ABBREVIATED STATEMENT OF WORK

FOR

FIBER OPTIC INFRASTRUCTURE INSTALL

PROJECT # 1046962

January 12, 2022

PREPARED BY:

17TH CIVIL ENGINEER SQUADRON (AETC)
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STATEMENT OF WORK
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PART 1.0 – SCOPE OF WORK:

1.1 GENERAL: The work to be performed under this contract and in accordance with this Statement of Work shall consist of furnishing all necessary parts, labor, tools, transportation, supplies, supervision, equipment, materials, and incidentals necessary for providing all work shown on the drawings (Technical Exhibits), statement of work, and all applicable codes, regulations, standards and criteria in effect at the date of solicitation. The work outlined below shall consist of, but not be limited to the following:

1.2 AGENCY RELATIONSHIP: Tom Green County (TGC) has sole contract authority. 17th Civil Engineer Squadron (17 CES) Goodfellow AFB shall serve in the role of providing contract coordination/monitoring but shall not have any direct contract authority to approve or disapprove construction work. All contract correspondence shall be directly submitted to TGC contract representative.

1.3 PROJECT DESCRIPTION: The Contractor shall engineer, furnish, install, terminate and test single mode fiber optic cable at Information transfer building 146 towards North Gate, South Gate and B740 aboard Goodfellow Air Force Base, San Angelo Texas.).Included are four CLIN options. If any departure from the SOW or SOO are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted as soon as possible to the Contracting Officer, or designated representative for action. No such departures shall be made without prior approval of the Contracting Officer, or designated representative. Refer to Technical Exhibit 01: Statement of Objective Fiber Optic Infrastructure Install

1.3.1 CLIN OPTION 1: OSP/ISP Standardization (EMCS)-The Contractor shall engineer, furnish, install, and test (EFI&T) single mode (SM) fiber optic cable (FOC) at ITB 146 and ISP wiring to seven buildings aboard Goodfellow Air Force Base, San Angelo Texas. The Contractor shall provide all equipment, tools, materials, supplies, transportation, labor, supervision, management, and other incidentals necessary to meet the requirements as stated in the Statement of Objectives (SOO). All electronics equipment, supplies, and materials to be installed shall be new and not refurbished. Refer to Technical Exhibit 02: Statement of Objectives for OSP/ISP Standardization (EMCS)

1.3.2 CLIN OPTION 2: DS FOC Install from ITB's to ITB's Phase II-The Contractor shall engineer, furnish, install and test (EFI&T) 96 strand single mode (SM) fiber optic cable (FOC) at several ITB's. ITB's include 146, 701, 448, and 3311. The Contractor shall provide all equipment, tools, materials, supplies, transportation, labor, supervision, management, and other incidentals necessary to meet the requirements as stated in the SOO. All electronics equipment, supplies, and materials to be installed shall be new and not refurbished. Refer to Technical Exhibit 03: Statement of Objectives for DS FOC Install from ITB's to ITB's Phase II

1.3.3 CLIN OPTION 3: OSP Standardization Bldg 448 Phase I-The Contractor shall engineer, furnish, install and test (EFI&T) single mode (SM) fiber optic cable (FOC) at ITB 448 to eight buildings aboard Goodfellow Air Force Base, San Angelo Texas. The Contractor shall provide all equipment, tools, materials, supplies, transportation, labor, supervision, management, and other incidentals necessary to meet the requirements as stated in the SOO. All electronics equipment, supplies, and materials to be installed shall be new and not refurbished. Refer to Technical Exhibit 04: Statement of Objectives for OSP Standardization Bldg 448 Phase I

1.3.4 CLIN OPTION 4: OSP Standardization Bldg 448 Phase II-The Contractor shall engineer, furnish, install and test (EFI&T) single mode (SM) fiber optic cable (FOC) at ITB 448 to eleven (11) buildings aboard Goodfellow Air Force Base, San Angelo Texas. The Contractor shall provide all equipment, tools, materials, supplies, transportation, labor, supervision, management, and other incidentals necessary to meet the requirements as stated in the SOO. All electronics equipment, supplies, and materials to be installed shall be new and not refurbished. Refer to Technical Exhibit 05: Statement of Objectives for OSP Standardization Bldg 448 Phase II

1.4 LOCATION: Goodfellow Air Force Base is located in Tom Green County, on the southeast side of San Angelo, TX. and is bounded to the north by Highway #388 (Paint Rock Rd.), to the west by Fort McKavitt Rd and Bell Street/Christoval Road, to the south by Highway #1223 (San Antonio Hwy.) and to the east by the eastern city limits. Work locations are established on Technical Exhibits Map/drawings and SOOs.

1.5 WORK AND MECHANICS: The work for this project shall be executed in the best and most workmanlike manner, by qualified and efficient mechanics/tradesmen, skilled in their respective trades. Only certified journeymen in each respective trade, or apprentices under the direct supervision of certified journeymen, shall be permitted to install and/or supervise installation for this project. Individual trade work for this project shall be performed and quality maintained by the applicable trade, only. All trades shall coordinate their work with that of other trades. The Contractor shall coordinate and perform all operations in a manner that shall result in a professional and expeditiously completed project. The Contractor shall provide items of work not specifically indicated, but obviously and/or normally required to complete and properly execute the work. The work shall be in strict accordance with prevailing industry standards and manufacturer's instructions. Work and materials shall comply with this Statement of Work, the Drawings and the editions in effect at the time of this solicitation for all applicable codes, criteria, regulations and guidelines, all of which shall be made a part of the SOW.

1.5.1 QUALITY ASSURANCE: The Contractor shall provide Quality Assurance Support for the life of the project. The Contractor's quality assurance evaluator shall assist the Government

representative in performing random spot checks and system acceptance tests. The Contractor shall be responsible for identifying system and outside plant deficiencies and /or discrepancies throughout the life of the project. A weekly report (soft copy) shall be submitted indicating progress/status and listing any deficiencies/discrepancies found and actions to correct them.

1.6 PROJECT SUPERINTENDENT/ALTERNATE: Project Superintendent shall have five years general construction experience, minimum; shall be a high school graduate or GED equivalent, minimum and having held the same position on 3 prior like projects of equal or greater complexity and construction costs, minimum. The Superintendent and/or the Alternate shall be available five work [5] days per week, eight [8] hours per work day. The Superintendent's approved alternate shall meet the same criteria as the superintendent, shall be present and able to respond on the Superintendent's behalf when the Superintendent is not available.

1.6.1 PROJECT MANAGEMENT: The Contractor shall provide a Project Manager (PM) and alternate(s) responsible for contract performance and continuity. The Contractor shall identify the Project Manager's or alternate's range of authority to act for the Contractor relating to daily contract operation.

1.6.2 MINIMUM CONTRACTOR QUALIFICATIONS: All work shall be performed by an experienced Telecommunications Contractor. The Contractor shall have a minimum of 3 years of experience in Telecommunications Systems installations and provide the technician's splicing certifications that are to perform work on this project.

1.7 PERFORMANCE PERIOD: The Contractor shall have 90 calendar days to perform all work associated with this project.

1.8 WORK SCHEDULE: Workdays shall be from 0730 to 1630, Monday thru Friday; no weekend work allowed unless approved by the Contracting Officer. If weekend work is required Contractor shall submit request in writing to Contracting Office a minimum of 72 hours in advance. The Contractor shall provide written notification to the Contracting Officer fourteen (14) calendar days lead time for work schedule.

1.9 WORK AREA ACCESS: Government escorts are not needed in this area.

1.10 CONCRETE TRUCKS: Cleaning out of concrete trucks on Goodfellow AFB is prohibited. Concrete truck chutes, only, may be rinsed at the construction site. Wastewater and concrete from this rinse shall be collected in a high-density polyethylene (HDPE) plastic-lined box or pit provided by the Contractor at the site. At the end of pouring operations, the Contractor shall excavate all the waste and liner and properly dispose of same. The Contractor shall dispose of all concrete debris to an authorized off base site and shall remove any and all concrete debris and residue at the end of the project at no additional cost to the Government. The pit shall be completely backfilled and the site restored to original conditions.

1.11 REFERENCES: All publications listed herein shall be the most current editions in effect at the time of solicitation and form a part of this Statement of Work and attached Statements of

Objectives Appendix A: Applicable Standards. The publications are referred to in the text by basic designation only and include the following:

GAFB INSTRUCTION
GAFBI 32-2001 Goodfellow AFB Base Fire Protection Program
GAFBI 31-102 Installation Security Instruction

INTERNATIONAL BUILDING CODE [IBC]

INTERNATIONAL FIRE CODE [IFC]

NATIONAL ELECTRIC CODE [NEC]

NFPA 70- NATIONAL ELECTRIC CODE

UNIFORM BUILDING CODE (UBC)

US ARMY CORPS OF ENGINEERS HEALTH AND SAFETY MANUAL EM 385-1-1

AFI 91-203-AIR FORCE CONSOLIDATED OCCUPATIONAL SAFETY INSTRUCTION

OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION (OSHA)
OSHA STD 29 CFR 1910 and 1926
OSHA STD 29 CFR 1910.252 Welding, Cutting and Brazing (General Requirements)
OSHA STD 29 CFR 1910.268 Telecommunications

AMERICAN CONCRETE INSTITUTE [ACI]

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES [ACIL]

AFBAN-FS-AF BASE AREA NETWORK FUNCTIONAL SPECIFICATION, 2017

NEMA TC 2- ELECTRICAL POLYVINYL CHLORIDE (PVC) TUBING AND CONDUIT

ANSI/TIA-606-B ADMINISTRATION STANDARD FOR TELECOMMUNICATION INFRASTRUCTURE

ANSI/TIA-568-C COMMERCIAL BUILDING TELECOMMUNICATIONS (568C.1,568C.2,568C.3) CABLING STANDARD

ANSI/TIA-607-B COMMERCIAL BUILDING GROUNDING (EARTHING) AND BONDING REQUIREMENTS FOR TELECOMMUNICATION

ANSI/TIA-569-C COMMERCIAL BUILDING STANDARD FOR TELECOMMUNICATION PATHWAYS AND SPACES

ANSI/TIA-570-C RESIDENTIAL TELECOMMUNICATION INFRASTRUCTURE STANDARD

ANSI/TIA-758 CUSTOMER-OWNED OUTSIDE PLANT TELECOMMUNICATION INFRASTRUCTURE STANDARD

T.O. 00-33A-1001, METHODS AND PROCEDURES, GENERAL CYBERSPACE SUPPORT ACTIVITIES

BICSI TDM MANUAL- BUILDING INDUSTRIES CONSULTING SERVICES INTERNATIONAL TELECOMMUNICATION DISTRIBUTION METHODS (TDM) MANUAL

BICSI- OUTSIDE PLAN DESIGN REFERENCE MANUAL

RUS BULLETIN 1751F-643 UNDERGROUND PLANT DESIGN

RUS BULLETIN 1751F-644 UNDERGROUND PLANT CONSTRUCTION TELECOMMUNICATION ENGINEERING SHIELD CONTINUITY AND CONSTRUCTION MANUAL (TE&CM) 451.2

RUS BULLETIN 1751F-801 ELECTRICAL PROTECTION FUNDAMENTALS

RUS BULLETIN 1753F-151 (515B) SPECIFICATIONS AND DRAWINGS FOR UNDERGROUND CABLE INSTALLATION

FGDC-STD-007.3-1998 GEOSPATIAL POSITIONING ACCURACY STANDARDS PART 3: NATIONAL STANDARD FOR SPATIAL DATA ACCURACY

UFC 3-520-01 INTERIOR ELECTRICAL SYSTEMS

UFC 3-580-01 TELECOMMUNICATION INTERIOR INFRASTRUCTURE PLANNING AND DESIGN (CH. 1 & 2)

GOODFELLOW AIR FORCE BASE TELECOMMUNICATION REQUIREMENTS (17CS, SOP)

1.12 SUBMITTALS: The Contractor shall provide submittals in the form of manufacturer's data, certificates of compliance and samples for all items provided and install ed per the attached AF Form 66. The Contractor will not be permitted to perform any work on site without approved submittals. The submittals listed on the attached AF Form 66 shall be required and shall be submitted for Government Approved (GA) or For Information Only (FIO). Use AF Form 3000

to process submittals. Submit four copies of submittals to Contracting Officer. Execute DD Form 1354 Checklist and submit to Contracting Officer before final payment is issued.

1.13 MANUFACTURER'S CATALOG DATA: Data composed of catalog cuts, brochures, circulars, specifications and product data, and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents.

1.14 SAMPLES: N/A

1.15 CONTRACTORS WARRANTY: The Contractor shall warrant all equipment, materials and workmanship for a period of one [1] year after project completion. Any manufacturer and/or specified warranty that is for a period longer than the one [1] year Contractor warranty shall be so warranted. At a date one month prior to termination of the one [1] warranty, the Contractor and the Government shall review all installed equipment, materials, workmanship and the Contractor shall make repairs and/or replacements of defective warranty items.

1.16 MANUFACTURERS WARRANTY: The contractor shall identify all items being installed that are covered by a manufacturers guarantee or warranty and provide validated copies of such. The identification shall list the name of the company and the expiration date of the guarantee or warranty.

1.17 SAFETY: All Contractor operations shall be conducted and performed in accordance with Department of Labor, OSHA requirements found in 29 CFR 1910 (1910.146 and 1910.147) and 29 CFR 1926, and Air Force Occupational Safety & Health (AFOSH) standards including AFI 91-203, Air Force Consolidated Occupational Safety Instruction. The Contractor shall also ensure that all work shall be performed in accordance with project identified national standards, military manuals, instructions, pamphlets, standards, and handbooks, and with the edition in effect on the date of this solicitation of the Corps of Engineers (COE) Safety Manual 385-1-1. All job sites shall be subject to inspections by the Department of Labor. In the event of conflicts between the OSHA standards and these requirements, the most stringent shall apply.

1.17.1 Resolution of Department of Labor citations for violations of Occupational Safety and Health Standards is a Contractor responsibility and shall provide for no basis of a claim against the Government.

1.18 TEMPORARY FENCE: Prior to the start of any work for this project, the Contractor shall provide temporary barricades on the road where the work begins. There shall be no need to fence off the perimeter.

1.19 FIELD OFFICE: The Contractor shall maintain a clean, secure, weather-tight, temporary portable field office placed on site with all required services during the duration of the project.

1.20 PORTABLE TOILETS: For the duration of this project, the Contractor shall provide and properly maintain portable toilet[s] on site for the use of the workers.

1.21 PRODUCT DATA: N/A

1.22 AS BUILT DRAWINGS: Following the project completion or turnover, within 14 days the Contractor shall furnish 2 redline drawings showing the "as-built" configuration in format specified by base SCX project manager. The base communications squadron will provide baseline drawings. The Contractor shall provide As-Built Rack Elevation, Inside Cable Plant and Outside Cable Plant drawings and distribute per Goodfellow Air Force Base, Standard Operating Procedures.

1.22.1 AS BUILT DOCUMENTATION IN CVC: The Contractor shall record geospatial data and provide as-built documentation (shape files) of all new installed maintenance hole system components (including metadata) compatible with the Cyberspace Infrastructure Planning System (CIPS) Visualization Component (CVC) drawing system. Data points shall be recorded at the center of each manhole/handhole lid and at intervals not to exceed 25 feet along cable routes. Sufficient data points shall be recorded to capture any change in direction along the route. All GPS coordinates shall have +/- 3 feet accuracy for all readings. The government is responsible for providing the Contractor with a copy of the installation's most current GeoBase Common Installation Picture (CIP), and current CVC drawings of the areas of interest. The government will review the shape files in CVC and transcribe the information to the CVC system. Shape files shall be delivered upon project completion.

1.23 DELIVERY AND STORAGE: All equipment and materials delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variation, dirt and dust, and any other contaminants. Store all materials in a secure, clean and dry location.

1.24 WELDING, CUTTING, AND BRAZING: Fire Protection shall complete inspection of all welding, cutting and brazing operations prior to any operation. The contractor shall provide the appropriate operable fire extinguisher. Contractor shall comply be with OSHA STD29 CFR 1910.252 Welding, Cutting and Brazing (General Requirements) and AFOSH 91-5 Welding, Cutting and Brazing. Air Force Form 592 USAF Welding, Cutting and Brazing permit will be issued prior to any operation and shall be kept on site till completion of operation or permit expires. Contact Fire Protection at (325) 654-3532/33/34 for issuance of permit.

1.25 OPERATIONS SECURITY (OPSEC) REQUIREMENTS: The purpose of OPSEC is to reduce the vulnerability of Air Force missions by eliminating or reducing successful adversary collection and exploitation of critical or sensitive information. OPSEC applies to all activities that prepare, sustain, or employ forces during all phases of operations. OPSEC is a process of identifying, analyzing and controlling critical and sensitive information indicating friendly actions associated with military operations and other activities to: 1) identify those actions that can be observed by adversary intelligence systems; 2) determine what specific indications could be collected, analyzed, and interpreted to derive critical or sensitive information in time to be useful to adversaries; 3) select and execute measures that eliminate or reduce to an acceptable level the vulnerabilities of friendly actions to adversary exploitation.

Organizations and personnel supporting the 17th Training Wing have OPSEC requirements associated with their activities and support. The Contractor will comply with the 17th Training Wing OPSEC Program and during the construction contract pre-construction meeting further

information will be provided by the Government on the Goodfellow AFB OPSEC Program. The basis for the OPSEC program is AFI 10-701.

1.25.1 SPECIFIC REQUIREMENTS:

a. Contractor personnel will receive OPSEC Awareness Education and Duty-Related Training within 90 days of contract start date and annually thereafter.

b. OPSEC Awareness Education and Training will be provided or coordinated through government channels.

c. The contractor is susceptible to OPSEC assessments, surveys or any other evaluation tool available for the Wing OPSEC Program Manager or subordinate OPSEC Coordinator to use in order to gauge the effectiveness of the overall program.

1.26 UTILITY CONSERVATION: The Contractor will be required to participate in government energy conservation programs. For the purpose of this contract, utilities such as water, electricity, etc., will be furnished by the government at no cost to the contractor. Long distance and Defense Switched Network (DSN) telephone services will not be provided.

1.27 WORK SCHEDULE: Working hours for the Contractor will normally be between the hours of 7:30 A.M. and 4:30 P.M. excluding Saturdays, Sundays, and Federal holidays. Refer to Section H of the solicitation/contract document for further information on working days. If the Contractor desires to work during periods other than above, a request must be made to the Contracting Officer in writing four (4) calendar days in advance of his/her intention. If the required base personnel are reasonably available, the Contracting Officer may authorize the Contractor to perform work during periods other than normal duty hours/days.

1.28 NORMAL WORK HOURS: The Contractor shall schedule all work to commence between the hours of 7:30 AM and 4:30 PM, Monday through Friday, except on the Federal holidays and days designated as "Family Days" by Air Education and Training Command (AETC) as listed below. Permission to work outside these normal business hours may be granted by the Contracting Officer. Requests to work outside the normal work hours must be submitted in writing to the Contracting Officer at least 3 working days in advance of the date requested.

Federal Holiday			
		2022	2023
New Year's Day	01 Jan	31 Dec	02 Jan 24
Martin Luther King's	3rd Monday in January	17 Jan	16 Jan
President's Day	3rd Monday in February	21 Feb	20 Feb
Memorial Day	Last Monday in May	30 May	29 May
Juneteenth	19 June	20 June	19 June
Independence Day	04 Jul	04 July	04 July
Labor Day	1st Monday in September	05 Sept	04 Sept
Columbus Day	2nd Monday in October	10 Oct	09 Oct
Veterans Day	11 Nov	11 Nov	10 Nov

Thanksgiving Day	4th Thursday in	24 Nov	23 Nov
Christmas Day	25 Dec	26 Dec	25 Dec

While AETC Family Days have not been identified past calendar year 2018 it is anticipated that the same number of AETC Family days will be declared each year.

Any Holiday falling on a Saturday will be observed the preceding Friday. Any Holiday falling on a Sunday will be observed the following Monday.

The base could be closed because of security problems, adverse weather, or other events. Unless otherwise notified by the Government, the Contractor should monitor local television stations, radio stations, or Goodfellow's Facebook page for notification of a possible base closure or late opening. The Contractor may not receive any other form of notification of a base closure from the Government, unless contacted by the Contracting Officer (CO) or the COR. The Contractor is responsible for notifying his/her employees. Contractor(s) do not report when the base is closed due to security problems and/or adverse weather.

1.24 TOBACCO USE IN AETC FACILITIES: Contractors are advised that the Commander has placed restrictions on the smoking of tobacco products in AETC facilities. AFI 40-102, Tobacco Use in the Air Force, outlines the procedures used by the commander to control smoking in our facilities. Contractor employees and visitors are subject to the same restrictions as government personnel. Smoking is permitted only in designated smoking areas. Additional information, to include locations of designated smoking areas, will be provided to the contractor at the pre-performance conference.

1.25 BASE ACCESS SECURITY REQUIREMENTS: The Contractor shall comply at all times with base law enforcement and security requirements to include base pass requirements.

1.25.1 SECURITY REQUIREMENTS: The Contractor shall process and provide a Site Visit Request Letter to 17 CS/SCXP within 5 calendar days after contract award. This spreadsheet shall identify the names (as shown on the driver's license), driver's license numbers and state of issue, and birth date of the personnel who will be performing work under this SOW, company name, address, phone number and contract number, start date and end date. This information is required to grant access to the base. If required by the base, the Contractor shall provide identification badges for their employees. All Contractor personnel shall wear these badges while on duty on the Government site. The badges shall identify the individual, company name, and by clearly and distinctly marked as Contractor and be in accordance with base regulations.

1.25.2 SECURITY CLEARANCE: Stated work and associated products shall be performed at the UNCLASSIFIED level. However, some of this work will take place in secure areas where Contractor employees must be escorted at all times. The Contractor must coordinate access to secure areas at least 24 hours ahead of time with the 17 CS/SCXP PM. It is the Government's responsibility to provide escorts.

1.26 CONTRACTOR INSTALLATION ACCESS PASS: Before arrival, a Government identification card-holding person from the sponsoring agency, Base Contracting

office/administrator or applicable local project manager shall submit a request for base access using the 17 Training Wing's Base Access List (BAL) memorandum as a form of registration for each credential applicant. The base sponsor/sponsoring agency/Contracting Officer and the contracted management team shall establish an accountability process to account for

each applicant, to oversee the BAL process, and to retrieve installation passes when access is no longer required. Base sponsors/sponsoring agencies or contract officers shall ensure the BAL is accurate, it is signed and forwarded to the 17 SFS Pass & Registration section for completion of the vetting and fitness determination processes. The BAL shall be delivered to Pass & Registration, located at the Visitor Control Center (VCC). When delivery is not possible, the BAL shall be forwarded to Pass & Registration via a ".mil" email account located on Goodfellow AFB. The BAL shall include pertinent visitor information, reason for entry, frequency of entry, destination, times each day requiring entry, and duration of request.

Contractor Initial (and periodic) Installation Access Screening. The Contractor shall provide Pass and Registration with two forms of identification, one of which shall be a state issued photo identification. Prior to being allowed access, a minimum of a background/National Crime Information Center (NCIC) check shall be completed on all Contractors, requesting unescorted access for official business. This screening process shall validate the Contractor's suitability to visit Goodfellow and certify that the Contractor shall not pose an increased threat to the base populace. The Contractor shall then be issued a temporary Defense Biometric Identification System (DBIDS) pass or AF Form 75A through the expiration date on the BAL request. Possession of an authorized access pass shall not automatically authorize or guarantee access to the installation. The individual shall still have a valid purpose to be on the installation and properly sponsored, as applicable.

1.26.1 ACCESS DENIAL: If it is determined a Contractor requesting access has been convicted of a felony or pled guilty to a felony charge within the past 10 years, or is considered not fit to obtain authorized access based on the information obtained during the identity vetting, or criminal history indicates the individual shall present a threat to the good order, discipline and morale of the installation, Security Forces personnel shall deny entry. The Contractor shall be informed of the access denial, shall be issued an Access Denial Letter, and shall be informed on how they shall appeal this order.

1.26.2 ACCESS DENIAL APPEAL PROCESS: When denied access, contract visitors shall be informed to report back their manager. If the contract worker and management are considering an appeal, it shall be submitted by letter to the 17 SFS Commander, within 30 days of access denial. The contract manager shall first contact the military contract officer/administrator or on-base sponsor for additional guidance and clarification. The appeal shall be delivered to the installation Visitor Control Section or mailed to Security Forces, addressed to 17 SFS/CC, 361 Apache Trail, Goodfellow AFB, 76908. The Contractor's appeal shall discuss all facts and reasons to support rescinding access denial. The 17 TRW/CC shall approve/disapprove all appeals for entry.

1.26.3 FOR INSTALLATION ACCESS ON NON-DUTY HOURS OR DOWN DAYS: Identify which workers need access on weekends, Federal holidays/family days, and down days, where required.

Ensure only workers that are already vetted are on the Extended-Hours request (no new personnel). New personnel require a new BAL and formal vetting.

Complete the "After Hours" BAL for workers requiring down day access to the installation.

Identify the vehicle requirements. If operations cannot support the search procedures for large vehicles/special purpose equipment, the request shall be declined unless arrangements are made to deliver the vehicle/equipment prior, during normal duty hours.

During the above-mentioned days, the Contract officering, contract representative sponsoring ID cardholder shall be required to be present during hours of the work request.

1.26.4 All BALs shall be accomplished each time employees or personnel change, not to exceed 180 days. Oversight for BAL updates and establishment of procedures to ensure Physical Access Control System (PACS) credentials and locally created access credentials from individuals who no longer require installation access shall be the responsibility of the contracting officer/contract administrator.

When an employee (regardless of position) is no longer employed by the Contractor or Sub-Contractor all DBIDS passes shall be to be returned to the Contract Officer/Administrator or to the Visitor Control Center. If a local issued access credential/pass is not returned, the contract officer shall withhold funds or the Installation Commander shall consider permanent debarment to the installation. Immediate access denial shall be initiated by Pass & Registration updating the DBIDS database until disposition of the DBIDS pass shall be resolved.

1.27 DEMOLITION: N/A

1.28 PERMITS: The Contractor shall complete and process all permits required to complete the installation prior to any trenching, or modifications to a facility, maintenance hole or hand hole; for example, the Base Civil Engineering Work Clearance Request, a digging permit, (AF Form 103) and Base Civil Engineer Work Request (AF Form 332). AF Form 103 and AF Form 332 {and any other required permits (as determined by Base Civil Engineering (BCE) or 17 CS/SCXP, etc.)} shall be submitted at IAW local procedures. All utility markings, flags, etc. shall be maintained by the contractor after the responsible work center/shop identifies/locates them. If a utility is severed or damaged due to neglect or if attributed to the fault of the contractor, then the contractor shall repair and return the utility back to the same condition it was in prior to the damage. The form(s)/permits shall be submitted within 10 calendar days after award.

1.29 INTEGRATED PROCESS TEAM (IPT): The Contractor shall chair a weekly IPT meeting that includes Contractor representatives, the 17 CS/SCXP Project Manager (PM), and other base personnel as required. The Contractor shall provide an agenda and a worldwide "Meet

Me" teleconference capability for the duration of the project. The purpose of the IPT meeting is to discuss project progress, problems being encountered, and other information necessary/beneficial to ensure success and timely completion of contract requirements. The Contractor shall record meeting minutes and distribute to the attendees. The contractor shall provide at this meeting a weekly action register, in Microsoft excel, to capture items that need to be addressed. Action register shall have at a minimum Project Description, Contact list, Action Item List, Discrepancy List, and any pertinent information related to the project.

PART 2.0 – PRODUCTS:

2.1 REFERENCES TO MATERIALS, MANUFACTURERS AND PRODUCTS: Materials shall be the standard product of manufacturer's regularly engaged in the manufacture of such products. The products furnished shall meet the quality and specifications indicated herein.

2.2 SITE VISITS: The Contractor may visit the premises to become thoroughly familiar with details of the work and working conditions, verify dimensions in the field, and shall advise the Contracting Officer of any discrepancies before starting the work.

PART 3.0 – EXECUTION:

3.1 GENERAL: All work shall be performed as shown and in accordance with the manufacturer's diagrams and instructions, unless otherwise specified. The Contractor shall field verify all dimensions and site conditions. Price increase adjustments to the original contract price will not be issued because the Contractor was not aware of existing conditions. The Contractor shall provide all labor, materials, tools and equipment required to perform all dismantling, repairs and installation as listed in this statement of work.

3.2 INSTALLATION: All work shall be done with the building occupied and the work area unoccupied. The Contractor shall coordinate with the Contract Inspector prior to start of work.

3.3 SPECIFIC REQUIREMENTS: Refer to Para. 2.2 in the appropriate SOO.

3.3.1 MAINTENANCE HOLES (MHs): The Contractor shall pump out water as required. Water shall be drained IAW BCE and base environmental requirements.

3.3.2 MEASUREMENTS: Any distances provided in this SOO are approximations and should NOT be used for ordering ma0terials or determining duct lengths.

3.3.3 SPLICE CONDUCTORS: All fiber splicing shall be performed in accordance with RUS Bulletin 1735F-401, Standards for Splicing Copper and Fiber Cable. The fusion splice method shall be used for all splicing and terminations of fiber optic cable. Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors.

