

Bay Springs Telephone Company, Inc.

Smith County, MS Community Broadband NTIA Project

Request for Proposal

Engineering services on a fiber construction project

Response: Technical inquiries and specification clarifications are due by 4 PM on September 30, 2022, to Lisa Wigington at LisaW@tec.com. All inquiries must be in writing. Responses will be provided to all known respondents. Respondents are not entitled to rely on any verbal clarification or response from anyone in connection with this RFP. Respondents must have professional engineering license in the state of Mississippi and experience with National Telecommunications and Information Administration (NTIA) projects. Final RFP due by October 14, 2022.

Description of Project: The Smith County Community Broadband Project Phase 2 proposed funded service area covers approximately 132 square miles of rural Smith county in central Mississippi. This project will bring approximately 126 miles of core fiber to some of the most rural areas of Mississippi and make high speed broadband available to approximately 1,029 locations through fiber to the home technology.

Detailed Description of Existing Operations: Standards based, RUS approved, technology is used, and the network has been constructed using RUS standard construction practices. BST currently has 131 remote concentrators (Adtran TA5000) positioned throughout its network. BST is serving all of these remotes with fiber to the node (FTTN).

Each central office and remote has been upgraded beginning in 2019 and through the 2021 budget cycle as unfunded. The access equipment has already been upgraded to take the network from 1 GB core to 10 GB on all fiber fed COTs and remote upgrades were ongoing in 2020 and 2021. Approximately 97% of the census blocks included in the serving area are utilizing the existing copper plant. Utilizing ADSL2+ and VDSL2 technology in the remotes, this copper plant is being bonded, where there is enough copper available, to provide 25.0/3.0 broadband service up to 8,000 feet of the remote concentrators. Each serving remote has been constructed with carrier grade DC power plants and batteries with at least 8 hours of backup in the event of a long-term power outage. All sites are monitored by remote alarm systems and alarms are responded to 24X7 by on-call and network operations center (NOC) personnel. If the commercial power were to be affected for an even longer period, TEC can provide longer-term temporary power via fixed or portable generators as necessary. A detailed disaster recovery plan is on file and updated annually.

Approximately 3% of the census blocks included inside the service area are being served by a fiber to the home network design. The equipment strategy for any expansion project is to leverage existing fiber and continue it to deploy a Gigabit Passive Optical Network (GPON) Fiber to the Home (FTTH) solution using the Adtran TA5000 platform. Customers served via GPON have access to an aggregate of 2.4 Gbps bandwidth in the downstream direction and 1.2 Gbps upstream from the Optical Network Terminal (ONT) at their home through distributed optical splitters to the serving remote Optical Line Terminal (OLT).

This GPON capacity will easily scale to provide Gigabit service for these customers. However, if more bandwidth were to be required, NG-PON2 or XGS-PON at 10 Gbps or Point to Point 10 Gbps connections or higher could be deployed on an as-needed basis over the proposed Fiber optic cable.

Latency within the proposed Adtran FTTH equipment ranges from microseconds to around 3-5ms, depending on location and distance from the master node.

The middle mile architecture for this project will utilize high-capacity transport rings and redundant link aggregation interfaces for a highly scalable and redundant network. The network will utilize a redundant 100 Gbps (scalable to higher speed on some links and lower on others) transport ring comprised of carrier grade ADTRAN and Cisco Ethernet aggregation switches (or equivalent) with full layer 2.5 and MPLS capabilities. Each optical light terminal is connected in a redundant fashion to different parts of the transport ring(s). Redundant core routers, in physically diverse locations, will provide the paths out of the local and middle mile network to the external IXP network. This diverse and redundant pathing of the transport to the interexchange points delivers a robust network that will ensure maximum uptime and minimal latency.

The middle mile / backhaul architecture leverages existing networks, using primarily a Layer 2 architecture. All transport is fiber-based. In the access aggregation portion of the network, individual 10 to 100 Gbps links are aggregated using 802.1ax Link Aggregation and G.8032 Ethernet Ring Protection Switching (ERPS) to interconnect the RTs and connect them to the core network. 100G transport links connect the access rings to the LecNet headend in Jackson, MS. A centralized network operations center (NOC) is located in Jackson, MS and operated by a TEC subsidiary, LecNet. TEC has 100 GB redundant transport routes from the company to the NOC. TEC's Internet peering connections and routers are monitored by the NOC personnel and two upstream providers, Cogent and AT&T, to ensure redundancy and adequate bandwidth and IP addresses are available to our broadband customers. TEC also peers at 350 East Cermak (Chicago) and 56 Marietta (Atlanta) via multiple CSpire 10 Gbps transit links. Additionally, TEC hosts Netflix and Akamai caching servers at the NOC in order to minimize streaming congestion on the network. In total, TEC has 50 Gbps of internet transport and transit bandwidth, with the ability to scale it higher as bandwidth usage grows. This network facilitates excellent response times across the network with minimal latency.

Detailed description of the proposed project: The strategy for this expansion project is to leverage existing fiber and continue building a network using a fiber to the home architecture utilizing passive optical networking (PON) technology and topology. The fiber plant will be designed to provide a fiber for every location passed and engineered for a 32:1 split ratio with ample spare fiber for growth in the area. The network equipment deployed will be the ADTRAN TA5000 with dual-function GPON/XGS-PON line cards, which will allow cost-effective deployment of GPON (2.5G) today while allowing a seamless overlay of XGS-PON (10G) as needed in the future.

BST intends to provide Gigabit performance services utilizing GPON and XGS-PON technologies over fiber at the end of the project construction in 2022. GPON (ITU-T standard G.984) is capable of subscriber speeds of 1Gbps symmetrical, while XGS-PON (ITU-T Recommendation G.9807.1) is capable of subscriber speeds of 10 Gbps symmetrical.

