**ATTACHMENT A**

**SOLICITATION NO. 0900000503**

This Solicitation is a Contract Document and is a request for proposal in connection with the Contract awarded by the Office of Management and Enterprise Services as more particularly described below. Any defined term used herein but not defined herein shall have the meaning ascribed in the General Terms or other Contract Document.

**PURPOSE**

The Contract is awarded as a statewide contract on behalf of The State of Oklahoma Office of Management and Enterprise Services (OMES), Central Purchasing Division on behalf of Information Services Division (ISD), for qualified Suppliers for Inside/Outside Plant services as well as Emergency restoration services. Services include: Outside Plant, Inside Plant, Emergency Restoration and Tower Services

**1.** **Contract Term and Renewal Options**

The initial Contract term, which begins on the effective date of the Contract, is one year and there are four [4] one-year options to renew the Contract.

**2.** Certain Contract requirements and terms are set forth below as Exhibit 1.

**EXHIBIT**

For the purposes of this solicitation the state is broken into several areas and categories of service.

Areas include:

1. South Central Region including Oklahoma City
2. Northeast Region including Tulsa
3. North Central Region
4. Northwest Region
5. Southwest Region
6. Southeast Region

Services include: Outside Plant, Inside Plant, Emergency Restoration and Tower Services

The State is interested in a cabling partner using Leviton products that can handle all aspects of the States’ network needs and can provide services statewide however Suppliers may bid on a region or all regions. The State reserves the right to award to more than one Supplier if it is determined to be in the best interest of the State.

OMES historical sales represent sales to State Agencies, Oklahoma K-12, Higher Education, Tribal, and other affiliated entities. Oklahoma fiscal year runs July 1 through June 30th.

|  |  |  |  |
| --- | --- | --- | --- |
| FY19 | FY20 | FY21 to date | Total |
| $6,574,834.25 | $6,454,110.48 | $4,296,119.12 | $17,322,063.85 |

2.1. **Mandatory Qualifications**

2.1.1. The Supplier’s actual staff assigned to perform under this contract shall be certified and be fully familiar and trained to install, maintain, and move telecommunication systems. Each Supplier shall provide a list of the telecommunications systems on which they are certified to work.

2.1.2. The Supplier shall have proven documented experience in new cable installation, renovation, removal, termination and testing, splicing standard for aerial and underground telecommunication cable (copper), fiber optic cable, and phone/data system installations.

2.1.3. The Supplier shall provide copies of licenses and training certificates on all technicians who will be performing services under this contract.

2.1.4. The Supplier shall identify by category, the actual technicians available for use; and the maximum and minimum number of technicians available for the following categories:

* Telecommunication Cable installers
* Fiber Optic Cable Installer
* Telecommunication and Fiber Optic Cable Terminators and Testers
* Customer-owned outside Plant designer, manager, and Installer
* Telephone Technicians
* Paging Systems Installers

2.1.5. Licenses and certificates shall be kept current. The Supplier shall provide OMES with an annual update to the list of technicians and copies of their licenses and certifications.

2.1.6. The Supplier shall maintain adequate personnel to maintain multiple projects in each of the areas a bid has been awarded as deemed necessary by the State.

2.1.7. Suppliers shall provide proof that they are currently licensed to do business in the State of Oklahoma. A copy of each license or permit shall accompany the Supplier’s RFP reply for each area on which they are bidding. Should any permits over and above the general Supplier’s building permit be required, the Supplier is responsible for obtaining said permits and paying all fees associated with said permits.

2.1.8. License and Permits pertaining to assigned State projects (right-of-way etc.) will be obtained by the State authority having jurisdiction. If requested, the Supplier may obtain these items which in-turn can be detailed in the submitted estimate/quote.

**2.2. Outside Plant Requirements**

2.2.1. Outside plant suppliers shall meet ownership or long term lease requirements for the following equipment and tools. Suppliers shall submit to the State of Oklahoma Office of Management and Enterprise Services/ISD proof of ownership or lease of vehicles and heavy machines listed below with bid response. Proof of ownership can be a bill of sale or a copy of a long term lease agreement. If needed, Contractor will furnish make, model and specifications on said equipment prior to bid opening.

2.2.2. One (1) or more Trenchers (Capable of a 48 in. Minimum depth)

2.2.3. Two (2) or more backhoes

2.2.4. One (1) or more Air or Hydro Vacuum Evacuation Truck(s)

2.2.5. Metal cutting and welding equipment to alter, remove, or repair damage to pipeline conduit without damaging poly fiber inside pipe;

2.2.6. Concrete saws, air hammers and other such tools capable of cutting or removing concrete and asphalt roadways, drives, parking lots, etc.

2.2.7. One (1) Plowing Cat (The State requires 48” depth or greater)

2.2.8. One (1) Directional Boring Machine (capable of boring 2000+ft. in a single bore)

2.2.9. One (1) Directional Boring Machines (capable of boring 1000 to 1500 ft in a single bore).

2.2.10. The contractor shall have available resources and adequate equipment to handle all cable installation and relocation. It is a mandatory requirement the contractor possess (own or have available through long term lease), at a minimum the following types of tools, test equipment, and construction equipment, and make available a list and visual inspection at any time of all equipment by State personnel.

2.2.11. Test equipment capable of measuring and certifying current standards for Category 5e, Category 6 and 6a copper cables and provide printable test reports. When future Standards become available, equipment shall be able to be upgraded.

2.2.12. Adequate equipment capable of splicing aerial and direct buried copper and fiber cable(s).

2.2.13. Two (2) or more Fiber Connector Terminating/Polishing Kits.

2.2.14. Fusion splicing equipment (Two (2) or more for single fibers for fiber optic cable to include; and test equipment capable of measurement of loss in each individual splice, end to end attenuation and OTDR (Optical Time – Domain Reflectometer) signature traces (minimum of One (1) or more OTDR’s).

2.2.15. The selected contractor shall be completely responsible for the equipment listed above. The lack of, or failure of equipment shall not be acceptable reason for non-completion of projects. Specialized equipment shall be identified at the start of the project with any associated cost or fees.

2.2.16. Tower climbers on sight must be able to show proof of (competent climber, rescue training, high angle rescue is a plus). Crew on site must provide a OSHA safety and rescue plan at all times. Safety rescue kit must be at the base of the climbing site at all times, clean dry and serviceable.

**2.3. Inside Plant Requirements**

2.3.1. The contractor shall have available resources and adequate equipment to handle all cable installation and relocation. It is a mandatory requirement the contractor possess (own or have available through long term lease), at a minimum, the following types of tools, test equipment and construction equipment. Contractor shall make available to State personnel a list for visual inspection at any time.

2.3.2. Test equipment capable of measuring and certifying current standards for Category 5e, Category 6 and 6a copper cables and provide printable test reports. When future Standards become available, equipment shall be able to be upgraded. Adequate equipment capable of splicing fiber and copper cables.

2.3.3. Two (2) or more Fiber Connector Terminating/Polishing Kits.

2.3.4. Fusion splicing equipment (one (1)) or more for single fibers, and test equipment capable of measurement of loss in each individual splice, end to end attenuation and OTDR signature traces (minimum of One (1) or more OTDR’s).

2.3.5. The selected contractor shall be completely responsible for the equipment listed above. The lack of, or failure of equipment shall not be acceptable reason for non-completion of projects. Specialized equipment shall be identified at the start of the project with any associated cost or fees.

**2.4. Specification Requirements:**

2.4.1. BICSI - Training

The State of Oklahoma has adopted Building Industry Consulting Service International (BICSI) Methodology of Telecommunication design, installation and repair. As outlined in this RFP these standards and methods are industrial non-Supplier specific.

The selected Supplier will provide the State with proof of qualified BICSI designers and technicians on staff within 90 days of selection. After the first year, all Supplier team leads shall have current BICSI certification and provide proof. This level shall be maintained throughout the life of the contract. The project designer and a minimum of one (1) technician for inside plant and outside plant installation shall possess a Registered Communications Distribution

Designer (RCDD) or Installer Certification. These individuals will be ultimately responsible for State projects as assigned.

Should the RCDD assigned to State projects change during the life of this contract, the new RCDD assigned shall also submit prove of certification. Certificates of Certification shall be submitted at least 30 days prior to the first year contract renewal date. The Supplier will be responsible for all fees and expenses associated with this training and certification.

2.4.2. Telecommunication System Training

All telephone technicians shall be trained and equipped to certify Category 5e, 6, 6a or higher computer wiring.

2.5. **SCOPE OF WORK**

2.5.1. Areas of Work

This RFP will consist of three distinct areas of responsibility and support. Each area below will be administered by the Office of Management and Enterprise Services. The areas are: Inside Plant, Outside Plant, Emergency Restoration

2.5.2. Customer-Owned Outside Plant Installation and Repair

One of the purposes and objectives of this scope of work reflects the planned installation and maintenance of ANSI/TIA/EIA Standards compliant outside plant cabling systems or components thereof at any State of Oklahoma, statewide, owned facility or facility under the authority of the State. This may include County or City offices which are authorized under State Statute as being part of respective Agencies. The basic concept is primarily (planned) support encompassing the installation and maintenance of State Owned Outside plant facilities. This effort will support voice, data, video and other low-voltage control services as deemed necessary for the transmission of information between State of Oklahoma Agencies and users.

2.5.3. Customer-Owned Inside Plant Installation and Repair

The State of Oklahoma Office of Management and Enterprise Services provides internal installation of telecommunication services and support for State Agencies throughout Oklahoma. This service includes, and is not limited to, voice and data intra-building cable installation, repair, testing, and removal; customer-owned private branch exchange (PBX) systems installation, removal, relocation including moves, adds, and changes of end units; and customer owned voice/data components to include fiber optic reconfiguration and repair throughout all areas of the State. The selected Supplier(s) shall be required to support these services with installation labor, equipment and/or components. The Supplier(s) may be required to respond to projects in adjacent areas of responsibility.

In order to fulfill the Office of Management and Enterprise Services service mandate, Inside Plant consists of three geographic areas of responsibility. Supplier(s) may submit their bid in response to each geographic area identified. A supplier does not have to bid on all areas. More than one Supplier may be selected to service each geographic area.

The geographic areas are:

(1) Oklahoma City (See Note) (2) Tulsa (3) Oklahoma Statewide (excluding the areas identified above)

Each city service area is considered from the center of the city to the city limits or a 30 mile radius from the center of the city, whichever is greater. Supplier(s) responses should consider mileage fees within each recognized area.