3.3.4 CABLE RACKS AND CABLE RACK SUPPORTS: Cable racks shall be installed in maintenance holes as required – this includes new and existing MHs/HHs. Splices shall not be supported by the cables that enter each end of the splice case. The splices shall be supported by cable hooks under the splice case. Telecommunications industry standard cable hooks of the appropriate length shall be provided to support cables and splice cases. The cable hooks shall be secured using cable rack locking clips. All cables shall be supported using racking clips, cable racks, and cable hooks.

3.3.5 LABELING: The Contractor shall label all equipment and cables they install and cables identified for re-use IAW TIA-606-B-2012 and as directed by the 17CS, SCXP. New ducts shall be permanently labeled on the wall of each building/maintenance hole indicating the connecting building/maintenance hole at the other end of the duct (for example, "To MH-200"). Tagging and labeling of new cables shall be IAW 17CS labeling scheme.

3.3.6 CABLE TAGS: All tags shall be permanently labeled, easily visible and corrosion resistant. Install cable tags in all maintenance holes/handholes, cable vaults, pull boxes and building entrance terminal locations. When cables pass through a maintenance hole, put a tag on the cable, approximately 2 feet from each duct entrance. Information on the cable tag shall identify cable by size, type, cable number and count. See Para 2.2.5 (above) for nomenclature for tagging.

3.3.7 PULLING TAPE: All newly installed ducts left vacant shall be provided with a waterproof, corrosion resistant, pre- lubricated flat woven polyester pull tape with sequential footage markings (1250 lb. pulling strength) for future cable installations. The pull tape shall extend into the maintenance holes and be secured to a cable rack or pulling iron, etc.

3.3.8 CABLE TERMINATION: Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors in cassette style housing. The pigtails shall be sized the same as the OSP fiber they are spliced to, i.e., 125/8.3 micron to 125/8.3 micron. The pigtails shall be duplex (or simplex) unless otherwise agreed to by 17 CS/SCXP.

3.3.9 OSP MAINTENANCE LOOP(S): The Contractor shall install a minimum of a 50 foot fiber optic cable maintenance loop at the first MH from the building, at every splice point MH location and at every 3rd MH in the route. The maintenance loop slack shall be properly labeled, securely supported to the cable ladder and off the MH floor or in telecomm room.

3.3.10 GROUNDING/BONDING: Grounding/Bonding hardware such as corrosion resistant wire, bonding ribbon, clamps, ground rod, etc. necessary to properly bond/ground the cable in MHs shall be provided by the Contractor. In addition, grounding/bonding of telecommunication racks to telecomm busbar and building ground if necessary. Reference UFC 3-580-01, TIA 607, and TIA 758.

3.3.11 UNDERGROUND CONDUIT SYSTEM: The Contractor shall be responsible for any required trenching and/or boring necessary to lay the duct system. The Contractor is also responsible for backfilling ditch lines and compaction of fill materials with appropriate compaction tools. Directional drilling shall be used for major road crossings, taxiways, runways,

etc. Otherwise, crossing of paved surfaces may be performed by pavement cuts and resurfacing with appropriate matching road material. This does not prevent the Contractor from using directional drilling if it is more cost effective. Ducts will be appropriately protected when placed under paved surfaces (i.e., concrete encasement).

3.3.11.1 COMPOSITION: N/A

3.3.11.2 TYPICAL SITUATIONS: The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-40 Polyvinyl Chloride (PVC) (Schedule 40) IAW NEMA TC-2. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell- end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirements.

3.3.11.3 UNIQUE/ SITE SPECIFICATION SITUATIONS: The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-80-PVC (Schedule 80) IAW NEMA TC-2; high density polyethylene (HDPE) SIDR 11.5, Galvanized Iron Pipe (GIP) or "thickwall" stainless steel. Schedule 80 PVC shall be limited to risers, all above ground conduit and under the roadway/parking pavement. High density polyethylene (HDPE) SIDR 11.5 shall be used when directional bring is used. GIP or stainless steel shall be used under major roadways, taxiways, and runways. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell-end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirement.

3.3.11.4 INSTALLATION: Installation of underground conduits/ducts shall be IAW RUS Bulletin 1751F-643 and RUS Bulletin 1753F-151. Ducts installed beneath roads, sidewalks, parking areas, other paved surfaces or areas to be paved, etc. shall be installed a minimum of 36" below grade. In a MH with knockouts, ducts shall start at the bottom knockout, allowing for upward expansion in the MH. All ducts not installed under roads, sidewalks, parking areas, or areas to be paved, etc. shall have a minimum of 36 inches ground cover, where possible. The Contractor shall provide other protective measures, concrete cap, etc., in those areas where the minimum ground cover cannot be achieved. Grading of ducts shall be accomplished IAW RUS Bulletin 1751F-643. All conduits shall be continuous between MH/HHs (i.e., no breaks or separations in the conduit runs between MH/HHs).

3.3.11.5 BENDS AND SEALING: All bends between MHs shall be a minimum of ten times (10X) the diameter of the duct size (i.e., 4 inch duct = 40 inches) with the sum of bends in all directions not exceeding a total of 90 degrees, where practical. Coordinate with 17 CS/SCXP if runs have bends that total more than 90 degrees is required. Ducts shall have bell-ends and enter a MH perpendicular to the surface of the wall through which it is entering. All ducts/inner-ducts entering MH shall be sealed.
Universal duct plugs or removable putty sealants may be used. Upon completion of conduit sections, a rigid 12" long test mandrel ¼" (6.4mm) smaller than the inside diameter of the conduit shall be pulled through two diagonally opposite ducts to ensure proper alignment. In addition, all ducts shall be cleared of loose materials such as concrete, mud, dirt, stones, etc.

3.3.11.6 UTILITY SEPRATION: When communications ducts cross either power duct or buried power cable, maintain a minimum separation of 3 inches of concrete or 12 inches of well-tamped earth between the two or 12 inches of well tamped earth when parallel; for pipes (e.g., gas, water, oil) maintain 6 inches when crossing or 12 inches when parallel.

3.3.11.7 SPACERS AND TRACER WIRE: Along the length of the duct run, if the ducts are installed by trenching, spacers shall be placed at five (5) foot intervals and cable warning tape shall be buried one (1) foot above the conduit and shall follow the duct route. The tape shall be a minimum of three inches wide and orange in color with the appropriate warning message. At least one duct shall have tracer wire or be otherwise locatable from the surface.

3.3.11.8 ENTRANCE CONDUITS INTO EXISTING MAINTENANCE HOLES: When new entrance conduits/ducts or sleeves are required, the Contractor shall bore and install the necessary holes and install the ducts or sleeves, if a knockout does not exist. Penetration shall not be in such a location through the wall as to block use of existing ducts in the maintenance hole. New ducts will be a minimum of 18 inches from either the maintenance hole floor or ceiling, if practical. The minimum bending radius for entry conduit/ducts shall be no less than 10 times the inside diameter of the conduit. Ducts and openings around ducts shall be sealed to prevent moisture from entering the maintenance holes.

3.3.11.9 EXCAVATION/BUILDING PENETRATIONS: All wall penetrations, including inside buildings, shall be restored to meet the required base fire ratings.

3.3.12 OUTSIDE PLANT INSTALLATION: This section describes the underground cables, flexible geotextile multiple cell fabric, innerduct and MH/HH plus conduit system installation requirements. The Contractor shall design and install Customer-Owned Outside Plant Telecommunications Infrastructure in accordance with ANSI/TIA-758. Each cable installation shall be coordinated with 17 CS/SCXP so that the impact on the building users is properly coordinated. The sequence of installation is at the Contractor’s discretion.

3.3.12.1 INFRASTRUCTURE INSTALLATION: Refer to Para. 2.2.13.1 in the appropriate SOO.

3.3.12.1.1 MAINTENANCE HOLES / HAND HOLES: Refer to Para 2.2.13.1.1 in the appropriate SOO.

3.3.12.1.2 HANDHOLE INSTALLATION / DUCTBANK &EMIT INFRASTRUCTURE: Refer to Para 2.2.13.1.2 in the appropriate SOO.

3.3.12.1.3 DUCTBANK INFRASTRUCTURE / GEO-TEXTILE FABRIC INSTALLATION: Refer to Para 2.2.13.1.3 and Para 2.2.13.1.4 in the appropriate SOO.

3.3.12.2 FABRIC OPTIC CABLE INSTALLATION: Refer to Para 2.2.13.2 , Para 2.2.13.2.1, Para 2.2.13.2.2, Para 2.2.13.2.3, Para 2.2.13.2.4, Para 2.2.13.2.5, and Para 2.2.13.2.6 in the appropriate SOO.

3.4 TEST AND ACCEPTANCE/ INSTALLATION TEST PLAN: The Contractor shall provide a test plan as to how the system shall be pre-tested, in-progress- tested and post-tested to demonstrate to the Government that the system is fully operational ready to be placed into service. The Contractor shall test the system to demonstrate to the Government quality assurance representative. These tests shall be accomplished prior to the system being placed into service.

3.4.1 OUTSIDE PLANT CABLE TESTING: All strands of fiber optic cables shall be tested IAW TIA 526-7 Measurement of Optical Power Loss of Installed Single-mode Fiber Cable Plant, or equivalent. As a minimum, the following tests shall be performed. Both Optical Time Domain Reflectometer (OTDR) and Optical Power Meter tests will be used for all end-to-end circuits. Between FODPs, bi- directional testing at 1310 nm and 1550 nm is required.
NOTE: Testing of the Fiber Optic Cables on the reel shall be provided to the 17 CS/SCXP prior to installation.

3.4.2 ACCEPTANCE/INSTALLATION TEST REPORT: The Contractor shall provide an installation test report of the results of the testing accomplished under the installation test plan IAW CDRL A006.

3.4.3 FINAL ACCEPTANCE: The Contractor shall schedule a final project walk-through with the 17 CS/SCXP. This should be scheduled 10 calendar days prior to acceptance.

PART 4.0 – UTILITY OUTAGES AND SPECIAL CONDITIONS:

4.1 BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST: The Contractor shall obtain and process AF Form 103 for approval prior to commencement of work for this project. The Contractor shall have this approved form on the job site at all times.

4.1.1 Due to the requirement for multiple agencies to coordinate on these requests, expect 7 – 10 days for paperwork processing. Contractor requests should be submitted at the earliest possible date to preclude delays.

4.2 UTILITY OUTAGES: When a utility outage is necessary to perform the contract work in a occupied facility, regardless of whether the work area is occupied, the outage shall be performed by the Contractor during non-duty hours at no additional cost to the Government, unless otherwise approved by the Contracting Officer. The Contractor shall notify the Contract Inspector of outage requirements to include buildings affected; length of outage; and reasons for outage. The Contractor must allow affected occupants a minimum of two – (2) weeks notice prior to outage. The Contractor is also required to provide the Contracting Office a written notification of the requested outage.

4.3 BASE FIRE REGULATIONS: The Contractor shall comply with Base Fire Regulations as set forth in the latest edition of GAFB Instruction 32-2001, titled “Base Fire Protection Program”. The Contractor shall use no explosives or fire in performing the work. All work shall be in strict compliance with all National Fire Codes.

4.4 CONFINED SPACE:

CONFINED SPACES: In Accordance With Air Force Occupational Safety & Health Standard. 91-25, Ch. 7, the organization shall ensure the following information is included in the SOW (or equivalent contracting tool) when a contractor enters a confined space:

a. Notify the contractor if the space is classified permit or non-permit required.

b. Brief contractor on the contents of the space.

c. Brief contractor on the known hazards of the space.

d. Brief the contractor on what precautions and procedures have been implemented by the organization to protect AF workers.

e. Coordinate operations and procedures and agree on permit system to be used if both AF and contractor personnel will enter the space at the same time.

The fire department will coordinate (document) on the contract if they are supplying a rescue team.

The contractor will follow all requirements outline in OSHA Std. 1910.146.

4.5 LOCKOUT/TAGOUT, HAZARDOUS ENERGY CONTROL:

LOCKOUT/TAGOUT: In addition to the requirements in OSHA Std. 1910.147, if a contractor needs to lock or tag something out, the contractor will ensure that affected employees are notified before and after the locks and tags are used.

4.6 TRAFFIC CONTROL: In the event base vehicular traffic is to be disrupted by trenching or horizontal directional boring, the Contractor shall make appropriate notifications NLT 10 calendar days in advance to 17 CS/SCXP of the planned disruptions.

PART 5.0 - ENVIRONMENTAL REQUIREMENTS:

5.1 COMPLIANCE WITH LAWS**:** Construction activities are NOT exempt from air emission, storm water, hazardous waste, and other environmental compliance rules and regulations. The Contractor shall comply and ensure that all Sub-Contractors comply with all applicable federal, state, and local laws, regulations, ordinances and standards related to environmental matters.

5.2 PROTECTION OF HISTORICAL AND ARCHAEOLOGICAL RESOURCES: All known Historical, Archaeological, and Cultural Resources within the Contractors work area will be designated on the contract Technical Exhibits. The Contractor shall take precautions during the contract to preserve all resources, as they existed at the time of contract award and comply with the Archaeological and Historic Preservation Act (AHPA) and the Archaeological Resources

Protection Act (ARPA). The Contractor shall provide all protective devices such as off-limit markings, fencing, barricades or other devices as needed and shall be responsible for preservation of the sites during this contract.

All items having any potential historical or archaeological interest outside of designated areas, which are discovered in the course of any construction activities, shall be carefully preserved. The Contractor shall protect the find in-place by leaving the archaeological find undisturbed and by using flags to mark a 50-foot radius area around the find. The find shall be immediately reported to the Contracting Officer so that the proper authorities may be notified. All work shall be stopped in the immediate area of the discovery until directed by the Contracting Officer to resume work. Any work required to preserve or protect these finds shall be accomplished before work resumes.

5.3 HAZARDOUS AND SPECIAL WASTES GENERATED BY THE CONTRACTOR: The Contractor shall identify, characterize, containerize, store and dispose of hazardous wastes in strict accordance with federal guidelines found in the Code of Federal Regulations, Title 40 (40 CFR) parts 260-270, state regulation 30 TAC 335, all local guidelines, and as specified. A Uniform Hazardous Waste Manifest shall be used by the Contractor to document all parties and locations involved in the transportation, storage and disposal of all hazardous and special wastes. This form shall be provided to the government by the Contractor and signed by the Base Environmental Coordinator (CEIE) before the waste is transported from the limits of government property. A copy of the manifest shall be signed by the receiver of the waste and submitted to the Contracting Officer not later than forty-five days after disposal has taken place. Hazardous waste treatment, storage and disposal facility shall be located within in the state of Texas, permitted by the U.S. EPA, and approved by CEIE.

5.4 CONTRACTOR ENCOUNTERED HAZARDOUS WASTE: The Contractor shall notify the Contracting Officer's Representative and CEIE upon encountering any material not identified in this Statement of Work thought to be hazardous that could jeopardize the safety of workers or personnel in the area. The Government will be responsible for characterization, transportation, storage and disposal of the waste if necessary.

5.5 ASBESTOS: To the best of the Government's knowledge, no asbestos-containing material (ACM) will be encountered during this project. Should the Contractor encounter previously unidentified or suspected ACM, which must be disturbed to comply with the contract documents, the Contractor shall cease that work which would disturb the suspect material and shall immediately notify the Contracting Officer. The Government will take appropriate measures to ascertain the material's composition and determine any remedial actions necessary.

5.5.1 Asbestos Containing Building Materials: Under no circumstances, under the provisions of this contract, shall the Contractor be allowed to provide asbestos containing building materials, or products containing encapsulated asbestos or mineral fibers as defined in the 40 CFR 61, National Emission Standards for Hazardous Air Pollutants of 1990, to GAFB.

The Contractor shall provide a signed statement, accompanied by Safety Data Sheets (SDS) for project materials, from a licensed asbestos inspector or the project architect or engineer, proclaiming that no asbestos-containing building materials were used in the construction.

5.6 HAZARDOUS MATERIALS: The Contractor shall provide to the Contracting Officer an AF Form 3000, Material and Approval Submittal, listing all materials to be utilized during the contract. If any of the material is classified as hazardous in accordance with AFI 32-7086, the Contractor will submit an AF Form 3952, (Chemical/Hazardous Material Request Authorization) for each material item with all supporting information as required for approval. The Contractor must obtain authorization from the Contracting Officer prior to bringing or using hazardous materials on the installation. The Contractor must supply an up-to-date SDS for each requested AF Form 3952 item listed as a hazardous material, as defined to be delivered under this contract. The hazardous material shall be properly identified and include any applicable identification number, such as National Stock Number or Special Item Number. This information shall also be included on the SDSs submitted under this contract. The Contractor must maintain an onsite file of all SDSs. The Contractor shall submit for Government Approval (via AF Form 3000) to the Contracting Officer on a monthly basis, or at the end of the contract, as determined by the Contracting Officer, a report (2 copies) of usage of HAZMAT materials within that period on GAFB Contractors Hazardous Materials Usage Report. No hazardous materials, lubricants, oils, liquids or related materials shall be deposited in the refuse containers on base.

5.7 NUISANCE AND POLLUTING ACTIVITY PROHIBITED: Polluting, dumping, or discharging of any harmful, nuisance, or regulated materials (such as but not limited to concrete truck washout, vehicle maintenance fluids, residue from saw cutting operations, solid waste and hazardous substances) into building drains, site drains, streams, waterways, holding ponds or to the ground surface shall not be permitted and the Contractor shall be held responsible for any and all damages which may result. Further, the Contractor shall conduct work activities in such a fashion as to avoid creating any legal nuisance, including but not limited to, suppression of noise and dust, control of erosion, and implementation of other measures as necessary to minimize impacts of work activities.

5.8 RELEASE OF FLUIDS TO THE SANITARY SEWER SYSTEM: Goodfellow AFB's sanitary sewer system discharges into the Publicly Owned Treatment Works (POTW) operated by the City of San Angelo, Texas. This POTW has established testing requirements for certain constituents as well as discharge limits of those same constituents. Accordingly, any Contractor performing work at Goodfellow AFB and contemplating a release of non-hazardous water into the sanitary sewer system shall meet the pretreatment standards and comply with the testing/release requirements established by the City of San Angelo. Contractor is also responsible for all testing, monitoring, measuring, documenting, etc. to verify this compliance. Contractor shall not discharge wastewater to base's sanitary sewer without prior approval of the Government.

5.9 PESTICIDES (INSECTICIDES, FUNGICIDES, HERBICIDES, ETC.): Application of all pesticides shall be accomplished by certified pest control personnel or under the supervision of a State of Texas certified pest control operator. Contractor shall furnish labels and SDSs for all contract pesticide materials at least 25 days prior to start of contract for approval by AETC Pest

Management Coordinator (PMC) via an AF Form 3000. Any nonstandard pesticide not listed in the installation approved inventory list must be approved by the AETC PMC prior to use. Delivery and storage of pesticides shall be monitored by certified personnel to insure the adequacy of containers and the safe storage of toxic materials. Disposal of containers and chemicals will be monitored to prevent pollution of natural drainage systems or the unintentional release of pesticide particulates into the air. The Contractor shall comply with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and submit an AF Form 3000, Material and Approval Submittal, with copies of certifications for operator using to the Contracting Officer for approval prior to application of Insecticide, Fungicides, and/or Herbicides. Additionally, the Contractor shall notify the Goodfellow AFB Entomology Shop at (325-654-5208) at least five calendar days in advance by the Contractor of proposed application of any pesticides, insecticides, fungicides, herbicides, etc. and copies of all application records shall be submitted to the Base Entomology Shop. The Contractor shall use the GAFB Pesticide Application Form, available from Base Civil Engineer office to submit the required application information.

5.10 AIR EMISSIONS: Media blasting may require registering the construction activity under state regulation 30 TAC 106.452. The Contractor shall prepare the state form PI-7 for signature approval by the base prior to start of construction. The Contractor shall meet all provisions of the Permit-By-Rule.

5.11 DRINKING WATER: For all drinking water disruptions, the Contractor shall adhere to 30 TAC 290 Subchapter D paragraph 290.46(g and j). Submit an analysis report and a "Drinking Water Customer Service Inspection checklist" via an AF Form 3000 for Government Approval. Contact Bioenvironmental Engineering at (325) 654-3126 prior to restoring drinking water service.

5.12 PROTECTION OF WATER RESOURCES: All work under this contract shall be performed in such a manner that objectionable or nuisance conditions will not be created in lakes, reservoirs, streams or storm water conveyances through or adjacent to the project areas. The Contractor shall comply with the terms and conditions of Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit, TXR150000 (GCP). At least 30 days prior to the start of construction, the Contractor shall seek coverage under the GCP for storm water and non-storm water discharges associated with his construction activities.

5.12.1 For all soil disturbance of more than 1 acre, the Contractor shall prepare a Storm Water Pollution Prevention Plan (SWP3) meeting all requirements specified in the GCP and will include the Contractor's Best Management Practices for erosion and sedimentation control at the site. This plan shall be submitted for Government approval (GA).

5.12.2 Regardless of the amount of soil disturbed, all non-storm water discharges from Contractor's site shall conform with TPDES General Permit TXR040000 for Small Municipal Separate Storm Sewer Systems (MS4).

5.12.3 If a Notice of Intent (NOI) is required for permit coverage, the Contractor shall submit the NOI to the state and provide copies to the Government via Form 3000 FIO. Contractor shall make required MS4 notifications to the City of San Angelo and the base. Copies of all

notifications will be provided to the Contracting Officer via Form 3000 FIO. Contractor shall be responsible for fees associated with obtaining coverage under the GCP.

5.12.4 The Contractor shall also file a Notice of Termination (NOT) TCEQ Form 20023 promptly after site stabilization in accordance with the general permit is achieved. These forms may be found at the TCEQ website (http://www.tceq.state.tx.us). The prime Contractor's principal shall sign to certify the NOI/NOC/NOT or Construction Site Notice. A copy of the NOT shall be provided to the Contracting Officer and Base Environmental Coordinator, FIO.

5.12.5 The Government will specify if the contracted project is part of a larger common development requiring additional storm water measures be taken to obtain permit coverage, or if the project area of construction is greater than 5 acres.

5.12.6 Post-Construction Cleanup or Obliteration: The Contractor shall obliterate all evidence of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess materials, or any other vestiges of construction. It is anticipated that excavation, filling, and plowing of roadways shall be required to restore the area to near natural conditions, which will permit the growth of vegetation thereon. The disturbed areas shall be graded and filled as required, and topsoil shall be spread to a depth of approximately four inches over the entire area and the entire area seeded with 30 pounds (pure live seed) of common Bermuda per 1000 square feet and then watered as required until a lush hardy growth is established to the satisfaction of the Contracting Officer. Restoration to original contours is required unless otherwise directed by the Contracting Officer.

5.1.2.7 At the end of the project, and prior to final acceptance, the Contractor shall submit a solid waste diversion report by completing the Construction Waste Management form identifying the materials and weights either recycled or diverted from solid waste disposal to other re-use as well as weights of waste disposed in a landfill.

5.13 ENVIRONMENTAL MANAGEMENT SYSTEM: Contractor's on site supervisory personnel shall complete EMS Awareness Training. The Base Civil Engineer Environmental Coordinator should be contacted at (325) 654-5946 for information to complete the awareness training within 60 days of contract award or a new contract employee supervisor begins work. The training will be accomplished utilizing The Environmental Awareness Course Hub (TEACH) at https://usaf.learningbuilder.com. The Contractor is responsible for providing EMS Awareness Training records, for each employee, to the Contracting Officer

PART 6.0 - SITE MAINTENANCE AND CLEANUP:

6.1 SITE MAINTENANCE: The Contractor shall protect adjacent property, buildings and their contents from dust, dirt or other materials. Work areas shall be maintained in a neat, clean, safe condition and shall, at a minimum, be cleaned at the end of each shift. All streets and roadways in/or adjacent to the site shall remain free of project generated trash and debris at all times.

6.2 CLEANUP: The Contractor shall collect any and all trash, debris, refuse, garbage, etc., that is generate and place it in appropriate containers with lids or approved covers on a periodic basis

or as directed by the Contracting Officer's representative. The aforementioned materials shall be hauled from the site by appropriate means on a daily basis, unless otherwise approved by the Contracting Officer's representative. Disposal shall be outside the limits of Government property. Disposal shall be by sanitary landfill or other approved methods and shall conform to all local, state, and federal guidelines, criteria, and regulations. Upon completion of the work, the Contractor shall leave the work site and storage area(s) in a clean, neat and workmanlike condition satisfactory to the Contracting Officer. It is anticipated that excavation, filling, and plowing of roadways shall be required to restore the area to near natural conditions that will permit the growth of vegetation thereon. Restoration to original contours is required unless otherwise directed by the Contracting Officer.

6.3 SITE RESTORATION/ DEBRIS REMOVAL: The Contractor shall restore all disturbed grounds to the "as found" condition or better after installation. Base grounds restoration requirements shall be complied with. Common use areas shall be restored to their original condition. The Contractor shall be responsible for disposing of all residues from this project off base and in accordance with Federal, state and base environmental laws and regulations. All residue produced by directional drilling operations (i.e., slurry) shall be disposed of off base on the same day the residue is produced, at an appropriate disposal facility at the contractor's expense, IAW federal, state, local and Goodfellow AFB environmental laws and regulations. Under no circumstances will the contractor stage or store boring residue in slurry ponds or other containment areas on Goodfellow AFB.

PART 7.0 - ENERGY CONSERVATION:

7.1 UTILITIES CONSERVATION: The Contractor shall instruct employees in utilities conservation practices. The Contractor shall be responsible for operating under conditions that preclude the waste of utilities, which shall include: Lights shall be used only in areas where and when work is actually being performed. The Contractor shall not adjust mechanical equipment controls for heating, ventilation and air conditioning systems. Water faucets or valves shall be turned off after the required usage has been accomplished. The Contractor shall use good judgment in the conservation of Government utilities. Prevailing energy conservation practices shall be adhered to and enforced by the Contractor.

PART 8.0 – RESPONSIBILITY:

8.1 The above 1 through 7 summaries do not in any way limit the responsibility of the Contractor to perform all work and furnish all plant, labor, and materials required by this Statement of Work.

PART 9.0 – STORAGE AND PARKING:

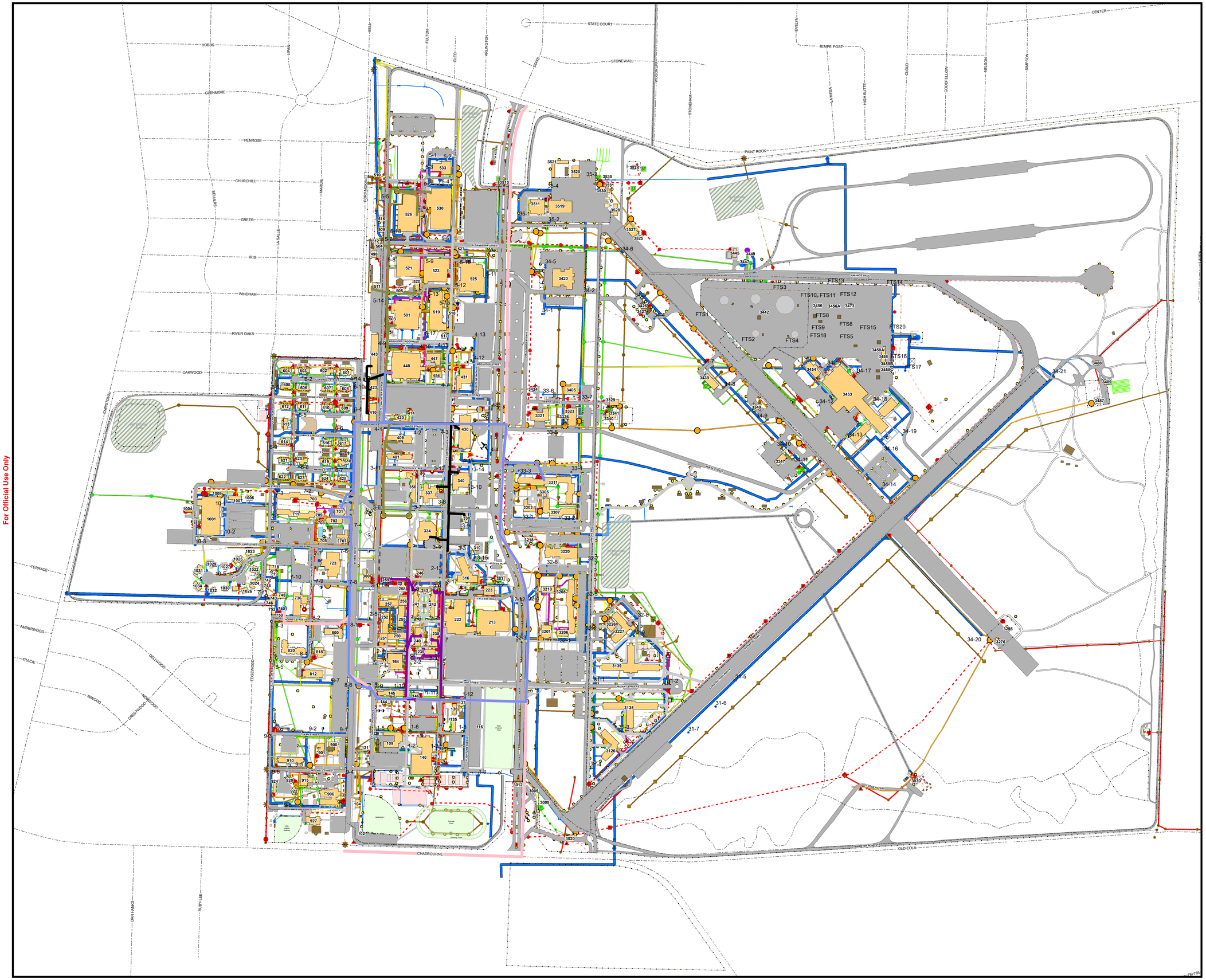
9.1 CONTRACTOR STORAGE: The Contracting Officer's representative shall designate Contractor storage and parking area. All project storage areas shall be kept free of debris, leaks, stains, or splashes and kept in a neat, clean, and safe condition. Any contamination of the storage area by a hazardous substance shall be immediately remediated by the Contractor, in accordance

with PART 5.0 above at no additional expense to the Government. All hazardous materials shall be secured when not in use.