The build out timeline and turn up of customers is a one-year period for this project. This proposed design will deploy single mode fiber optic cables constructed utilizing RUS approved construction techniques. The Smith County Community Broadband Project is projected to be 75% aerial and 25% underground fiber

construction. Aerial fiber construction will utilize existing poles under a current pole attachment agreement with the local electric cooperative in the proposed service area.

Buried or bored fiber will be placed in existing previously disturbed public rights-of-ways. To provide a more secure reliable fiber footprint all the buried fiber will be placed at a minimum depth of 36 inches unless other depths are required by the affected highway, railroad, municipalities, or other authorities. The two methods of underground construction that will be utilized are predominately plowing with a 1.25" pipe for fiber and directional boring utilized when road or stream or other types of crossings are required. Directional boring will also be utilized when it is not possible to plow or boring is more feasible construction. Along the buried fiber route, flush-mounted handholes will be deployed with the proposed fiber being accessible at each location. This will allow for easy access to the network and makes future expansions more economical and feasible.

Network Diagrams: Attached for review – Exhibit A

Engineering Categories and Descriptions: Vendor needs to provide engineering services for fiber project. Response should include detailed projections of hours, rates and estimated expenses related to each of the categories presented in Exhibit B, as well as a not to exceed number for the entire project.

Request for Proposal - Bid Sheet				
Bay Springs Telephone Company, Inc.				
Smith County Community Broadband Project				
RFP Submitter:				
Contact:				
Contact e-mail & phone:				
ENGINEERING SERVICE CATEGORY	HOURS	AVERAGE RATE	ESTIMATED EXPENSES	TOTAL NOT TO EXCEED
Project Design				
Assistance to Owner				
Coordination				
Central Office Equipment Engineering Services				
Outside Plant Staking Services				
Outside Plant Contract Document Phase Engineering Services				
Outside Plant Construction Phase				
Totals				

Deliverables:

1. Will comply with any requirements as pertaining to a RUS 217 contract.
2. Staking sheets complete with service addresses and GPS of all locations passed.
 - a. Address list should contain notations of inhabitable/noninhabitable, residential / business / church.
 - b. Engineering firm will secure all ROW as required.
 - c. Staking sheets will also indicate the existing ROW and any known obstacles to construction along with proposed construction route. It will also indicate manner of proposed construction along with estimate of construction cost. Will determine best side for construction depending on these factors.
 - d. Staking sheets will include any pertinent information needed for the construction corridor to complete any and all permit requirements, and for construction drawings.
 - e. Staking sheets will be generated using GPS information for such items as centerline, ROW, driveways, culverts, poles if aerial construction, with suggested attachment heights.
 - f. Training contractor on environmental requirements.

3. Permits and Environmental requirements.
 - a. Permits and correspondence with environmental agencies to confirm requirements. Provide all required maps, applications and any other documents needed to be submitted with permits.
 - b. Assist with any environmental studies or finding experts to perform studies as needed.
 - c. Secure all permits for local, county, state, forestry, wetlands, railroads that maybe required in a timely manner as to meet construction schedules.
4. Plans and Specs
 - a. Will create Plans and Specs and review with Owner. Including any legend requirements and identification.
 - b. Will secure proper documentation from contractors to meets RUS Community Connect requirements.
 - c. Will provide owner with tally of units for materials to be used for construction with enough time to place orders and keep on schedules.
 - d. Bid ready plans and specs packet with required RUS contract completed.
 - e. Provide bid packages to all prospective bidders.
 - f. Management of the bid process for fiber contractors.
5. Project management and resident engineer.
 - a. All construction activity will be supervised by an on-site engineer to ensure RUS standards of construction and compliance with environmental regulations.
 - b. Training contractor on environmental requirements.
 - c. Will conduct any pre-bid meetings, and preconstruction meetings as needed.
 - d. Will provide adequate inspection to confirm construction units and quantities.
 - e. Will ensure all restoration is completed and generate any restoration punch lists as needed.
 - f. Will review tests results and notify owner and contractor of any concerns or failures to meet standards.
 - g. Does not include drop fiber, which will be constructed as services are sold and will be monitored by local employees.
 - h. Will provide weekly progress reports construction and track all non-construction days due to weather.
 - i. Bi-weekly calls with company and RUS GFRs to review updates and timelines for the project.
 - j. Test results from completed fiber construction.
6. Cut sheets and as-built maps in Auto-CAD format.
 - a. Cutsheets will be created for fiber and copper connections as needed.
 - b. Cutsheets will be labeled as to identify all cables and equipment with appropriate naming system utilized by Owner.
 - c. Will also include depth profiles for buried, as needed.
 - d. As-builts will be provided in a geospatial format to be usable by the owner for any mapping systems they are utilizing.