Note: The Oklahoma City Area includes the Capitol Telecommunication System.

2.5.3.1. Capitol Telecommunication System - Oklahoma City Area Only

In addition to the above requirements for installation support, the selected Supplier shall provide qualified telephone technicians to service the Capitol Complex Telephone System, its associated remotes and peripheral equipment. Areas of responsibility and support include: the Capitol, Department of Public Safety, the Oklahoma University Health Sciences, and 4545 North Lincoln Complexes and other locations within 5 miles of the state capitol. The technicians shall be qualified and prepared to provide technical labor to install, service, test, and place in service various types of telephone instruments, cables, wires, electronic station apparatus, jacks, etc. The technicians will be assigned to the State of Oklahoma Office of Management and Enterprise Services Information Services Division. They will be assigned installation projects which will vary in size and duration.

All technicians are expected to be skilled in the installation of telephone station apparatus, computer wiring, computer wire testing and certification. Unless otherwise specified, computer wiring will require BICSI Installer or Technician certification and documentation. No junior technicians or trainees will be accepted for Capitol Telecommunication System assignment. Supervision of the contractor’s technicians will be the responsibility of the contractor. Overall management and scheduling of the jobs within the Capitol Telecommunication System will be under the direction and control of the OMES Information Services Division.

2.5.4. Emergency Restoration

In the event of a telecommunication service interruption (caused by the severing of connected cabling) to any state owned facility provisioned by State of Oklahoma Agencies, the Supplier will affect repairs as specified in the following requirements. Restoration and repairs include damages to voice and data systems to include Acts of God or any disruption of service to any supported State or County owned Agency or Facility. These facilities entail the repair of services involving outside plant, intra-building, and inter-building copper, fiber optic, and coax cabling to include their associated equipment, electronic components, manholes, huts, poles and any additional mechanisms identified as necessary for the operations of the State’s Telecommunication Network.

This shall be an on-call type contract with installation or repair services starting with a call from OMES/ISD for emergency repairs.

The Contractor project manager shall respond within 15 minutes of notification of an emergency repair request. Response or resolution can be made either verbally or in writing. Upon notification, the Contractor shall be on site within two (2) hours. OMES/ISD will determine if and when an emergency repair is declared. If time permits (as determined by OMES/ISD) a project package may be requested.

The contractor shall be able to respond to all requirements with equipment, tools, and manpower on location within four (4) hours or less of the notification.

Upon notification through OMES/ISD, the Supplier is required to provide the necessary qualified repair technicians, material and equipment in the time specified. The Supplier will contact the Office of Management and Enterprise Services/ISD for final coordination and identification of restoration upon completion.

Additionally, OMES/ISD provides internal telecommunication services for State Agencies throughout the State of Oklahoma. These services include but are not limited to voice and data intra-building cable installation, repair, and testing throughout all areas of the State. The selected Supplier(s) may be required to supply emergency support of this service with installation material, and equipment.

2.5.5. Overall Intent

The overall purpose and intent of this contract will be to support State entities as identified with installation and repair services equal to, or below, average competitive rates. Suppliers of this contract should prepare a separate reply for each scope of work.

2.5.6. Definitions of Authority

This contract can be utilized by Office of Management and Enterprise Service, Oklahoma Department of Transportation. Oklahoma Turnpike Authority or OneNet each having authority over their specialized networks, systems, and projects. As identified in this contract they shall be considered the State Authority Having Jurisdiction (SAHJ) for their individual projects. If the project is considered a joint agency project an overall project manager (State Agency) will be identified as SAHJ.

2.5.6.1. Authority Having Jurisdiction (AHJ)

Under the administrations of this contract the authority having jurisdiction will pertain to local Oklahoma State, County, or City Officials administering local laws, codes, and standards. This includes officials such as: building official, electrical inspector, fire marshal, or other individuals or entities responsible for interpretation and enforcement of local building and electrical codes.

2.5.7. Definition of State Projects (Inside and Outside Plant)

All line items listed herein, shall be considered to be provided and installed in place per this specification, attached details and as directed by the State of Oklahoma Office of Management and Enterprise Services..

State projects are defined as individual tasks which involve installation, repairs, reconfiguration, or removal of telecommunication networks components or systems. Large tasks may be detailed into phases for scheduling, cost effectiveness, and inclusion into planned construction. The Supplier will be notified by the SAHJ of each individual task required via service request. At the discretion of the SAHJ, the Supplier will respond to each service request with an official project package as in section C.6.11. Whenever possible, the Supplier will combine project/tasks in the best interest of the State to reduce overall cost and time. The project package will be review by the SAHJ upon receipt for accuracy and acceptance. If accepted, the project package/estimate will then be considered a quote and legally binding as such. It will be the Supplier(s) responsibility to submit revisions or change orders due to changes in job requirements or equipment. Change orders shall state clearly identify additional job requirements, cost adjustments, and/or material needed.

Supplier shall follow State approved construction methods unless other methods are approved by SAHJ Project Manager. (See Construction Methods).

The Supplier shall be able to respond with company equipment, manpower, and technical expertise for installation and relocation repair of State of Oklahoma telecommunications facilities.

The State of Oklahoma Office of Management and Enterprise Services, its Agencies and /or representatives reserve the right to inspect Supplier’s equipment and any State Project or Supplier site location without notice.

2.5.8. Standard - BICSI Telecommunications Dictionary (Current Edition)

The State of Oklahoma Office of Management and Enterprise Services has adopted the Building Industry Consulting Service International (BICSI) references manuals as the official installation standards for the State. The BICSI Telecommunication Dictionary is a collection of internationally recognized industry terms, acronyms and abbreviations, symbols, and resources. This dictionary will be the official guide used to define terms, acronyms, abbreviations and symbols throughout the life of this RFP, State Projects, Packages and As-built.

2.5.9. Project Designer

The chosen Suppliers shall provide a Project Designer that shall act as a single point of contact for all activities regarding identified projects. The Project Designer will be responsible for all decisions required of State of Oklahoma and shall coordinate with the SAHJ during installation activities. The Designer shall notify SAHJ of any inspections relating to building code, fire safety or other performance or installation related issues are scheduled and shall coordinate the inspection between SAHJ and inspector. The project designer shall ultimately possess an RCDD in accordance with the specification of section C.4.1.

2.5.10. Construction Manager

The Supplier shall provide a Site/Construction manager for each project/job assigned. This manager will be considered the onsite point of contact for questions or issues concerning installation’s or repairs. The construction manager may or may not be an RCDD.

2.5.11. Project Package

(1) Cost Estimate (Labor, Installation Equipment, Test Equipment)

(2) Detailed Material List

(3) A design schematic of planned installation/repair/reconfiguration

(4) A detailed Statement of Work

(5) Schedule of Events: The Supplier(s), prior to start of work, will provide a schedule of events outlining each stage of a project from start to finish.

2.5.12. Field Survey

A Field Survey will be scheduled for each State project and customer based on requests for service. The SAHJ will contact the Supplier(s) with site location, time, and date. If the site is under construction, Suppliers shall coordinate additional field surveys with the general Contractor at the general Contractor’s convenience. The Supplier(s) will coordinate and produce an installation time table in conjunction with the current construction. If a new construction, the Supplier(s) may be required to aid in the cabling design of the structure.

Unless otherwise specified all design specifications will be identified during the initial field survey through the SAHJ and/or the customer. After submission of the estimate any change in the requested service shall be executed and/or authorized by the SAHJ via a change order request.

2.5.13. Price Estimates/Quotes

The Supplier will provide cost estimates for each individual project as identified. The estimates will include materials (if requested), equipment, and labor rate for installation or repair. The State may or may not elect to provide the materials for each project to the Supplier. The State of Oklahoma is not liable for any costs incurred by Suppliers in preparation of the estimates. All estimates will be considered conclusive in nature at the time of presentation pending final approval by the State. Prior to final approval by the State the Supplier may update or adjust the estimates to reflect changes in material or installation cost. The estimates upon presentation will be considered good for 30 days from the date of received before it shall be reinstated or disregarded by the Supplier. It will be the Suppliers responsibility to ensure all estimates presented are accurate and up-to-date according to contract rates.

Price quotations are to include the furnishing of all materials, equipment, maintenance, rental cost, permits/licenses and the provision of all labor and services necessary or proper for the completion of the work except as may be otherwise expressly provided in the Contract Documents. The State will not be liable for any costs beyond those proposed herein and awarded. Time and materials only quotes will be unacceptable unless requested in writing from the State per individual project. The Supplier shall not include sales, consumer, use, and other similar taxes in the price quotations. In case of discrepancy in computed price estimates, the lowest combined value of individual unit costs shall prevail.

2.5.14. Price Stability

Contract prices and discounts shall be fixed at the time of estimate approval by the State and the Supplier. In the event of price changes, replacement material or equipment shall be purchased at the lower of contract or then current market price. In no case shall a price higher than contract price be paid for equipment proposed.

In the event that the State desires to purchase equipment or services not contained in the contract, future purchases will be determined using the Supplier-specified mark-up from cost in the proposal from the Suppliers cost as of the date of the order.

2.5.15. Variation in Quantities and Configurations

Equipment and capacity requirements are the best estimates current market available on market availability and industry standards. The State reserves the right to modify quantity and configuration requirements. The Supplier agrees to sell the State the revised quantity of items at the unit price as stated in the RFP regardless of quantity changes.

2.5.16. Bonding

Within the service areas of responsibility, several projects may be assigned simultaneously. At the discretion of the State, the Supplier may be required to obtain a Performance and Payment bond to cover their portion of a project. The cost of the bond will be identified as such in the Supplier’s estimate/quote.

2.5.16.1. Performance and Payment Bonding

If the estimate/quotation for the project is accepted by the SAHJ, and the SAHJ elects to require bonding for the project, the Supplier will have five (5) business days to deliver the Performance and Payment Bond to the SAHJ. The Bond shall be in the amount of the estimate/quotation for the work to be performed, guaranteeing to the State the completion and performance of the work covered in such as well as full payment of all suppliers, agents, laborers, or Sub-Contractors employed in the performance of the project. Such Bond shall be in a form and with a Surety acceptable to the State of Oklahoma and shall provide for the protection of all persons supplying labor or materials used for the performance of the work. Purchase order(s) will not be issued until a valid performance and payment bond is received. Failure to provide this Bond may be sufficient cause for immediate termination of the Contract resulting from this RFP.