PART 10.0 - COMPLETION OF WORK:

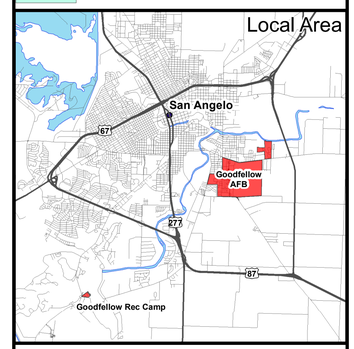
10.1 OPERATIONAL SYSTEMS: The Contractor shall insure that work for this project is performed in accordance with the criteria herein and that all equipment and systems shall be fully operational at the completion of work for this project.

END OF STATEMENT OF WORK



Legend

- CLIN 3a
- CLIN 3b
- CLIN 3c
- CLIN 3d
- CLIN 3e
- Handhole
- Manhole
- Water
- Sewer
- Gas
- Electrical
- Stormwater
- Communications
- HVAC
- Fuels



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Fiber Backbone

17 CES/CENME, GeoBase
Building 3511, Room 124
17CES.CENME.GEOBASE@us.af.mil

GOODFELLOW AIR FORCE BASE

Map Date: January 2022

Map Path: F:\GeoBase Data\Maps\3 Work Requests\59800_Fiber Backbone\59800_Fiber_Backbone.mxd

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SCHEDULE OF MATERIAL SUBMITTALS

PROJECT NUMBER	PROJECT TITLE	SOLICITATION/CONTRACT NO.
1046962	Fiber Optic Infrastructure Install	

TO BE COMPLETED BY THE PROJECT ENGINEER												TO BE COMPLETED BY CONTRACT ADMINISTRATOR								
		NO. OF COPIES REQUIRED														DATE CONTRACTOR NOTIFIED				
LINE NUMBER	ITEM OR DESCRIPTION OF ITEM, CONTRACT REFERENCE, TYPE OF SUBMITTAL (Ref spec & para)	CERTIFICATE OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER'S RECCOMENDATIONS	MANUFACTURER'S WARRANTY	OPERATING INSTRUCTIONS	SEE PARA	OTHERS AS SPECIFIED	REQUIRED SUBMISSION DATE	DATE RECEIVED IN CONTRACTING	DATE TO CIVIL ENGINEERING	RETURN SUSPENSE DATE	FOLLOW UP	APPROVED	DIS-APPROVED	CONTRACTOR RE-SUBMITTAL	FINAL APPROVAL	REMARKS
1	ASOW: 1.5 Certified Journeymen for each Trade	x							4		Prior to start of construction									GA
2	ASOW: 1.5.1 Weekly Report (soft copy)	x							4		Weekly									FIO
3	ASOW: 1.8 Work Schedule	x							4		14 days prior to start									FIO
4	ASOW:1.12 Submittals	x							4		Prior to start of construction									FIO
5	ASOW: 1.16 Manufacturer's Warranty	x							4		Prior to Acceptance									FIO
6	ASOW: 1.17 Safety Plan	x							4		Prior to start of construction									FIO
7	ASOW: 1.22 As-Builts		x						4		(d)									GA
8	ASOW: 1.24 Welding, Cutting, and Brazing Permit AF 592	x							4		Prior to use									GA
9	ASOW: 1.25.1 Site Visit Request Letter	x							4		Within 5 calendar days after contract award									GA

10	ASOW: 1.28 Base Digging Permit AF Form 103	x							4		Within 10 calendar days of contract award									FIO
11	ASOW: 1.28 Base Civil Engineer Work Request AF Form 332	x							4		Within 10 calendar days of contract award									FIO
12	SOO:2.1.6 IPT Meeting Minutes	x							4		As Required									FIO
13	SOO: 2.1.7 Weekly Progress Report	x							4		Weekly									FIO
14	SOO: 2.2.17 Project Milestone Schedule	x							4		Prior to Start of Construction									FIO
15	SOO: 2.2.20 Installation Test Plan	x							4		Prior to Acceptance									GA
16	SOO: 2.2.21 Installation Test Report	x							4		Prior to Acceptance									GA
17	ASOW: 4.2 Utility Outage Request/Notification	x							4		14 Days Prior									GA
18	ASOW: 4.4 Confined Space Permit	x							4		Prior to Use									GA
19	ASOW: 4.6 Traffic Detour Notification	x							4		Notify NLT 10 calendar days in advance									GA
20	ASOW: 5.3 Hazardous and Special Wastes Generated by the Contractor	x							4		As Required									FIO

(a) As soon as possible but in no case later than 45 calendar days after NTP.
(b) Prior to Final Inspection.
(c) Prior to Use.
(d) As Required.

21	ASOW:5.4 Contractor Encountered Hazardous Waste	x							4		As Required									FIO
22	ASOW: 5.6 Hazardous Material	x							4		As Required									FIO
23	ASOW: 5.10 Air Emmision	x							4		Prior to Construction									FIO
24	ASOW: 5.11 Drinking Water	x																		FIO
25	ASOW: 5.12 Protection of Water Resources(Construction General Permit)_	x							4		30 Days Prior to Start of Construction									FIO
26	ASOW: 5.1.2.7 Construction Waste Management	x							4		Prior to Acceptance									GA

(a) As soon as possible but in no case later than 45 calendar days after NTP.
(b) Prior to Final Inspection.
(c) Prior to Use.
(d) As Required.

(a) As soon as possible but in no case later than 45 calendar days after NTP.
(b) Prior to Final Inspection.
(c) Prior to Use.
(d) As Required.

(a) As soon as possible but in no case later than 45 calendar days after NTP.
(b) Prior to Final Inspection.
(c) Prior to Use.
(d) As Required.

STATEMENT OF OBJECTIVES (SoO)

For

5G Infrastructure (FOC)

at GOODFELLOW AFB, TX

22 November 2021

Prepared By 17 CS SCXP

328 Ft. Lancaster

GAFB, TX 73145-2713

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1. SCOPE

This SOW defines the requirement for the Contractor engineer, furnish, install, terminate and test (EFIT&T) single mode (SM) fiber optic cable at ITB 146 towards North Gate, South Gate and B740 aboard Goodfellow Air Force Base, San Angelo Texas. The contractor shall provide all equipment tools, materials, supplies, transportation, labor, supervision, management, and other incidentals necessary to meet the requirements as stated in this SoO. All electronics equipment, supplies, and materials to be installed shall be new and not refurbished.

2. REQUIREMENTS

2.1. GENERAL REQUIREMENTS

2.1.1. Safety Requirements

The contractor shall remain in compliance with all Federal, State, and base security and safety laws, regulations, policies, and requirements.

2.1.1.1 Contractor Safety Standard Expectation

The Contractor will comply with all applicable OSHA and Air Force Safety Standards.

2.1.1.2 Base Fire Regulations

The Contractor shall comply with Base Fire Regulations as set forth in the latest edition of GAFB Instruction 32-2001, titled "Base Fire Protection Program". The Contractor shall use no explosives in performing the work. All work shall be in strict compliance with NFPA-101. Contract SOW must reference the USACE Safety and Health Manual EM-385-1-1 and NFPA 241 and must contain the requirement that the Installation's fire regulations be followed. All work shall be in strict compliance with NFPA-101.

2.1.2. Site Coordination

The Contractor shall meet with the base safety officer immediately upon arrival on site for review of the specific safety requirements prior to installation.

2.1.2.1. Confined Space

The Contractors entering spaces on Goodfellow AFB are responsible for the safety of their personnel and for their own confined spaces permit program as outlined in AFI 91-203. All confined space operations must be coordinated with the Base Safety Office prior to start of work.

2.1.2.2. Accident/Incident Reporting and Investigation

The Contractor shall record and report all available facts relating to each instance of injury to the Base Safety Office. The Contractor shall secure the scene of any accident and wreckage until released by the accident investigative authority through the Base POC. If the Government elects to conduct an investigation of the incident, the Contractor shall cooperate fully and assist the Government personnel until the investigation is completed.

2.1.2.3. Work Area(s)

At day's end, the Contractor shall remove all debris and surplus materials from the work place. Safety barriers shall be in place to protect unfinished work site at the end of the day. All open holes or trenches shall be completely enclosed by flexible orange construction safety fencing, or other safety barriers, at the end of the work day. Equipment and materials required to complete the work effort may remain on site as long as they are organized/stored in a manner that does not cause a safety hazard.

2.1.2.4. Traffic control

In the event base vehicular traffic is to be disrupted by trenching or horizontal directional boring, the Contractor shall make appropriate notifications NLT 10 calendar days in advance to 17 CS/SCXP of the planned disruptions.

2.1.3. Security Requirements

The Contractor shall process and provide a Site Visit Request Letter to 17 CS/SCXP within 5 calendar days after contract award. This spreadsheet shall identify the names (as shown on the driver's license), driver's license numbers and state of issue, and birth date of the personnel who will be performing work under this SOW, company name, address, phone number and contract number, start date and end date. This information is required to grant access to the base. If required by the base, the Contractor shall provide identification badges for their employees. All Contractor personnel shall wear these badges while on duty on the Government site. The badges shall identify the individual, company name, and be clearly and distinctly marked as Contractor and be in accordance with base regulations.

2.1.3.1. Security Clearances

Stated work and associated products shall be performed at the UNCLASSIFIED level. However, some of this work will take place in secure areas where Contractor employees must be escorted at all times. The Contractor must coordinate access to secure areas at least 24 hours ahead of time with the 17 CS/SCXP PM. It is the Government's responsibility to provide escorts.

2.1.3.2. Operational Security (OPSEC)

Network infrastructure (MHDS, MH/HH locations, fiber paths, etc.) is on the 17 CS Critical Information List and must be protected. The Contractor shall take appropriate measures to protect detailed information pertaining to the EFI&T effort, to include appropriate marking of documents as "For Official Use Only (FOUO)," and ensuring limited distribution of documents and schematics/drawings to only those individuals with a valid need to know. In accordance with (IAW) AFI 10-701, OPSEC Considerations, the contractor shall develop an OPSEC plan to ensure the protection of FOUO data either furnished by the government or produced by the contractor. The contractor's OPSEC plan provided in the RFP shall be incorporated into the SOW.

2.1.4. Environmental Compliance

The Contractor shall comply with the most stringent environmental federal, state, and local laws and regulations; and Air Force policies, instructions, and plans. The federal Government is not exempt from compliance with environmental regulations. The contractor shall maintain an awareness of changing environmental regulatory requirements to avoid environmental deficiencies for activities on Goodfellow AFB.

2.1.5. Permits

The Contractor shall complete and process all permits required to complete the installation prior to any trenching, or modifications to a facility, maintenance hole or hand hole; for example, the Base Civil Engineering Work Clearance Request, a digging permit, (AF Form 103) and Base Civil Engineer Work Request (AF Form 332). AF Form 103 and AF Form 332 {and any other required permits (as determined by Base Civil Engineering (BCE) or 17 CS/SCXP, etc.)} shall be submitted at IAW local procedures. All utility markings, flags, etc. shall be maintained by the contractor after the responsible work center/shop identifies/locates them. If a utility is severed or damaged due to neglect or if attributed to the fault of the contractor, then the contractor shall repair and return the utility back to the same condition it was in prior to the damage. The form(s)/permits shall be submitted within 10 calendar days after award.

2.1.6. Integrated Process Team (IPT)

The Contractor shall chair a weekly IPT meeting that includes Contractor representatives, the 17 CS/SCXP Project Manager (PM), and other base personnel as required. The Contractor shall provide an agenda and a worldwide "Meet Me" teleconference capability for the duration of the project. The purpose of the IPT meeting is to discuss project progress, problems being encountered, and other information necessary/beneficial to ensure success and timely completion of contract requirements. The Contractor shall record meeting minutes and distribute to the attendees. The contractor shall provide at this meeting a weekly action register, in Microsoft excel, to capture items that need to be addressed. Action register shall have at a minimum Project Description, Contact list, Action Item List, Discrepancy List, and any pertinent information related to the project. (CDRL A004)

2.1.7. Quality Assurance

The Contractor shall provide Quality Assurance Support for the life of the project. The Contractor's quality assurance evaluator shall assist the Government representative in performing random spot checks and system acceptance tests. The Contractor shall be responsible for identifying system and outside plant deficiencies and /or discrepancies throughout the life of the project. A weekly report (soft copy) shall be submitted indicating progress/status and listing any deficiencies/discrepancies found and actions to correct them. (CDRL A003)

2.1.8. Contractor Personnel

2.1.8.1. Project Management

The Contractor shall provide a Project Manager (PM) and alternate(s) responsible for contract performance and continuity. The Contractor shall identify the Project Manager's or alternate's range of authority to act for the Contractor relating to daily contract operation.

2.1.8.2. Site Point of Contact (POC)

The Contractor shall designate the Contractor's on-site team leader and alternate(s) as the Site POC for individual projects in their Site Visit Request Letter. The Site POC or alternate(s) shall be on site during duty hours until project completion and shall oversee all facets of the installation tasks. The Site POC shall be the interface for all work site communications with the Government, including quality, safety, and discrepancy matters.

2.1.8.3. Personnel Requirements

The Project Manager, Site POC, and respective alternate(s) shall be able to read, write, speak, and understand English. All reporting and documentation shall be in English.

2.1.9. Electronic Contractor Manpower Reporting Application (ECMRA)

TBD by 17CE.

2.1.10. Warranty

The Contractor shall provide a one year warranty or manufacturer's standard commercial warranty, whichever is longer. This warranty shall include a one year workmanship warranty. The warranty period shall start from the date of system and/or project acceptance. The Contractor shall provide written procedures and required information for warranty services at or prior to site acceptance.

2.2. SPECIFIC REQUIREMENTS

The Contractor shall EFIT&T SM, indoor/outdoor or outdoor rated FOC's from ITB 146 towards north and south gate, and Water tower near B740 aboard Goodfellow Air Force Base using existing and new maintenance hole duct bank system. Contractor shall also install associated fiber optic distribution panels, with pre-terminated, factory certified connectors within cassette style modules all fusion spliced.

2.2.1. Maintenance Holes (MHs)

The Contractor shall pump out water as required. Water shall be drained IAW BCE and base environmental requirements.

2.2.2. Measurements

Any distances provided in this SOO are approximations and should NOT be used for ordering materials or determining duct lengths.

2.2.3. Splice Conductors

All fiber splicing shall be performed in accordance with RUS Bulletin 1735F-401, Standards for Splicing Copper and Fiber Cable. The fusion splice method shall be used for all splicing and terminations of fiber optic cable. Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors.

2.2.4. Cable Racks and Cable Rack Supports

Cable racks shall be installed in maintenance holes as required – this includes new and existing MHs/HHs. Splices shall not be supported by the cables that enter each end of the splice case. The splices shall be supported by cable hooks under the splice case. Telecommunications industry standard cable hooks of the appropriate length shall be provided to support cables and splice cases. The cable hooks shall be secured using cable rack locking clips. All cables shall be supported using racking clips, cable racks, and cable hooks.

2.2.5. Labeling

The Contractor shall label all equipment and cables they install and cables identified for re-use IAW TIA-606-B-2012 and as directed by the 17CS, SCXP. New ducts shall be permanently labeled on the wall of each building/maintenance hole indicating the connecting building/maintenance hole at the other end of the duct (for example, “To MH-200”). Tagging and labeling of new cables shall be IAW 17CS labeling scheme.

2.2.6. Cable Tags

All tags shall be permanently labeled, easily visible and corrosion resistant. Install cable tags in all maintenance holes/handholes, cable vaults, pull boxes and building entrance terminal locations. When cables pass through a maintenance hole, put a tag on the cable, approximately 2 feet from each duct entrance. Information on the cable tag shall identify cable by size, type, cable number and count. See Para 2.2.5 (above) for nomenclature for tagging.

2.2.7. Pulling Tape

All newly installed ducts left vacant shall be provided with a waterproof, corrosion resistant, pre-lubricated flat woven polyester pull tape with sequential footage markings (1250 lb. pulling strength) for future cable installations. The pull tape shall extend into the maintenance holes and be secured to a cable rack or pulling iron, etc.

2.2.8. Cable Terminations

Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors in cassette style housing. The pigtails shall be sized the same as the OSP fiber they are spliced to, i.e., 125/8.3 micron to 125/8.3 micron. The pigtails shall be duplex (or simplex) unless otherwise agreed to by 17 CS/SCXP.

2.2.9. OSP Maintenance Loop(s)

The Contractor shall install a minimum of a 50 foot fiber optic cable maintenance loop at the first MH from the building, at every splice point MH location and at every 3rd MH in the route. The maintenance loop slack shall be properly labeled, securely supported to the cable ladder and off the MH floor or in telecomm room.

2.2.10. Grounding/Bonding

Grounding/Bonding hardware such as corrosion resistant wire, bonding ribbon, clamps, ground rod, etc. necessary to properly bond/ground the cable in MHs shall be provided by the Contractor. In addition, grounding/bonding of telecommunication racks to telecomm busbar and building ground if necessary. Reference UFC 3-580-01, TIA 607, and TIA 758.

2.2.11. Underground Conduit System

The Contractor shall be responsible for any required trenching and/or boring necessary to lay the duct system. The Contractor is also responsible for backfilling ditch lines and compaction of fill materials with appropriate compaction tools. Directional drilling shall be used for major road crossings, taxiways, runways, etc. Otherwise, crossing of paved surfaces may be performed by pavement cuts and resurfacing with appropriate matching road material. This does not prevent the Contractor from using directional drilling if it is more cost effective. Ducts will be appropriately protected when placed under paved surfaces (i.e., concrete encasement).

2.2.11.1. Composition. N/A

2.2.11.2. Typical Situations

The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-40 Polyvinyl Chloride (PVC) (Schedule 40) IAW NEMA TC-2. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell-end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirements.

2.2.11.3. Unique /Site Specific Situations

The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-80-PVC (Schedule 80) IAW NEMA TC-2; high density polyethylene (HDPE) SIDR 11.5, Galvanized Iron Pipe (GIP) or "thickwall" stainless steel. Schedule 80 PVC shall be limited to risers, all above ground conduit and under the roadway/parking pavement. High density polyethylene (HDPE) SIDR 11.5 shall be used when directional bring is used. GIP or stainless steel shall be used under major roadways, taxiways, and runways. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell-end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirement.

2.2.11.4. Installation

Installation of underground conduits/ducts shall be IAW RUS Bulletin 1751F-643 and RUS Bulletin 1753F-151. Ducts installed beneath roads, sidewalks, parking areas, other paved surfaces or areas to be paved, etc. shall be installed a minimum of 36" below grade. In a MH with knockouts, ducts shall start at the bottom knockout, allowing for upward expansion in the MH. All ducts not installed under roads, sidewalks, parking areas, or areas to be paved, etc. shall have a minimum of 36 inches ground cover, where possible. The Contractor shall provide other protective measures, concrete cap, etc., in those areas where the minimum ground cover cannot be achieved. Grading of ducts shall be accomplished IAW RUS Bulletin 1751F-643. All conduits shall be continuous between MH/HHs (i.e., no breaks or separations in the conduit runs between MH/HHs).

2.2.11.5. Bends and Sealing

All bends between MHs shall be a minimum of ten times (10X) the diameter of the duct size (i.e., 4 inch duct = 40 inches) with the sum of bends in all directions not exceeding a total of 90 degrees, where practical. Coordinate with 17 CS/SCXP if runs have bends that total more than 90 degrees is required. Ducts shall have bell-ends and enter a MH perpendicular to the surface of the wall through which it is entering. All ducts/inner-ducts entering MH shall be sealed. Universal duct plugs or removable putty sealants may be used. Upon completion of conduit sections, a rigid 12" long test mandrel ¼" (6.4mm) smaller than the inside diameter of the conduit shall be pulled through two diagonally opposite ducts to ensure proper alignment. In addition, all ducts shall be cleared of loose materials such as concrete, mud, dirt, stones, etc.

2.2.11.6. Utility Separation

When communications ducts cross either power duct or buried power cable, maintain a minimum separation of 3 inches of concrete or 12 inches of well-tamped earth between the two or 12 inches of well tamped earth when parallel; for pipes (e.g., gas, water, oil) maintain 6 inches when crossing or 12 inches when parallel.

2.2.11.7. Spacers and Tracer Wire

Along the length of the duct run, if the ducts are installed by trenching, spacers shall be placed at five (5) foot intervals and cable warning tape shall be buried one (1) foot above the conduit and shall follow the duct route. The tape shall be a minimum of three inches wide and orange in color with the appropriate warning message. At least one duct shall have tracer wire or be otherwise locatable from the surface.

2.2.11.8. Entrance Conduits into Existing Maintenance Holes

When new entrance conduits/ducts or sleeves are required, the Contractor shall bore and install the necessary holes and install the ducts or sleeves, if a knockout does not exist. Penetration shall not be in such a location through the wall as to block use of existing ducts in the maintenance hole. New ducts will be a minimum of 18 inches from either the maintenance hole floor or ceiling, if practical. The minimum bending radius for entry conduit/ducts shall be no less than 10 times the inside diameter of the conduit. Ducts and openings around ducts shall be sealed to prevent moisture from entering the maintenance holes.

2.2.11.9. Excavation/Building Penetrations

All wall penetrations, including inside buildings, shall be restored to meet the required base fire ratings.

2.2.12 N/A

2.2.13. Outside Plant Installation

This section describes the underground cables, flexible geotextile multiple cell fabric, innerduct and MH/HH plus conduit system installation requirements. The Contractor shall design and install Customer-Owned Outside Plant Telecommunications Infrastructure in accordance with ANSI/TIA-758. Each cable installation shall be coordinated with 17 CS/SCXP so that the impact on the building users is properly coordinated. The sequence of installation is at the Contractor's discretion.

2.2.13.1. Infrastructure Installation

The Contractor shall install the following new infrastructure; 2 x 4" outdoor rated conduits approximately 1,970 feet, on dirt or roadway, one 3x3 inch Geo-textile Fabric approximately 2,100 feet, and three (3) 144 port FODP's. Additionally, 8,464 feet of 144 strand single mode corning glass fiber, 1,492 feet of 72 strand single mode corning glass fiber, and 2,200 feet of 24 strand single mode corning glass fiber. (Coordinate exact location with 17 CS/SCXP).

2.2.13.1.1. Hand Holes

Hand Holes (HH) installed under this project shall have an American Association of State Highway and Transportation Officials (AASHTO) rating of H-20 or equivalent. As stated in this SOO, HHs shall have minimum interior dimensions of 3 feet W x 5 feet L x 4 feet H (Width, Length, Height). HHs shall be furnished with a lockable cover, ladder, cable racks hardware, pulling irons, a sump, water resistance gaskets, bonding ribbon and a grounding system. HH shall meet the requirements of TIA-758-A, paragraph 4.2.1. Prefabricated HHs are preferred. HH covers shall be labeled with 1/8 inch raised letters stating "COMMUNICATIONS". All HHs shall be of concrete construction –polymer concrete (i.e., Quazite) construction is NOT authorized. Coordinate numbering/labeling of new HH with 17 CS/SCXP.

2.2.13.1.2. Handhole Installation

Install Hand Holes IAW the following Table:

Placement	Qty.	Size (inches)	Figure	Comment
New HHole near S. Chadbourne St.	1	3'x5'x4'	1	2 X 4" outdoor rated conduit
New HHole near Fort Stockton Ave.	1	3'x5'x4'	2	2 X 4" outdoor rated conduit
New HHole near Paint Rock Rd.	1	3'x5'x4'	3	2 X 4" outdoor rated conduit

2.2.13.1.3. Ductbank Infrastructure

Install 4" PVC and/or HDPE SIDR 11.5 duct banks IAW the following Table:

From Mhole/HHole	To MHole or Tel Room	Quantity	Size (inches)	Approx. Distance (Feet)	Figure	Comment
MH-140	New MHole near S. Chadbourne St.	2	4	758'	1	2 X 4" outdoor rated conduit
MH-211	New MHole near Fort Stockton Ave.	2	4	470'	2	2 X 4" outdoor rated conduit
MH-120	New MHole near Paint Rock Rd.	2	4	772'	3, 4, 5, 6	2 X 4" outdoor rated conduit

2.2.13.1.4. Geo-textile Fabric Installation

Install Geo-textile fabrics IAW the following Table:

From Building	To Maintenance Hole	Quantity	Approx. Distance (Feet)	Figure	Comment
MH-140	New MHole near S. Chadbourne St.	1	800	1	Install one-3x3" Geo- textile fabrics (detectable type
MH-211	New MHole near Fort Stockton Ave.	1	500	2	Install one-3x3" Geo- textile fabrics (detectable type
MH-120	New MHole near Paint Rock Rd.	1	800	3, 4, 5, 6	Install one-3x3" Geo- textile fabrics (detectable type)

2.2.13.2. Fiber Optic Cable Installation

Install outside plant FOC as described in the following paragraphs. The cable shall be all dielectric, loose buffer tube, water blocked, single mode, corning glass, outside plant (OSP) cable suitable for indoor/outdoor applications. The Contractor shall coordinate each cable installation with the 17CS/SCXP so as to minimize the impact on building users. The intent is to install the cable in one continuous length, to the extent that it is practical. The Contractor shall determine whether there is some practical reason for an intermediate splice in the cable at some maintenance hole/handhole between the cable end points. If an underground splice is necessary, it shall be accomplished IAW commonly accepted telecommunications industry practices for fusion splicing optical fiber cable and sealed with a splice case suitable for the application. If a splice case is installed in a maintenance hole/handhole it shall be pressure tested IAW the manufacturer's instructions. If a splice case leaks, it shall be reinstalled and retested. A coil of 50 feet of cable shall be provided on each cable entering or leaving a splice case in a maintenance hole or handhole and approved by 17CS/SCXP.

2.2.13.2.1. Fiber Optic Cable from ITB 146 to MH-140

The Contractor shall install approximately 1,987 feet of one continuous length, 144-strand SM FOC from ITB 146 to MH-140 utilizing existing Maintenance Hole Ductbank System. Length of run in SOO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 146 and/to MH-240:

- At ITB 146, One (1) 4U, 144-size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At ITB 146, Fusion Splice 144-strand SM fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.

- At MH-140 and MH-020, install one re-enterable corning, dome style splice case, capable of housing 144-strand splice.
- At MH-140 leave FOC 146-XXX, 1-144 Dark in MH for future use.
- At ITB 146, OTDR and Power Meter/Light Source test in both directions.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.2. Fiber Optic Cable from MH-140 to New Hand Hole

The Contractor shall install approximately 858' feet of one continuous length, 24-strand SM FOC from MH-140 to newly installed Hand Hole near S. Chadbourne Street. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following:

- From MH-140, Fusion Splice 24-strand single mode fiber optic cable to new 144 strand single mode fiber.
- If possible, OTDR and Power Meter/Light Source test in both directions to B146.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

Install Indoor/Outdoor or Outdoor rated Single Mode Fiber Optic Cable IAW the following Table and Figure 1:

From Building, MH or HH	To Bldg or MHole	FOC Size	FOC ID/Strands	Approx. Distance (Feet)	Figure	Comment
ITB 146	MH-140	144 SM	FOC 146-XXX, 1-144	1987	1	Corning specifications.
MH-140	HH-(NEW)	24	FOC 146-XXX, 121-144	775	1	Corning specifications.

2.2.13.2.3. Fiber Optic Cable from ITB 146 to MH-211

The Contractor shall install approximately 1,492 feet of one continuous length, 72-strand SM FOC from ITB 146 to MH-211 utilizing existing Maintenance Hole Ductbank System. Length of run in SOO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 146 and/to MH-211:

- At ITB 146, One (1) 4U, 144-size fiber optic distribution panel, along with cassette style

fiber panels. Verify placement with 17CS.

- At ITB 146, Fusion Splice 72-strand SM fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At MH-211 and MH-220, install one re-enterable corning, dome style splice case, capable of housing 144-strand splice.
- At MH-211 leave FOC 146-XXX, 1-144 Dark in MH for future use.
- At ITB 146, OTDR and Power Meter/Light Source test in both directions.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.4. Fiber Optic Cable from MH-211 to New Hand Hole

The Contractor shall install approximately 1,470' feet of one continuous length, 24-strand SM FOC from MH-211 to newly installed Hand Hole near Fort Stockton Ave. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following:

- From MH-211, Fusion Splice 24-strand single mode fiber optic cable to new 72 strand single mode fiber.
- If possible, OTDR and Power Meter/Light Source test in both directions to B146.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

Install Indoor/Outdoor or Outdoor rated Single Mode Fiber Optic Cable IAW the following Table and Figure 2:

From Building, MH or HH	To Bldg or MHole	FOC Size	FOC ID/Strands	Approx. Distance (Feet)	Figure	Comment
ITB 146	MH-211	72 SM	FOC 146-XXX, 1-72	1492	2	Corning specifications.
MH-211	HH-NEW	24	FOC 146-XXX, 1-24	1470	2	Corning specifications.