Engineering Service Category	Description
PROJECT DESIGN, ASSISTANCE AND COORDINATION	
Project Design	
Hours: _____ Average Rate: _____ Estimated Expenses: _____ Total Not to Exceed for Category: _____	<p>The Project shall be constructed in accordance with the current Loan Design, Project Schedule (if developed), and Borrower’s Environmental Report. Such Loan Design shall be based on the latest applicable criteria as specified by the Owner and the Administrator.</p> <p>When necessary for the preparation of plans and specifications, the Engineer shall, upon request of the Owner and with the approval of the Administrator: (1) revise as necessary the Loan Design and Borrower’s Environmental Report; (2) prepare or revise as necessary the outside plant design; (3) make measurements and analyses of existing traffic; (4) make tests of existing cable, including the determination of field locations for treatment of existing facilities associated with installation of carrier equipment; and (5) submit the resulting Loan Design and Borrower’s Environmental Report to the Owner in a format suitable for approval by the Administrator.</p> <p>If, after the approval of the Loan Design and Borrower’s Environmental Report, or plans and specifications by the Owner and the Administrator, it shall be determined by the Owner that any change is required, the Engineer shall prepare such revisions in the Loan Design, Borrower’s Environmental Report, and plans and specifications, or any part thereof, as is necessitated by the changes in requirements for service, design criteria, or other reasons arising during the performance of services for the Project.</p>
Assistance to Owner	
Hours: _____ Average Rate: _____ Estimated Expenses: _____ Total Not to Exceed for Category: _____	<p>The Engineer, to the extent requested by the Owner, shall assist in the Owner’s obtaining agreements and authorizations required for the Project, including without limitation the furnishing of engineering information and drawings, and participating in the Owner’s obtaining:</p> <ul style="list-style-type: none"> A. Toll, EAS, operator assistance, special services and other connecting company commitments; B. Joint use or joint occupancy agreements with other utilities; C. Permits for crossing public roads, railroads, navigable streams or bodies of water; D. Right-of-way authorizations, easements, and other permits necessary for encroachment on public or private lands; E. Authorizations from regulatory bodies and franchises from public bodies; and F. Environmental studies and clearances.
Coordination	
Hours: _____ Average Rate: _____ Estimated Expenses: _____ Total Not to Exceed for Category: _____	<p>The Engineer, to the extent requested by the Owner, shall coordinate the work of others engaged in the Project, including work performed or supervised by the Owner, architect, and other engineers, to facilitate expeditious and economical completion of the Project. Services pursuant to this section shall be in addition to, and shall not include, services required by other provisions of this Agreement.</p>
CENTRAL OFFICE EQUIPMENT ENGINEERING SERVICES	
Hours: _____ Average Rate: _____	<p>Review of Requirements. Prior to the preparation of plans and specifications, the Engineer shall review with the Owner the current and future requirements of the Project, in respect to central office equipment additions, replacements, modifications or completely new offices. The Engineer, to the extent requested by the Owner, shall prepare such studies as the Owner may require supporting the selection by the Owner of the final design plan.</p>

<p>Estimated Expenses:</p> <hr/> <p>Total Not to Exceed for Category:</p> <hr/>	<p>Plans and Specifications and Contracts.</p> <p>A. <i>Preparation of Plans and Specifications.</i> Plans and specifications shall be prepared by the Engineer in accordance with standard NTIA specifications and requirements for central office equipment and shall be submitted to the Owner in a format suitable for approval by the Administrator.</p> <p>B. <i>Bidders Qualifications.</i> The Engineer shall review with the Owner all Bidder qualifications and shall prepare and furnish to the qualified bidders the plans and specifications upon the conditions provided in the applicable standard NTIA contract forms and in accordance with 7 CFR Part 1753.</p> <p>C. <i>Bid or Proposal.</i> The Engineer shall be available to each prospective bidder for consultation with respect to the details of the plans and specifications and all other matters pertaining to the preparation of the proposals for the supply of equipment or services. Therefore, all changes to or clarifications of the plans and specifications provided to one prospective bidder shall be provided by the Engineer in writing to all other prospective bidders and to the Owner.</p> <p>The Engineer shall attend and supervise all technical prebid review meetings and openings of quotes for the furnishing of equipment or services therefor. Where additions to existing equipment are proposed, a quote may be solicited from the original supplier or separate materials and installation contracts may be requested from several suppliers. The Engineer shall carefully check all quotes received and shall render to the Owner assistance in connection with the Owner’s consideration of the quotes received so that contracts may be prudently and properly awarded.</p> <p>The Engineer shall submit in writing to the Owner recommendations of first and second choice of bidders stating the reasons therefor, or, if the analysis of quotes indicates that no quote is satisfactory because of prices or other conditions, the Engineer shall recommend to the Owner that all quotes be rejected, giving reasons therefor. Unless otherwise directed by the Owner, the Engineer shall proceed in respect to rebidding in the manner provided for herein for the initial bidding.</p> <p>D. <i>Award of Contract.</i> The Engineer shall prepare and furnish to the Owner three (3) copies of a detailed tabulation of all the bids or quotes and a tabulation showing the bidders’ names and totals. The Owner shall submit to the Administrator the bidding information required for approval of the award of the contract by the Administrator. Upon receipt of notice from the Owner of the Administrator’s approval of the award of the contract, the Engineer shall prepare contracts in accordance with 7 CFR Part 1753.</p> <p>E. <i>Contract Amendments.</i> If, after the equipment contract and the installation contract have been approved by the Owner and the Administrator, it shall be determined by the Owner that any change or changes in the plans and specifications are advisable, the Engineer shall prepare and submit a contract amendment in accordance with 7 CFR Part 1753.</p> <p>F. <i>Customer Information and Engineering Meeting.</i> If necessary, the Engineer shall arrange, at a mutually agreeable time, a Customer Information and Engineering Meeting with the Owner, Contractor and Engineer to review the Contractor’s proposal, equipment lists, software, data requirements, translation requirements, etc. prior to beginning of manufacture.</p> <p>G. <i>Compliance.</i> The Engineer shall review all equipment lists, manufacturer’s drawings, and other data submitted by the Contractor, to determine apparent compliance of such lists, drawings and other data with the approved contract. This shall not relieve the Contractor of its obligation to meet the performance specifications of the contract.</p> <p>H. <i>Pre-Installation Meeting.</i> The Engineer shall arrange at a mutually agreeable time, a pre-</p>
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	<p>installation meeting between the Contractor, Owner and Engineer, after the Contractor’s installer has arrived at the contract site, to clarify areas of responsibility, check scheduling and to determine the Contractor’s proposed compliance with the plans and specifications.</p> <p>I. <i>Progress Reports.</i> A competent representative of the Engineer shall make periodic visits to the equipment installation site to inspect the progress and quality of the executed work and to determine, in general, if the work is proceeding in accordance with the contract. The Engineer shall report at least monthly to the Owner in writing stating the results of Inspections. When the Engineer observes any failure of the executed work or work in progress to comply with the requirements of the contract, this shall be reported to the Owner immediately. These reports shall include suitable recommendations. If the engineer observes an unsafe practice, his only responsibility shall be to consult immediately with the Contractor and if his concerns are not satisfied, to notify the Owner immediately.</p> <p>Tests. The Engineer shall conduct, or cause to be conducted by the installer, such tests of all such equipment as required by the Owner and the Administrator to determine that the equipment meets the performance requirements of the plans and specifications. The Engineer shall make recommendations for the correction of performance or operational difficulties. All cases of performance or operational difficulties due to faulty installation or defective equipment shall be reported to the Contractor, for correction. When the corrections have been made, the Engineer shall retest the equipment. The Engineer shall furnish test equipment, when required, for all required tests or measurements performed by the Engineer.</p> <p>The Owner and a representative of the Administrator will normally conduct a final inspection of completed construction. When requested by the Owner, a qualified representative of the Engineer shall be present.</p> <p>Final Documents. The Engineer shall prepare or cause to be prepared, and shall submit to the Owner for approval, in a format suitable for approval by the Administrator, complete and detailed final documents as specified in 7 CFR 1753 and a statement showing the total amounts due the Contractor, pursuant to the terms of the contract, including any amendments thereto. The final documents shall be submitted for the Owner’s approval within forty (40) calendar days after the completion of construction based on the date on the certificate of completion covered by each central office equipment contract and each installation contract.</p>
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OUTSIDE PLANT STAKING SERVICES