2.5.16.2. Qualification of Surety

The Performance and Payment Bond shall be executed by a Surety Company of recognized standing, authorized to do business in the State of Oklahoma and having a resident agent within the State of Oklahoma and readily accessible to the State. The Surety Company shall hold a current Certificate of Authority as Acceptable Surety on Federal Bonds, in accordance with U.S. Department of Treasury Circular 570, Current Revision.

2.5.17. Right to Reject

The State of Oklahoma reserves the right to accept or reject all estimates, quotes and/or sections thereof.

Estimates to request for service should be submitted initially with the most favorable terms that The Supplier can propose.

The chosen Suppliers shall identify sufficient equipment and telecommunication technicians as part of their inventory and staff. Sub- Contractors will not be used for any telecommunication facility installation (Inside & Outside Plant). Sub-Contractors can be used for specialized installation support such as asphalt, concrete laying, welding or building repair etc. The project designer shall identify and clearly state in each individual project design when a Sub-Contractor will be utilized and the task they will perform. Should the Suppliers use Sub-Contractors for portions of the work, the State of Oklahoma reserves the right to reject any Sub-Contractor without explanation or recourse by the Supplier or Sub-Contractor.

2.5.18. Schedule of Events

Prior to start of work, contract installers will provide a schedule of events outlining each stage of a project from start to finish. This may be waived for an emergency repair.

If the project is an emergency repair, the Supplier is required to provide an estimated time of repair and service restoration.

2.5.19. Permits

The Supplier will be responsible for obtaining State, local, county, city and public sub-division permits with the assistance of Office of Management and Enterprise Services and/or Project Agency responsible if required.

2.5.20. Safety

The Supplier shall provide all safeguards, safety devices and protective equipment and take any other needed actions to reasonably protect the public and private property connection with the performance of the work covered by the contract.

The Supplier shall take the necessary precautions and bear the sole responsibility for the safety of the methods employed in performing the work. The Supplier shall at all times comply with the regulations set forth by Federal, State and local laws, rules, and regulations concerning “OSHA” and all applicable state labor laws, regulations and standards. The Supplier shall indemnify and hold harmless the State of Oklahoma from and against all liabilities, suits, damages, costs and expenses (including attorney’s fees and court costs) which may be imposed on the State of Oklahoma because of The Supplier, Sub-Contractor, or supplier’s failure to comply with the regulations stated herein.

2.5.21. Materials Storage

The Supplier should have secured space to store all materials.

For emergency restoration Suppliers shall have a secured space available to store material for quick response which may require additional qualified personnel.

2.5.22. Federal/State Laws, Codes, Standards and Ordinances

The Supplier’s specification of materials as well as performance of the work shall comply with applicable Federal, State and local laws, rules, regulations and codes. The Supplier shall give required notices, shall procure necessary governmental licenses and inspections, and shall pay without burden to the State of Oklahoma all fees and charges in connection therewith unless specifically provided otherwise. In the event of violation, The Supplier shall pay all fines and penalties, including attorney’s fees, and other defense costs and expenses in connection therewith.

The proposed design and all work shall conform to the 2008 Edition of the National Electrical Code, National Electrical Safety Code and all state and local codes and ordinances. ANSI/TIA/EIA Standards 568-B.1, B.2, B.3, 569-A, 606-A, 758 and J-STD-607 shall be adhered to during all installation activities. Methodologies outlined in the latest edition of the BICSI Telecommunications Distribution Methods Manual, Customer-Owned Outside Plant Manual and Telecommunications Cabling Installation Manual shall also be used during all installation activities. Should conflicts exist, the codes and ordinances of the State of Oklahoma or County/City of construction, The OK Department of Health and Environmental Control, and the Oklahoma State Fire Marshall shall take precedent.

The Supplier is solely responsible for warranting the appropriateness of materials, design criteria and installation methodology submitted in the Price Quotation.

2.5.23. Federal Communications Commission

Equipment requiring FCC registration or approval shall have received such approval and shall be appropriately identified.

2.5.24. Failure to Complete and Liquidated Damages

Because the actual damages for delay in completion are impractical to determine, the successful Supplier and its sureties shall be liable for and shall pay to the State of Oklahoma stipulated and fixed, agreed, and liquidated damages the sum of One Thousand and no/100 dollars ($1,000.00) for each 30 days of delay (that is not caused by failure of the State of Oklahoma to provide necessary access or information) beyond the scheduled installation date until all work is completed and accepted (up to the maximum value of the original contract).

2.5.25. Special Conditions

Locations in the State of Oklahoma through its customers could be under construction. As such, activities in the buildings are being conducted by the General Contractor towards completion of their responsibilities under their contract with the State. As such, work by the General Contractor shall not be interrupted by the Supplier’s work activities without advance agreement from the SAHJ and the

General Contractor. The Supplier will be required to work around all of the conditions listed above as well as working with the SAHJ and staff to minimize disruptions to normal business activities.

2.5.26. Installation Materials

During the initial project design phase the Supplier will establish a detailed list of material needed for project completion. This list will be submitted to the SAHJ with the Labor and Material estimate for each individual project. The detailed list will consist of the quantity, type, name brand (if applicable) and product number. This list may be waived by the State based upon size of the job and urgency.

A site visit is required on outside plant cable installations and pricing should include all labor and materials.

Supplier will provide all materials for inside plant, outside plant and emergency restorations or installations.

2.5.27. Telecommunication Systems Materials

State owned equipment to be installed will be located in one or more centers located in around each area of responsibility. It is the responsibility of the successful Supplier to retrieve and transport the equipment and/or components to the job site as required. The Supplier will be accountable for all material and equipment assigned for installation or repair of State Property.

2.5.28. Emergency Restoration Materials

The Supplier will be required to maintain repair material (on-hand) as necessary to facilitate emergency repairs to State Inside and Outside Plant facilities. The SAHJ and the Supplier will establish material levels to be maintained at the Supplier’s expense.

All emergency installation (internal and outside plant) material will be procured through the State Authority Having Jurisdiction via authorized contract Suppliers. In the best interest of the State, the SAHJ may authorized the Supplier to procure, accept, and/or store material (if available) for use on State Projects only.

2.5.29. Warranty/Liability

Labor and workmanship hereinafter specified and furnished shall be fully guaranteed by the Supplier for three (3) years from certificate of acceptance date against any defects. OMES will procure material with a warranty against defects for a total of one (1) year from date of installation. Defects which may occur as the result of faulty workmanship within one year (material) and three years after installation and acceptance by the State shall be corrected by The Supplier at no additional cost to the State of Oklahoma. The Supplier shall promptly, at no cost to State, correct or re-perform any non-conforming or defective work within one year after completion of the project of which the work is a part. The period of The Supplier’s warranty for any item(s) so described herein are not exclusive remedies, and the State has recourse to any warranties of additional scope given by The Supplier to the State and all other remedies available at law or in equity. The Supplier’s warrantees shall commence with acceptance of/or payment for the work in full. The Supplier shall provide the State with a sample certification form to be submitted by The Supplier to the manufacturer to procure the manufacturer’s certification and warranty. On completion of the work said certification and warranty will be provided to the State in writing before final payment is made to the Supplier. All electronics installed as part of this undertaking will have a five (5) year warranty from the manufacturer and said warranty will be in writing.

All equipment and/or material shall be new and come with a minimum one year warranty. The Supplier shall be the sole contact for all repairs/returns of items during the warranty period. The Supplier shall be responsible for all shipping, coordination of repair/return, obtaining RMA numbers, etc. The Supplier shall provide a name and phone number or e-mail address for the person who will be the focal point for all actions pertaining to this contract. Warranty options and information should be attached to bid specifications for each project.

The Supplier shall pass along to the State any additional warranties offered by the manufacturers, at no additional costs to the State, should said warranties extend beyond the period specified therein.

This warranty shall in no manner cover equipment that has been damaged or rendered unserviceable due to negligence, misuse, acts of vandalism, or tampering by the State or anyone other than employees or agents of The Supplier. The Supplier’s obligation under its warranty is limited to the cost of repair of the warranted item or replacement thereof, at The Supplier’s option. Insurance covering said equipment from damage or loss is to be borne by The Supplier until full acceptance of equipment and services.

2.5.30. Technology Refresh

After contract award, the Supplier, upon commercial announcement of hardware or software modifications or new releases for the latter that can be technically and economically substituted or added for/to items listed in the contract, shall inform the State said items are available for addition or substitutions.

The Supplier shall offer said items to the state at their cost plus a markup price. Supplier cost is subject to audit by the State of Oklahoma. The States cost shall never exceed manufacturers list price. These item(s) may be accepted at the option of the State, provided at least equivalent performance with economic benefits or significantly enhanced performance at no additional cost per unit of capability accrues to the State.

No change in system components and/or installation material may be made without prior notification and either verbal or written approval of the State. The State reserves the right to request shipment of a newly configured demonstration unit for re-evaluation before approval is given.

2.5.31. Change Orders

Modifications or additions to any assigned project will require a change order request presented to the SAHJ for authorization. Any work performed by the Supplier(s) without prior express SAHJ authorization cannot be submitted for payment. It will be the Supplier(s) responsibility to ensure a change order has been authorized prior to performing work not on the original project design.

2.5.32. Payment Conditions

2.5.32.1. General – Excluding the Capitol Complex Communication System

In accordance with state statutes, payment will be made upon acceptance of the job by the State of Oklahoma. All job invoices shall be presented to the State for payment no later than forty five (45) business days after project completion. The telecommunication project (voice/data network or system) will be deemed acceptable when The Supplier delivers to the State:

* Cables which are 99% free of defective pairs of copper or fiber strands
* ANSI/TIA/EIA-568-B series compliant test results on all cabling/wiring
* As-built package (described in C.11 below)
* Completed detail Invoice
* Certificate of Acceptance/Warranty

Acceptance will be deemed “in full” upon receipt by The Supplier of a Notice of Acceptance issued by the State (for all new installation) upon proof of beneficial use and full implementation of the Terms and Conditions and Technical Specifications of the Contract.

Upon receipt of the Notice of Acceptance, The Supplier shall notify the State of a release of all liens (if applicable) for all materials and services associated with this project. Additions or reconfiguration of current installations will require a signature by the customer on a notice of acceptance, submitted to the Office of Management and Enterprise Services for payment. Payment shall be made upon acceptance of the job by State of Oklahoma.

2.5.32.2. Capitol Complex Telecommunication System Payment

Pricing for technical labor shall be quoted on a per-hour basis. Hourly cost for technical labor shall be all inclusive.