2.2.13.2.5. Fiber Optic Cable from ITB 146 to MH-120

The Contractor shall install approximately 6,477 feet of one continuous length, 144-strand SM FOC from ITB 146 to MH-120 utilizing existing Maintenance Hole Ductbank System. Length of run in SOO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 146 and/to MH-120:

- At ITB 146, One (1) 4U, 144-size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At ITB 146, Fusion Splice 144-strand SM fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At MH-011,MH-030, MH-040, MH-060, MH-080, MH-090, MH-110, and MH-120, install one re-enterable corning, dome style splice case, capable of housing 144-strand splice.
- At MH-120 leave FOC 146-XXX, 1-144 Dark in MH for future use.
- At ITB 146, OTDR and Power Meter/Light Source test in both directions.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.6. Fiber Optic Cable from MH-120 to New Hand Hole

The Contractor shall install approximately 872' feet of one continuous length, 24-strand SM FOC from MH-120 to newly installed Hand Hole near Paint Rock Rd. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following:

- From MH-120, Fusion Splice 24-strand single mode fiber optic cable to new 144 strand single mode fiber.
- If possible, OTDR and Power Meter/Light Source test in both directions to B146.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

Install Indoor/Outdoor or Outdoor rated Single Mode Fiber Optic Cable IAW the following Table and Figures 3/4/5/6:

From Building/ MH/HH	To Bldg or MHole	FOC Size	FOC ID/Strands	Approx. Distance (Feet)	Figure	Comment
ITB 146	MH-120	144 SM	FOC 146-XXX, 1-144	1,472	3, 4, 5, 6	Corning specifications.
MH-120	HH (NEW)	24	FOC 146-XXX, 1-24	872	3, 4, 5, 6	Corning specifications.

2.2.14. Site Restoration/Debris Removal

The Contractor shall restore all disturbed grounds to the "as found" condition or better after installation. Base grounds restoration requirements shall be complied with. Common use areas shall be restored to their original condition. The Contractor shall be responsible for disposing of all residues from this project off base and in accordance with Federal, state and base environmental laws and regulations. All residue produced by directional drilling operations (i.e., slurry) shall be disposed of off base on the same day the residue is produced, at an appropriate disposal facility at the contractor's expense, IAW federal, state, local and Goodfellow AFB environmental laws and regulations. Under no circumstances will the contractor stage or store boring residue in slurry ponds or other containment areas on Goodfellow AFB.

2.2.15. Service Outages

The Contractor shall be responsible for preventing any unscheduled (i.e. cutting or disabling any in-service cables or equipment.), Contractor-caused, interruptions of communications capabilities that are properly identified. The Contractor shall coordinate planned outages with the site POC at least 10 calendar days in advance of the outage if the implementation necessitates disruption of service, (e.g., communications, electrical, or other utilities).

2.2.16. Identification/Marking

The Contractor shall clearly mark all Contractor-Furnished Property and Equipment (CFP/CFE) with their company's name. The Contractor shall place an easily read, very visible, sign (minimum 8.5 inches x 11 inches) on large containers, construction equipment, or un-manned rental vehicles while on the Government installation indicating the company name and both the Contractor and Site POC's names and local telephone numbers.

2.2.17. Installation Schedules

The Contractor shall provide a complete milestone schedule that denotes project activities to include time-phased start and completion dates for the project and sub-projects associated with the installation of the components and system. (CDRL A002)

2.2.18. Weekly Status Reports

The Contractor shall prepare a Weekly Status Report in English and shall distribute. The purpose of the report is to inform IPT members of project progress, problems being encountered, and other topics necessary/beneficial to ensure success and timely completion of the contract requirements. (CDRL A003)

2.2.19. As-Built Drawings

The Contractor shall submit red line drawings showing the "as-built" configuration in format specified by base SCX project manager. The base communications squadron will provide baseline drawings. The Contractor shall provide As-Built Rack Elevation, Inside Cable Plant and Outside Cable Plant drawings and distribute per Goodfellow Air Force Base, Standard Operating Procedures. (CDRL A001)

2.2.20. Test and Acceptance/Installation Test Plan

The Contractor shall provide a test plan as to how the system shall be pre-tested, in-progress-tested and post-tested to demonstrate to the Government that the system is fully operational ready to be placed into service. The Contractor shall test the system to demonstrate to the Government quality assurance representative. These tests shall be accomplished prior to the system being placed into service. (CDRL A005)

2.2.20.1 Outside Plant Cable testing

All strands of fiber optic cables shall be tested IAW TIA 526-7 Measurement of Optical Power Loss of Installed Single-mode Fiber Cable Plant, or equivalent. As a minimum, the following tests shall be performed. Both Optical Time Domain Reflectometer (OTDR) and Optical Power Meter tests will be used for all end-to-end circuits. Between FODPs, bi- directional testing at 1310 nm and 1550 nm is required.

NOTE: Testing of the Fiber Optic Cables on the reel shall be provided to the 17 CS/SCXP prior to installation.

2.2.21. Acceptance/Installation Test Report

The Contractor shall provide an installation test report of the results of the testing accomplished under the installation test plan IAW CDRL A006.

2.2.22. Final Acceptance

The Contractor shall schedule a final project walk-through with the 17 CS/SCXP. This should be scheduled 10 calendar days prior to acceptance.

2.2.23. As-Built Documentation in CVC

The Contractor shall record geospatial data and provide as-built documentation (shape files) of all new installed maintenance hole system components (including metadata) compatible with the Cyberspace Infrastructure Planning System (CIPS) Visualization Component (CVC) drawing system. Data points shall be recorded at the center of each manhole/handhole lid and at intervals not to exceed 25 feet along cable routes. Sufficient data points shall be recorded to capture any change in direction along the route. All GPS coordinates shall have +/- 3 feet accuracy for all readings. The government is responsible for providing the Contractor with a copy of the installation's most current GeoBase Common Installation Picture (CIP), and current CVC drawings of the areas of interest. The government will review the shape files in CVC and transcribe the information to the CVC system. Shape files shall be delivered upon project completion. (CDRL A001)

3. GENERAL INFORMATION

3.1. Period of Performance

The period of performance for the project shall be determined based on the proposed schedule and actual contract award date.

3.2. Place of Performance

The place of performance is Goodfellow AFB, TX.

3.3. Hours of Operation

The Contractor shall routinely work during normal duty hours of the site. However, mission requirements may necessitate work outside normal hours (nights and/or weekends), especially if existing service must be interrupted. Any site work requested by the Contractor to be performed outside of normal duty hours shall be coordinated with the 17 CS/SCXP and approved by the Contracting Officer at least 10 calendar days in advance.

3.4. Holidays/Down Days

The Contractor shall not perform under this contract on federal holidays or site-unique down-days unless expressly authorized by the CO and coordinated with the 17 CS/SCXP Project Manager.

3.5. Base Support

The Contractor shall identify any base support requirements (for example, laydown and storage areas) necessary to complete this project in their proposal. The contractor shall return all government furnished lay-down and storage areas to their original condition upon completion of the project.

3.6. Minimum Contractor Qualifications.

All work shall be performed by an experienced Telecommunications Contractor. The Contractor shall have a minimum of 3 years of experience in Telecommunications Systems installations and provide the technician's splicing certifications that are to perform work on this project.

APPENDIX A: APPLICABLE STANDARDS

The following list is not all-exclusive. The Contractor shall comply with applicable commercial code and standards

AFI 91-203 – Air Force Consolidated Occupational Safety Instruction

AFBAN-FS – AF Base Area Network Functional Specification, 2017

OSHA CFR 29 Part 1910-268 – Telecommunications

NEMA TC 2- Electrical Polyvinyl Chloride (PVC) Tubing and Conduit

ANSI/TIA-606-B Administration Standard for Telecommunications Infrastructure

TIA-568-C Commercial Building Telecommunications (568C.1, 568C.2, 568C.3) Cabling Standard

ANSI/TIA-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

TIA-569-C - Commercial Building Standard for Telecommunications Pathways and Spaces

TIA-570-C –Residential Telecommunications Infrastructure Standard

TIA-758 - Customer-owned Outside Plant Telecommunication Infrastructure Standard

T.O. 00-33A-1001, Methods and Procedures, General Cyberspace Support Activities Management Procedures and Practice Requirements

BICSI TDM Manual - Building Industries Consulting Services International Telecommunications Distribution Methods (TDM) Manual

BICSI – Outside Plan Design Reference Manual

RUS Bulletin 1751F-643 - Underground Plant Design

RUS Bulletin 1751F-644 - Underground Plant Construction Telecommunications Engineering Shield Continuity and Construction Manual (TE&CM) 451.2

RUS Bulletin 1751F-801 – Electrical Protection Fundamentals

RUS Bulletin 1753F-151 (515b) - Specifications and Drawings for Underground Cable Installation

NFPA 70 - National Electric Code

FGDC-STD-007.3-1998 - Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy

UFC 3-520-01. Interior Electrical Systems

UFC 3-580-01, Telecommunications Interior Infrastructure Planning and Design (Ch. 1 & 2)

Goodfellow Air Force Base Telecommunications Requirements (17CS, SOP)

APPENDIX B: LIST OF DELIVERABLES

All deliverables are subject to Government acceptance and approval. They shall meet professional standards and the requirements set forth in this SOO. All deliverables shall be produced using recommended software tools/versions as accepted by the Government. The Contractor shall submit the following deliverables:

CDRL	Data Item Title	Data Item Title
A001	As Built	
A002	Work Schedule	
A003	Status Report	
A004	Meeting Minutes	
A005	Test Plan	
A006	Test Report	

APPENDIX C: LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AFM	Airfield Management (BaseOPS)
Approx	Approximately
ATC	Air Traffic Control Tower
ATCALS	Air Traffic Control and Landing Systems
BCE	Base Civil Engineering
CDRL	Contract Deliverable
CFE	Contractor-Furnished Equipment
CFP	Contractor-Furnished Property
CIP	Common Installation Picture
CIPS	Cyberspace Infrastructure Planning System
CMA	Controlled Movement Area
CMHDS	Communications Maintenance Hole Duct System
CO	Contracting Officer
Comm	Communications
CS	Communications Squadron
CSI-B	Cyberspace Integrator-Base
CVC	CIPS Visualization Component
ECMRA	Contractor Manpower Reporting Application
EFI&T	Engineer, Furnish, Install and Test
FOC	Fiber Optic Cable
FODP	Fiber Optic Distribution Panels
FOUO	For Official Use Only
FY	Fiscal Year
HDPE	High Density Polyethylene
HH	Hand Hole
IAW	In Accordance With
ID	Inside Diameter
ILS	Instrument Landing System
IPT	Integrated Process Team
ITB	Information Transfer Building
LMR	Land Mobile Radio
MH	Maintenance Hole
MHDS	Maintenance Hole Duct System
NLT	No Later Than
NPDES	National Pollution Discharge Elimination System
OEM	Original Equipment Manufacturer
OPSEC	Operational Security
OSHA	Occupational Safety & Health Administration
OSP	Outside Plant
OSS	Operations Support Squadron
OTDR	Optical Time Domain Reflectometer
PDF	Portable Document Format
PM	Project Manager
POC	Point Of Contact
Prime	Prime Contractor

PSI	Pounds per Square Inch
PVC	Polyvinyl Chloride
QAE	Quality Assurance Evaluator
QCM	Quality Control Manager
Qty	Quantity
RUS	Rural Utilities Service Bulletin
SCOW	Supply Chain Operations Wing
SCX	Scheduler Planner
SE	System Engineer
SM	Single Mode
SOO	Statement of Objectives
Sub	Sub-Contractor
SWPPP	Storm Water Pollution Prevention Plan
TIA	Telecommunications Industry Association
TMGB	Telecommunication Main Ground Bus-Bar
TRD	Technical Requirements Document

APPENDIX D: DRAWINGS

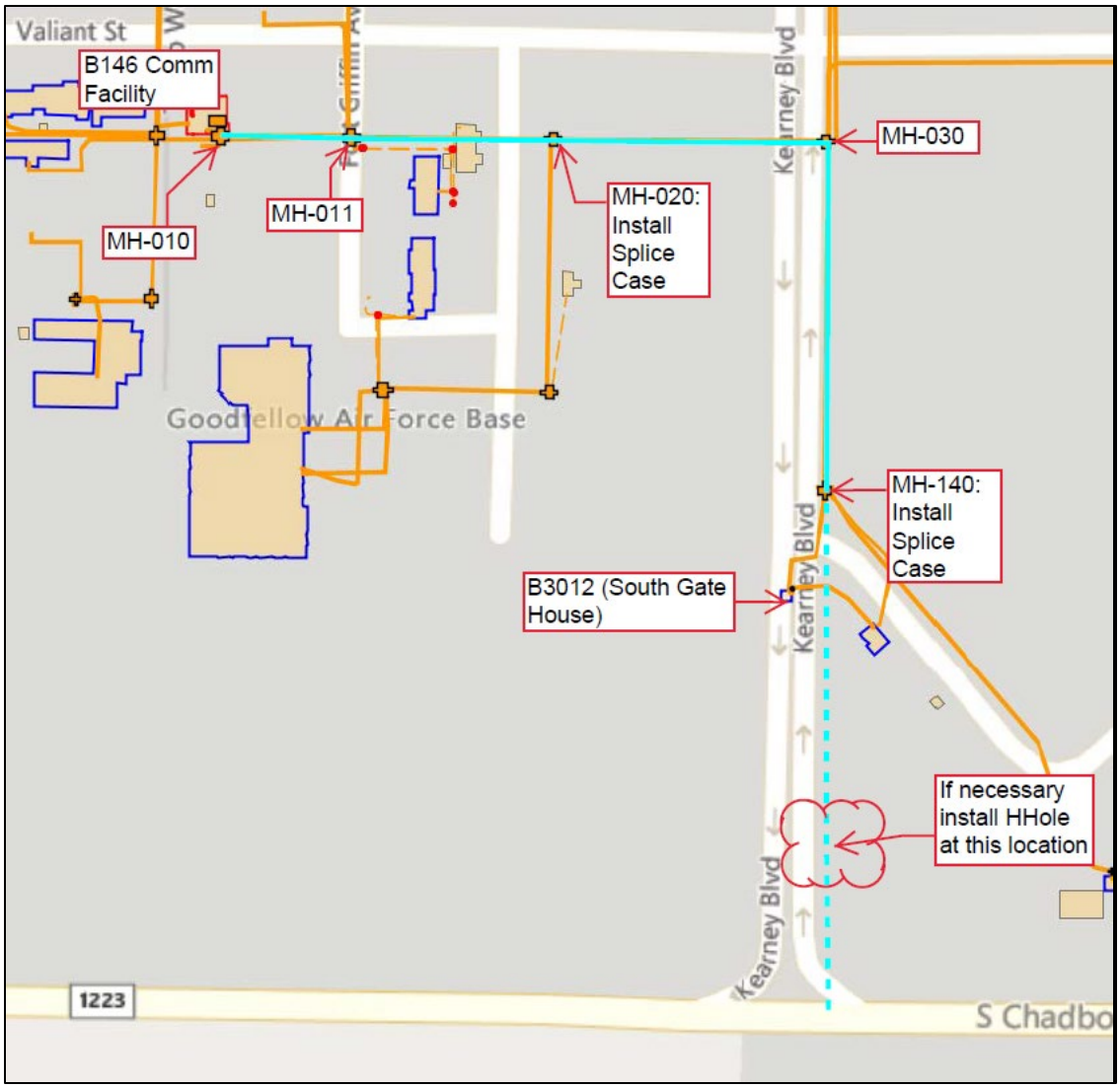


Figure 1: B146 towards S. Chadbourne St. (South Gate)

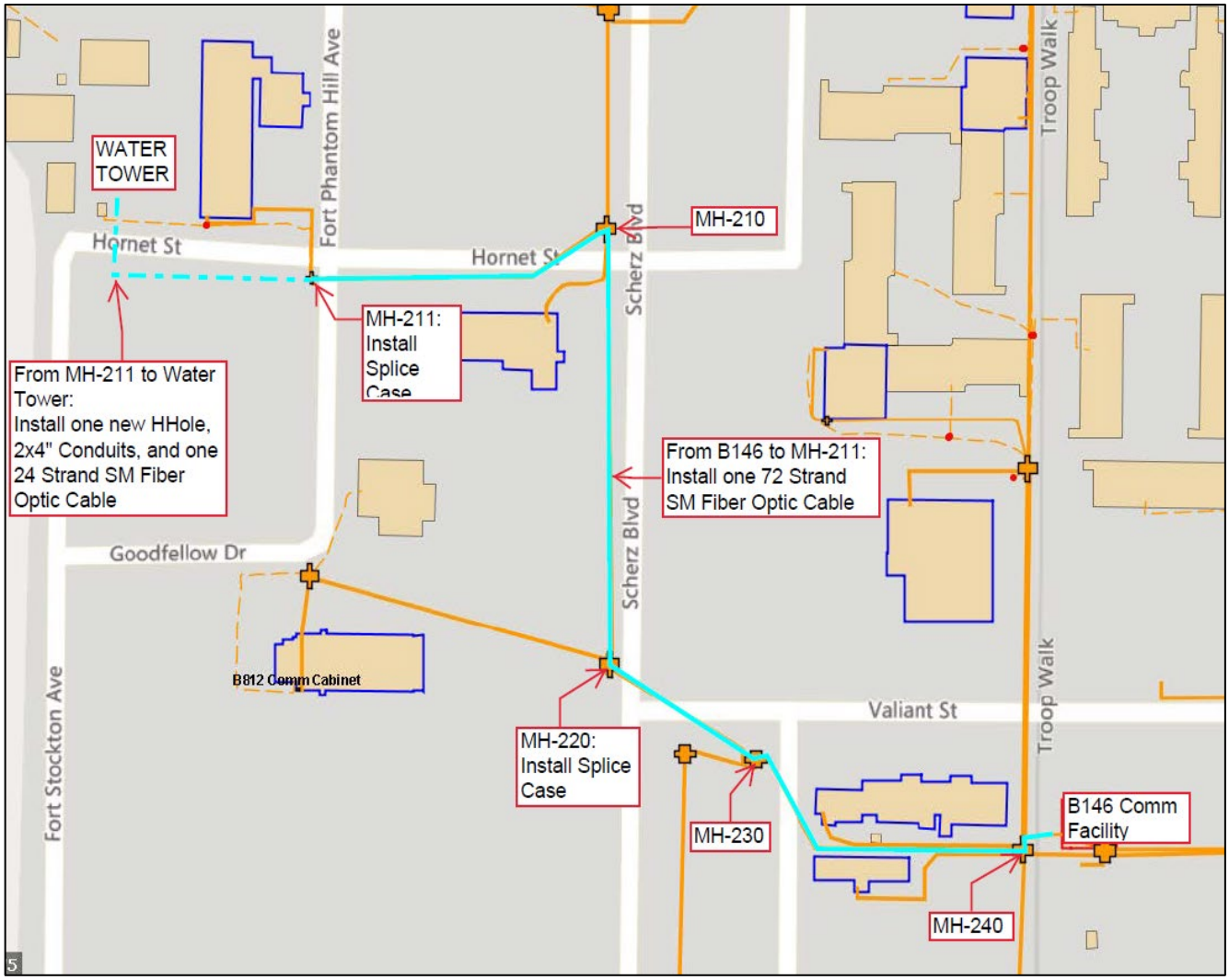


Figure 2: B146 towards B740 (Water Tower)

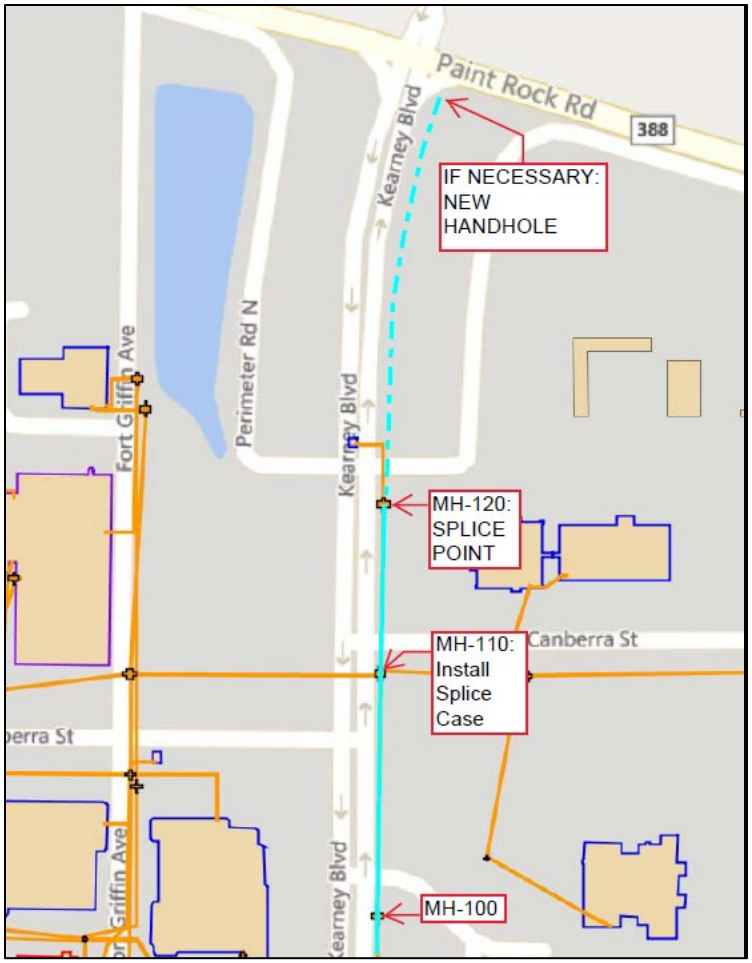


Figure 3: B146 towards Paint Rock Road (North Gate)

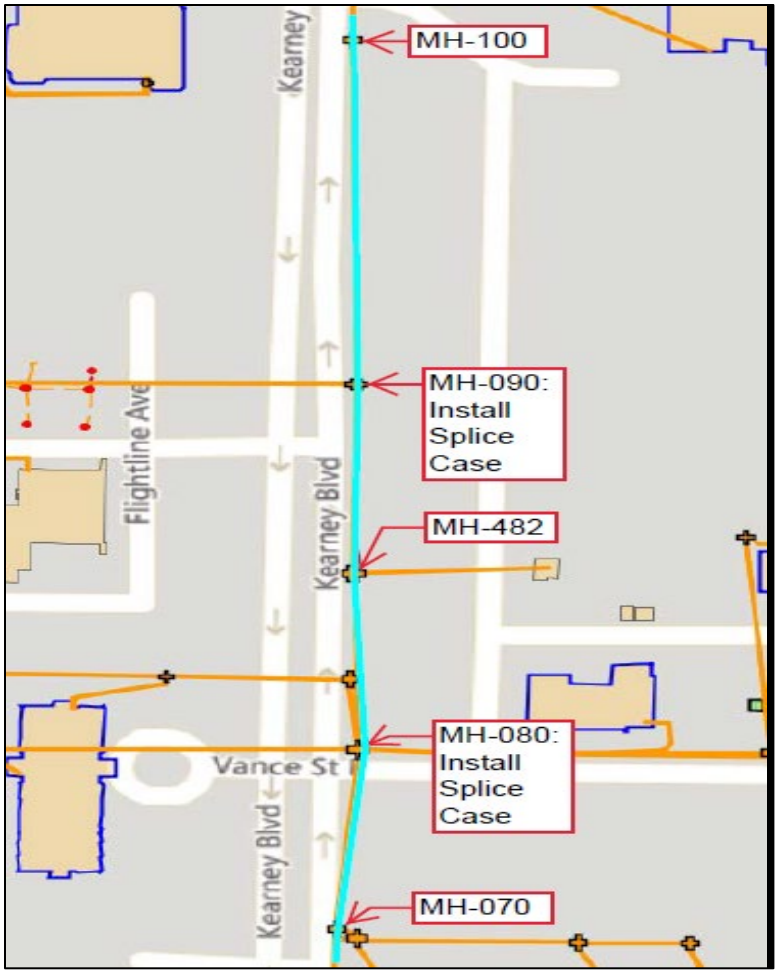


Figure 4: B146 towards Paint Rock Road (North Gate)

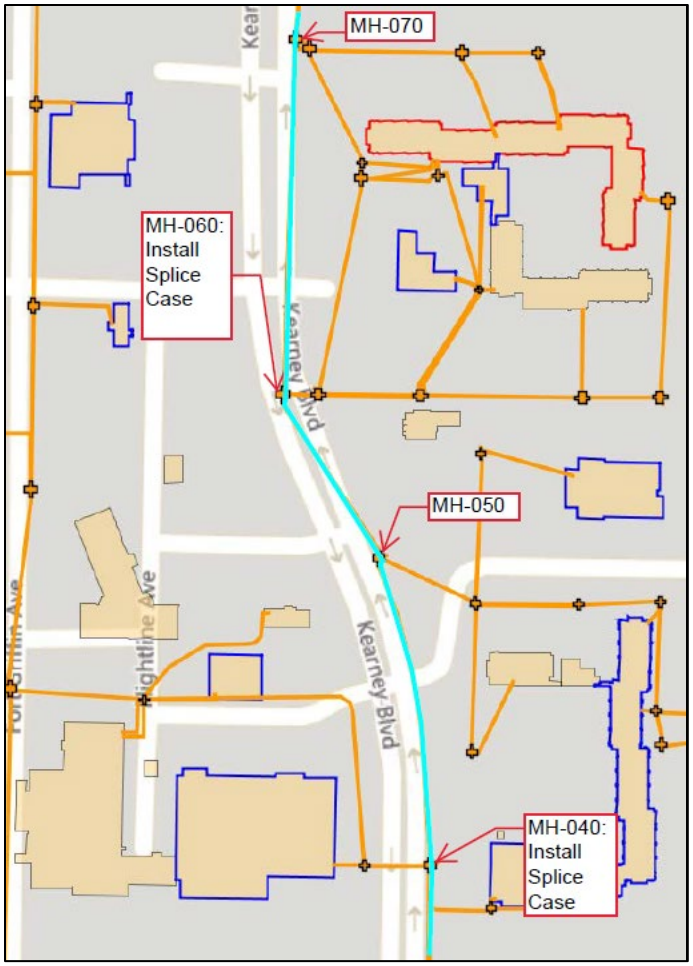


Figure 5: B146 towards Paint Rock Road (North Gate)