<p>Hours: _____</p> <p>Average Rate: _____</p> <p>Estimated Expenses: _____</p> <p>Total Not to Exceed for Category: _____</p>	<p>Review of Requirements. Prior to the commencement of staking, the Engineer shall review with the Owner the current requirements of the Project with respect to outside plant and service entrance staking. At this review, decisions shall be reached concerning public and private rights-of-way, nominal width of construction corridors, and design status.</p> <p>Staking Requirements.</p> <p>A. <i>General.</i></p> <ol style="list-style-type: none"> 1. Staking for aerial plant shall include locating the proposed line and marking all new pole and other locations as necessary to construct the facilities. 2. Staking for buried plant shall include locating the proposed facilities indicating all pertinent construction information including details of the construction corridor. 3. Staking for underground plant shall include locating conduit systems, construction corridors, marking manhole sites and detailing all other pertinent information. 4. Staking for service entrances shall include locating protectors on the structure, the routing of aerial or buried entrances and the placement of markers, if required, to indicate construction information. <p>B. <i>Commencement.</i> The Engineer, with the approval of the Owner, shall determine when staking of the Project shall begin. The Engineer shall not commence staking in any area of the Project until the Owner has:</p>
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1. Either (a) stated in writing that right-of-way authorizations and easements reasonably required therefor have been procured, or (b) directed the Engineer in writing to perform right-of-way procurement under section 2, paragraph D, of RUS Form 217a - Project Design, Assistance, and Coordination;
2. Identified to the Engineer, by map locations, which line segments shall be staked on public right-of-way and which line segments shall be staked on privately owned right-of-way; and
3. Provided information to the Engineer pertaining to limitations on width of construction corridors for each such line segment.

The Owner shall review with the Engineer, and shall inform the Engineer, which specific lines are to be staked. The Owner shall furnish to the Engineer a current list of all existing and potential subscribers by map location and grade of service for whom service is to be furnished.

When requested by the Engineer, the Owner shall also furnish the telephone numbers of the existing subscribers. In determining when to proceed with staking, farming operations and other relevant conditions shall be taken into consideration so as to minimize the need for restaking. The Owner, when requested by the Engineer, shall furnish a qualified person to accompany each staking crew for the purpose of negotiating with landowners or tenants with respect to such right-of-way authorizations and easements, widths of construction corridors, and locations of proposed facilities.

C. *Changes.*

1. If, during the progress of staking by the Engineer, the Owner shall change the routing or location of a particular line segment, the Owner shall as early as practicable, notify the Engineer in writing of such changes. Upon such notice the Engineer shall duly note such change and instruct the staking crews accordingly. The same procedure shall be followed for changes made in type or quantity of facilities during the staking phase of the Project.
2. If during the process of staking, the Engineer determines that the routing of facilities along the right-of-way designated by the Owner would result in high costs of placement due to obstacles, inadequate construction corridors, or other circumstances, the Engineer shall notify the Owner and recommend alternative routing. If alternative routing is approved by the Owner and right-of-way can be obtained, the Engineer shall arrange to stake the facilities along the alternate route.

D. *Time of Staking.*

1. The Engineer shall proceed diligently with staking and continue therewith in such a manner that, prior to the release of plans and specifications to bidders, the staking of all outside plant facilities except service entrances shall be complete in order that the plans and specifications shall be complete and accurate.
2. If service entrances are included in the construction contract, staking of the service entrances shall be completed prior to beginning of construction in a Work Sector. If such staking is being performed by the Owner, the Engineer shall keep the Owner advised of the status of construction and the Owner shall do the staking in a timely manner.
3. The Engineer shall perform all restaking made necessary by changes discussed under paragraph C of section 2, above, as necessary to minimize delays in construction.

E. *Manner of Staking.* The staking shall be done in a thorough and workmanlike manner such that construction can be completed in accordance with the latest revision of the *National Electrical Safety Code, National Electric Code*, local and State laws, rules, regulations and

orders of regulatory bodies having jurisdiction; and the Loan Design, Borrower's Environmental Report, and specifications approved by the Owner and the Administrator. The Engineer shall in no case stake lines other than those shown in the approved Loan Design except for minor re-routing and minor changes dictated by field conditions, unless such change shall have been previously approved by the Owner and the Administrator. The Engineer shall replace all markers lost or removed prior to or during construction of the Project. All costs, including costs of markers, equipment, and other materials used in connection with the staking, shall be borne by the Engineer. All markers and existing poles shall be properly identified with corresponding listing on the construction sheets. Where it is probable that the Contractor or the Owner will have difficulty in locating markers, the Engineer shall provide some other suitable means to identify the location. When staking service entrances, the Engineer shall give due consideration to the location of the station protector (or network interface device if it incorporates a station protector) in relation to the availability of adequate grounding and the length of the service drop and station wiring.