Billing for technical installation labor provided to the Capitol Complex Telecommunication System under the terms of this contract shall be submitted monthly to the state but no more than 45 days after completion or acceptance.

The successful Supplier shall be required to maintain an employee time report for each technician assigned to OMES/ISD. Copies of employee’s time reports shall be submitted each week for each contract employee.

Time reports shall be signed and verified by the Supplier’s manager and signed by the technical manager from OMES/ISD.

No reimbursement will be made for technician travel time or lost time due to circumstances beyond the control of the State of Oklahoma. No reimbursement will be made for per-diem, meals, lodging or any miscellaneous expenses.

In order to prevent service interruption and to lessen interference with normal working activities in the administrative offices, the State of Oklahoma reserves the right to schedule telephone installation work during the day, evening, or night time hours.

Transportation for technical personnel to and from work locations, as well as transporting of equipment and tools shall be the responsibility of the Supplier.

The successful Supplier will provide pagers and cellular telephone service for technicians to communicate with each other.

2.6. **DESIGN**

2.6.1. Design Specification & Standards (References, Standards, and Codes)

State of Oklahoma Office of Management and Enterprise Services standards will be based upon the Customer-Owned Outside Plant Design Manual (CO- OSP) produced by BICSI, the Telecommunications Distribution Methods Manual (TDMM) also produced by BICSI, ANSI/TIA/EIA and ISO/IEC standards, and NEC codes, among others. Also applicable will be the State of Oklahoma Fire Protection Code, Local Building Codes and Regulations, and required permits and registrations.

It is required that the Designer be thoroughly familiar with the content and intent of these references, standards, and codes and that the Designer be capable of applying the content and intent of these references, standards, and codes to all inside/outside plant communications system designs executed on the behalf of State of Oklahoma.

Listed below are references, standards, and codes applicable to Telecommunication Distribution System (Inside/Outside) Plant design. If questions arise as to which reference, standard, or code should apply in a given situation, the more stringent shall prevail. As each of these documents is modified over time, the latest edition and addenda to each of these documents is considered to be definitive.

2.6.1.1. BICSI TDMM BICSI Telecommunications Distribution Methods Manual

2.6.1.2. BICSI CO-OSP BICSI Customer-Owned Outside Plant Design Manual

2.6.1.3. BICSI TCIM BICSI Telecommunication Cabling Installation Manual

2.6.1.4. TIA/EIA–758 Customer-Owned Outside Plant Telecommunications Cabling Standard

2.6.1.5. TIA/EIA- 568 Commercial Building Telecommunications Cabling Standard

2.6.1.6. TIA/EIA-569 Commercial Building Standard for Telecommunication Pathways & Spaces

2.6.1.7. TIA/EIA-606 The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings

2.6.1.8. TIA/EIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications

2.6.1.9. TIA/EIA-455 Fiber Optic Test Standards (10)TIA/EIA-526 Optical Fiber Systems test Procedures

2.6.1.10. IEEE 802.3 (series) Local Area Network Ethernet Standards, including the IEEE 802.3Z Gigabit Ethernet Standard

2.6.1.11. NEC National Electric Code, NFPA

2.6.1.12. NESC National Electric Safety Code, IEEE

2.6.1.13. L & I Department of Labor and Industries, Electrical Section, RCW 19,28, WAC 296-46 and WAC 296-401A,

Interim Printing

2.6.1.14. OSHA Codes Occupational Safety and Health Administration, Code of Federal Regulations (CFR) Parts 1910 - General Industry, and 1926 - Construction Industry, et al.

2.6.2. General Design Considerations

As discussed previously, the design of pathway shall conform to the TIA/EIA standard, current State hierarchical topology and Pathways. All installations and/or restorations on the State Capitol Complex in Oklahoma City and Tulsa will require authorization from the Department of Central Services. The SAHJ will provide all necessary authorization and/or permits as required in these areas. The designer will make every effort to design installation with a product line which provides a certificate of certification from the manufacturers.

Prior to design, the Designer is expected to meet with the AHJ of the State Agency and review requirements for the project. Items to review should include proposed pathway routing, aesthetic requirements, long range plans that the Agency has regarding new and existing buildings, paved areas, opens spaces, etc. which could be affected by the design, and any unique requirements specific to the project. After the requirements review, a thorough and detailed field investigation shall be conducted. The field survey shall include, but should not be limited to:

2.6.2.1. A thorough review of existing records and a comparison of these records against actual field conditions.

2.6.2.2. Notation of the condition, suitability, and diagrams showing the locations of existing pathway, demarc’s, and building entrances likely to be used during the course of the project.

2.6.2.3. Documentation of where the telecommunications pathway will require coordination with pathway used for other utilities.

2.6.2.4. Investigate adverse conditions and obstructions (such as low ceiling, firewalls, reinforced walls, etc.) and any significant changes in building structure along proposed pathways.

2.6.2.5. Notation of the existing telecommunication closets, low voltage systems and emergency/security response systems.

2.6.2.6. Notation of the most desirable locations for new installations of facilities as how they conform to ANSI/TIA/EIA and BICSI Telecommunication Installation standards.

2.6.2.7. Detailed design should commence only after the field survey has been conducted and reviewed by the State Agency Having Jurisdiction.

2.6.3. Detailed Project Drawings

Unless otherwise directed all assigned Projects will require Project Installation Drawing prior to the start of the project. The drawing will be submitted in a compatible software program with the State along with one hardcopy. Construction drawings should be thoroughly and accurately marked. Listed below are items that should be included on construction drawings, dependent upon the type of project:

• Routing of the pathway system, including ductbanks and UCV’s.

• Physical locations of obstructions, including UCVs, ductbanks, buildings, roads, poles, existing underground utilities.

• Duct configurations indicating duct sizes and types between UCVs and between UCVs and buildings.

• Duct contents indicating cable assignments.

• UCV and building cable racking diagrams (elevations) indicating the positions of all existing and new cables and splice enclosures.

• Backboard/entrance facility elevations within buildings.

• Pair sizes, gauges, and types of copper cables.

• Strand counts and types of optical fibers.

• Drain slope requirements

• Labeling

• Phasing (if required)

• Staging

2.6.4. Manufacturers

In addition to the standards listed above, manufacturers of communications cabling infrastructure products also supply standards and procedures for the installation. These standards will be strictly adhered to unless otherwise specified in the manuals or codes above. The interior/outside plant communications distribution designer is required to incorporate compatible manufacturer products into the design of State of Oklahoma Telecommunication Systems and Networks. If conflicts exist between manufacturers recommended installation standards and ANSI/TIA/EIA Standards and/or BICSI Standards the more stringent standard will be used.

2.6.5. Deviation from Standards

It is not the intent of State of Oklahoma Office of Management and Enterprise Services to rigidly impose standards on every aspect of telecommunication/technology design and installation. Each design is unique and each design may be subject to situations in which deviations from the standards are warranted.

If the Designer feels that deviation from a given standard is warranted, the Designer shall submit a written deviation request to the Office of Management and Enterprise Services or applicable State Agency. The request will, at a minimum, indicate the standard from which there is a proposed deviation, the substitution being proposed in place of the standard, the reason the request is being made, and an explanation of the justifications (economic, technical or otherwise) for the deviation. The Designer may, upon written approval from AHJ, incorporate the design deviation into the overall design. The Office of Management and Enterprise Services or AHJ approval is required on a project- by-project basis. The Designer should not assume that a deviation approval for one project means that the deviation will necessarily be approved for a subsequent project.

2.7. **INSTALLATION**

2.7.1. Installation Methodology

The Building Industry Consulting Service International Standards (BICSI) is the official installation methodology approved by the State of Oklahoma Office of Management and Enterprise Services. All cable (copper or fiber optic) provisioning through this Agency will be completed by following these standards. All work done as part of this undertaking will conform to the following guidelines. As each of these documents is modified over time, the latest edition and addenda to each of these documents is considered to be definitive.

Local Codes

2008 edition of the National Electrical Code (or most current edition)

2008 edition of the National Electrical Safety Code (or most current edition) ANSI/NECA/BICSI 568-2001

ANSI/TIA/EIA 568-B.1 and B.2 ANSI/TIA/EIA 569-A ANSI/TIA/EIA 606-A J-STD-607ª

The current edition of the BICSI Cabling Installation Manual

The current edition of the BICSI Telecommunications Distribution Methods Manual The current edition of the BICSI LAN Design Manual

The manufacturer’s installation instruction/specifications Customer Owned Installation Methods and Standards

Where conflicts exist between any two or more referenced guidelines, the issue can be resolved by using the above list. The higher the reference is located on the list, the more authority it has with local codes being highest and manufacturers and Customer Owned guidelines being lowest.

2.7.2. General Installation Methods and Standards

The technical specifications contained herein are intended to serve as a minimum guideline for the installation work to be performed as part of this undertaking. The scope of work will encompass all aspects of installation, labeling, documentation and acceptance of the work in accordance with the adopted BICSI standard specifications, drawings, etc. Questions related to these specifications should be addressed to the appropriate State Agency (SAHJ) contact as indicated in the beginning of this RFP. The State of Oklahoma is in the process of reconfiguring its voice/data network to conform to established telecommunication standards. It will be the Supplier(s) responsibility to identify and report issues of concerns which will prevent or delay their efforts to complete a project.

The cabling installer shall use manufacturer approved methods to restore the original rating of the fire rated architectural structures and assemblies to any penetrations made during the installation and holes created by the removal of existing penetrations. Reference ANSI/TIA/EIA-569-A, Annex A for information regarding fire-stops.

2.7.3. Outside Plant Construction and Outside Emergency Restoration Methods

Contractor’s field installation shall be in compliance with the State’s regulations and the Installation Methods identified in the information above.

If cable installation along the proposed route is not feasible, alternate methods or routing will be determined by the SAHJ (Project Manager). Conflict between the identified State Requirement and the referenced guidelines can be resolved by using the referenced BICSI guidelines and standards.

2.7.3.1. Oil, Steam, or Gasoline Pipeline

Conduit or gasoline pipeline preparation for cable shall follow guidelines and Cost of cable shall include this work:

• All existing conduit and/or steam pipe shall be prepared by rodding, cleaning and repairing the conduit and/or steam pipe as necessary

• Contractor shall pig all gasoline pipelines dry of water with the use of a Girard Poly Pig, four inch (4”) swabs or state approved equipment.