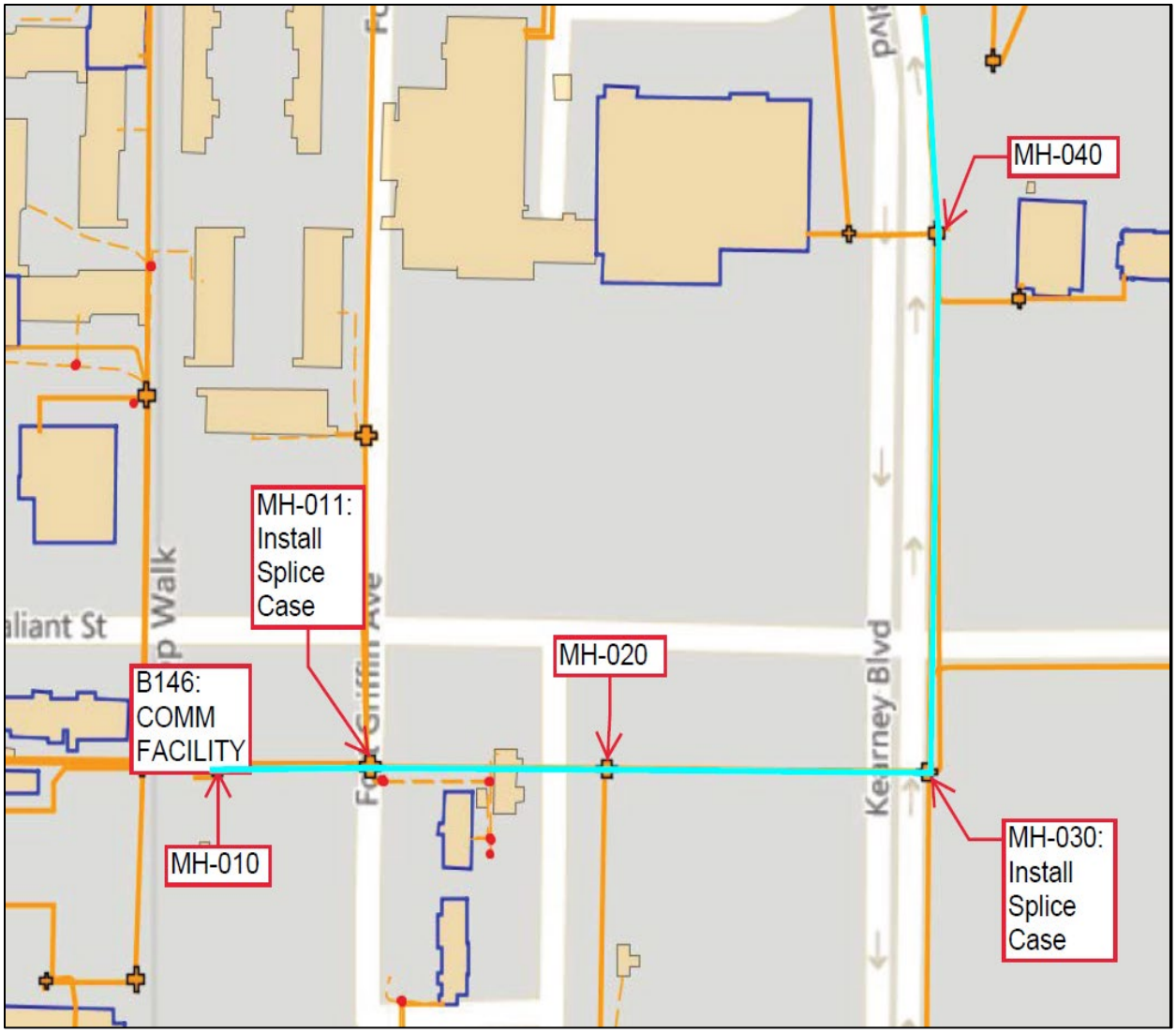
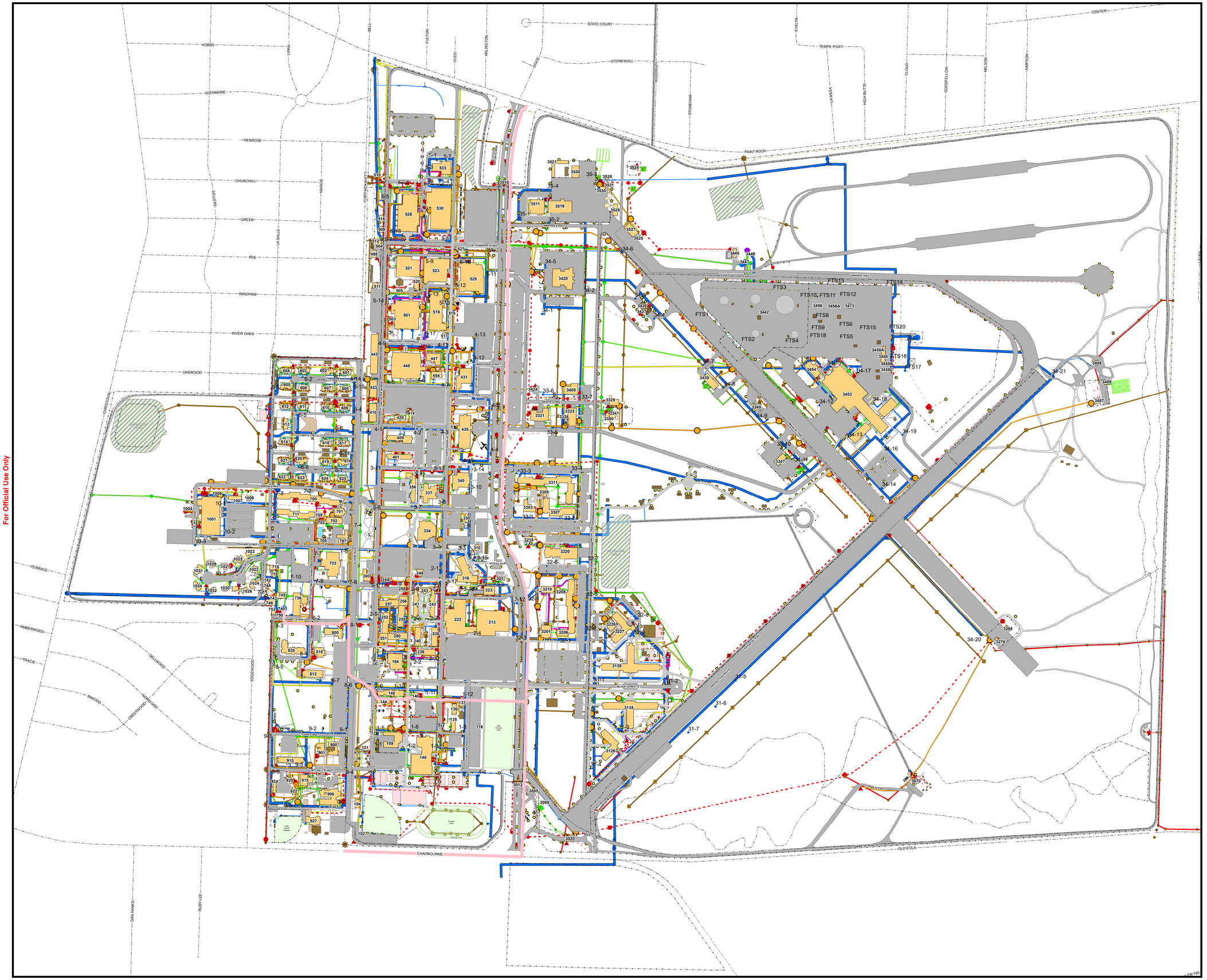
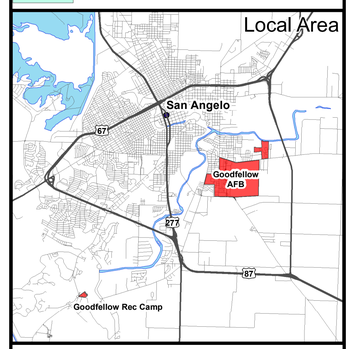


Figure 6: B146 towards Paint Rock Road (North Gate)



Legend

- CLIN 3a
- CLIN 3b
- CLIN 3c
- CLIN 3d
- CLIN 3e
- Handhole
- Manhole
- Water
- Sewer
- Gas
- Electrical
- Stormwater
- Communications
- HVAC
- Fuels



N

Meters
0 95 190 380

Feet
0 245 490 980 1,470

Fiber Backbone

17 CES/CENME, GeoBase
Building 3511, Room 124
17CES.CENME.GEOBASE@us.af.mil

GOODFELLOW AIR FORCE BASE

Map Date: January 2022

Map Path: F:\GeoBase Data\Maps\3 Work Requests\59800_Fiber Backbone\59800_Fiber_Backbone.mxd

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STATEMENT OF OBJECTIVES (SoO)

For

OSP/ISP Standardization (EMCS)

at GOODFELLOW AFB, TX

14 December 2021

Prepared By 17 CS SCXP

328 Ft. Lancaster

GAFB, TX 73145-2713

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1. SCOPE

This SOW defines the requirement for the Contractor to engineer, furnish, install, and test (EFI&T) single mode (SM) fiber optic cable (FOC) at ITB 146 and ISP wiring to seven buildings aboard Goodfellow Air Force Base, San Angelo Texas. The Contractor shall provide all equipment, tools, materials, supplies, transportation, labor, supervision, management, and other incidentals necessary to meet the requirements as stated in this SoO. All electronics equipment, supplies, and materials to be installed shall be new and not refurbished.

2. REQUIREMENTS

2.1. GENERAL REQUIREMENTS

2.1.1. Safety Requirements

The contractor shall remain in compliance with all Federal, State, and base security and safety laws, regulations, policies, and requirements.

2.1.1.1 Contractor Safety Standard Expectation

The Contractor will comply with all applicable OSHA and Air Force Safety Standards.

2.1.1.2 Base Fire Regulations

The Contractor shall comply with Base Fire Regulations as set forth in the latest edition of GAFB Instruction 32-2001, titled "Base Fire Protection Program". The Contractor shall use no explosives in performing the work. All work shall be in strict compliance with NFPA-101. Contract SOW must reference the USACE Safety and Health Manual EM-385-1-1 and NFPA 241 and must contain the requirement that the Installation's fire regulations be followed. All work shall be in strict compliance with NFPA-101.

2.1.2. Site Coordination

The Contractor shall meet with the base safety officer immediately upon arrival on site for review of the specific safety requirements prior to installation.

2.1.2.1. Confined Space

The Contractors entering spaces on Goodfellow AFB are responsible for the safety of their personnel and for their own confined spaces permit program as outlined in AFI 91-203. All confined space operations must be coordinated with the Base Safety Office prior to start of work.

2.1.2.2. Accident/Incident Reporting and Investigation

The Contractor shall record and report all available facts relating to each instance of injury to the Base Safety Office. The Contractor shall secure the scene of any accident and wreckage until released by the accident investigative authority through the Base POC. If the Government elects to conduct an investigation of the incident, the Contractor shall cooperate fully and assist the Government personnel until the investigation is completed.

2.1.2.3. Work Area(s)

At day's end, the Contractor shall remove all debris and surplus materials from the work place. Safety barriers shall be in place to protect unfinished work site at the end of the day. All open holes or trenches shall be completely enclosed by flexible orange construction safety fencing, or other safety barriers, at the end of the work day. Equipment and materials required to complete the work effort may remain on site as long as they are organized/stored in a manner that does not cause a safety hazard.

2.1.2.4. Traffic control

In the event base vehicular traffic is to be disrupted by trenching or horizontal directional boring, the Contractor shall make appropriate notifications NLT 10 calendar days in advance to 17 CS/SCXP of the planned disruptions.

2.1.3. Security Requirements

The Contractor shall process and provide a Site Visit Request Letter to 17 CS/SCXP within 5 calendar days after contract award. This spreadsheet shall identify the names (as shown on the driver's license), driver's license numbers and state of issue, and birth date of the personnel who will be performing work under this SOW, company name, address, phone number and contract number, start date and end date. This information is required to grant access to the base. If required by the base, the Contractor shall provide identification badges for their employees. All Contractor personnel shall wear these badges while on duty on the Government site. The badges shall identify the individual, company name, and be clearly and distinctly marked as Contractor and be in accordance with base regulations.

2.1.3.1. Security Clearances

Stated work and associated products shall be performed at the UNCLASSIFIED level. However, some of this work will take place in secure areas where Contractor employees must be escorted at all times. The Contractor must coordinate access to secure areas at least 24 hours ahead of time with the 17 CS/SCXP PM. It is the Government's responsibility to provide escorts.

2.1.3.2. Operational Security (OPSEC)

Network infrastructure (MHDS, MH/HH locations, fiber paths, etc.) is on the 17 CS Critical Information List and must be protected. The Contractor shall take appropriate measures to protect detailed information pertaining to the EFI&T effort, to include appropriate marking of documents as "For Official Use Only (FOUO)," and ensuring limited distribution of documents and schematics/drawings to only those individuals with a valid need to know. In accordance with (IAW) AFI 10-701, OPSEC Considerations, the contractor shall develop an OPSEC plan to ensure the protection of FOUO data either furnished by the government or produced by the contractor. The contractor's OPSEC plan provided in the RFP shall be incorporated into the SOW.

2.1.4. Environmental Compliance

The Contractor shall comply with the most stringent environmental federal, state, and local laws and regulations; and Air Force policies, instructions, and plans. The federal Government is not exempt from compliance with environmental regulations. The contractor shall maintain an awareness of changing environmental regulatory requirements to avoid environmental deficiencies for activities on Goodfellow AFB.

2.1.5. Permits

The Contractor shall complete and process all permits required to complete the installation prior to any trenching, or modifications to a facility, maintenance hole or hand hole; for example, the Base Civil Engineering Work Clearance Request, a digging permit, (AF Form 103) and Base Civil Engineer Work Request (AF Form 332). AF Form 103 and AF Form 332 {and any other required permits (as determined by Base Civil Engineering (BCE) or 17 CS/SCXP, etc.)} shall be submitted at IAW local procedures. All utility markings, flags, etc. shall be maintained by the contractor after the responsible work center/shop identifies/locates them. If a utility is severed or damaged due to neglect or if attributed to the fault of the contractor, then the contractor shall repair and return the utility back to the same condition it was in prior to the damage. The form(s)/permits shall be submitted within 10 calendar days after award.

2.1.6. Integrated Process Team (IPT)

The Contractor shall chair a weekly IPT meeting that includes Contractor representatives, 17CONS, the 17 CS/SCXP Project Manager (PM), and other base personnel as required. The Contractor shall provide an agenda and a worldwide "Meet Me" teleconference capability for the duration of the project.
The purpose of the IPT meeting is to discuss project progress, problems being encountered, and other information necessary/beneficial to ensure success and timely completion of contract requirements. The Contractor shall record meeting minutes and distribute to the attendees. The contractor shall provide at this meeting a weekly action register, in Microsoft excel, to capture items that need to be addressed. Action register shall have at a minimum Project Description, Contact list, Action Item List, Discrepancy List, and any pertinent information related to the project. (CDRL A004)

2.1.7. Quality Assurance

The Contractor shall provide Quality Assurance Support for the life of the project. The Contractor's quality assurance evaluator shall assist the Government representative in performing random spot checks and system acceptance tests. The Contractor shall be responsible for identifying system and outside plant deficiencies and /or discrepancies throughout the life of the project. A weekly report (soft copy) shall be submitted indicating progress/status and listing any deficiencies/discrepancies found and actions to correct them. (CDRL A003)

2.1.8. Contractor Personnel

2.1.8.1. Project Management

The Contractor shall provide a Project Manager (PM) and alternate(s) responsible for contract performance and continuity. The Contractor shall identify the Project Manager's or alternate's range of authority to act for the Contractor relating to daily contract operation.

2.1.8.2. Site Point of Contact (POC)

The Contractor shall designate the Contractor's on-site team leader and alternate(s) as the Site POC for individual projects in their Site Visit Request Letter. The Site POC or alternate(s) shall be on site during duty hours until project completion and shall oversee all facets of the installation tasks. The Site POC shall be the interface for all work site communications with the Government, including quality, safety, and discrepancy matters.

2.1.8.3. Personnel Requirements

The Project Manager, Site POC, and respective alternate(s) shall be able to read, write, speak, and understand English. All reporting and documentation shall be in English.

2.1.9. Electronic Contractor Manpower Reporting Application (ECMRA)

The contractor shall report ALL contractor labor hours (including subcontractor labor hours) required for performance of services provided under this contract for Goodfellow AFB single mode (SM) fiber optic cable (FOC) from ITB to ITB, via a secure data collection site. The contractor is required to completely fill in all required data fields using the following web address http://www.ecmra.mil Reporting inputs will be for the labor executed during the period of performance during each Government fiscal year (FY), which runs October 1 through September 30. While inputs may be reported any time during the FY, all data shall be reported no later than October 31 of each calendar year. Contractors may direct questions to the ECMRA help desk.

2.1.10. Warranty

The Contractor shall provide a one year warranty or manufacturer's standard commercial warranty, whichever is longer. This warranty shall include a one year workmanship warranty. The warranty period shall start from the date of system and/or project acceptance. The Contractor shall provide written procedures and required information for warranty services at or prior to site acceptance.

2.2. SPECIFIC REQUIREMENTS

The Contractor shall EFI&T SM, indoor/outdoor or outdoor rated FOC's from ITB 146 to seven (7) buildings aboard Goodfellow Air Force Base using the existing maintenance hole duct bank system. Contractor shall also install associated fiber optic distribution panels, with pre-terminated, factory certified connectors within cassette style modules all fusion spliced. In addition contractor will install a relay rack, ISP Wiring, and EMT from TR to EMSC Panel.

2.2.1. Maintenance Holes (MHs)

The Contractor shall pump out water as required. Water shall be drained IAW BCE and base environmental requirements.

2.2.2. Measurements

Any distances provided in this SOO are approximations and should NOT be used for ordering materials or determining duct lengths.

2.2.3. Splice Conductors

All fiber splicing shall be performed in accordance with RUS Bulletin 1735F-401, Standards for Splicing Copper and Fiber Cable. The fusion splice method shall be used for all splicing and terminations of fiber optic cable. Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors.

2.2.4. Cable Racks and Cable Rack Supports

Cable racks shall be installed in maintenance holes as required – this includes new and existing MHs/HHs. Splices shall not be supported by the cables that enter each end of the splice case. The splices shall be supported by cable hooks under the splice case. Telecommunications industry standard cable hooks of the appropriate length shall be provided to support cables and splice cases. The cable hooks shall be secured using cable rack locking clips. All cables shall be supported using racking clips, cable racks, and cable hooks.

2.2.5. Labeling

The Contractor shall label all equipment and cables they install and cables identified for re-use IAW TIA-606-B-2012 and as directed by the 17CS, SCXP. New ducts shall be permanently labeled on the wall of each building/maintenance hole indicating the connecting building/maintenance hole at the other end of the duct (for example, "To MH-200"). Tagging and labeling of new cables shall be IAW 17CS labeling scheme.

2.2.6. Cable Tags

All tags shall be permanently labeled, easily visible and corrosion resistant. Install cable tags in all maintenance holes/handholes, cable vaults, pull boxes and building entrance terminal locations. When cables pass through a maintenance hole, put a tag on the cable, approximately 2 feet from each duct entrance. Information on the cable tag shall identify cable by size, type, cable number and count. See Para 2.2.5 (above) for nomenclature for tagging.

2.2.7. Pulling Tape

All newly installed ducts left vacant shall be provided with a waterproof, corrosion resistant, pre-lubricated flat woven polyester pull tape with sequential footage markings (1250 lb. pulling strength) for future cable installations. The pull tape shall extend into the maintenance holes and be secured to a cable rack or pulling iron, etc.

2.2.8. Cable Terminations

Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors in cassette style housing. The pigtails shall be sized the same as the OSP fiber they are spliced to, i.e., 125/8.3 micron to 125/8.3 micron. The pigtails shall be duplex (or simplex) unless otherwise agreed to by 17 CS/SCXP.

2.2.9. OSP Maintenance Loop(s)

The Contractor shall install a minimum of a 50 foot fiber optic cable maintenance loop at the first MH from the building, at every splice point MH location and at every 3rd MH in the route. The maintenance loop slack shall be properly labeled, securely supported to the cable ladder and off the MH floor or in telecomm room.

2.2.10. Grounding/Bonding

Grounding/Bonding hardware such as corrosion resistant wire, bonding ribbon, clamps, ground rod, etc. necessary to properly bond/ground the cable in MHs shall be provided by the Contractor. In addition, grounding/bonding of telecommunication racks to telecomm busbar and building ground if necessary. Reference UFC 3-580-01, TIA 607, and TIA 758.

2.2.11. Underground Conduit System

The Contractor shall be responsible for any required trenching and/or boring necessary to lay the duct system. The Contractor is also responsible for backfilling ditch lines and compaction of fill materials with appropriate compaction tools. Directional drilling shall be used for major road crossings, taxiways, runways, etc. Otherwise, crossing of paved surfaces may be performed by pavement cuts and resurfacing with appropriate matching road material. This does not prevent the Contractor from using directional drilling if it is more cost effective. Ducts will be appropriately protected when placed under paved surfaces (i.e., concrete encasement).

2.2.11.1. Composition. N/A

2.2.11.2. Typical Situations

The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-40 Polyvinyl Chloride (PVC) (Schedule 40) IAW NEMA TC-2. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell-end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirements.

2.2.11.3. Unique /Site Specific Situations

The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-80-PVC (Schedule 80) IAW NEMA TC-2; high density polyethylene (HDPE) SIDR 11.5, Galvanized Iron Pipe (GIP) or “thickwall” stainless steel. Schedule 80 PVC shall be limited to risers, all above ground conduit and under the roadway/parking pavement. High density polyethylene (HDPE) SIDR 11.5 shall be used when directional bring is used. GIP or stainless steel shall be used under major roadways, taxiways, and runways. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell-end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirement.

2.2.11.4. Installation

Installation of underground conduits/ducts shall be IAW RUS Bulletin 1751F-643 and RUS Bulletin 1753F-151. Ducts installed beneath roads, sidewalks, parking areas, other paved surfaces or areas to be paved, etc. shall be installed a minimum of 36" below grade. In a MH with knockouts, ducts shall start at the bottom knockout, allowing for upward expansion in the MH. All ducts not installed under roads, sidewalks, parking areas, or areas to be paved, etc. shall have a minimum of 36 inches ground cover, where possible. The Contractor shall provide other protective measures, concrete cap, etc., in those areas where the minimum ground cover cannot be achieved. Grading of ducts shall be accomplished IAW RUS Bulletin 1751F-643. All conduits shall be continuous between MH/HHs (i.e., no breaks or separations in the conduit runs between MH/HHs).

2.2.11.5. Bends and Sealing

All bends between MHs shall be a minimum of ten times (10X) the diameter of the duct size (i.e., 4 inch duct = 40 inches) with the sum of bends in all directions not exceeding a total of 90 degrees, where practical. Coordinate with 17 CS/SCXP if runs have bends that total more than 90 degrees is required. Ducts shall have bell-ends and enter a MH perpendicular to the surface of the wall through which it is entering. All ducts/inner-ducts entering MH shall be sealed. Universal duct plugs or removable putty sealants may be used. Upon completion of conduit sections, a rigid 12" long test mandrel ¼" (6.4mm) smaller than the inside diameter of the conduit shall be pulled through two diagonally opposite ducts to ensure proper alignment. In addition, all ducts shall be cleared of loose materials such as concrete, mud, dirt, stones, etc.

2.2.11.6. Utility Separation

When communications ducts cross either power duct or buried power cable, maintain a minimum separation of 3 inches of concrete or 12 inches of well-tamped earth between the two or 12 inches of well tamped earth when parallel; for pipes (e.g., gas, water, oil) maintain 6 inches when crossing or 12 inches when parallel.

2.2.11.7. Spacers and Tracer Wire

Along the length of the duct run, if the ducts are installed by trenching, spacers shall be placed at five (5) foot intervals and cable warning tape shall be buried one (1) foot above the conduit and shall follow the duct route. The tape shall be a minimum of three inches wide and orange in color with the appropriate warning message. At least one duct shall have tracer wire or be otherwise locatable from the surface.

2.2.11.8. Entrance Conduits into Existing Maintenance Holes

When new entrance conduits/ducts or sleeves are required, the Contractor shall bore and install the necessary holes and install the ducts or sleeves, if a knockout does not exist. Penetration shall not be in such a location through the wall as to block use of existing ducts in the maintenance hole. New ducts will be a minimum of 18 inches from either the maintenance hole floor or ceiling, if practical. The minimum bending radius for entry conduit/ducts shall be no less than 10 times the inside diameter of the conduit. Ducts and openings around ducts shall be sealed to prevent moisture from entering the maintenance holes.

2.2.11.9. Excavation/Building Penetrations

All wall penetrations, including inside buildings, shall be restored to meet the required base fire ratings.

2.2.12 N/A

2.2.13. Outside Plant Installation

This section describes the underground cables, flexible geotextile multiple cell fabric, innerduct and MH/HH plus conduit system installation requirements. The Contractor shall design and install Customer-Owned Outside Plant Telecommunications Infrastructure in accordance with ANSI/TIA-758. Each cable installation shall be coordinated with 17 CS/SCXP so that the impact on the building users is properly coordinated. The sequence of installation is at the Contractor's discretion.

2.2.13.1. Infrastructure Installation

The Contractor shall install the following new infrastructure; 2 x 4" outdoor rated conduits approximately 953 feet, on dirt or roadway, 2 x 4" indoor rated EMT approximately 461 feet, one 3x3 inch Geo-textile Fabric approximately 1,579 feet, seven (7) 24 ports FODP and two (2) 144 port FODP's. Additionally, 1,722 feet of 144 strand single mode corning glass fiber, 1,285 feet of 96 strand single mode corning glass fiber, and 3,649 feet of 24 strand single mode corning glass fiber. (Coordinate exact location with 17 CS/SCXP).

2.2.13.1.1. Maintenance Holes

This project requires no new Maintenance Holes.

2.2.13.1.2. Ductbank & EMT Infrastructure

Install 4" PVC and/or HDPE SIDR 11.5 duct banks and/or EMT IAW the following Table and Figure 1:

From Building	To MHole or Tel Room	Quantity	Size (inches)	Approx. Distance (Feet)	Figure	Comment
B238	MH-012	2	4	174	1	2 X 4" outdoor rated conduit
B239	MH-012	2	4	158	1	2 X 4" outdoor rated conduit
B240	MH-243	2	4	208	1	2 X 4" outdoor rated conduit
B241	MH-244	2	4	140	1	2 X 4" outdoor rated conduit
B242	MH-043	2	4	93	1	2 X 4" outdoor rated conduit
B259	MH-244	2	4	180	1	2 X 4" outdoor rated conduit
B238/Boiler Room	B238/TR	2	4	75	1	2x4" indoor rated EMT
B239/Boiler Room	B239/TR	2	4	75	1	2x4" indoor rated EMT
B240/Boiler Room	B240/TR	2	4	75	1	2x4" indoor rated EMT
B356/Boiler Room	B356/TR	2	4	236	4	2x4" indoor rated EMT

2.2.13.1.3. Geo-textile Fabric Installation

Install Geo-textile fabrics IAW the following Table:

From Building	To Maintenance Hole	Quantity	Approx. Distance (Feet)	Figure	Comment
B238	MH-012	1	234	1	Install one-3x3" Geo- textile fabrics (detectable type)
B239	MH-012	1	218	1	Install one-3x3" Geo- textile fabrics (detectable type)
B240	MH-243	1	268	1	Install one-3x3" Geo- textile fabrics (detectable type)
B241	MH-244	1	200	1	Install one-3x3" Geo- textile fabrics (detectable type)
B242	MH-043	1	153	1	Install one-3x3" Geo- textile fabrics (detectable type)
B259	MH-244	1	240	1	Install one-3x3" Geo- textile fabrics (detectable type)
B356	MH-246	4	266	4	Install one-3x3" Geo- textile fabrics (detectable type)

2.2.13.2. Fiber Optic Cable Installation

Install outside plant FOC as described in the following paragraphs. The cable shall be all dielectric, loose buffer tube, water blocked, single mode, corning glass, outside plant (OSP) cable suitable for indoor/outdoor applications. The Contractor shall coordinate each cable installation with the 17CS/SCXP so as to minimize the impact on building users. The intent is to install the cable in one continuous length, to the extent that it is practical. The Contractor shall determine whether there is some practical reason for an intermediate splice in the cable at some maintenance hole/handhole between the cable end points. If an underground splice is necessary, it shall be accomplished IAW commonly accepted telecommunications industry practices for fusion splicing optical fiber cable and sealed with a splice case suitable for the application. If a splice case is installed in a maintenance hole/handhole it shall be pressure tested IAW the manufacturer's instructions. If a splice case leaks, it shall be reinstalled and retested. A coil of 50 feet of cable shall be provided on each cable entering or leaving a splice case in a maintenance hole or handhole and approved by 17CS/SCXP.

2.2.13.2.1. Fiber Optic Cable from ITB 146 to MH-244

The Contractor shall install approximately 742 feet of one continuous length, 144-strand SM FOC from ITB 146 to MH-243 and 664 feet of one continuous length, 96-strand SM FOC from MH-243 to MH-244 utilizing existing Maintenance Hole Ductbank System. Length of run in SOO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 146 and/to MH-244:

- At ITB 146, One (1) 4U, 144-size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At ITB 146, Fusion Splice 144-strand SM fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At MH-243 and MH-244, install one re-enterable corning, dome style splice case, capable of housing 144-strand splice.
- At MH-243 leave FOC 146-X, 1-24 Dark in MH for future use.
- At MH-244 leave FOC 146-X, 121-144 Dark in MH for future use.
- At ITB 146, OTDR and Power Meter/Light Source test in both directions to B240, B241, and B259.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable. Provide twelve (12), FOC patch cords per 17CS/SCXP guidance.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.2. Fiber Optic Cable from MH-243 and MH-244 to B240/B241/B259/B356

The Contractor shall install approximately 2,574 feet of one continuous length, 24-strand SM FOC from MH-243 to Building 240, MH-244 to B241, MH-244 to B259, and MH-244 to B356 utilizing existing Maintenance Hole Ductbank System. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following at each building:

- At each building, one fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At each building, Fusion Splice 24-strand single mode fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At each building, OTDR and Power Meter/Light Source test in both directions to B146.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

Install Indoor/Outdoor or Outdoor rated Single Mode Fiber Optic Cable IAW the following Table and Figure 2:

From Building	To Bldg or MHole	FOC Size	FOC ID/Strands	Approx. Distance (Feet)	Figure	Comment
ITB 146	MH-243	144 SM	FOC 146-X, 1-144	742	2	Corning specifications.
MH-243	MH-244	96 SM	FOC 146-X, 49-144	664	2	Corning specifications.
N/A	MH-243	N/A	FOX 146-X, 1-24	N/A	2	Dark in MH For Future Use.
B240	MH-243	24	FOC 146-X, 25-48	560	2	Corning specifications.
B259	MH-244	24	FOC 146-X, 49-72	530	2	Corning specifications
B241	MH-244	24	FOC 146-X, 73-96	300	2	Corning specifications.
N/A	N/A	N/A	FOC 146-X, 97-120	N/A	2	Dark in MH For Future Use.
B356	MH-244	24	FOC 146-X, 121-144	1184	4	Corning Specifications.

2.2.13.2.3. Fiber Optic Cable from ITB 146 to MH-043

The Contractor shall install approximately 980 feet of one continuous length, 144-strand SM FOC from ITB 146 to MH-012 and 621 feet of one continuous length, 96-strand SM FOC from MH-012 to MH-043 utilizing existing Maintenance Hole Ductbank System. Length of run in SOO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 146 and/to MH-043:

- At ITB 146, One (1) 4U, 144-size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At ITB 146, Fusion Splice 144-strand SM fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At MH-012 and MH-043, install one re-enterable corning, dome style splice case, capable of housing 144-strand splice.
- At MH-043 leave FOC 146-X, 73-144 Dark in MH for future use.
- At ITB 146, OTDR and Power Meter/Light Source test in both directions to B238, B239, and B242.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable. Provide twelve (12), FOC patch cords per 17CS/SCXP guidance.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.4. Fiber Optic Cable from MH-012 and MH-043 to B238/B239/B242

The Contractor shall install approximately 1,075 feet of one continuous length, 24-strand SM FOC from MH-012 to B238 and B239 and MH-043 to B242, utilizing existing Maintenance Hole Ductbank System. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following at each building:

- At each building, one fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At each building, Fusion Splice 24-strand single mode fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At each building, OTDR and Power Meter/Light Source test in both directions to B146.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

Install Indoor/Outdoor or Outdoor rated Single Mode Fiber Optic Cable IAW the following Table and Figure 2:

From Building	To Bldg or MHole	FOC Size	FOC ID/Strands	Approx. Distance (Feet)	Figure	Comment
ITB 146	MH-012	144 SM	FOC 146-X, 1-144	980	2	Corning specifications.
MH-012	MH-043	96 SM	FOC 146-X, 49-144	621	2	Corning specifications.
B239	MH-012	24	FOC 146-X, 1-24	408	2	Corning specifications.
B238	MH-012	24	FOC 146-X, 25-48	1,012	2	Corning specifications.
B242	MH-043	24	FOC 146-X, 49-72	243	2	Corning specifications.
N/A	MH-043	N/A	FOC 146-X, 73-144	N/A	2	Dark in MH For Future Use.