F. *Construction Sheets.* The Engineer shall prepare or maintain construction sheets in such standard form as the Owner shall require (and as hereinafter described) to: serve as the means by which directions are given for the construction of the Project; serve as the permanent plant record by the Owner's facilities as built; and identify adequately the geographical location of the facilities, including non-standard construction corridors and cable placement locations. The Engineer shall enter thereon all pertinent and useful design, specifications and data governing the construction of the Project, including, without limitations:

1. Detailed instructions on the point of attachment of the Owner's facilities on existing pole lines employed in joint use with others;
2. Non-standard depths for installing buried and underground facilities;
3. The presence, but not location of, buried facilities of other utilities when known;
4. The presence of rock when known;
5. Vegetation clearing requirements; and
6. Surface type and surface features of terrain if appropriate.

Copies of construction sheets shall be made available for sale to all prospective bidders in advance of the pre-bid conference. For contract construction five counterparts of the construction sheets shall be supplied by the Engineer to the Contractor for construction use and two copies shall be supplied to the Owner. For force account construction three copies of the construction sheets shall be supplied to the Owner. When revisions in staking are necessary, the Engineer shall issue copies of the revised construction sheets.

G. *Resident.* A Resident, with full authority to act for the Engineer per this attachment, shall be maintained by the Engineer at the site of the Project at all times when staking or other services required under this attachment are being performed at the site of this Project. The Resident may also be engaged in staking as well as in supervising the staking activities of other staking crews of the Engineer. The Engineer shall establish and maintain, in the proximity of the Project, a field office with telephone service at all times when staking or other services required under this RUS Form 217e are in progress.

H. *Reporting.* The Engineer shall prepare, execute, and submit to the Owner (insert frequency of reporting - minimal monthly) all estimates, certificates, reports and other documents required to be executed by the Engineer pursuant to the loan contract.

I. *Joint Use or Joint Occupancy.* In connection with staking of joint use or joint occupancy facilities the Engineer shall:

1. Prepare and submit to the Owner for approval, detailed information on pole changes, additional poles, and other changes or additions required in existing facilities of other parties to joint use or joint occupancy agreements to accommodate the Owner's

	<p>facilities; and</p> <p>2. Coordinate engineering activities under direction of the Owner with other parties to joint use or joint occupancy agreements.</p> <p>J. The Engineer with the approval of the Owner shall have the option of performing staking on the project under the circumstances described below on a time and expense basis consistent with Table 2 of this Agreement.</p> <p>1. Less than 10 miles of buried or aerial plant,</p> <p>2. Emergency restoral of service, or</p> <p>3. Natural disasters.</p>
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OUTSIDE PLANT CONTRACT DOCUMENT PHASE ENGINEERING SERVICES

<p>Hours: _____</p> <p>Average Rate: _____</p> <p>Estimated Expenses: _____</p> <p>Total Not to Exceed for Category: _____</p>	<p>Review of Requirements. The Engineer shall use the Loan Design and other information furnished by the Owner under this Agreement as the basis for the preparation of the plans and specifications. Prior to the beginning of the preparation of the plans and specifications, the Engineer shall review with the Owner all data furnished to determine the most recent requirements for facilities to be included in the plans and specifications.</p> <p>Map Tracings and Other Data. Prior to and during the preparation of the plans and specifications by the Engineer, the Owner, if it has not previously done so by other provisions of this Agreement, shall furnish any of the following items needed by the Engineer:</p> <p>A. Up-to-date tracings of the detail and town maps of the area of the proposed system on which the Loan Design was based and which show the existing system, and a tracing of the key map when a key map is required by the Owner;</p> <p>B. Up-to-date cable schematics (cable plant layout), and construction sheets showing the existing system construction;</p> <p>C. Up-to-date line and station data on existing subscribers;</p> <p>D. The Loan Design and Borrower’s Environmental Report on which the loan was based;</p> <p>E. Current information as to the location and extent of electric and other lines available for joint use, together with conformed copies of all existing joint use or joint occupancy agreements covering such lines;</p> <p>F. Current listing of existing, signed, and potential subscribers by map location and grade of service to be considered in the preparation of the plans and specifications. The list of existing subscribers shall be properly referenced to the line and station data;</p> <p>G. Detailed lists of materials on hand, or on order, which are to be furnished by the Owner in the construction of the Project, together with the quantity and value of each item of such materials; and</p> <p>H. A written statement setting forth the scope of plans and specifications and the sequence in which the construction shall be performed and whether service entrances are to be included in the plans and specifications.</p> <p>The map tracings, schematics, and construction sheets are to be of suitable material capable of allowing corrections to be made of the information shown thereon and capable of being reproduced.</p> <p>Schematics, Assignments, and Cut Sheets.</p> <p>A. <i>Cable Schematics.</i> The Engineer shall prepare cable schematics in such form as the Owner shall require to: (a) serve as a means by which directions are given for connecting feeder cable and</p>
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distribution cable pairs, cross-connection terminals, connecting load coils, and such other directions as may be necessary for properly splicing the feeder cables, distribution cables and other facilities being installed; (b) serve as the permanent circuit assignment record of the Owner's cable and wire facilities; and (c) adequately identify the physical location of all equipment, devices and connections other than services, associated with the pairs of such feeder cable and distribution cable facilities.

- B. *Circuit and Number Assignments.* If requested by the Owner, the Engineer shall prepare telephone number assignments and shall identify the circuit to which the service is to be connected for station installations, including without limitation such information with respect to central office equipment connections as may be required.
- C. *Cut Sheets.* Where modification of existing lines is to be performed, the Engineer shall furnish in such form as the Owner shall require complete and detailed information, collectively known as "Cut Sheets" for: (a) making such changes in circuit connections in the existing outside plant as may be required, including without limitation all associated devices such as load coils, terminals, and temporary connections; (b) making such changes in telephone number assignments and service connections as may be required, including without limitations, the corresponding connection changes required at the central office end; and (c) designating the sequence to be followed in making such changes.