• Contractor shall attach to the 4” line a Poly Pig Launcher Trap with 4” outlet, 6” inlet and a 2” valve connection (to connect to air compressor 150-200 pounds pressure).

• Unit shall have a bleed port valve and a pressure gauge with an adapter to mount a tag line reel to use with a 4” 4 cup pig.

• In all cases, the 4” gasoline pipes shall be purged by air pressure using a four (4”) poly foam pig equipped with Tough Coat to force all water and dirt particles from the line prior to cable insertion. (ex. Poly Foam 4” Pig – Sage Brush Supply Company, Tulsa, Oklahoma).

• Contractor personnel working in the underground systems are not exempt from performing air quality tests prior to entering.

• If pre-atmosphere tests indicate unsafe gaseous or dead air conditions, adequate forced air ventilation shall be provided.

• Federal and/or Oklahoma State confined air quality safety regulations shall be followed to assure safe working conditions.

• All equipment of the Outside Cable Plant, including the sheath shields and metal terminal boxes shall be grounded to a single point earth ground, which will be approved by the SAHJ Manager. A copper bus bar shall be mounted at the bottom of each termination. The bus bar on each termination shall be connected to the building earth ground bus using a 6 AWG electrical cable. Each terminal shall be connected to the earth ground serving the building with 6 AWG copper ground wire. If no earth ground, the Contractor shall install a ground conductor 6 AWG from the building ground to the termination location. This ground shall be as close to zero resistance as possible, never exceeding 0.5 ohms. All equipment including the cable sheath shields shall be connected to the earth ground serving the building with 6 AWG copper ground wire.

• It is imperative that communication cable inner sheath bonding is made whenever there is an inner sheath separation and that inner sheath grounding is made at cable ends or termination locations.

2.7.3.2. Handling of Fiber Optic Cable

Cable shall be carefully inspected by the SAHJ (Project Manager) and the Contractor during the plowing and trenching operation prior to installation into the project, to be certain that it is free from defects or damage.

Bends of small radii and twists that might damage cable shall be avoided. During the placing operations, cable shall not be bent in a radius less than 20 times the outside diameter of the cable.

Care is to be exercised during the plowing operation to insure that the cable is fed either manually or by capstan into the ground through the plow, loose and at no tension.

If, during the plowing operation, the plow should strike a buried object or rock that stops the equipment and necessitates removal of the plow from the ground, the plow shall be removed from the ground carefully, without backing the plow, to avoid damage to the cable. Should it be necessary to back the plow to remove it from the ground, the cable shall be uncovered and removed from the plow, a sufficient distance back, to enable inspection by the SAHJ (Project Manager) to determine whether the cable has been damaged. In either case, the cable will be exposed for inspection by the SAHJ (Project Manager).

2.7.3.3. Depth of Buried Plant

Unless otherwise specified by the SAHJ (Project Manager) or State Construction Drawings, the depth of buried cable plowed, measured from the top of the cable to the surface of ground or rock shall be as listed in the following table:

Minimum depth in soil 48”

Minimum depth in ditch crossing 48” Minimum depth in rock 24”.

In the case of a layer of soil over rock, either the minimum depth in rock, measured to the surface of the rock, or the minimum depth in soil, measured to the surface of the soil, shall constitute the depth of buried cable.

When placing cable during cable plowing operation and rock is encountered that will not pre-rip, as specified, to a minimum depth of 48”, the cable should be buried using the open trenching method to a minimum depth of 24”.

2.7.3.4. Buried Cable Markers

Above ground optical fiber cable warning markers (sign post) will be placed at a five hundred foot interval and at each road crossing to warn of the cable prior to digging. In addition, electronic cable markers will be installed at each location where the cable changes direction more than 45 degrees. Non-conductive warning tape will be installed at a depth 18” above the inner duct.

2.7.3.5. Conduit

All conduit shall be installed in locations as shown on the Cable Plant Maps to fit the existing field conditions. However, if major relocations are necessary, the Contractor shall receive SAHJ approval prior to making relocations.

The end of all vacant or cable filled ducts shall be sealed with an 8 to 1 ratio expandable urethane form, 3M Scotchcast 4416 or SAHJ approved equivalent, making them watertight and rodent proof.

All exposed cable and conduit in open trenches will be supported to eliminate unnecessary strain. All coating, wrappings and insulation will be protected. If there is any damage of this type, the SAHJ (Project Manager) will be notified immediately.

See Standard; Typical Conduit Construction Detail (2” Galvanized Electrical Conduit) and Special Detail – Bridge Attachments, Sheets 3 and 5.

2.7.3.6. Cable/Conduit Trenching

The use of explosives on a State of Oklahoma project will not be allowed without prior authorization of the SAHJ (Project Manager) responsible for the project.

Excavating equipment should be selected to minimize danger to underground and overhead systems. This includes considering size, weight, speed and controllability of equipment.

Do not attempt to work too close to underground facilities with heavy equipment. Expose all existing pipe and cable by hand digging so that machine operators can clearly see the system.

All trenching depths shall be forty-eight (48”) except where the State directs the depth shall be more or less than forty-eight (48”)

Should the trenching be excavated to a greater depth than that given, the Contractor shall, at his own expense, bring such excavation to required grade with such material as directed, notwithstanding that it may be necessary to bring such material from other localities or to purchase suitable material; and the trench shall be tamped, as directed.

The material excavated shall be deposited along the side of the trench in such a manner as to create the least inconvenience possible. Prolonged storage over or near facilities should be avoided. It should be arranged so that rocks, concrete, and other debris cannot fall in open trenches.

Where ground-water or soft, yielding, or otherwise unsuitable material is encountered in the bottom of the trench, which is an unsuitable foundation for the conduit or cable, such material shall be excavated from the full width of the trench to a satisfactory depth. The resulting space shall be back-filled with imported bedding properly compacted to give adequate support.

When placing cable in a trench in rock, the cable shall be cushioned by a fill of sand or selected soil at least 3 inches thick on the floor of the trench before placing of the cable. The backfill for at least 6 inches above the cable shall be free of stones, rock or other hard, sharp or frozen materials which might damage the cable. Alternate methods are permissible subject to the approval of the SAHJ (Project Manager).

The asphalted pavement cut shall be replaced in kind with HMHL Asphalt, type “A”. Where plant mix or asphalted concrete surfacing exists, pavement shall not be less than 4” in thickness.

2.7.3.7. Conduit Boring

This section covers the installation of conduit by boring or jacking.

Conduit shall be placed under existing pavement and sidewalk by approved bore and push methods. When conduit used is Schedule 40 PVC, the joint will always be long belled ends, cleaned of dirt and debris before cemented and two (2) wraps of duct tape applied after cement is set up.

All street, driveway and waterway crossings are to be bored and conduit installed.

The pavement shall not be disturbed and boring and pushing pits shall be kept at least five (5) feet clear of the edge of the surfaced area. Excessive use of water such that pavement might be undermined or sub-grade softened will not be permitted.

Where conduit passes under a surfaced area, an “X” shall be cut in the curb or surfacing above the conduit crossing for future reference and relocation purposes.

All bores will be documented to SAHJ’s Project Manager showing location and depth details of the bore and materials used.

2.7.3.8. Splicing – Cable Fiber Optic, Fusion

All cable ends shall be cut to the same length before closure is applied. This length is thirty (30) feet. Cable bends shall not be less than twenty (20) times the outside diameter of the cable.

Cable having the outer jacket removed shall have a protective closure placed on it at the end of the work day.

The metallic sheath and center strength members of each cable shall be bonded and connected separately to a shield protection pedestal with No. 6 insulated solid copper ground wire. The shield isolation pedestal shall be connected to a 5/8” x 10’ driven ground rod with No. 6 bare solid copper wire.

All splice closures shall be encapsulated and flash tested with dry nitrogen upon completion of splicing. OTDR measurements shall be performed during the fusion welding process to verify average splice loss is not exceeded, and before fusion welding to insure the cable was not damaged during placement. All splice points shall have a quality inspection performed by the State Representative prior to closing the protective closure.

Splice data shall be recorded on each splice using the State Quality Assurance forms or State approved forms provided by the Supplier.

Splice sheets shall include the splicers name, company, splice location, number of splice attempts on each fiber, time and date of splice, reel number and weather conditions.

All buffer tubes shall be labeled in accordance with the manufacturer’s methods.

Organizer trays shall be marked with permanent ink to indicate which group and/or buffer tube is spliced in that tray.

2.7.3.9. Standard splicing requirements

The optical loss for any individual splice point shall be less than or equal to .10 db.

Fibers shall be installed in such a manner as not to induce bend at 1300 NM and 1550 NM. The maximum db loss for any individually splice fiber optic strand shall be less than .1 db.

The fusion welder and welding process shall be specifically designed to splice signal fibers of both IVD and OVD design.

Materials used for splicing will be new and in good condition. Portions of the cable that are cut (such as buffer tubes) shall be repaired and protected.

Pigtail splicing requirements shall follow the same scope and optical requirements as standard fiber splicing outlined in Section 7.3.8 above, with this exception:

The splice will be installed in organizer trays and in termination boxes supplied by the light guide equipment Supplier. Minimum bending radius for the pigtails shall be 1.5 inches.

The Pigtail splice and ST or SC connector combined loss for any individual fiber shall be less than or equal to .5 db.

2.7.3.10. Erosion Control

Type F-1 plain riprap – The areas to be protected shall be dressed approximately to the lines and grades shown on the plans prior to placing the riprap. The plain riprap graded so that the smaller stone is uniformly distributed throughout the mass, may be dumped over the area designated until the required 12 inch (12”) depth is attained. Hand and/or machine placing will be required as is necessary to deposit stones to the general lines and to the thickness shown on the plans.

This plan will be modified by SAHJ Manager as required.

2.7.3.11. Sign Posts

Sign posts installed shall be plumb when driven into the ground 24 inches (24”) using a driving cap (Ductile Iron). Special instruction will be provided covering driving methods. (Do not install post with sign Pre-installed).

2.7.3.12. Concrete Wall Cores

Manhole, pull boxes, tunnel and building penetration shall be made by use of a “Core Drill” and will be sleeved. All penetrations will be patched so that water, silt, etc. will not enter the tunnel or building.

Core drilling for conduit insertion shall be finished and sealed with water proof cement between the core drill wall and the new conduit to eliminate water seepage.

Core drilling for cable insertion shall be sealed and finished with 8 to 1 ratio expandable foam, 3M Scotchcast 4416 or State approved equivalent, between the core wall and the cable to eliminate water seepage.

