

In addition to the two physical, active-active NOC locations, each of our NOC personnel is equipped for virtual support. This means that via a secure VPN connection to the Lighttower Network they can access the necessary tools to monitor the network. As such, they can handle calls and track tickets to resolutions even when remote. Lighttower's regional offices are also equipped to support additional staff in the event of an emergency with direct access to all systems and applications.

Lighttower Business Continuity

Today, there are many steps already being taken and actions defined within Lighttower's standard operating policies and procedures that serve or act as business continuity guidelines.

- Diversity in Network Operations Centers from a systems and connectivity perspective, as well as geography.
- All NOC systems are supported by secondary power supplies, both UPS and generator.
- All NOC technicians are equipped with full remote secure logins and voice capability for remote access in all regions to perform their duties and responsibilities.
- Each region maintains maintenance spares depot for all core equipment technology hardware deployed within the network and region. Lessens our dependency on the manufacturer and decreases MTTR (mean time to repair).
- Operations team has a clear escalation and call-out policy and plan that is updated and reviewed weekly to determine coverage and back-up requirements.
- Emergency call-out agreements with retainer fees are established with prime vendors in all regions for support of the physical plant. This includes spare components and fiber cable to handle any network impact.
- All network equipment configurations are backed up and archived to facilitate immediate restoration in the event of network element failure.
- Establish a crisis conference bridge for all updates and information sharing during any event.

Customer Portal

The Lighttower Fiber Networks Customer Center is an online portal that provides access to information about your Accounts, Orders, Services, Support Tickets, and your Lighttower points of contact.

The Lighttower Customer Center has been upgraded with a number of new services and features to better serve our customers. Features in the current version of Lighttower's Customer Center include:

Feature	Feature Details
Billing	View or download current and past invoices in PDF format
Services	Get a quick inventory of current services and service status
Orders	View the status of pending or past orders
Support	View open or past support tickets and create new tickets
Lighttower Points of Contact	Contact your assigned Lighttower Account Team <ul style="list-style-type: none">• Account Executive• Client Services Manager• Project Manager delivering new services• Network Management Center• Billing Department

Response Highlights

HIGHLIGHT	YES/NO	COMMENTS
100% Owned Fiber	YES	All fiber spans/routes included in the Lightower response are owned and maintained by Lightower. There will be no 3rd party fiber providers or subcontractors included in this network design.
Dedicated Project Team	YES	Lightower will provide a dedicated Project Management team that will assist Arlington Public Schools from start to completion if, providing timely updates throughout the deployment of the new Network.
Implemented Networks of Similar Scope	YES	Lightower has deployed and is currently managing several large enterprise customers of similar size and scope.

Exhibit C

Fees for Services (Revised Amendment No. 5)

FEES FOR CONTRACT #28FY16 – E-RATE INTERNET ACCESS SERVICES

Name: Bob Bermppohl

Address: 1220 Augusta Drive, Suite 600, Houston TX 77057

Phone: 703-434-8439

Facsimile: 703-434-8510

SERVICE REQUESTED	Monthly recurring cost for right of use for each site connection: From Date of APS Acceptance through June 30, 2016 2022*	Initialization Cost	Initialization: Number of Business Days Following Receipt of Purchase Order	TOTAL COSTS:
<u>1. FIBER OPTIC CONNECTIVITY*</u>				
1301 N. Stafford, 2 nd Floor, Arlington, VA 22201 ->Equinix @ Filigree	\$2,400.00	\$0.00	Estimated 75	\$2,400.00
2770 S. Taylor St., Arlington, VA 22206 ->Equinix @ Filigree	3,260.00	\$0.00	Estimated 75	\$3,260.00
				\$5,660.00
SERVICE REQUESTED	Monthly recurring cost From Date of APS Acceptance through June 30, 2016 2022*	Initialization Cost	Initialization: Number of Business Days Following Receipt of Purchase Order	TOTAL COSTS:
<u>2. CO-LOCATION SERVICES*</u>	\$1,806.00	\$0.00	Estimated 75	\$1,806.00
SERVICE REQUESTED	Monthly recurring cost for 10GB /Tier – 1 from Date of APS Acceptance through June 30, 2016 2021*	Initialization Cost	Initialization: Number of Business Days Following Receipt of Purchase Order	TOTAL COSTS:
<u>3. INTERNET SERVICES*</u> Per Scope of Services	\$18,819.00	\$0.00	Estimated 75	\$18,819.00
SERVICE REQUESTED	Monthly recurring cost for 40GB /Tier – 1 from July 1, 2021 through June 30, 2022*	Initialization Cost	Initialization: Number of Business Days Following Receipt of Purchase Order	
<u>3a. INTERNET SERVICES*</u> Per Scope of Services	\$24,000	\$0.00	Estimated 75	

SERVICE REQUESTED	One-time cost for 10GB/Tier July 1, 2019 through June 30, 2020	Initialization Cost	Initialization: Number of Business Days Following Receipt of Purchase Order	TOTAL COSTS:
4. Move a location of CID 103749-DF-ARTNVACY From 1426 N. Quincy St., Arlington VA 22201 to Washington-Liberty and Lee HS 1301 N. Stafford, 2 nd Floor, Arlington VA 22201.	\$19,250.00			\$19,250.00
GRAND TOTAL PRICE				\$45,535.00

- Crown Castle is including the three (3) Equinix Cross-Connects ~~required for our solution in our pricing quoted above~~ (1 for each dark fiber connection and 1 for the internet at Equinix Ashburn). APS will incur a \$332.00 monthly recurring charge for any future applications requiring Cross-Connects at Equinix Ashburn.
- ~~Pricing above is based on APS awarding services 1, 2 & 3 to Crown Castle.~~

~~**~~Monthly recurring cost is to include all applicable fees, taxes, charges, etc.