Outside Plant Plans and Specifications and Contracts.

- A. *Plans and Specifications.* The Engineer shall, to the extent not previously prepared under other provisions of this Agreement, prepare and review with the Owner complete and detailed plans and specifications, drawings, maps and other documents required for the construction of the outside plant facilities to be included as a part of the Project. During the preparation of the plans and specifications, the Engineer shall make such changes in the plans and specifications as may be reasonably required by the Owner as a condition of approval by the Owner and Administrator.
- B. *Content of Plans and Specifications.* The plans and specifications for outside plant shall be prepared in sufficient time to allow normal completion of construction of the outside plant to coincide with the established service dates and shall include the following:
 - 1. One copy of the key map of the system, when a tracing is furnished by the Owner.
 - 2. One copy (or more if necessary, for clarity) of the central office area detail maps (sometimes referred to as exchange detail maps) and town maps of the system, on which there shall be indicated the following:
 - a. Location of lines to be constructed, indicating joint use or joint occupancy lines;
 - b. Location of switching centers and pair-gain devices;
 - c. Location of existing lines included as part of the proposed system and modification of such lines;
 - d. Location of existing lines to be retired;
 - e. Locations other than service entrances, where right-of-way has not been obtained;
 - f. Work Sectors indicating sequence of construction;
 - 3. Complete drawings of each type of non-standard NTIA unit covering the construction and the materials to be used.
 - 4. An estimate of quantities of the various units of construction.
 - 5. A complete cable plant layout and cable schematics, when applicable, for each central

office area as prepared pursuant to paragraph A of section 3.

6. If the Project contains requirements for installation of underground conduit, manholes and associated appurtenances, the Engineer, during the preparation of the plans and specifications, shall secure field data necessary for the proper design of such facilities (including plan and profile data, if required, and detail construction drawings, including cable to be installed), and shall proceed with the preparation of detailed plans and specifications for the construction of such facilities. Such drawings and specifications, when completed, shall be added to, and made a part of, the construction plans and specifications.
7. An itemized list of materials on hand or on order to be furnished by the Owner, showing the locations of delivery points and delivery schedules of such materials, the quantity, unit price and extended price.
8. The form of the contract to be entered into between a Contractor and the Owner for the construction of the outside plant, including forms of notice and instructions to bidders, Contractor's proposal, materials and construction specifications, Contractor's bond, description of assembly units and construction drawings.

Note: Plans and specifications for outside plant facilities to be constructed under a force account proposal do not require Items 7 and 8, above.

C. *Contracts.*

1. Upon receipt of notice by the Engineer from the Owner of the Administrator's approval of the plans and specifications, the Engineer shall, unless otherwise instructed by the Owner, with the approval of the Administrator, proceed to take all usual and customary actions, including compliance with the procedures set forth herein and in 7 CFR Part 1753, to facilitate full, free, and competitive bidding for the award of contracts.
2. Notices to Bidders shall be sent in accordance with Subpart F of 7 CFR Part 1753. The Engineer shall then review with the Owner and the Owner shall approve the qualifications of bidders who replied to the notice, as a condition of release of bid documents to any such bidder. The Engineer shall prepare and furnish to such qualified bidders the appropriate bid documents including construction sheets, and the plans and specifications upon the conditions provided in the applicable standard NTIA contract forms. The construction sheets shall be furnished upon payment of reasonable charges. The Engineer shall also prepare and furnish, upon payment of reasonable charges, to material suppliers requesting them, copies of the Contractor's proposal sheets for outside plant together with any special drawings or material specifications pertaining thereto and a list of materials to be furnished by the Owner.
3. The Engineer shall conduct a Pre-Bid Conference in accordance with Subpart F of 7 CFR Part 1753 and shall be available to each prospective bidder for consultation with respect to the details of the plans and specifications and all other matters pertaining to the preparation of the proposals for the construction, or the supply of materials and equipment or services therefor. All changes to or clarifications of the plans and specifications provided to one prospective bidder shall be provided in writing to all other prospective bidders and to the Owner.
4. The Engineer shall attend and supervise all openings of bids for the construction, or for the furnishing of materials and equipment or services therefor. The Owner shall return unopened bids received from Bidders not previously qualified under paragraph C2 of this section. In the event that bids are received from less than three (3) qualified bidders, the bids shall remain unopened and the Owner shall notify the Administrator thereof immediately. If directed by the Owner, the Engineer shall proceed in respect of the rebidding, in the manner provided for herein for the initial bidding. The Engineer shall check the assembly unit prices and summarize of all bids received. The Engineer shall render to the Owner assistance in connection with the Owner's consideration of

	<p>the bids received so that contracts may be prudently and properly awarded. The Engineer shall submit to the Owner a written recommendation for award of the contract or rejection of all bids stating the reasons therefor.</p> <p>5. The Engineer shall prepare and furnish to the Owner three (3) copies of the detailed proposal sheets or a detailed tabulation of the low bid, and a tabulation showing the names and totals of all bids. The Owner shall submit to the Administrator the bidding information for approval by the Administrator of the award of the contract. Upon receipt of notice from the Owner of the Administrator's approval of the award of the contract, the Engineer shall prepare three (3) counterparts of the construction contract to be executed by the Owner and the successful bidder and the Owner shall forward such executed counterparts to the Administrator for approval.</p> <p>6. If, after the construction contract has been approved by the Owner and the Administrator, it shall be determined by the Owner that any changes in the plans and specifications are advisable, the Engineer shall prepare and submit a contract amendment in accordance with 7 CFR Part 1753.</p>
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OUTSIDE PLANT CONSTRUCTION PHASE