2.7.3.13. Vaults and Pull Boxes

Vaults and pull boxes are to be of the type specified herein.

Excavation shall be made to the required depth and the base upon which the vault or pull box is to be set, shall be compacted to a firm even surface.

All soft and unsuitable material shall be removed and replaced with 12” of aggregate coarse, type “A” material which shall be 100% passing 100%, 1 ½” durable crushed rock or limestone, free of excessive foreign matter, under the vault or pull box floor, thoroughly compacted.

The top of the vault and pull boxes are to be constructed in such a manner that the tops are flush with the adjacent ground line.

2.7.3.14. Asphalt/Concrete Street Repair

Typical street repair to be used only if the Contractor is unable to push or bore under existing streets. Existing pavement is to be saw cut to a neat line with a minimum of 4”-0” cut.

If saw cut is within 4’-0” of existing pavement joint or crack, pavement repair shall be maintained at all times. All paving cuts are to be half-width as local and through traffic shall be maintained at all times.

2.7.3.14.1. 4” Concrete Sidewall Repair

Typical sidewalk repair is to be used only if the Contractor is unable to push or bore under existing sidewalks.

When open 4” or 6” cable/conduit, trenching is required across existing sidewalks and conduit is not installed, sidewalk is to be saw cut to a neat line at the nearest joint. Minimum cut will be 4”-0”.

All forming, placing and finishing shall be in accordance with Section 414.04 and Section 610.04 of the Oklahoma Department of Transportation Standard Specifications, Edition of 2009 and any subsequent revisions thereof.

2.7.3.15. Pipe Repair

In the event that a damaged pipe is encountered, the damaged portion shall be removed and replaced per IAW Safety standards as outlined in the State of Oklahoma Labor Requirement, OSHA and Federal Safety Standards and Procedures. Repairs are to be made by excavating and exposing the pipe, including 18” on each end of the pipe.

Repair shall form a water-tight joint and, if pipe is steel, insulation from ground is required using polyguard #600 primer and #634 tape or State approved equivalent.

One ground wire type GW (REA type NQA, specification PE-85) consisting of a tinned solid #6 AWG copper conductor insulated with black polyvinyl chloride shall be welded to each end of the pipe using thermoweld connections, type 15-P (Continental Industries Inc., Tulsa, Oklahoma).

2.7.3.16. General Plowing Requirements

Plowing cable includes the hauling of cable from storage area to work location and any cable handling required to properly install the cable in ground in accordance with State construction drawings or specifications.

Pre-ripping of the buried cable route shall precede all plowing and shall be made in the same direction as cable is to be plowed at a minimum depth 6 inches greater than the minimum cable depth required.

The plowing equipment shall be subject to the approval of the SAHJ (Project Manager) and the public railroad authorities having jurisdiction over highway and/or railroad right-of-ways.

The equipment and construction methods used by the Contractor shall be such as to cause minimum displacement of the soil. The slot made in the soil by the cable plows shall be closed immediately by driving a vehicle track or wheel over the slot or by other suitable means approved by the SAHJ (Project Manager).

Damage to banks, ditches and roads caused by the equipment shall be immediately repaired to the satisfaction of the SAHJ Project Manager and public authorities having jurisdiction over highway and railroad right-of-ways where involved.

Where cable is buried near the edge of pavement, the Contractor shall take particular care to avoid damaging the pavement. If such damage does occur, repairs shall be made immediately to meet the requirements of state or local authorities having jurisdiction over the pavement involved.

The Contractor shall promptly repair any damage to fences, lawns, shrubbery, drives and any other property damaged during construction. Each cable plow operation shall be equipped with a ground test meter for sheath fault testing. Testing for sheath faults shall be performed at the end of each day and the results provided to the SAHJ (Project Manager).

Underground objects encountered during plowing operations which could damage the cable shall be exposed for inspection by the Contractor at the discretion of the SAHJ (Project Manager).

2.7.3.17. Cable Plow

The cable plow tractor shall be capable of delivering a minimum of 55,000 pounds (2.45 x 10 to the 5th N) drawbar pull at 1.2 MPH (1.93 km/hr) forward speed to bury the cable at the specified depth in soil.

Vibratory cable plows shall not be used. The equipment shall be capable of extending and offsetting the plow in order to maintain the required minimum depths and distances under all terrain conditions.

2.7.3.18. Plowchute

The design of the plowchute shall be such that the buried cable passing through the plow shall not bind and shall not be bent in a radius less than 20 times the outside diameter of the cable and shall have a removable gate for the purpose of inspection. The plowshare shall have a hinged fair lead which shall be equipped with smooth, free-wheeling rollers or low friction surfaces to prevent damage to the fiber optic cable passing through.

The cable path inside the plowchute shall be free of burrs, sharp edges or excessive surface roughness. Welds shall be smooth.

2.7.3.19. Pre-Rip Plow

The pre-rip plowing shall be accomplished with a pre-rip tractor capable of delivering a minimum of 55,000 pounds (2.45 x 10 to the 5th N) drawbar pull at 1.2 MPH (1.93 km/hr) forward speed and is capable of pre-ripping the buried cable at the specified depth in soil.

The Contractor shall exercise particular care in the use of trenching equipment and shovels in joining trenches to the slot made by the plow to be certain that the fiber optic cable is not damaged.

2.7.3.20. Rock Excavating

Soil conditions shall be defined as rock where a pre-rip tractor capable of delivering a minimum of 55,000 pounds (2.45 x 10 to the 5th N) drawbar pull at 1.2 MPH (1.93 km/hr) forward speed, is incapable of ripping after two attempts at the specified depth, or when field conditions at the side show the existence of rock at a depth preventing the placement by trenching equipment of the cable at the depths required in construction drawings.

2.7.3.21. Fence and Gate

Type II fence and gate construction shall be in accordance with Section 624 of the Standard Specifications for Highway Construction, Edition of 2009 and all subsequent editions.

2.7.3.22. Cut and Repair – Asphalt Drive

Asphalt Drive Repair is for restoration of existing asphalt surfaces requiring opening for cable placement by either open trench or cable plowing.

Care shall be exercised so as not to cause undue under-breakage or shattering of the adjacent area and all removal is to be to neat lines.

All broken or damaged surfacing is to be removed and the trench thoroughly compacted prior to placement of new material.

Asphaltic pavement cut shall be replaced in kind and shall not be less than four (4) inches in depth. Hand spreading of the new material will be permitted and compaction shall be obtained by using mechanical tampers bringing the finished surface to the original line and grade.

All work to be performed in a neat and workmanlike condition, including cleanup and removal of all rubbish, excavated and discarded materials.

2.7.3.23. Repair Drive – Crusher Run

Existing gravel surfaces cut or damaged by placement of the buried cable by open trench or cable plowing shall be reshaped and compacted to the original line and grade.

The new material “Crusher Run” aggregate, shall be placed over the re-compacted area and blended as required with the old material and re-compacted, bringing the surface to a neat and workmanlike condition.

All innerduct and locating wire will be installed at a minimum depth of forty-two inches below finished grade. The optical fiber warning tape shall be installed at a depth of eighteen inches above the innerduct. Where a minimum depth cannot be maintained, the innerduct shall be encased with a minimum of three inches of concrete or be installed in a galvanized steel conduit for a minimum of fifteen feet beyond the location where the minimum depth cannot be attained.

Where forty-two inches of depth cannot be maintained, the SAHJ shall be notified via telephone call and shall approve the change in depth prior to the trench being closed.

2.7.4. Inside Plant Construction and Inside Emergency Restoration Methods

2.7.4.1. Cable Handling

All cable being installed shall be handled with care and protected from being kinked. A kink is defined, for purposes herein, as violation of the manufacturer’s specified Minimum Bend Radius for each type cable involved. Cable shall not be formed into a condition that causes the outside sheath to wrinkle.

Unsheathed cable shall not be left exposed to the elements. Cable will be unrolled from the shipping spool, and not allowed to spill from the side of the spool.

2.7.4.2. Pulling Cable in Conduit

When cable is being installed in conduit or innerduct, as the pull commences, the cable pulling lubricant shall be compatible with all cable jackets. (Excludes LSZH/LSHF cables. Use Polywater LZ instead.) The lubricant shall be UL or CSA listed. The lubricant shall contain no waxes, greases, silicones, or polyalkylene glycol oils or waxes. The amount and procedural use of lubricant shall be in accordance with the manufacturer’s specifications, or a State approved equivalent is to be applied through the conduit opening to reduce tension on the pulling line.

On longer or larger cables, additional lubricating points may be required. The limiting factor during cable pulling varies with the size and length of the cable.

2.7.4.3. Hanging and Laying in Trays

Cable being installed in tunnels or above ceilings shall be pulled and supported periodically to prevent cable sheath damage. Fiber Optic cables will be laid in cable trays on cable racks or attached to building walls as indicated on the Cable Map.

The Hilti 8mm fasteners (Pin DN32PO8) used to attach clamps and cable to building and tunnel walls shall be shot without concrete spalling.

If spalling is experienced, a Hilti DX-400 fastening tool equipped with a spalling attachment shall be used or holes shall be pre-drilled to a depth of ¾” to prevent spalling or use anchor, hammerdrive 3/16” x 7/8” (use 3/16” drill). (American Anchor Company) Cable and/or conduit attached to walls shall be clamped every 24 inches (24”). Horizontal and vertical cable runs shall be level and plumb. Feeder and distribution cables will be paralleling power cables throughout the system.

Maximum separation shall always be maintained at ceiling levels between power and communication cables.

The separation is necessary to provide maximum clearances for safety reasons and also, to provide separation to minimize any undesirable effects in the communications resulting from impedance.

Prior to placing communications cables, power cable impedance readings shall be taken to assure approved standards are being met. If a mismatch occurs between power cables, it shall not exceed national and/or local acceptable electrical standards.

If tests indicate corrective action is necessary, it should be performed prior to placing communications cables.

2.7.4.4. Damage and Repair of Fiber

Every instance of damaged cable observed at any time, whether prior to installation in plant, occurring during construction, or discovered by test or observation subsequent to installation in plant, shall immediately be brought to the attention of the SAHJ (Project Manager). The method of repair or correction of such damage shall be in accordance with the written instructions of the SAHJ (Project Manager).

Repair of all damaged cable shall be done under the direction of SAHJ and all associated costs due to damage by Supplier shall be at Supplier’s expense.