2.2.13.2.5. Buildings 238/239/240/241/242/259

Buildings contain one telecomm room. Contractor will upgrade the proposed Telecomm Room provided by 17CS. Contractor shall engineer, furnish, install, and test one Dual NIPR telecomm outlet at each building from TR to EMCS Panel. Additional details for this task can be provided during site survey or as needed by 17CS SCXP. New Telecommunications Room and Inside plant wiring shall, at a minimum, meet all UFC 3-580-01, Ch. 1/2 and 17CS SOP requirements.

Install ISP Cable and Infrastructure for each building IAW the following Table and Figure 3:

TASK	QTY
Install one sheet of 4' X 8' 3/4 inch fire-rated plywood backboard on wall. Mount one 19 inch relay rack with base insulator kit. Include two single sided vertical and two single sided horizontal wire management. Install 12 inch ladder racking to achieve cabling pathway and provide three point bracing to meet seismic zone 4 requirements. Install TMGB using all UL listed materials, bond rack, ladder rack, and building entrance terminal with number six green stranded wire and two hole lugs for bonding connections. Install # 2 wire from TMGB to building electrical service ground. Install 20 Amp-120 Volt-Surge Suppressed Horizontal Power distribution on the 19-inch rack. Installation shall meet all ANSI/TIA/EIA 568 standards and UFC 3-580-01.	1
Provide and install Cat-6, 48 port patch panels for NIPR Terminations.	1
Provide and install two green Cat-6 plenum cables up to 295’ to support network services from the existing TR (Telecom Room) to specified work area. (EMCS Panel) Termination method shall be 568B type wiring configuration to support NIPR Services.	1
Provide appropriate size, green Cat-6 Patch Cord	2
Provide CAD Services and Provide (1) Hard Copy 24" X 36" CAD Drawing	1

2.2.14. Site Restoration/Debris Removal

The Contractor shall restore all disturbed grounds to the “as found” condition or better after installation. Base grounds restoration requirements shall be complied with. Common use areas shall be restored to their original condition. The Contractor shall be responsible for disposing of all residues from this project off base and in accordance with Federal, state and base environmental laws and regulations. All residue produced by directional drilling operations (i.e., slurry) shall be disposed of off base on the same day the residue is produced, at an appropriate disposal facility at the contractor’s expense, IAW federal, state, local and Goodfellow AFB environmental laws and regulations. Under no circumstances will the contractor stage or store boring residue in slurry ponds or other containment areas on Goodfellow AFB.

2.2.15. Service Outages

The Contractor shall be responsible for preventing any unscheduled (i.e. cutting or disabling any in-service cables or equipment.), Contractor-caused, interruptions of communications capabilities that are properly identified. The Contractor shall coordinate planned outages with the site POC at least 10 calendar days in advance of the outage if the implementation necessitates disruption of service, (e.g., communications, electrical, or other utilities).

2.2.16. Identification/Marking

The Contractor shall clearly mark all Contractor-Furnished Property and Equipment (CFP/CFE) with their company's name. The Contractor shall place an easily read, very visible, sign (minimum 8.5 inches x 11 inches) on large containers, construction equipment, or un-manned rental vehicles while on the Government installation indicating the company name and both the Contractor and Site POC's names and local telephone numbers.

2.2.17. Installation Schedules

The Contractor shall provide a complete milestone schedule that denotes project activities to include time-phased start and completion dates for the project and sub-projects associated with the installation of the components and system. (CDRL A002)

2.2.18. Weekly Status Reports

The Contractor shall prepare a Weekly Status Report in English and shall distribute. The purpose of the report is to inform IPT members of project progress, problems being encountered, and other topics necessary/beneficial to ensure success and timely completion of the contract requirements. (CDRL A003)

2.2.19. As-Built Drawings

The Contractor shall submit red line drawings showing the “as-built” configuration in format specified by base SCX project manager. The base communications squadron will provide baseline drawings. The Contractor shall provide As-Built Rack Elevation, Inside Cable Plant and Outside Cable Plant drawings and distribute per Goodfellow Air Force Base, Standard Operating Procedures. (CDRL A001)

2.2.20. Test and Acceptance/Installation Test Plan

The Contractor shall provide a test plan as to how the system shall be pre-tested, in-progress-tested and post-tested to demonstrate to the Government that the system is fully operational ready to be placed into service. The Contractor shall test the system to demonstrate to the Government quality assurance representative. These tests shall be accomplished prior to the system being placed into service. (CDRL A005)

2.2.20.1 Outside Plant Cable testing

All strands of fiber optic cables shall be tested IAW TIA 526-7 Measurement of Optical Power Loss of Installed Single-mode Fiber Cable Plant, or equivalent. As a minimum, the following tests shall be performed. Both Optical Time Domain Reflectometer (OTDR) and Optical Power Meter tests will be used for all end-to-end circuits. Between FODPs, bi- directional testing at 1310 nm and 1550 nm is required.

NOTE: Testing of the Fiber Optic Cables on the reel shall be provided to the 17 CS/SCXP prior to installation.

2.2.21. Acceptance/Installation Test Report

The Contractor shall provide an installation test report of the results of the testing accomplished under the installation test plan IAW CDRL A006.

2.2.22. Final Acceptance

The Contractor shall schedule a final project walk-through with the 17 CS/SCXP. This should be scheduled 10 calendar days prior to acceptance.

2.2.23. As-Built Documentation in CVC

The Contractor shall record geospatial data and provide as-built documentation (shape files) of all new installed maintenance hole system components (including metadata) compatible with the Cyberspace Infrastructure Planning System (CIPS) Visualization Component (CVC) drawing system. Data points shall be recorded at the center of each manhole/handhole lid and at intervals not to exceed 25 feet along cable routes. Sufficient data points shall be recorded to capture any change in direction along the route. All GPS coordinates shall have +/- 3 feet accuracy for all readings. The government is responsible for providing the Contractor with a copy of the installation's most current GeoBase Common Installation Picture (CIP), and current CVC drawings of the areas of interest. The government will review the shape files in CVC and transcribe the information to the CVC system. Shape files shall be delivered upon project completion. (CDRL A001)

3. GENERAL INFORMATION

3.1. Period of Performance

The period of performance for the project shall be determined based on the proposed schedule and actual contract award date.

3.2. Place of Performance

The place of performance is Goodfellow AFB, TX.

3.3. Hours of Operation

The Contractor shall routinely work during normal duty hours of the site. However, mission requirements may necessitate work outside normal hours (nights and/or weekends), especially if existing service must be interrupted. Any site work requested by the Contractor to be performed outside of normal duty hours shall be coordinated with the 17 CS/SCXP and approved by the Contracting Officer at least 10 calendar days in advance.

3.4. Holidays/Down Days

The Contractor shall not perform under this contract on federal holidays or site-unique down-days unless expressly authorized by the CO and coordinated with the 17 CS/SCXP Project Manager.

3.5. Base Support

The Contractor shall identify any base support requirements (for example, laydown and storage areas) necessary to complete this project in their proposal. The contractor shall return all government furnished lay-down and storage areas to their original condition upon completion of the project.

3.6. Minimum Contractor Qualifications.

All work shall be performed by an experienced Telecommunications Contractor. The Contractor shall have a minimum of 3 years of experience in Telecommunications Systems installations and provide the technician's splicing certifications that are to perform work on this project.

APPENDIX A: APPLICABLE STANDARDS

The following list is not all-exclusive. The Contractor shall comply with applicable commercial code and standards

AFI 91-203 – Air Force Consolidated Occupational Safety Instruction

AFBAN-FS – AF Base Area Network Functional Specification, 2017

OSHA CFR 29 Part 1910-268 – Telecommunications

NEMA TC 2- Electrical Polyvinyl Chloride (PVC) Tubing and Conduit

ANSI/TIA-606-B Administration Standard for Telecommunications Infrastructure

TIA-568-C Commercial Building Telecommunications (568C.1, 568C.2, 568C.3) Cabling Standard

ANSI/TIA-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

TIA-569-C - Commercial Building Standard for Telecommunications Pathways and Spaces

TIA-570-C –Residential Telecommunications Infrastructure Standard

TIA-758 - Customer-owned Outside Plant Telecommunication Infrastructure Standard

T.O. 00-33A-1001, Methods and Procedures, General Cyberspace Support Activities Management Procedures and Practice Requirements

BICSI TDM Manual - Building Industries Consulting Services International Telecommunications Distribution Methods (TDM) Manual

BICSI – Outside Plan Design Reference Manual

RUS Bulletin 1751F-643 - Underground Plant Design

RUS Bulletin 1751F-644 - Underground Plant Construction Telecommunications Engineering Shield Continuity and Construction Manual (TE&CM) 451.2

RUS Bulletin 1751F-801 – Electrical Protection Fundamentals

RUS Bulletin 1753F-151 (515b) - Specifications and Drawings for Underground Cable Installation

NFPA 70 - National Electric Code

FGDC-STD-007.3-1998 - Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy

UFC 3-520-01. Interior Electrical Systems

UFC 3-580-01, Telecommunications Interior Infrastructure Planning and Design (Ch. 1 & 2)

Goodfellow Air Force Base Telecommunications Requirements (17CS, SOP)

APPENDIX B: LIST OF DELIVERABLES

All deliverables are subject to Government acceptance and approval. They shall meet professional standards and the requirements set forth in this SOO. All deliverables shall be produced using recommended software tools/versions as accepted by the Government. The Contractor shall submit the following deliverables:

CDRL	Data Item Title	Data Item Title
A001	As Built	
A002	Work Schedule	
A003	Status Report	
A004	Meeting Minutes	
A005	Test Plan	
A006	Test Report	

APPENDIX C: LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AFM	Airfield Management (BaseOPS)
Approx	Approximately
ATC	Air Traffic Control Tower
ATCALS	Air Traffic Control and Landing Systems
BCE	Base Civil Engineering
CDRL	Contract Deliverable
CFE	Contractor-Furnished Equipment
CFP	Contractor-Furnished Property
CIP	Common Installation Picture
CIPS	Cyberspace Infrastructure Planning System
CMA	Controlled Movement Area
CMHDS	Communications Maintenance Hole Duct System
CO	Contracting Officer
Comm	Communications
CS	Communications Squadron
CSI-B	Cyberspace Integrator-Base
CVC	CIPS Visualization Component
ECMRA	Contractor Manpower Reporting Application
EFI&T	Engineer, Furnish, Install and Test
FOC	Fiber Optic Cable
FODP	Fiber Optic Distribution Panels
FOUO	For Official Use Only
FY	Fiscal Year
HDPE	High Density Polyethylene
HH	Hand Hole
IAW	In Accordance With
ID	Inside Diameter
ILS	Instrument Landing System
IPT	Integrated Process Team
ITB	Information Transfer Building
LMR	Land Mobile Radio
MH	Maintenance Hole
MHDS	Maintenance Hole Duct System
NLT	No Later Than
NPDES	National Pollution Discharge Elimination System
OEM	Original Equipment Manufacturer
OPSEC	Operational Security
OSHA	Occupational Safety & Health Administration
OSP	Outside Plant
OSS	Operations Support Squadron
OTDR	Optical Time Domain Reflectometer
PDF	Portable Document Format
PM	Project Manager
POC	Point Of Contact
Prime	Prime Contractor

PSI	Pounds per Square Inch
PVC	Polyvinyl Chloride
QAE	Quality Assurance Evaluator
QCM	Quality Control Manager
Qty	Quantity
RUS	Rural Utilities Service Bulletin
SCOW	Supply Chain Operations Wing
SCX	Scheduler Planner
SE	System Engineer
SM	Single Mode
SOO	Statement of Objectives
Sub	Sub-Contractor
SWPPP	Storm Water Pollution Prevention Plan
TIA	Telecommunications Industry Association
TMGB	Telecommunication Main Ground Bus-Bar
TRD	Technical Requirements Document

APPENDIX D: DRAWINGS

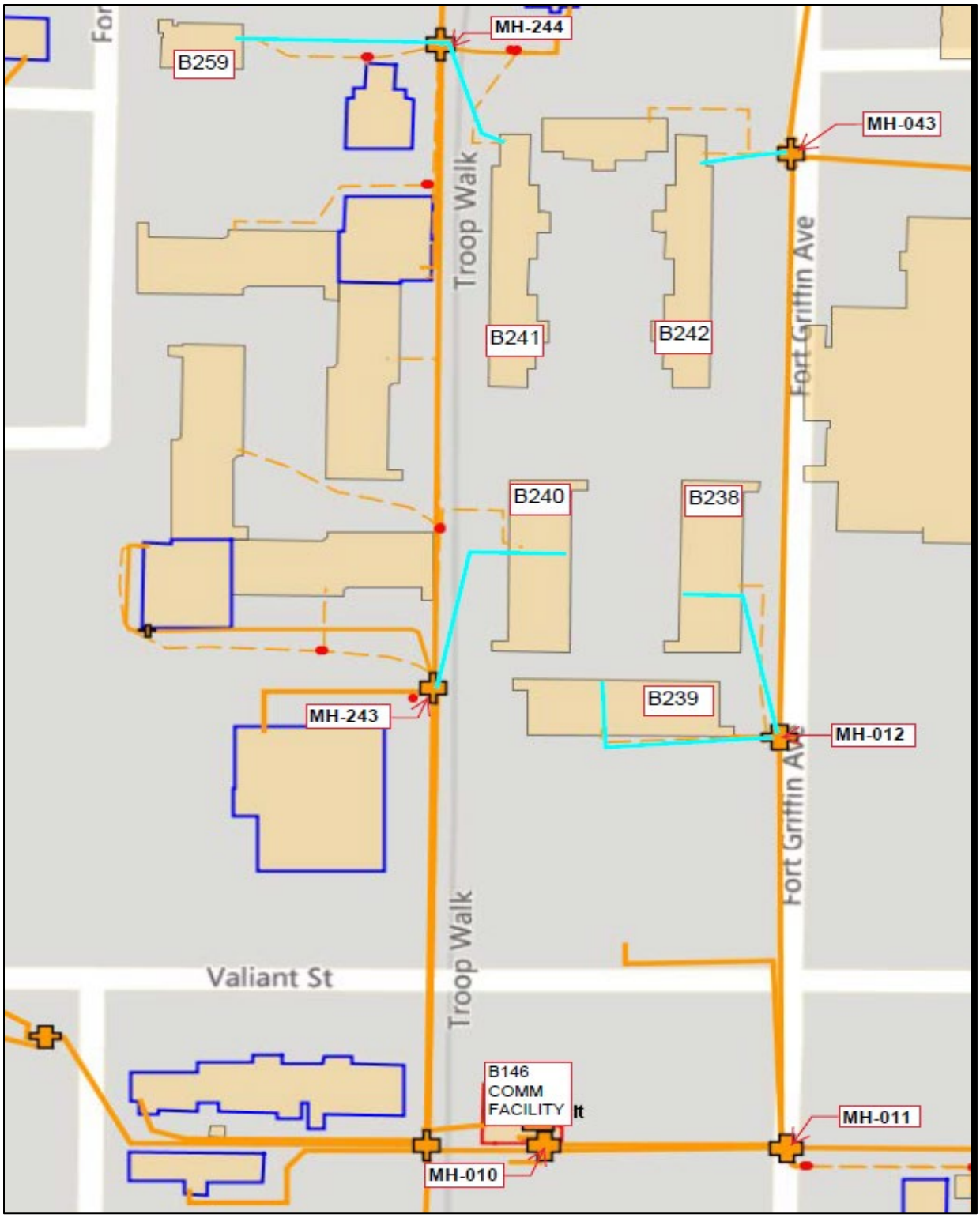


Figure 1: Proposed Trench/Conduit/EMT Work

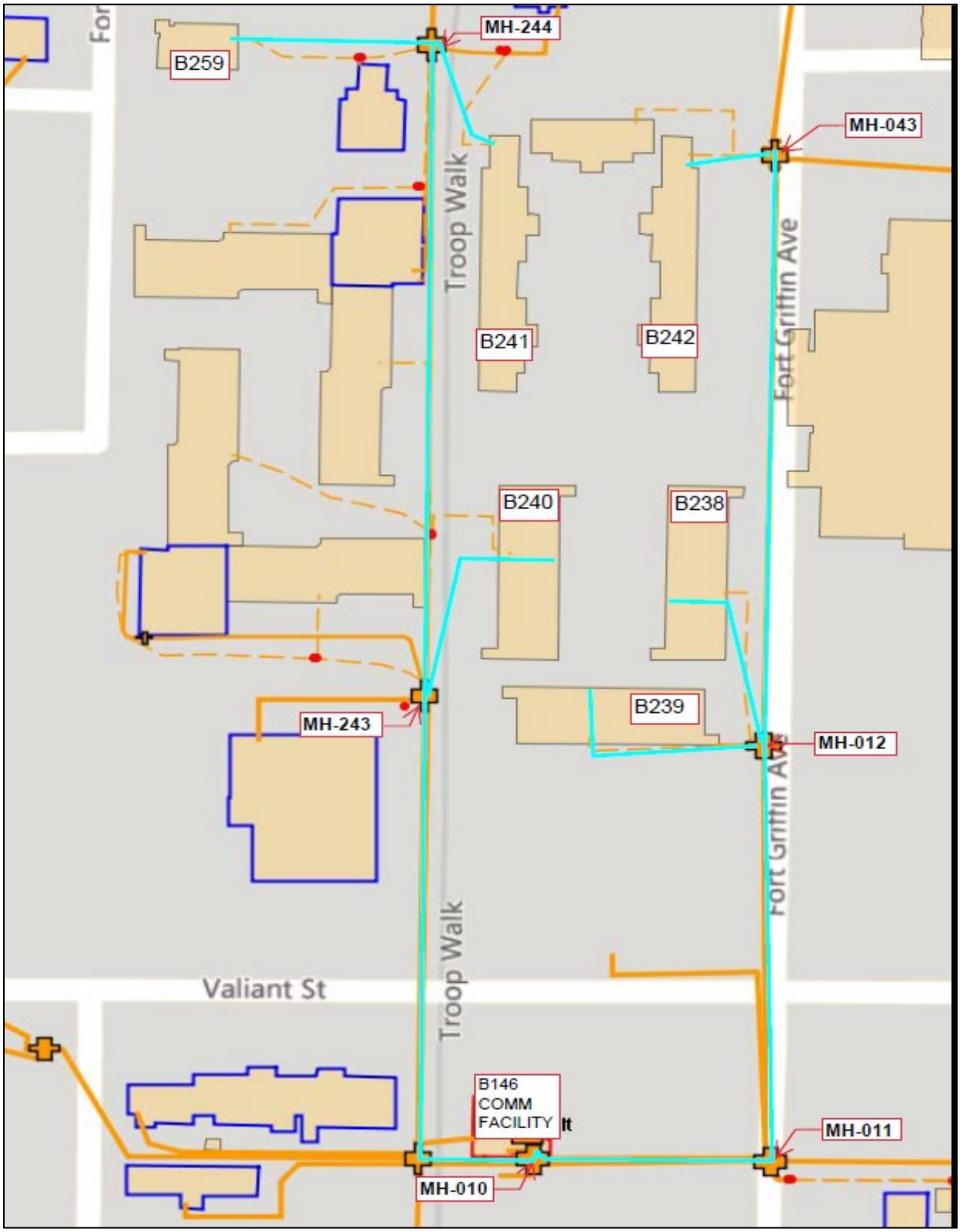


Figure 2: Proposed FOC Work

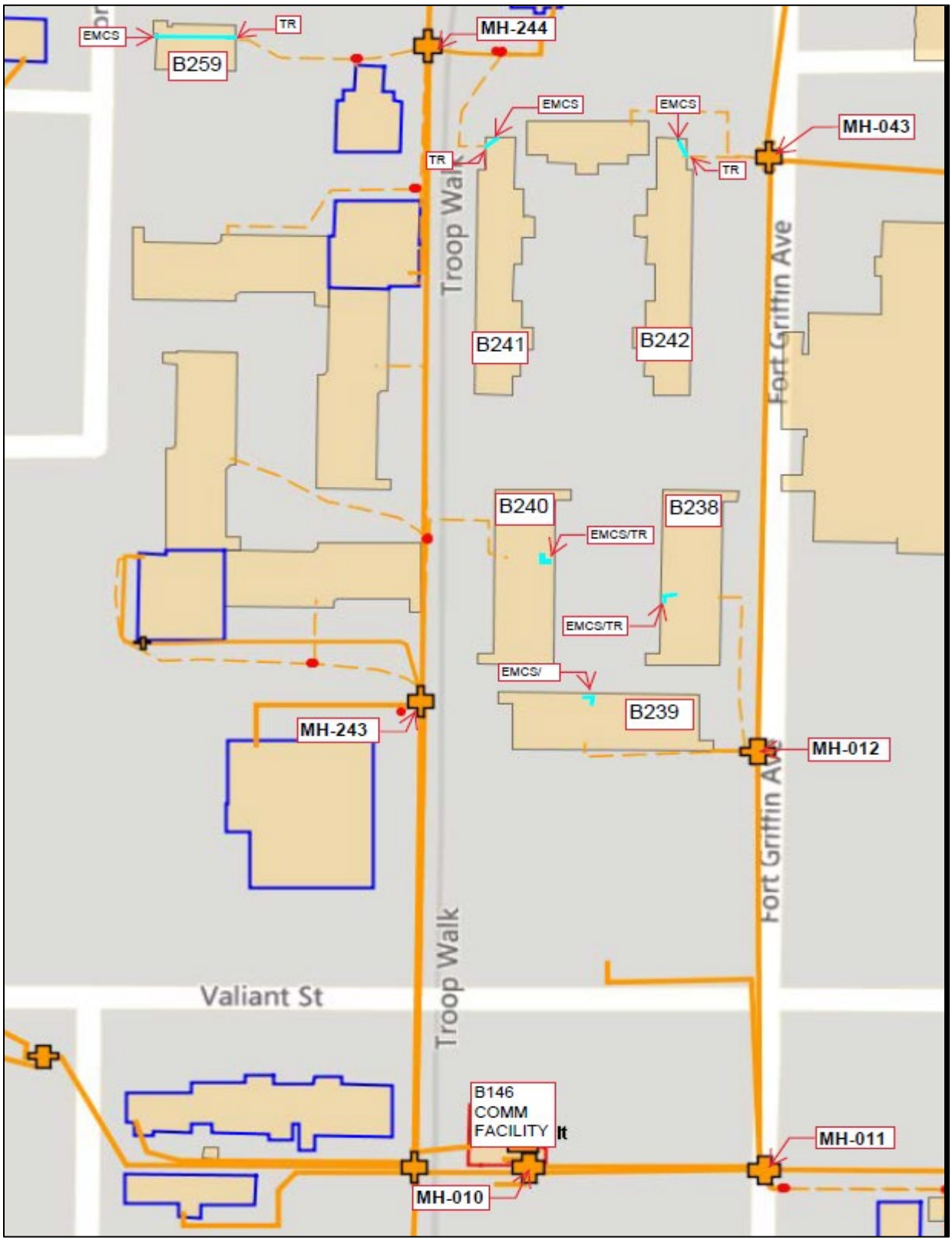


Figure 3: Proposed ISP Work

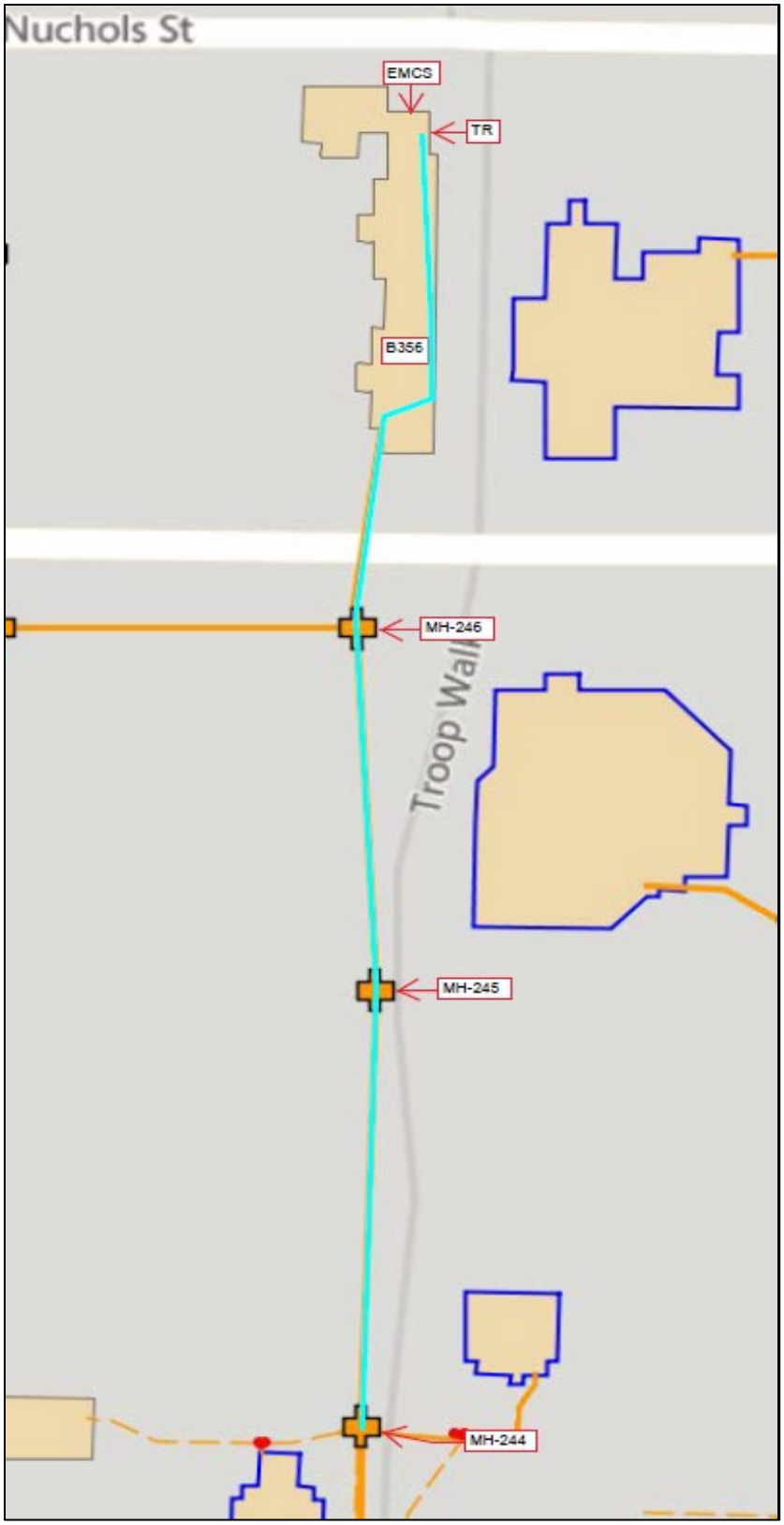
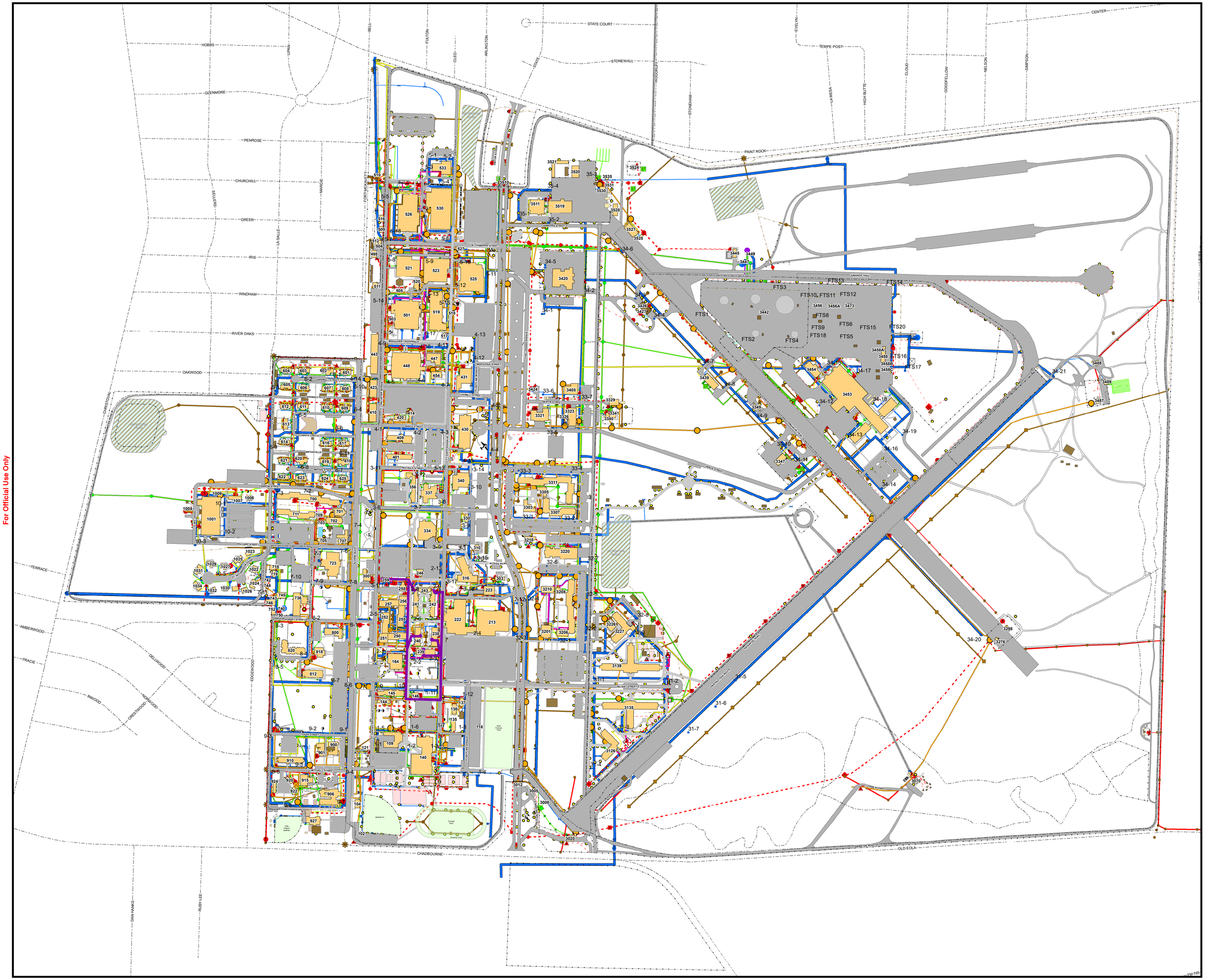
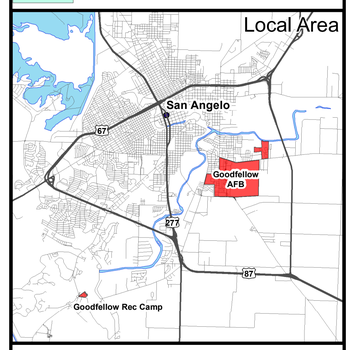


Figure 4: Proposed OSP/ISP Work For B356



Legend

- CLIN 3a
- CLIN 3b
- CLIN 3c
- CLIN 3d
- CLIN 3e
- Handhole
- Manhole
- Water
- Sewer
- Gas
- Electrical
- Stormwater
- Communications
- HVAC
- Fuels



N

Meters
0 95 190 380

Feet
0 245 490 980 1,470

Fiber Backbone

17 CES/CENME, GeoBase
Building 3511, Room 124
17CES.CENME.GEOBASE@us.af.mil

GOODFELLOW AIR FORCE BASE

Map Date: January 2022

Map Path: F:\GeoBase Data\Maps\3 Work Requests\59800_Fiber Backbone\59800_Fiber_Backbone.mxd

For Official Use Only

STATEMENT OF OBJECTIVES (SOO)

For

DS FOC Install from ITB's to ITB's Phase II at

GOODFELLOW AFB, TX

1 September 2020

Prepared By 17 CS SCXP

328 Ft. Lancaster

GAFB, TX 73145-2713

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1. SCOPE

This SOW defines the requirement for the Contractor to engineer, furnish, install and test (EFI&T) 96 strand single mode (SM) fiber optic cable (FOC) at several ITB's. ITB's include 146, 701, 448, and 3311. The Contractor shall provide all equipment, tools, materials, supplies, transportation, labor, supervision, management, and other incidentals necessary to meet the requirements as stated in this SOO. All electronics equipment, supplies, and materials to be installed shall be new and not refurbished.