<p>Hours: _____</p> <p>Average Rate: _____</p> <p>Estimated Expenses: _____</p> <p>Total Not to Exceed for Category: _____</p>	<p>Construction Phase.</p> <p>A. <i>General.</i> As engineering representative of the Owner, and in accordance with sound and accepted engineering practices, the Engineer: (1) shall provide Construction Administration and Inspection services; (2) shall assist the Owner in obtaining the expeditious and economical construction of the Project in accordance with the approved plans and specifications, the terms of the construction contract or force account proposal, and 7 CFR Part 1753; and (3) shall have and exercise sole responsibility for the issuance of supplemental directives to the Contractor regarding the Contractor's performance in accordance with the terms of the construction contract as approved by the Owner and the Administrator. The Engineer's undertaking hereunder shall not relieve the Contractor of the Contractor's obligation to perform the work in conformity with the plans and specifications and in a workmanlike manner and shall not impose upon the Engineer any obligation to see that the work is performed in a safe manner. The Engineer shall not be responsible for the failure of the Contractor to perform the work in accordance with the contract or to perform the work in a safe workmanlike manner. In fulfilling the above responsibility, the Engineer shall as necessary:</p> <ol style="list-style-type: none"> 1. Interpret the plans and specifications and convey such interpretation to the Contractor; 2. Inspect the progress of and quality of construction, in sufficient detail to provide reasonable assurance to the Owner of the adequacy of such progress and quality of construction, pursuant to the requirements of the plans and specifications and contract; 3. Confirm the acceptability of materials and equipment proposed by the Contractor to be utilized in the construction prior to the use of such materials or equipment on the Project and promptly reject materials and equipment not in compliance with the plans and specifications; and 4. Inspect the manner of incorporation of the materials and equipment into the Project, and the workmanship with which such materials and equipment are incorporated and reject materials, equipment and workmanship which the Engineer determines will not be in compliance with the plans and specifications. Such Inspection shall be deemed to be adequate if a reasonable percentage of all routine construction units (other than units requiring detailed inspection) are observed at the time of installation and found free of error. <p>The above enumeration of specific requirements shall not limit the general undertakings of the Engineer to perform services set forth in the first sentence of paragraph A of this section. The obligations of the Engineer hereunder are for the benefit of only the Owner and the Administrator and shall not relieve the Contractor of any of its own responsibilities under its contract with the Owner.</p>
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B. *Residents and Inspectors.*

1. A Resident with full authority to act for the Engineer shall be maintained by the Engineer at the site of the Project at all times during the entire period of scheduled construction (including times when the Resident is available and through no fault of the Engineer scheduled construction is not performed, and including times when corrective work is being performed) unless specifically directed otherwise by the Owner with the approval of the Administrator. A Resident shall be necessary for each outside plant construction contract.
2. If, at any time during construction, a Resident, or Inspector, is not required at the Project site, or such personnel are not available because of other responsibilities on the Project, the Engineer shall assign a Resident and/or Inspector on an intermittent basis, to effect necessary observations of construction during any critical phase of such construction.
3. If the Engineer determines that particular components of the work or particular circumstances during construction require the presence of a specialized representative of the Engineer, such as an architect, structural engineer, design engineer or other specialist for the purpose of interpreting contract requirements, or performing special inspections or tests to facilitate compliance by the Contractor with the plans and specifications and terms of the construction contract, the Engineer with prior approval of the Owner shall assign such personnel to the Project site.
4. The Engineer shall maintain at the site of the Project and under the direct supervision of the Resident a sufficient number of qualified Inspectors, to fully discharge the responsibility of the Engineer pursuant to paragraph A of this section (including times when such assigned Inspectors are available and through no fault of the Engineer scheduled construction is not performed). The number of Inspectors so required will vary with the size of the Project, the number of construction crews, and the speed of construction.
5. The number of Residents and Inspectors required by the Engineer for a routine construction schedule for this Project to effect completion within the allowed number of scheduled “working days” is as follows:
 - a. _____(_____) Residents(s);
 - b. _____(_____) Inspectors(s);

In the event conditions should arise, through no fault of and beyond control of the Engineer, which would require the placement by the Engineer of additional Inspectors (or Residents) on the Project, to accommodate special needs of the Owner (or Contractor, with approval of the Owner), then, with the approval of the Owner prior to their assignment to the Project, the Engineer shall assign such additional qualified personnel to the Project for the limited time of such requirements.

- C. *Pre-Construction Conference.* A competent representative from the office of the Engineer, and the Resident (or Residents) to be assigned to the Project, shall conduct the outside plant pre-construction conference. The detailed notes taken by the Engineer on items discussed shall be furnished to all parties. Such notes shall be used by the Resident, as applicable, in interpreting the plans and specifications pursuant to paragraph A1 of this section.
- D. *Project Office.* The Engineer shall establish and maintain a field office, with telephone service, in the proximity of the Project when construction is in progress and shall notify the Owner of the address and telephone number of such field office. Any notices, instructions or communications delivered to such field office shall be deemed to have been delivered to the Engineer.

- E. *Defective Construction.* If the construction is by contract, the Engineer shall notify the Contractor in writing of all observed or otherwise determined defects in workmanship or materials in accordance with the terms of the construction contract. If the construction is by force account, the Engineer shall advise the Owner relative to the correction of such defects.
- F. *Joint Use or Joint Occupancy.* In connection with all joint use or joint occupancy construction, the Engineer shall:
1. Coordinate construction activities for the Owner with the designated representative of other parties to joint use or joint occupancy agreements;
 2. Review for the Owner all changes proposed by other parties to joint use or joint occupancy agreements for changes in and additions to their existing pole lines under such agreements and submit to the Owner recommendations thereon.
- G. *Tests.* The Engineer shall conduct, or cause to be conducted, such tests of circuits and equipment as required by the Owner and the Administrator to determine compliance with the performance requirements of the plans and specifications. The Engineer shall make recommendations in writing for the correction of defective materials, workmanship, or equipment. All cases of transmission or operational difficulties due to faulty construction or defective materials or equipment in the Project shall be reported in writing to the Contractor for correction if the construction is by contract or to the Owner if construction is by force account. When the corrections have been made, the circuits and equipment shall again be tested. The Engineer shall furnish test equipment as required for performing all required tests or measurements.