Minor damage to the outer jacket of the cable observed prior to or occurring during construction shall be repaired as directed by the SAHJ (Project Manager).

Repair of Fiber Optic Cable damage shall include, but not be limited to the following:

a.) Replacement of fiber optic cable

b.) Cable placement costs

c.) Splicing materials and labor

d.) All materials required for placement

The length of cable replaced shall be at the direction of the SAHJ (Project Manager).

A handhold and 40 meters (131 feet) of cable (20 meters each side of damage) shall be required at all damage locations, including minor damage, unless otherwise specified by the SAHJ (Project Manager).

All open cable ends either placed or remaining on a cable reel shall have a cable cap placed on them. Cable Caps – Caps shall be molded neoprene with adjustable stainless steel band for tightening cap to cable. Cable Cap shall be equal or equivalent to “Cable Cap, ¾”, without valve”, (ex. Reliable Electric/Utility Products, 11333 Addison Street, Franklin Park, IL. 60131).

2.7.4.5. Communications Tower Repair and Maintenance

Tower Lighting: Respondent shall provide re-lamping of tower light fixtures on an as required basis at each site displaying obstruction lighting.

OMES has tower light systems on specific towers which requires annual relamping. The tower light alarm system shall be tested after re-lamping is completed. The Respondent shall provide replacement lamps. It is the responsibility of the Respondent to coordinate with the OMES and the OMES’ tenants to provide a safe working environment for the replacement of lamps.

General Site Maintenance: Respondent shall provide general site maintenance, other than obstruction lighting billable at three separate technician-hour rates. The Respondent shall provide any necessary materials to complete the site maintenance and bill the materials, as a separate line item. OMES shall provide written work assignments for each site for the Respondent to complete. The Respondent shall provide an estimated technician-hour requirement, applicable rate class, and materials list with estimated cost to complete each task to the OMES with a scheduled completion date. General maintenance includes power generation equipment, communications hut maintenance and fencing.

Schedule: All work shall be scheduled during normal working hours (Monday through Friday)

Maintenance Rate Classification: Respondent shall provide general maintenance labor at three separate technician-hour rate classifications. Rates to be bid are defined below:

Rate Class 1: Maintenance work from ground level to eight feet above ground level shall be classified Rate Class 1, also known as ground level maintenance.

Rate Class 2: Maintenance work eight feet above ground level and higher shall be classified as Rate Class 2, also known as high tower maintenance.

Rate Class 3: Maintenance that cannot be performed during the regular work week (Monday thru Friday, 8:00 A.M. to 5:00 P.M.) hours may be required by the Regents and classified as Rate Class 3, also known as emergency maintenance regardless of original rate class.

Hourly Rate: Each rate class of work shall be bid at a separate fixed hourly rate per technician submitted by the Respondent.

Respondent must be able to show proof of Competent Climber, and Rescue Training as well as example of OSHA safety and rescue plan for site work.

2.8. **MATERIALS**

2.8.1. Wire (Category 3, 5e , 6, 6a or higher)

Unless otherwise identified, all wire used on State projects will meet or exceed the requirements of ANSI/TIA/EIA 568-B.1 and will be Category 5e or above, CMP rated, Unshielded Twisted Pair (UTP)/Shielded Twisted Pair (STP). The wire will be from a State authorized contract Supplier and recognized under the ANSI/TIA/EIA and BICSI Standards. The SAHJ can authorize the Supplier to procure cabling which is compatible with previously installed material. The wire shall be from a recognized Certified Product Supplier (Leviton, Panduit, etc.) which offers a Certification Program for warranty.

2.8.2. Optical Fiber

All optical fiber used on State projects will meet or exceed the requirements of ANSI/TIA/EIA 568-B.3 and will be identified per each project assigned. Single and Multi-mode fiber will be Laser Optimized, OFNP rated. The optical fiber shall be from a recognized Certified Product Supplier (Leviton, Panduit, Corning, etc.) which offers a Certification Program for warranty.

2.8.3. Termination Hardware (Copper)

All copper termination hardware will meet or exceed the requirements of ANSI/TIA/EIA 568-B.1 and will be Category 5e, 6 or 6a, standard pin out. All termination hardware used for UTP/STP will be from an approved State Supplier and will carry a five year (minimum) warranty. The successful Supplier will not mix manufacturer’s products. The installation will be certified as a manufacturer certified installation on completion of the project.

2.8.4. Terminations Hardware (Optical Fiber)

All optical fiber terminations will meet or exceed the requirements of ANSI/TIA/EIA 568-B.1 and will be (identified by user) type connectors. All termination hardware used for the optical fiber will be from approved State Supplier and will carry a five year (minimum) warranty. The successful Supplier will not mix manufacturer’s products. The installation will be certified as a manufacturer certified installation on completion of the project. Connectors may be the direct termination type or pigtail.

2.8.5. Modular Jacks/Coupling

Each modular jack used on this contract will meet or exceed the requirements of ANSI/TIA/EIA 568-B.1, B.2, and B.3 and will be installed using a standard type pin out for copper and an (user specified) coupling for each optical fiber. All modular jacks will be from the same manufacturer as the patch panels.

2.8.6. Faceplates

Faceplates shall be (user specified) in gang type, color, and ports depending on the specific drawing specification. Surface mount locations may be required if requested by a State Customer. The faceplates shall have an identification strip on the upper space above the top port and on the lower space below the bottom port. Each port will be labeled in the center of the port on the faceplate.

2.8.7. Patch Panels (Copper)

Each UTP/STP patch panel used on this project will meet or exceed the requirements of ANSI/TIA/EIA 568-B.1 and B.2, T568-A pin out. The number of ports per patch panel will be identified by the designer for each project. The largest size patch panel will be in respect to the equipment rack and proposed wire management. Each modular jack to have a wire terminated will be labeled in accordance with ANSI/TIA/EIA 606-A. The patch panel will be identified by its position on the equipment rack. For example: where the patch panel is installed as the top one on the equipment rack, then it will be identified as patch panel 1, the second on the rack as patch panel 2 and so forth.

2.8.8. Patch Panels (Optical Fiber)

Each optical fiber patch panel used will meet or exceed the requirements of ANSI/TIA/EIA 568-B.1 and B.3. The number of ports per patch panel will be identified by the designer for each project. The largest size patch panel will be in respect to the equipment rack and proposed wire management. Each port to have a fiber terminated will be labeled in accordance with ANSI/TIA/EIA 606-A. The patch panel will be identified by its position on the equipment rack. For example: where the patch panel is installed as the top one on the equipment rack, then it will be identified as patch panel 1, the second on the rack as patch panel 2 and so forth. Should pigtail terminations be used, the specifications for the associated splice trays shall be the same as those used for the outside plant fiber.

2.8.9. Wire Management Panels

Four types of wire management panels can be employed on projects. Front, rear, vertical and horizontal. The same company as the termination hardware will manufacture the wire management panels. Front, horizontal, wire management hardware can be of the type to provide “ring type” panels. Front, horizontal, wire management panel will be sized to occupy two rack spaces (2U) and will provide a minimum of two inches of depth for patch cords. Rear, horizontal wire management panels will be of the bar type that attaches to the rear side of the equipment rack. Both front and rear, vertical, wire management hardware will be the “ring type” that is provided in individual rings that can be mounted at the screw holes and provide a channel to facilitate the vertical organizing of either the wires or patch cords.

2.8.10. Equipment Racks

Customer specified equipment racks will be employed on each project. Common type will be 84” high by 19” wide with six-inch deep channels. This type of rack will be floor mounted and attached to the nearest wall by a twelve-inch wide Flextray or equivalent wire tray. The tray will be mounted to the equipment rack perpendicular to the orientation of the equipment rack and permanently attached to the wall nearest to the rack or the wall where the wire comes down to the level of the rack regardless of whether the rack is mounted flush against the wall or not.

Spare capacity will be installed in each rack to provide twenty-five percent increases in termination hardware. This will include any active electronics specified herein.

2.8.11. Grounding/Bonding

All grounding and bonding for this project will be in accordance with the requirements of J-STD- 607A and the 2008 edition of the National Electrical Code (or most current edition). All provisions contained in the two documents referenced contain sections where the words, should, would, could, etc. implies suggested actions. These references will be considered mandatory as part of this undertaking. Page six of J-STD-607A provides a general schematic for accomplishing this work and shall be followed by the successful Supplier in implementing the guidelines contained therein.

2.8.12. Capitol Complex System Cabling

Each building will be equipped with both twisted-pair backbone cable and optical fiber backbone cable. They will be sized according to the SAHJ State specifications per project. The type of cable may be for a ‘riser’ application, requiring plenum-rated cable.

2.8.13. Twisted-Pair Backbone Cable

The cable shall be equivalent to ARMM type, CMR/MPR, 24 AWG, loose bundled cable with an overall aluminum/steel shield bonded to the outer jacket.

2.8.14. Optical Fiber Backbone Cable

Optical fiber backbone cable shall be sized by the State. Backbone cable shall be tight buffered cable from the BD of each building to each FD on each floor in each building. Where more than one FD is located on a floor, then each FD shall be served accordingly.

2.8.15. Capitol Complex Intra-Building Cabling Termination

Termination hardware shall be provided for each pair/strand provided in the cable plant. Each pair/strand shall be terminated on each end on the appropriate hardware as outlined in the following sub-section.

2.8.16. Twisted-Pair Cable Termination

Each pair on each end of each intra-building backbone cable shall be terminated on 110AA2-100-FT or 110AA2-300-FT terminal blocks mounted on the plywood backboard provided and mounted in each FD. 110-C5 clips shall be installed on each five pairs in the cable once terminated on the 110 terminal blocks.

2.8.17. Optical Fiber Cable Termination

Each strand on each end of each intra-building backbone cable shall be terminated using a connector compatible with previously installed connectors. These connectors shall be housed in an appropriately sized optical fiber distribution center that will be mounted on an equipment rack. The optical fiber distribution center will be mounted using ‘external star’ star washers on every mounting screw. Sufficient connector panels in a twelve port configuration will be provided. Blank plates shall occupy any vacant connector panel spaces.

2.8.18. Capitol Complex Inter-Building Cabling

Each building on the Capitol Grounds shall be provided with a 10Ω0, shielded, flooded, 24 AWG, twisted -pair, PE89 outside plant cable sized in accordance with the building’s internal pair requirements.

In addition, each building on this project may be provided with optical fiber cables. Where cost effective, ‘Composite’ or ‘hybrid’ cables may be allowed on each individual projects.