2. REQUIREMENTS

2.1. GENERAL REQUIREMENTS

2.1.1. Safety Requirements

The contractor shall remain in compliance with all Federal, State, and base security and safety laws, regulations, policies, and requirements.

2.1.1.1 Contractor Safety Standard Expectation

The Contractor will comply with all applicable OSHA and Air Force Safety Standards.

2.1.1.2 Base Fire Regulations

The Contractor shall comply with Base Fire Regulations as set forth in the latest edition of GAFB Instruction 32-2001, titled "Base Fire Protection Program". The Contractor shall use no explosives in performing the work. All work shall be in strict compliance with NFPA-101. Contract SOW must reference the USACE Safety and Health Manual EM-385-1-1 and NFPA 241 and must contain the requirement that the Installation's fire regulations be followed. All work shall be in strict compliance with NFPA-101.

2.1.2. Site Coordination

The Contractor shall meet with the base safety officer immediately upon arrival on site for review of the specific safety requirements prior to installation.

2.1.2.1. Confined Space

The Contractors entering spaces on Goodfellow AFB are responsible for the safety of their personnel and for their own confined spaces permit program as outlined in AFI 91-203. All confined space operations must be coordinated with the Base Safety Office prior to start of work.

2.1.2.2. Accident/Incident Reporting and Investigation

The Contractor shall record and report all available facts relating to each instance of injury to the Base Safety Office. The Contractor shall secure the scene of any accident and wreckage until released by the accident investigative authority through the Base POC. If the Government elects to conduct an investigation of the incident, the Contractor shall cooperate fully and assist the Government personnel until the investigation is completed.

2.1.2.3. Work Area(s)

At day's end, the Contractor shall remove all debris and surplus materials from the work place. Safety barriers shall be in place to protect unfinished work site at the end of the day. All open holes or trenches shall be completely enclosed by flexible orange construction safety fencing, or other safety barriers, at the end of the work day. Equipment and materials required to complete the work effort may remain on site as long as they are organized/stored in a manner that does not cause a safety hazard.

2.1.2.4. Traffic control

In the event base vehicular traffic is to be disrupted by trenching or horizontal directional boring, the Contractor shall make appropriate notifications NLT 10 calendar days in advance to 17 CS/SCXP of the planned disruptions.

2.1.3. Security Requirements

The Contractor shall process and provide a Site Visit Request Letter to 17 CS/SCXP within 5 calendar days after contract award. This spreadsheet shall identify the names (as shown on the driver's license), driver's license numbers and state of issue, and birth date of the personnel who will be performing work under this SOW, company name, address, phone number and contract number, start date and end date. This information is required to grant access to the base. If required by the base, the Contractor shall provide identification badges for their employees. All Contractor personnel shall wear these badges while on duty on the Government site. The badges shall identify the individual, company name, and be clearly and distinctly marked as Contractor and be in accordance with base regulations.

2.1.3.1. Security Clearances

Stated work and associated products shall be performed at the UNCLASSIFIED level. However, some of this work will take place in secure areas where Contractor employees must be escorted at all times. The Contractor must coordinate access to secure areas at least 24 hours ahead of time with the 17 CS/SCXP PM. It is the Government's responsibility to provide escorts.

2.1.3.2. Operational Security (OPSEC)

Network infrastructure (MHDS, MH/HH locations, fiber paths, etc.) is on the 17 CS Critical Information List and must be protected. The Contractor shall take appropriate measures to protect detailed information pertaining to the EFI&T effort, to include appropriate marking of documents as "For Official Use Only (FOUO)," and ensuring limited distribution of documents and schematics/drawings to only those individuals with a valid need to know. In accordance with (IAW) AFI 10-701, OPSEC Considerations, the contractor shall develop an OPSEC plan to ensure the protection of FOUO data either furnished by the government or produced by the contractor. The contractor's OPSEC plan provided in the RFP shall be incorporated into the SOW.

2.1.4. Environmental Compliance

The Contractor shall comply with the most stringent environmental federal, state, and local laws and regulations; and Air Force policies, instructions, and plans. The federal Government is not exempt from compliance with environmental regulations. The contractor shall maintain an awareness of changing environmental regulatory requirements to avoid environmental deficiencies for activities on Goodfellow AFB.

2.1.5. Permits

The Contractor shall complete and process all permits required to complete the installation prior to any trenching, or modifications to a facility, maintenance hole or hand hole; for example, the Base Civil Engineering Work Clearance Request, a digging permit, (AF Form 103) and Base Civil Engineer Work Request (AF Form 332). AF Form 103 and AF Form 332 {and any other required permits (as determined by Base Civil Engineering (BCE) or 17 CS/SCXP, etc.)} shall be submitted at IAW local procedures. All utility markings, flags, etc. shall be maintained by the contractor after the responsible work center/shop identifies/locates them. If a utility is severed or damaged due to neglect or if attributed to the fault of the contractor, then the contractor shall repair and return the utility back to the same condition it was in prior to the damage. The form(s)/permits shall be submitted within 10 calendar days after award.

2.1.6. Integrated Process Team (IPT)

The Contractor shall chair a weekly IPT meeting that includes Contractor representatives, the 38 ES Cyberspace Integrator-Base (CSI-B), the 38 ES System Engineer (SE), the 17 CS/SCXP Project Manager (PM), and other base personnel as required. The Contractor shall provide an agenda and a worldwide "Meet Me" teleconference capability for the duration of the project. The purpose of the IPT meeting is to discuss project progress, problems being encountered, and other information necessary/beneficial to ensure success and timely completion of contract requirements. The Contractor shall record meeting minutes and distribute to the attendees. The contractor shall provide at this meeting a weekly action register, in Microsoft excel, to capture items that need to be addressed. Action register shall have at a minimum Project Description, Contact list, Action Item List, Discrepancy List, and any pertinent information related to the project. (CDRL A004)

2.1.7. Quality Assurance

The Contractor shall provide Quality Assurance Support for the life of the project. The Contractor's quality assurance evaluator shall assist the Government representative in performing random spot checks and system acceptance tests. The Contractor shall be responsible for identifying system and outside plant deficiencies and /or discrepancies throughout the life of the project. A weekly report (soft copy) shall be submitted indicating progress/status and listing any deficiencies/discrepancies found and actions to correct them. (CDRL A003)

2.1.8. Contractor Personnel

2.1.8.1. Project Management

The Contractor shall provide a Project Manager (PM) and alternate(s) responsible for contract performance and continuity. The Contractor shall identify the Project Manager's or alternate's range of authority to act for the Contractor relating to daily contract operation.

2.1.8.2. Site Point of Contact (POC)

The Contractor shall designate the Contractor's on-site team leader and alternate(s) as the Site POC for individual projects in their Site Visit Request Letter. The Site POC or alternate(s) shall be on site during duty hours until project completion and shall oversee all facets of the installation tasks. The Site POC shall be the interface for all work site communications with the Government, including quality, safety, and discrepancy matters.

2.1.8.3. Personnel Requirements

The Project Manager, Site POC, and respective alternate(s) shall be able to read, write, speak, and understand English. All reporting and documentation shall be in English.

2.1.9. Electronic Contractor Manpower Reporting Application (ECMRA)

The contractor shall report ALL contractor labor hours (including subcontractor labor hours) required for performance of services provided under this contract for Goodfellow AFB single mode (SM) fiber optic cable (FOC) from ITB to ITB, via a secure data collection site. The contractor is required to completely fill in all required data fields using the following web address http://www.ecmra.mil

Reporting inputs will be for the labor executed during the period of performance during each Government fiscal year (FY), which runs October 1 through September 30. While inputs may be reported any time during the FY, all data shall be reported no later than October 31 of each calendar year. Contractors may direct questions to the ECMRA help desk.

2.1.10. Warranty

The Contractor shall provide a one year warranty or manufacturer's standard commercial warranty, whichever is longer. This warranty shall include a one year workmanship warranty. The warranty period shall start from the date of system and/or project acceptance. The Contractor shall provide written procedures and required information for warranty services at or prior to site acceptance.

2.2. SPECIFIC REQUIREMENTS

The Contractor shall EFI&T five (5) indoor/outdoor rated 96-strand SM FOC's from ITB's to ITB's using the existing maintenance hole duct bank system. Contractor shall also install associated fiber optic distribution panels, with pre-terminated, factory certified connectors within cassette style modules all fusion spliced in Buildings 146, 701, 448, and 3311.

2.2.1. Maintenance Holes (MHs)

The Contractor shall pump out water as required. Water shall be drained IAW BCE and base environmental requirements.

2.2.2. Measurements

Any distances provided in this SOO are approximations and should NOT be used for ordering materials or determining duct lengths.

2.2.3. Splice Conductors

All fiber splicing shall be performed in accordance with RUS Bulletin 1735F-401, Standards for Splicing Copper and Fiber Cable. The fusion splice method shall be used for all splicing and terminations of fiber optic cable. Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors.

2.2.4. Cable Racks and Cable Rack Supports

Cable racks shall be installed in maintenance holes as required – this includes new and existing MHs/HHs. Splices shall not be supported by the cables that enter each end of the splice case. The splices shall be supported by cable hooks under the splice case. Telecommunications industry standard cable hooks of the appropriate length shall be provided to support cables and splice cases. The cable hooks shall be secured using cable rack locking clips. All cables shall be supported using racking clips, cable racks, and cable hooks.

2.2.5. Labeling

The Contractor shall label all equipment and cables they install and cables identified for re-use IAW TIA-606-B-2012 and as directed by the 17CS, SCXP. New ducts shall be permanently labeled on the wall of each building/maintenance hole indicating the connecting building/maintenance hole at the other end of the duct (for example, "To MH-200"). Tagging and labeling of new cables shall be IAW 17CS labeling scheme.

2.2.6. Cable Tags

All tags shall be permanently labeled, easily visible and corrosion resistant. Install cable tags in all maintenance holes/handholes, cable vaults, pull boxes and building entrance terminal locations. When cables pass through a maintenance hole, put a tag on the cable, approximately 2 feet from each duct entrance. Information on the cable tag shall identify cable by size, type, cable number and count. See Para 2.2.5 (above) for nomenclature for tagging.

2.2.7. Pulling Tape

All newly installed ducts left vacant shall be provided with a waterproof, corrosion resistant, pre-lubricated flat woven polyester pull tape with sequential footage markings (1250 lb. pulling strength) for future cable installations. The pull tape shall extend into the maintenance holes and be secured to a cable rack or pulling iron, etc.

2.2.8. Cable Terminations

Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors in cassette style housing. The pigtails shall be sized the same as the OSP fiber they are spliced to, i.e., 125/8.3 micron to 125/8.3 micron. The pigtails shall be duplex (or simplex) unless otherwise agreed to by 17 CS/SCXP.

2.2.9. OSP Maintenance Loop(s)

The Contractor shall install a minimum of a 50 foot fiber optic cable maintenance loop at the first MH from the building, at every splice point MH location and at every 3rd MH in the route. The maintenance loop slack shall be properly labeled, securely supported to the cable ladder and off the MH floor or in telecomm room.

2.2.10. Grounding/Bonding

Grounding/Bonding hardware such as corrosion resistant wire, bonding ribbon, clamps, ground rod, etc. necessary to properly bond/ground the cable in MHs shall be provided by the Contractor. In addition, grounding/bonding of telecommunication racks to telecomm busbar and building ground if necessary. Reference UFC 3-580-01, TIA 607, and TIA 758.

2.2.11. Underground Conduit System

The Contractor shall be responsible for any required trenching and/or boring necessary to lay the duct system. The Contractor is also responsible for backfilling ditch lines and compaction of fill materials with appropriate compaction tools. Directional drilling shall be used for major road crossings, taxiways, runways, etc. Otherwise, crossing of paved surfaces may be performed by pavement cuts and resurfacing with appropriate matching road material. This does not prevent the Contractor from using directional drilling if it is more cost effective. Ducts will be appropriately protected when placed under paved surfaces (i.e., concrete encasement).

2.2.11.1. Composition. N/A

2.2.11.2. Typical Situations

The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-40 Polyvinyl Chloride (PVC) (Schedule 40) IAW NEMA TC-2. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell-end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirements.

2.2.11.3. Unique /Site Specific Situations

The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-80-PVC (Schedule 80) IAW NEMA TC-2; high density polyethylene (HDPE) SIDR 11.5, Galvanized Iron Pipe (GIP) or “thickwall” stainless steel. Schedule 80 PVC shall be limited to risers, all above ground conduit and under the roadway/parking pavement. High density polyethylene (HDPE) SIDR 11.5 shall be used when directional bring is used. GIP or stainless steel shall be used under major roadways, taxiways, and runways. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell-end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirement.

2.2.11.4. Installation

Installation of underground conduits/ducts shall be IAW RUS Bulletin 1751F-643 and RUS Bulletin 1753F-151. Ducts installed beneath roads, sidewalks, parking areas, other paved surfaces or areas to be paved, etc. shall be installed a minimum of 36" below grade. In a MH with knockouts, ducts shall start at the bottom knockout, allowing for upward expansion in the MH. All ducts not installed under roads, sidewalks, parking areas, or areas to be paved, etc. shall have a minimum of 36 inches ground cover, where possible. The Contractor shall provide other protective measures, concrete cap, etc., in those areas where the minimum ground cover cannot be achieved. Grading of ducts shall be accomplished IAW RUS Bulletin 1751F-643. All conduits shall be continuous between MH/HHs (i.e., no breaks or separations in the conduit runs between MH/HHs).

2.2.11.5. Bends and Sealing

All bends between MHs shall be a minimum of ten times (10X) the diameter of the duct size (i.e., 4 inch duct = 40 inches) with the sum of bends in all directions not exceeding a total of 90 degrees, where practical. Coordinate with 17 CS/SCXP if runs have bends that total more than 90 degrees is required. Ducts shall have bell-ends and enter a MH perpendicular to the surface of the wall through which it is entering. All ducts/inner-ducts entering MH shall be sealed.

Universal duct plugs or removable putty sealants may be used. Upon completion of conduit sections, a rigid 12" long test mandrel ¼" (6.4mm) smaller than the inside diameter of the conduit shall be pulled through two diagonally opposite ducts to ensure proper alignment. In addition, all ducts shall be cleared of loose materials such as concrete, mud, dirt, stones, etc.

2.2.11.6. Utility Separation

When communications ducts cross either power duct or buried power cable, maintain a minimum separation of 3 inches of concrete or 12 inches of well-tamped earth between the two or 12 inches of well tamped earth when parallel; for pipes (e.g., gas, water, oil) maintain 6 inches when crossing or 12 inches when parallel.

2.2.11.7. Spacers and Tracer Wire

Along the length of the duct run, if the ducts are installed by trenching, spacers shall be placed at five (5) foot intervals and cable warning tape shall be buried one (1) foot above the conduit and shall follow the duct route. The tape shall be a minimum of three inches wide and orange in color with the appropriate warning message. At least one duct shall have tracer wire or be otherwise locatable from the surface.

2.2.11.8. Entrance Conduits into Existing Maintenance Holes

When new entrance conduits/ducts or sleeves are required, the Contractor shall bore and install the necessary holes and install the ducts or sleeves, if a knockout does not exist. Penetration shall not be in such a location through the wall as to block use of existing ducts in the maintenance hole. New ducts will be a minimum of 18 inches from either the maintenance hole floor or ceiling, if practical. The minimum bending radius for entry conduit/ducts shall be no less than 10 times the inside diameter of the conduit. Ducts and openings around ducts shall be sealed to prevent moisture from entering the maintenance holes.

2.2.11.9. Excavation/Building Penetrations

All wall penetrations, including inside buildings, shall be restored to meet the required base fire ratings.

2.2.12 N/A

2.2.13. Outside Plant Installation

This section describes the underground cables, flexible geotextile multiple cell fabric, innerduct and MH/HH plus conduit system installation requirements. The Contractor shall design and install Customer-Owned Outside Plant Telecommunications Infrastructure in accordance with ANSI/TIA-758. Each cable installation shall be coordinated with 17 CS/SCXP so that the impact on the building users is properly coordinated. The sequence of installation is at the Contractor's discretion.

2.2.13.1. Infrastructure Installation

This project requires no new infrastructure installation.

2.2.13.1.1. Maintenance Holes

This project requires no new Maintenance Holes.

2.2.13.1.2. Ductbank Infrastructure

This project requires no new Ductbank Infrastructure.

2.2.13.1.3. Geo-textile Fabric Installation

At time's provide necessary amount of geo-textile fabric innerduct. TBD by contractor and approved by 17CS.

2.2.13.2. Fiber Optic Cable Installation

Install outside plant FOC as described in the following paragraphs. The cable shall be all dielectric, loose buffer tube, water blocked, single mode, corning glass, outside plant (OSP) cable suitable for indoor/outdoor applications. The Contractor shall coordinate each cable installation with the CS/SCXP so as to minimize the impact on building users. The intent is to install the cable in one continuous length, to the extent that it is practical. The Contractor shall determine whether or not there is some practical reason for an intermediate splice in the cable at some maintenance hole/handhole between the cable end points. If an underground splice is necessary, it shall be accomplished IAW commonly accepted telecommunications industry practices for fusion splicing optical fiber cable and sealed with a splice case suitable for the application. If a splice case is installed in a maintenance hole/handhole it shall be pressure tested IAW the manufacturer's instructions. If a splice case leaks, it shall be reinstalled and retested. A coil of 50 feet of cable shall be provided on each cable entering or leaving a splice case in a maintenance hole or handhole.

Install 96-Strand Single Mode Fiber Optic Cable IAW the following Table:

From Building	To Bldg	FOC Type	Approx. Distance (Feet)	Figure	Comment
ITB146	ITB701	96 SM	2,775	1	Fully manufactured corning specifications.
ITB701	ITB448	96 SM	2,044	1	Fully manufactured corning specifications.
ITB146	ITB3311	96 SM	3,385	1	Fully manufactured corning specifications.
ITB146	ITB448	96 SM	3,755	1	Fully manufactured corning specifications.
ITB701	ITB3311	96 SM	3,185	1	Fully manufactured corning specifications.

2.2.13.2.1. Fiber Optic Cable From ITB 146 to ITB 701

The Contractor shall install approximately 2,775 feet of one continuous length, 96-strand SM FOC from ITB 146 to ITB 701 utilizing existing Maintenance Hole Ductbank System. Length of run in SOO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 146 and ITB 701:

- At each ITB, One (1) 4U, 144 size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At each ITB, Fusion Splice 96-strand single mode fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At each ITB, OTDR and Power Meter/Light Source test in both directions.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable. Provide 40 FOC patch cords.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.2. Fiber Optic Cable From ITB 701 to ITB 448

The Contractor shall install approximately 2,044 feet of one continuous length, 96-strand SM FOC from ITB 701 to ITB 448 utilizing existing Maintenance Hole Ductbank System. Length of run in SOO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 701 and ITB 448:

- At each ITB, One (1) 4U, 144 size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At each ITB, Fusion Splice 96-strand single mode fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At each ITB, OTDR and Power Meter/Light Source test in both directions.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable. Provide 40 FOC patch cords.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.3. Fiber Optic Cable From ITB 146 to ITB 3311

The Contractor shall install approximately 3,385 feet of one continuous length, 96-strand SM FOC from ITB 146 to ITB 3311 utilizing existing Maintenance Hole Ductbank System. Length of run in SOO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 146 and ITB 3311:

- At each ITB, One (1) 4U, 144 size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At each ITB, Fusion Splice 96-strand single mode fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At each ITB, OTDR and Power Meter/Light Source test in both directions.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable. Provide 40 FOC patch cords.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.4. Fiber Optic Cable From ITB 146 to ITB 448

The Contractor shall install approximately 3,755 feet of one continuous length, 96-strand SM FOC from ITB 146 to ITB 448 utilizing existing Maintenance Hole Ductbank System. Length of run in SOO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 146 and ITB 448:

- At each ITB, One (1) 4U, 144 size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At each ITB, Fusion Splice 96-strand single mode fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At each ITB, OTDR and Power Meter/Light Source test in both directions.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable. Provide 40 FOC patch cords.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.5. Fiber Optic Cable From ITB 701 to ITB 3311

The Contractor shall install approximately 3,185 feet of one continuous length, 96-strand SM FOC from ITB 701 to ITB 3311 utilizing existing Maintenance Hole Ductbank System. Length of run in SOO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 701 and ITB 3311:

- At each ITB, One (1) 4U, 144 size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At each ITB, Fusion Splice 96-strand single mode fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At each ITB, OTDR and Power Meter/Light Source test in both directions.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable. Provide 40 FOC patch cords.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.14. Site Restoration/Debris Removal

The Contractor shall restore all disturbed grounds to the "as found" condition or better after installation. Base grounds restoration requirements shall be complied with. Common use areas shall be restored to their original condition. The Contractor shall be responsible for disposing of all residues from this project off base and in accordance with Federal, state and base environmental laws and regulations. All residue produced by directional drilling operations (i.e., slurry) shall be disposed of off base on the same day the residue is produced, at an appropriate disposal facility at the contractor's expense, IAW federal, state, local and Goodfellow AFB environmental laws and regulations. Under no circumstances will the contractor stage or store boring residue in slurry ponds or other containment areas on Goodfellow AFB.

2.2.15. Service Outages

The Contractor shall be responsible for preventing any unscheduled (i.e. cutting or disabling any in-service cables or equipment.), Contractor-caused, interruptions of communications capabilities that are properly identified. The Contractor shall coordinate planned outages with the site POC at least 10 calendar days in advance of the outage if the implementation necessitates disruption of service, (e.g., communications, electrical, or other utilities).

2.2.16. Identification/Marking

The Contractor shall clearly mark all Contractor-Furnished Property and Equipment (CFP/CFE) with their company's name. The Contractor shall place an easily read, very visible, sign (minimum 8.5 inches x 11 inches) on large containers, construction equipment, or un-manned rental vehicles while on the Government installation indicating the company name and both the Contractor and Site POC's names and local telephone numbers.

2.2.17. Installation Schedules

The Contractor shall provide a complete milestone schedule that denotes project activities to include time-phased start and completion dates for the project and sub-projects associated with the installation of the components and system. (CDRL A002)

2.2.18. Weekly Status Reports

The Contractor shall prepare a Weekly Status Report in English and shall distribute. The purpose of the report is to inform IPT members of project progress, problems being encountered, and other topics necessary/beneficial to ensure success and timely completion of the contract requirements. (CDRL A003)

2.2.19. As-Built Drawings

The Contractor shall submit red line drawings showing the "as-built" configuration in format specified by base SCX project manager. The base communications squadron will provide baseline drawings. The Contractor shall provide As-Built Rack Elevation, Inside Cable Plant and Outside Cable Plant drawings and distribute per Goodfellow Air Force Base, Standard Operating Procedures. (CDRL A001)

2.2.20. Test and Acceptance/Installation Test Plan

The Contractor shall provide a test plan as to how the system shall be pre-tested, in-progress-tested and post-tested to demonstrate to the Government that the system is fully operational ready to be placed into service. The Contractor shall test the system to demonstrate to the Government quality assurance representative. These tests shall be accomplished prior to the system being placed into service. (CDRL A005)

2.2.20.1 Outside Plant Cable testing

All strands of fiber optic cables shall be tested IAW TIA 526-7 Measurement of Optical Power Loss of Installed Single-mode Fiber Cable Plant, or equivalent. As a minimum, the following tests shall be performed. Both Optical Time Domain Reflectometer (OTDR) and Optical Power Meter tests will be used for all end-to-end circuits. Between FODPs, bi- directional testing at 1310 nm and 1550 nm is required.

NOTE: Testing of the Fiber Optic Cables on the reel shall be provided to the 17 CS/SCXP prior to installation.

2.2.21. Acceptance/Installation Test Report

The Contractor shall provide an installation test report of the results of the testing accomplished under the installation test plan IAW CDRL A006.

2.2.22. Final Acceptance

The Contractor shall schedule a final project walk-through with the 17 CS/SCXP. This should be scheduled 10 calendar days prior to acceptance.

2.2.23. As-Built Documentation in CVC

The Contractor shall record geospatial data and provide as-built documentation (shape files) of all new installed maintenance hole system components (including metadata) compatible with the Cyberspace Infrastructure Planning System (CIPS) Visualization Component (CVC) drawing system. Data points shall be recorded at the center of each manhole/handhole lid and at intervals

not to exceed 25 feet along cable routes. Sufficient data points shall be recorded to capture any change in direction along the route. All GPS coordinates shall have +/- 3 feet accuracy for all readings. The government is responsible for providing the Contractor with a copy of the installation's most current GeoBase Common Installation Picture (CIP), and current CVC drawings of the areas of interest. The government will review the shape files in CVC and transcribe the information to the CVC system. Shape files shall be delivered upon project completion. (CDRL A001)

3. GENERAL INFORMATION

3.1. Period of Performance

The period of performance for the project shall be determined based on the proposed schedule and actual contract award date.

3.2. Place of Performance

The place of performance is Goodfellow AFB, TX.

3.3. Hours of Operation

The Contractor shall routinely work during normal duty hours of the site. However, mission requirements may necessitate work outside normal hours (nights and/or weekends), especially if existing service must be interrupted. Any site work requested by the Contractor to be performed outside of normal duty hours shall be coordinated with the 17 CS/SCXP and approved by the Contracting Officer at least 10 calendar days in advance.

3.4. Holidays/Down Days

The Contractor shall not perform under this contract on federal holidays or site-unique down-days unless expressly authorized by the CO and coordinated with the 17 CS/SCXP Project Manager.

3.5. Base Support

The Contractor shall identify any base support requirements (for example, laydown and storage areas) necessary to complete this project in their proposal. The contractor shall return all government furnished lay-down and storage areas to their original condition upon completion of the project.