The outside plant tests to be made on this Project are noted in the table below:

Description of Test or Measurements	Test or Measurements		Will perform or participate in performing tests	
	Subscriber Loop Plant	Trunk Plant	Owner	Engineer
C.O. Ground Measurement				X
Copper Shield or Shield/Armor Continuity	X	X		X
Conductor Continuity	X	X		X
Shield or Armor Ground Resistance	X	X		X
Conductor Insulation Resistance	X	X		X
DC Loop Resistance				
DC Loop Resistance Unbalance				
VF Insertion Loss				
Loop Measurements (Loop Checking)				
Two-Person Structural Return Loss				
One-Person Open Circuit Measurements				
Cable Insertion Loss at Carrier Frequency				
Fiber Armor Continuity	X	X		X
Fiber Optic Splice Loss - Field	X	X		X
Fiber Optic Splice Loss - C. O.	X	X		X
End-to End Attenuation	X	X		X
End-to End Fiber Signature	X	X		

As appropriate, complete the table using these symbols:

- X - These are standard tests and measurements required on facilities as desired by the owner or required by the Administrator.
- * - These tests will not be required if the distribution pairs are not cross-connected to feeder pairs at the time of acceptance testing.

N/A - Not Applicable

H. *Connecting Companies.* The Engineer shall coordinate all engineering and construction activities with connecting companies and shall notify the Owner when the Project, or a section thereof, shall be ready to be placed in service. After giving such notice, the Engineer shall, when directed to do so by the Owner, cause the Project, or such section thereof as may be ready, to be placed in service.

I. *Reporting.* The Engineer shall prepare, execute and submit to the Owner (insert frequency of reporting - minimal monthly) all estimates, certificates, reports, and other documents required to be executed by the Engineer pursuant to a construction contract, a force account proposal, or the 7 CFR Part 1753. The Engineer shall review and, if satisfactory, recommend for approval each periodic estimate submitted by contractors prior to approval and payment by the Owner. Such recommendations shall include a statement by the Engineer based on the Engineer's Inspection of executed work and the progress of the work and subject to evaluation and testing of the work as a completed Project, that all construction for which payment is requested has been completed and cleaned up in accordance with the terms of the construction contract and that all defective construction of which the Contractor shall have received fifteen (15) or more days written notice, has been corrected.

The Engineer shall maintain a cumulative inventory of all units of construction incorporated in the Project, showing unit prices and extended totals, for all such units of construction. When it appears that the previously approved contract total is likely to be exceeded, the Engineer shall immediately notify the Owner in a format suitable for notifying the Administrator. When requested by the Owner or when the "Overrun" results in 20% above the contract total, the Engineer shall prepare a contract amendment in accordance with 7 CFR Part 1753 for execution by the Parties to the construction contract, to cover the additions or changes in construction units that are resulting in such "Overrun".

J. *Final Inspection.* The Owner and a representative of the Administrator will normally conduct a final inspection of completed construction. When requested by the Owner, a qualified representative of the Engineer shall be present.

Final Documents.

A. *Contract Construction.* If the Project or any portion thereof shall be constructed pursuant to a construction contract, the Engineer shall prepare and submit to the Owner complete and detailed final documents as specified in 7 CFR 1753 and a statement of all amounts payable by the Owner under the construction contract. The final documents shall be in a format suitable for approval by the Owner and subsequent submission to the Administrator for approval. These final documents shall be submitted to the Owner within forty-five (45) calendar days after the completion of construction based on the date shown on the certificate of completion covered by each contract.

B. *Force Account Construction.* If the Project or any portion thereof shall be constructed by force account:

1. Within thirty (30) calendar days after completion of construction of the Project, the Owner shall furnish to the Engineer the following data:
 - a. The cost of all materials used in construction of the Project;
 - b. Cost of right-of-way clearing (direct labor costs);
 - c. All direct labor costs chargeable to construction exclusive of the right-of-way clearing; and
 - d. A list of all items of overhead cost applicable to the construction of the Project, but excluding the cost of engineering, legal, accounting and other professional services, interest during construction and preliminary survey charges.

2. Within forty-five (45) calendar days after the completion of construction of the Project, the engineer shall prepare and submit to the Owner for approval complete and detailed final documents in such form as the Administrator may prescribe, including without limitation, a final inventory of construction and a final inventory of retirements. The final documents shall contain the labor and material unit costs based on data supplied by the Owner.

C. *Number of Copies.* Copies of final documents shall be furnished in accordance with 7 CFR Part 1753.

Plant Records.

A. *Prior to Cutover.* If the Owner shall have notified the Engineer not later than ten (10) days prior to of the start of construction in a central office area that the Owner elects to assign to the Engineer the preparation of any of the following plant records, the Engineer shall prepare and deliver these records to the Owner, not later than fifteen (15) calendar days prior to the start of Cutover of each central office area included as a part of the Project. These records cover the Cutover work on facilities completed as of the date of delivery of such records for each such area. The following records shall be in such form as the Owner, with the approval of the Administrator, may prescribe:

1. Cable schematics, corrected to show “as constructed” conditions of that portion of the Project as of such date;
2. Cable records data, for completed line segments as of such date;
3. Line and station data for completed line segments as of such date; and
4. Terminal assignment records.

B. *After Cutover.* The Engineer shall deliver to the Owner, within thirty (30) calendar days after Cutover of facilities in any completed exchange area or completed section of the Project, the record drawings of the following plant records covering such Project area (excluding any of such records that the Owner has previously elected to prepare with its own forces):

1. Cable schematics, corrected to show “as constructed” conditions of such Project area;
2. Cable record data, for all construction completed in such Project area;
3. Line and station records for all lines completed in such Project area as a part of the Project;
4. Final maps, showing record drawings facilities completed in such Project area; and
5. Final complete and detailed construction sheets, showing facilities completed in such Project area, including the designation of assembly units of existing plant retained in place along existing plant lines segments on which modification work was performed as a part of the Project.