2.8.19. Inter-Building Optical Fiber Cable

All optical fiber cable used for outside plant on a project shall be dielectric cable (no metallic components whatsoever). Each cable shall be rated as OFNR and shall be a loose tube construction flooded to prevent the intrusion of water into the cable assembly.

2.8.20. Multimode Optical Fiber Cable

This cable shall be manufactured to provide transmission, bandwidth and performance in accordance with ANSI/TIA/EIA-568-B.1 and B.3.

Each strand of multimode cable shall be 50/125µm, loose tube and rated to provide as a minimum the following parameters: 850nm 3.0dB/Km 500MHz

1300nm 1.0dB/Km 500MHz

2.8.21. Single-Mode Optical Fiber Cable

This cable shall be manufactured to provide transmission, bandwidth and performance in accordance with ANSI/TIA/EIA-568-B.1 and

B.3. Each strand of single mode cable shall be 8.3/125µm, loose tube and rated to provide as a minimum the following parameters: 1310nm 0.5dB/Km

1550nm 0.5dB/Km

2.8.22. Capitol Complex Inter-Building Cabling Termination

Termination hardware shall be provided for each pair/strand provided in the cable plant. Each pair/strand shall be terminated on each end on the appropriate hardware as outlined in the following sub-section.

2.8.23. Twisted-Pair Cable Termination

Each pair on each end of each intra-building backbone cable shall be terminated on or spliced to a listed Building Entrance Protector housing of 25, 50 or 100 pair configuration. They shall be equivalent to a Circa Model No. 1880B1-25, 50 or 100 and shall be mounted on the plywood on the wall of the Entrance Facility Room in each building on each end of the cable.

At the Capitol Complex, protector housings will be installed in sufficient quantity to provide for the termination of each pair in each cable entering the building. They shall be rack mounted on (designer specified) type protector frames designed specifically to accept these protectors. The termination stubs shall be routed to 110AA2 hardware mounted on the opposite side of the double-sided frame. Mount the new frames directly in line with the existing frames in the CD building.

Each pair in each protector housing shall be equipped with Circa Model Number C3B1S-30 protector module.

2.8.24. Optical Fiber Cable Termination

Each strand on each end of each intra-building backbone cable shall be terminated using a connector type designated by the State. These connectors shall be housed in an appropriately sized optical fiber distribution center that will be mounted on an equipment rack as described in Section 3.7. The optical fiber distribution center will be mounted using ‘external star’ star washers on every mounting screw. Sufficient connector panels in a twelve port configuration will be provided. Blank plates shall occupy any vacant connector panel spaces.

2.8.25. UTP/STP Patch Cords

Sufficient Category 5e, 6, 6a or higher patch cords will be provided, but not installed, to allow for future installation of each port in the electronics provided. The patch cords will be provided in lengths appropriate to facilitate minimum cordage required to terminate the electronics to the distribution system. All excess lengths of cordage will be stored in the vertical wire management on the front of the equipment racks.

2.8.26. Optical Fiber Patch Cords

Sufficient optical fiber patch cords will be provided and installed, to allow for installation of each connector pair provided. The patch cords will be provided in lengths appropriate to facilitate minimum cordage required to terminate the electronics to the optical fiber distribution system. All excess lengths of cordage will be stored in the vertical wire management on the front of the equipment racks.

2.9. **TESTING**

2.9.1. Cabling Testing

Each pair/strand of each intra-building backbone cable shall be tested and the tests results documented in a format that can be provided to the customer in both electronic and hard copy in accordance with Section 3.19 of this RFP. Testing all media is considered a part of normal Supplier installation process.

2.9.2. Twisted-Pair Backbone Cable Testing

Each pair in each intra-building backbone cable shall be tested using a comparable tester for all possible performance problems. This shall include a TDR scan of the cable pair that will be included as part of the test results provided in the As-Built Package under Section 11 of this RFP. The test results shall be provided to the customer as stated above.

2.9.3. Inter-Building Cable Testing

Each pair/strand of each inter-building backbone cable shall be tested and the tests results documented in a format that can be provided to the customer in both electronic and hard copy.

2.9.4. Twisted-Pair Backbone Cable Testing

Each pair in each inter-building backbone cable shall be tested using a Level III tester that meets or exceeds the requirements of ANSI/IA/EIA 568-B.1 and B.2 for all possible performance problems. This shall include a TDR scan of the cable pair that will be included as part of the test results provided in the As-Built Package under Section 3.19 of this RFP. The test results shall be provided to the customer as stated above

2.9.5. Optical Fiber Backbone Cable Testing

Each strand in each inter-building backbone cable shall be tested using an optical light source and power meter at both the 850 nm and 1300 nm wavelengths for multimode cable and 1310 nm and 1550 nm wavelengths for single mode cable from both ends of the cable. The results shall be provided to the customer as stated above.

2.9.6. UTP/STP Testing

Each Category 5e/6or 6a, or higher, wire will be tested using a Level III tester that meets or exceeds the requirements of ANSI/TIA/EIA 568-B.1 and B.2. Each wire will be tested in the “Permanent Link” configuration. The results will be stored in the tester and downloaded to a CD and included in the AS-Built package. A representative of the State may witness the downloading and storage of the files upon request. In addition, a copy of the results will be provided to the customer in the form of a CD or hardcopy upon request. The utility program employed by the manufacturer of the tester will be made available and loaded on a State PC for future review of downloaded files.

2.9.7. Optical Fiber Testing

Each optical fiber will be tested using a light source and power meter that meets or exceeds the requirements of ANSI/TIA/EIA 568-

B.1 and ANSI/TIA/EIA 526-7 and ANSI/TIA/EIA 526-14A. Each fiber will be tested at both the 850 nm and 1300 nm window. The results will be stored in the tester and downloaded to a CD and included in the AS-Built package. A representative of the State may witness the downloading and storage of the files upon request. In addition, a copy of the results will be provided to the customer in the form of a CD or hardcopy upon request. The utility program employed by the manufacturer of the tester will be made available and loaded on a State PC for review of downloaded files.

2.9.8. End-to-End Testing

If a State customer or its agent request END-TO-END testing the following procedures will be used. Upon completion of the copper and optical fiber testing, the circuits will be configured using the copper or optical fiber patch cords. Once they are configured, the customer will install the LAN’s file server on the network and provide a PC equipped with a network interface card for use by the Supplier in testing each optical fiber installed, terminated and tested. The Supplier will attach the PC to each cable, patch up the port to the associated hub and test the port’s capability to communicate with the file server.

During these tests, a representative of the State of Oklahoma shall be present to witness the tests unless otherwise agreed to by the agent or customer. The Supplier may also request a waiver which shall be in writing or the provisions of END-TO-END TEST may apply at a later date. Any modification of these requirements shall also be in writing.

2.10. **LABELING**

2.10.1. Labeling

All labeling of all wire/cable/equipment will be done in conformance with ANSI/TIA/EIA 606-A. As a minimum, each wire/cable installed will be labeled at each end of the wire/cable using a “flag” label in an area visible from the point of termination. At the faceplate end, the label can be concealed behind the faceplate but shall be readily accessible should the faceplate be removed from the point of attachment. At the patch panel location, the label will be attached to the cable between the point of termination on the patch panel and the vertical run on the equipment rack. It shall be visible in the bundle at the point of installation.

The cable will have a distinct identifier that is unique throughout the building. It will indicate the origination point, termination point and cable number. An example for a horizontal wire is: CD001/R1.1.56/WA205/V1, where the wire originates at the Telecommunications Room 001 on patch panel 1, port 56; terminates at work area 205, modular jack position Voice 1. An authorized representative of the State, prior to implementation, must approve any labeling scheme employed.

2.11. **AS-BUILT PACKAGE**

2.11.1. As-Built Requirements

The successful Supplier will provide an as-built package at the completion of each project. This package shall include as a minimum the following items:

• Updated drawings with any changes implemented

• Any routes of any wire/cables installed

• Test results for UTP/STP testing (as applicable)

• Test results for optical fiber testing (as applicable)

• Facility Assignment Records (FAR’s)

• Rack elevation layouts (indicating all hardware installed)

• Warranty Package to include dates (Product Warranty)

• Telecommunications floor plans indicating the location of any racks installed

• Certificate of Acceptance

• Summary sheet of test results for quick reference

Test results shall be provided as indicated in the testing sections of this specification.

Drawings provided to the Suppliers at the site survey conference can be used as the basis for any as-built. If changes are noted in the field, they shall be indicated on the Supplier’s updated drawings. The updated drawings shall be provided to the State of Oklahoma in electronic format and hard copy (in color).

FAR’s are records indicating the assignment and patch up of all UTP/STP and optical fiber ports activated during the project. They can be formatted on electronic media using an Excel spreadsheet or other cable management software and shall include hard copies of each record.

Rack elevation drawing, wall elevation drawings and all other drawings shall be provided to the State in electronic format (MicroSoft Visio, AutoCAD®, Adobe PDF, Microsoft Visio) and hard copy (in color if applicable).

At the time the as-built package is submitted, written proof of the Supplier applying to the manufacturer for “certification” of the installation shall be included along with an estimated date of receipt of final certification from the manufacturer. If required by the manufacturer, a factory representative can visit the installed locations for on-site inspection of the installation. The visit shall be coordinated with the SAHJ prior to being scheduled.

2.12. **INSPECTION**

2.12.1 Inspection, Acceptance and Title

Inspection and Acceptance will be at destination and upon successful installation unless otherwise provided. Title to/or risk of loss or damage to all items shall be the responsibility of the successful Supplier until acceptance by the State unless loss or damage result from negligence by the State. If the materials or services supplied to the State are found to be defective or not conform to the specifications, the State reserves the right to cancel the contract upon written notice to the Supplier and return products at the Supplier’s expense based upon the terms of the Contract.

The State of Oklahoma shall at all times have access to the work in preparation or progress and the Supplier shall provide proper facilities for such access and for inspection.

Upon request the Supplier shall not close up any work until the State has inspected the work. Should the Supplier close up the work prior to inspection by the State, the Supplier shall uncover the work for inspection by the State at no cost to the State and then recover the work according to the specification(s) contained herein.

The Supplier shall notify the State in writing when the work is ready for inspection. The State will inspect the work as expeditiously as possible after receipt of notification from the Supplier. Any delay experienced by the Supplier due to delayed response from the State will not be held against The Supplier in determining success of meeting established deadlines.