3.6. Minimum Contractor Qualifications.

All work shall be performed by an experienced Telecommunications Contractor. The Contractor shall have a minimum of 3 years of experience in Telecommunications Systems installations and provide the technician's certifications that are to perform work on this project.

APPENDIX A: APPLICABLE STANDARDS

The following list is not all-exclusive. The Contractor shall comply with applicable commercial code and standards

AFI 91-203 – Air Force Consolidated Occupational Safety Instruction

AFBAN-FS – AF Base Area Network Functional Specification, 2017

OSHA CFR 29 Part 1910-268 – Telecommunications

NEMA TC 2- Electrical Polyvinyl Chloride (PVC) Tubing and Conduit

ANSI/TIA-606-B Administration Standard for Telecommunications Infrastructure

TIA-568-C Commercial Building Telecommunications (568C.1, 568C.2, 568C.3) Cabling Standard

ANSI/TIA-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

TIA-569-C - Commercial Building Standard for Telecommunications Pathways and Spaces

TIA-570-C –Residential Telecommunications Infrastructure Standard

TIA-758 - Customer-owned Outside Plant Telecommunication Infrastructure Standard

T.O. 00-33A-1001, Methods and Procedures, General Cyberspace Support Activities Management Procedures and Practice Requirements

BICSI TDM Manual - Building Industries Consulting Services International Telecommunications Distribution Methods (TDM) Manual

BICSI – Outside Plan Design Reference Manual

RUS Bulletin 1751F-643 - Underground Plant Design

RUS Bulletin 1751F-644 - Underground Plant Construction Telecommunications Engineering Shield Continuity and Construction Manual (TE&CM) 451.2

RUS Bulletin 1751F-801 – Electrical Protection Fundamentals

RUS Bulletin 1753F-151 (515b) - Specifications and Drawings for Underground Cable Installation

NFPA 70 - National Electric Code

FGDC-STD-007.3-1998 - Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy

UFC 3-520-01. Interior Electrical Systems

UFC 3-580-01, Telecommunications Interior Infrastructure Planning and Design (Ch. 1 & 2)

Goodfellow Air Force Base Telecommunications Requirements (17CS, SOP)

APPENDIX B: LIST OF DELIVERABLES

All deliverables are subject to Government acceptance and approval. They shall meet professional standards and the requirements set forth in this SOO. All deliverables shall be produced using recommended software tools/versions as accepted by the Government. The Contractor shall submit the following deliverables:

CDRL	Data Item Title	Data Item Title
A001	As Built	
A002	Work Schedule	
A003	Status Report	
A004	Meeting Minutes	
A005	Test Plan	
A006	Test Report	

APPENDIX C: LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AFM	Airfield Management (BaseOPS)
Approx	Approximately
ATC	Air Traffic Control Tower
ATCALS	Air Traffic Control and Landing Systems
BCE	Base Civil Engineering
CDRL	Contract Deliverable
CFE	Contractor-Furnished Equipment
CFP	Contractor-Furnished Property
CIP	Common Installation Picture
CIPS	Cyberspace Infrastructure Planning System
CMA	Controlled Movement Area
CMHDS	Communications Maintenance Hole Duct System
CO	Contracting Officer
Comm	Communications
CS	Communications Squadron
CSI-B	Cyberspace Integrator-Base
CVC	CIPS Visualization Component
ECMRA	Contractor Manpower Reporting Application
EFI&T	Engineer, Furnish, Install and Test
FOC	Fiber Optic Cable
FODP	Fiber Optic Distribution Panels
FOUO	For Official Use Only
FY	Fiscal Year
HDPE	High Density Polyethylene
HH	Hand Hole
IAW	In Accordance With
ID	Inside Diameter
ILS	Instrument Landing System
IPT	Integrated Process Team
ITB	Information Transfer Building
LMR	Land Mobile Radio
MH	Maintenance Hole
MHDS	Maintenance Hole Duct System
NLT	No Later Than
NPDES	National Pollution Discharge Elimination System
OEM	Original Equipment Manufacturer
OPSEC	Operational Security
OSHA	Occupational Safety & Health Administration
OSP	Outside Plant
OSS	Operations Support Squadron
OTDR	Optical Time Domain Reflectometer
PDF	Portable Document Format
PM	Project Manager
POC	Point Of Contact
Prime	Prime Contractor

PSI	Pounds per Square Inch
PVC	Polyvinyl Chloride
QAE	Quality Assurance Evaluator
QCM	Quality Control Manager
Qty	Quantity
RUS	Rural Utilities Service Bulletin
SCOW	Supply Chain Operations Wing
SCX	Scheduler Planner
SE	System Engineer
SM	Single Mode
SOO	Statement of Objectives
Sub	Sub-Contractor
SWPPP	Storm Water Pollution Prevention Plan
TIA	Telecommunications Industry Association
TMGB	Telecommunication Main Ground Bus-Bar
TRD	Technical Requirements Document

APPENDIX D: DRAWINGS

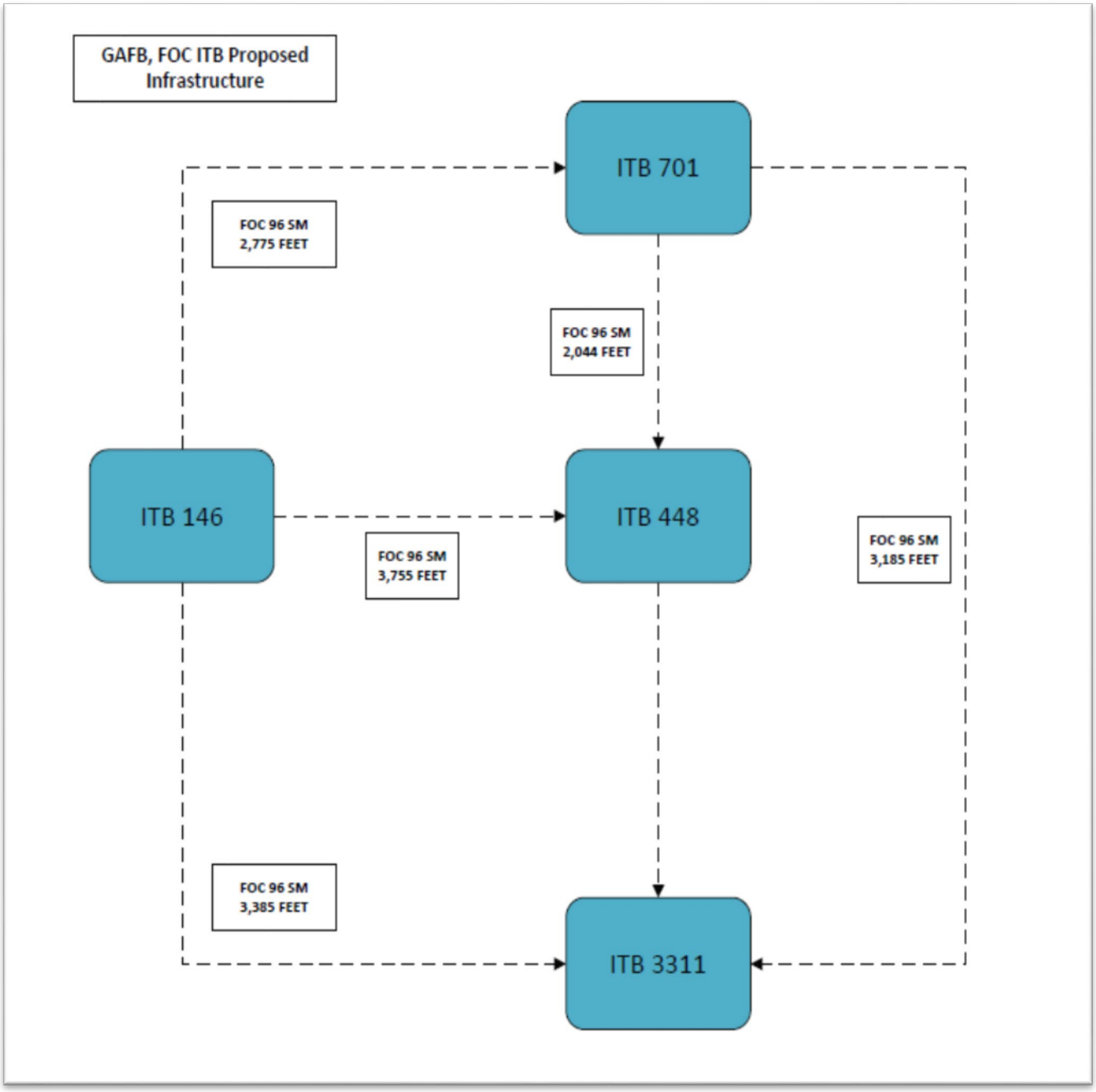
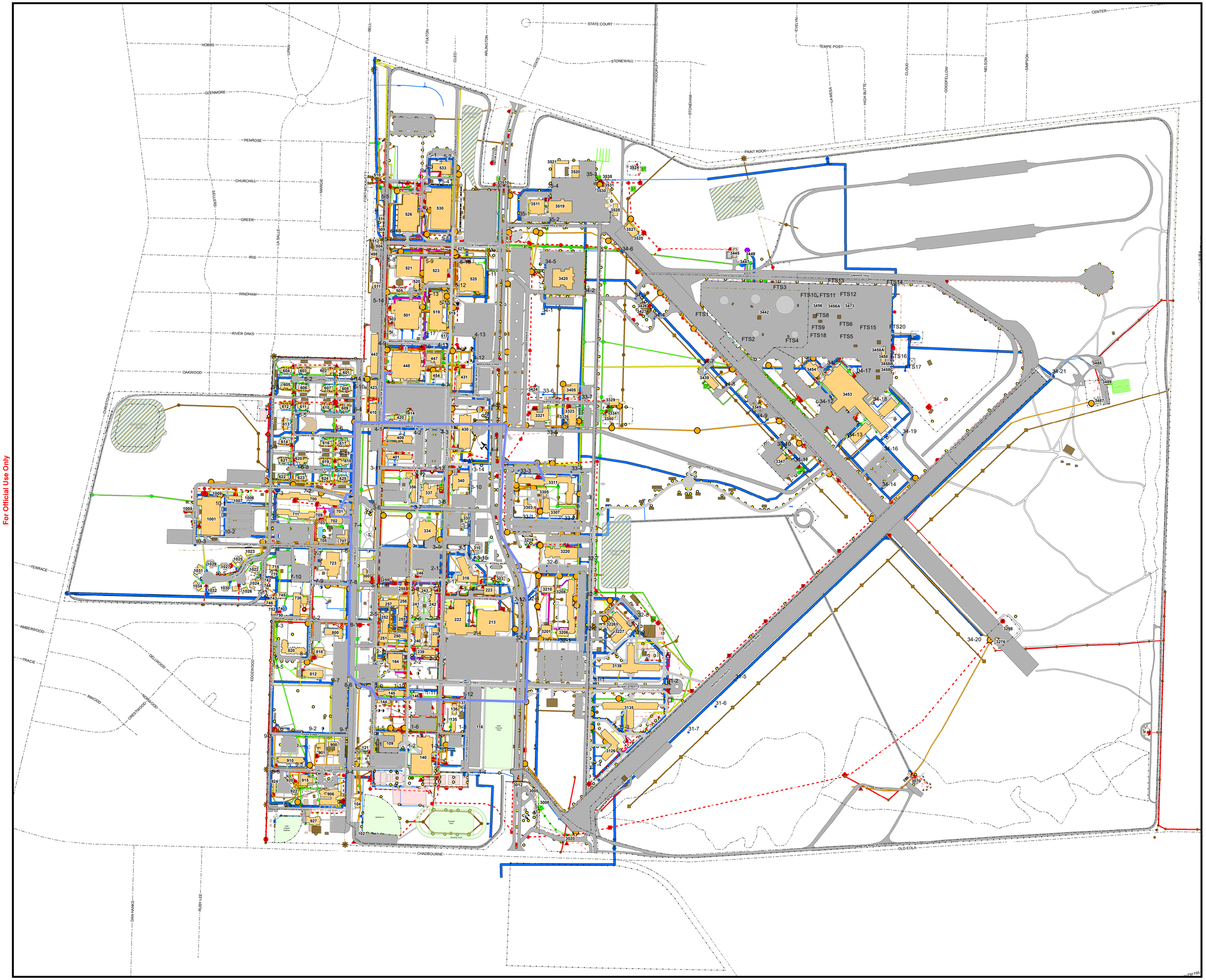
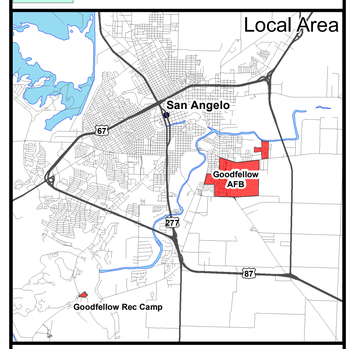


Figure 1: ITB to ITB Proposed FOC Upgrade



Legend

- CLIN 3a
- CLIN 3b
- CLIN 3c
- CLIN 3d
- CLIN 3e
- Handhole
- Manhole
- Water
- Sewer
- Gas
- Electrical
- Stormwater
- Communications
- HVAC
- Fuels



N

Meters
0 95 190 380

Feet
0 245 490 980 1,470

Fiber Backbone

17 CES/CENME, GeoBase
Building 3511, Room 124
17CES.CENME.GEOBASE@us.af.mil

GOODFELLOW AIR FORCE BASE

Map Date: January 2022

Map Path: F:\GeoBase Data\Maps\3 Work Requests\59800_Fiber Backbone\59800_Fiber_Backbone.mxd

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STATEMENT OF OBJECTIVES (SoO)

For

OSP Standardization Bldg 448 Phase I

at GOODFELLOW AFB, TX

12 October 2021

Prepared By 17 CS SCXP

328 Ft. Lancaster

GAFB, TX 73145-2713

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1. SCOPE

This SOW defines the requirement for the Contractor to engineer, furnish, install and test (EFI&T) single mode (SM) fiber optic cable (FOC) at ITB 448 to eight buildings aboard Goodfellow Air Force Base, San Angelo Texas. The Contractor shall provide all equipment, tools, materials, supplies, transportation, labor, supervision, management, and other incidentals necessary to meet the requirements as stated in this SoO. All electronics equipment, supplies, and materials to be installed shall be new and not refurbished.

2. REQUIREMENTS

2.1. GENERAL REQUIREMENTS

2.1.1. Safety Requirements

The contractor shall remain in compliance with all Federal, State, and base security and safety laws, regulations, policies, and requirements.

2.1.1.1 Contractor Safety Standard Expectation

The Contractor will comply with all applicable OSHA and Air Force Safety Standards.

2.1.1.2 Base Fire Regulations

The Contractor shall comply with Base Fire Regulations as set forth in the latest edition of GAFB Instruction 32-2001, titled "Base Fire Protection Program". The Contractor shall use no explosives in performing the work. All work shall be in strict compliance with NFPA-101. Contract SOW must reference the USACE Safety and Health Manual EM-385-1-1 and NFPA 241 and must contain the requirement that the Installation's fire regulations be followed. All work shall be in strict compliance with NFPA-101.

2.1.2. Site Coordination

The Contractor shall meet with the base safety officer immediately upon arrival on site for review of the specific safety requirements prior to installation.

2.1.2.1. Confined Space

The Contractors entering spaces on Goodfellow AFB are responsible for the safety of their personnel and for their own confined spaces permit program as outlined in AFI 91-203. All confined space operations must be coordinated with the Base Safety Office prior to start of work.

2.1.2.2. Accident/Incident Reporting and Investigation

The Contractor shall record and report all available facts relating to each instance of injury to the Base Safety Office. The Contractor shall secure the scene of any accident and wreckage until released by the accident investigative authority through the Base POC. If the Government elects to conduct an investigation of the incident, the Contractor shall cooperate fully and assist the Government personnel until the investigation is completed.

2.1.2.3. Work Area(s)

At day's end, the Contractor shall remove all debris and surplus materials from the work place. Safety barriers shall be in place to protect unfinished work site at the end of the day. All open holes or trenches shall be completely enclosed by flexible orange construction safety fencing, or other safety barriers, at the end of the work day. Equipment and materials required to complete the work effort may remain on site as long as they are organized/stored in a manner that does not cause a safety hazard.

2.1.2.4. Traffic control

In the event base vehicular traffic is to be disrupted by trenching or horizontal directional boring, the Contractor shall make appropriate notifications NLT 10 calendar days in advance to 17 CS/SCXP of the planned disruptions.

2.1.3. Security Requirements

The Contractor shall process and provide a Site Visit Request Letter to 17 CS/SCXP within 5 calendar days after contract award. This spreadsheet shall identify the names (as shown on the driver's license), driver's license numbers and state of issue, and birth date of the personnel who will be performing work under this SOW, company name, address, phone number and contract number, start date and end date. This information is required to grant access to the base. If required by the base, the Contractor shall provide identification badges for their employees. All Contractor personnel shall wear these badges while on duty on the Government site. The badges shall identify the individual, company name, and be clearly and distinctly marked as Contractor and be in accordance with base regulations.

2.1.3.1. Security Clearances

Stated work and associated products shall be performed at the UNCLASSIFIED level. However, some of this work will take place in secure areas where Contractor employees must be escorted at all times. The Contractor must coordinate access to secure areas at least 24 hours ahead of time with the 17 CS/SCXP PM. It is the Government's responsibility to provide escorts.

2.1.3.2. Operational Security (OPSEC)

Network infrastructure (MHDS, MH/HH locations, fiber paths, etc.) is on the 17 CS Critical Information List and must be protected. The Contractor shall take appropriate measures to protect detailed information pertaining to the EFI&T effort, to include appropriate marking of documents as "For Official Use Only (FOUO)," and ensuring limited distribution of documents and schematics/drawings to only those individuals with a valid need to know. In accordance with (IAW) AFI 10-701, OPSEC Considerations, the contractor shall develop an OPSEC plan to ensure the protection of FOUO data either furnished by the government or produced by the contractor. The contractor's OPSEC plan provided in the RFP shall be incorporated into the SOW.

2.1.4. Environmental Compliance

The Contractor shall comply with the most stringent environmental federal, state, and local laws and regulations; and Air Force policies, instructions, and plans. The federal Government is not exempt from compliance with environmental regulations. The contractor shall maintain an awareness of changing environmental regulatory requirements to avoid environmental deficiencies for activities on Goodfellow AFB.

2.1.5. Permits

The Contractor shall complete and process all permits required to complete the installation prior to any trenching, or modifications to a facility, maintenance hole or hand hole; for example, the Base Civil Engineering Work Clearance Request, a digging permit, (AF Form 103) and Base Civil Engineer Work Request (AF Form 332). AF Form 103 and AF Form 332 {and any other required permits (as determined by Base Civil Engineering (BCE) or 17 CS/SCXP, etc.)} shall be submitted at IAW local procedures. All utility markings, flags, etc. shall be maintained by the contractor after the responsible work center/shop identifies/locates them. If a utility is severed or damaged due to neglect or if attributed to the fault of the contractor, then the contractor shall repair and return the utility back to the same condition it was in prior to the damage. The form(s)/permits shall be submitted within 10 calendar days after award.

2.1.6. Integrated Process Team (IPT)

The Contractor shall chair a weekly IPT meeting that includes Contractor representatives, the 38 ES Cyberspace Integrator-Base (CSI-B), the 38 ES System Engineer (SE), the 17 CS/SCXP Project Manager (PM), and other base personnel as required. The Contractor shall provide an agenda and a worldwide "Meet Me" teleconference capability for the duration of the project. The purpose of the IPT meeting is to discuss project progress, problems being encountered, and other information necessary/beneficial to ensure success and timely completion of contract requirements. The Contractor shall record meeting minutes and distribute to the attendees. The contractor shall provide at this meeting a weekly action register, in Microsoft excel, to capture items that need to be addressed. Action register shall have at a minimum Project Description, Contact list, Action Item List, Discrepancy List, and any pertinent information related to the project. (CDRL A004)

2.1.7. Quality Assurance

The Contractor shall provide Quality Assurance Support for the life of the project. The Contractor's quality assurance evaluator shall assist the Government representative in performing random spot checks and system acceptance tests. The Contractor shall be responsible for identifying system and outside plant deficiencies and /or discrepancies throughout the life of the project. A weekly report (soft copy) shall be submitted indicating progress/status and listing any deficiencies/discrepancies found and actions to correct them. (CDRL A003)

2.1.8. Contractor Personnel

2.1.8.1. Project Management

The Contractor shall provide a Project Manager (PM) and alternate(s) responsible for contract performance and continuity. The Contractor shall identify the Project Manager's or alternate's range of authority to act for the Contractor relating to daily contract operation.

2.1.8.2. Site Point of Contact (POC)

The Contractor shall designate the Contractor's on-site team leader and alternate(s) as the Site POC for individual projects in their Site Visit Request Letter. The Site POC or alternate(s) shall be on site during duty hours until project completion and shall oversee all facets of the installation tasks. The Site POC shall be the interface for all work site communications with the Government, including quality, safety, and discrepancy matters.

2.1.8.3. Personnel Requirements

The Project Manager, Site POC, and respective alternate(s) shall be able to read, write, speak, and understand English. All reporting and documentation shall be in English.

2.1.9. Electronic Contractor Manpower Reporting Application (ECMRA)

The contractor shall report ALL contractor labor hours (including subcontractor labor hours) required for performance of services provided under this contract for Goodfellow AFB single mode (SM) fiber optic cable (FOC) from ITB to ITB, via a secure data collection site. The contractor is required to completely fill in all required data fields using the following web address http://www.ecmra.mil Reporting inputs will be for the labor executed during the period of performance during each Government fiscal year (FY), which runs October 1 through September 30. While inputs may be reported any time during the FY, all data shall be reported no later than October 31 of each calendar year. Contractors may direct questions to the ECMRA help desk.

2.1.10. Warranty

The Contractor shall provide a one year warranty or manufacturer's standard commercial warranty, whichever is longer. This warranty shall include a one year workmanship warranty. The warranty period shall start from the date of system and/or project acceptance. The Contractor shall provide written procedures and required information for warranty services at or prior to site acceptance.

2.2. SPECIFIC REQUIREMENTS

The Contractor shall EFI&T, single mode, indoor/outdoor or outdoor rated FOC's from ITB 448 to eight (8) buildings aboard Goodfellow Air Force Base using the existing maintenance hole duct bank system. Contractor shall also install associated relay racks, and fiber optic distribution panels, with pre-terminated, factory certified connectors within cassette style modules all fusion spliced.

2.2.1. Maintenance Holes (MHs)

The Contractor shall pump out water as required. Water shall be drained IAW BCE and base environmental requirements.

2.2.2. Measurements

Any distances provided in this SoO are approximations and should NOT be used for ordering materials or determining duct lengths.

2.2.3. Splice Conductors

All fiber splicing shall be performed in accordance with RUS Bulletin 1735F-401, Standards for Splicing Copper and Fiber Cable. The fusion splice method shall be used for all splicing and terminations of fiber optic cable. Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors.

2.2.4. Cable Racks and Cable Rack Supports

Cable racks shall be installed in maintenance holes as required – this includes new and existing MHs/HHs. Splices shall not be supported by the cables that enter each end of the splice case. The splices shall be supported by cable hooks under the splice case. Telecommunications industry standard cable hooks of the appropriate length shall be provided to support cables and

splice cases. The cable hooks shall be secured using cable rack locking clips. All cables shall be supported using racking clips, cable racks, and cable hooks.

2.2.5. Labeling

The Contractor shall label all equipment and cables they install and cables identified for re-use IAW TIA-606-B-2012 and as directed by the 17CS, SCXP. New ducts shall be permanently labeled on the wall of each building/maintenance hole indicating the connecting building/maintenance hole at the other end of the duct (for example, “To MH-200”). Tagging and labeling of new cables shall be IAW 17CS labeling scheme.

2.2.6. Cable Tags

All tags shall be permanently labeled, easily visible and corrosion resistant. Install cable tags in all maintenance holes/handholes, cable vaults, pull boxes and building entrance terminal locations. When cables pass through a maintenance hole, put a tag on the cable, approximately 2 feet from each duct entrance. Information on the cable tag shall identify cable by size, type, cable number and count. See Para 2.2.5 (above) for nomenclature for tagging.

2.2.7. Pulling Tape

All newly installed ducts left vacant shall be provided with a waterproof, corrosion resistant, pre-lubricated flat woven polyester pull tape with sequential footage markings (1250 lb. pulling strength) for future cable installations. The pull tape shall extend into the maintenance holes and be secured to a cable rack or pulling iron, etc.

2.2.8. Cable Terminations

Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors in cassette style housing. The pigtails shall be sized the same as the OSP fiber they are spliced to, i.e., 125/8.3 micron to 125/8.3 micron. The pigtails shall be duplex (or simplex) unless otherwise agreed to by 17 CS/SCXP.

2.2.9. OSP Maintenance Loop(s)

The Contractor shall install a minimum of a 50 foot fiber optic cable maintenance loop at the first MH from the building, at every splice point MH location and at every 3rd MH in the route. The maintenance loop slack shall be properly labeled, securely supported to the cable ladder and off the MH floor or in telecomm room.

2.2.10. Grounding/Bonding

Grounding/Bonding hardware such as corrosion resistant wire, bonding ribbon, clamps, ground rod, etc. necessary to properly bond/ground the cable in MHs shall be provided by the Contractor. In addition, grounding/bonding of telecommunication racks to telecomm busbar and building ground if necessary. Reference UFC 3-580-01, TIA 607, and TIA 758.

2.2.11. Underground Conduit System

The Contractor shall be responsible for any required trenching and/or boring necessary to lay the duct system. The Contractor is also responsible for backfilling ditch lines and compaction of fill materials with appropriate compaction tools. Directional drilling shall be used for major road crossings, taxiways, runways, etc. Otherwise, crossing of paved surfaces may be performed by

pavement cuts and resurfacing with appropriate matching road material. This does not prevent the Contractor from using directional drilling if it is more cost effective. Ducts will be appropriately protected when placed under paved surfaces (i.e., concrete encasement).

2.2.11.1. Composition. N/A

2.2.11.2. Typical Situations

The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-40 Polyvinyl Chloride (PVC) (Schedule 40) IAW NEMA TC-2. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell-end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirements.

2.2.11.3. Unique /Site Specific Situations

The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-80-PVC (Schedule 80) IAW NEMA TC-2; high density polyethylene (HDPE) SIDR 11.5, Galvanized Iron Pipe (GIP) or "thickwall" stainless steel. Schedule 80 PVC shall be limited to risers, all above ground conduit and under the roadway/parking pavement. High density polyethylene (HDPE) SIDR 11.5 shall be used when directional bring is used. GIP or stainless steel shall be used under major roadways, taxiways, and runways. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell-end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirement.

2.2.11.4. Installation

Installation of underground conduits/ducts shall be IAW RUS Bulletin 1751F-643 and RUS Bulletin 1753F-151. Ducts installed beneath roads, sidewalks, parking areas, other paved surfaces or areas to be paved, etc. shall be installed a minimum of 36" below grade. In a MH with knockouts, ducts shall start at the bottom knockout, allowing for upward expansion in the MH. All ducts not installed under roads, sidewalks, parking areas, or areas to be paved, etc. shall have a minimum of 36 inches ground cover, where possible. The Contractor shall provide other protective measures, concrete cap, etc., in those areas where the minimum ground cover cannot be achieved. Grading of ducts shall be accomplished IAW RUS Bulletin 1751F-643. All conduits shall be continuous between MH/HHs (i.e., no breaks or separations in the conduit runs between MH/HHs).

2.2.11.5. Bends and Sealing

All bends between MHs shall be a minimum of ten times (10X) the diameter of the duct size (i.e., 4 inch duct = 40 inches) with the sum of bends in all directions not exceeding a total of 90 degrees, where practical. Coordinate with 17 CS/SCXP if runs have bends that total more than 90 degrees is required. Ducts shall have bell-ends and enter a MH perpendicular to the surface of the wall through which it is entering. All ducts/inner-ducts entering MH shall be sealed. Universal duct plugs or removable putty sealants may be used. Upon completion of conduit sections, a rigid 12" long test mandrel ¼" (6.4mm) smaller than the inside diameter of the conduit shall be pulled through two diagonally opposite ducts to ensure proper alignment. In addition, all ducts shall be cleared of loose materials such as concrete, mud, dirt, stones, etc.

2.2.11.6. Utility Separation

When communications ducts cross either power duct or buried power cable, maintain a minimum separation of 3 inches of concrete or 12 inches of well-tamped earth between the two or 12 inches of well tamped earth when parallel; for pipes (e.g., gas, water, oil) maintain 6 inches when crossing or 12 inches when parallel.

2.2.11.7. Spacers and Tracer Wire

Along the length of the duct run, if the ducts are installed by trenching, spacers shall be placed at five (5) foot intervals and cable warning tape shall be buried one (1) foot above the conduit and shall follow the duct route. The tape shall be a minimum of three inches wide and orange in color with the appropriate warning message. At least one duct shall have tracer wire or be otherwise locatable from the surface.

2.2.11.8. Entrance Conduits into Existing Maintenance Holes

When new entrance conduits/ducts or sleeves are required, the Contractor shall bore and install the necessary holes and install the ducts or sleeves, if a knockout does not exist. Penetration shall not be in such a location through the wall as to block use of existing ducts in the maintenance hole. New ducts will be a minimum of 18 inches from either the maintenance hole floor or ceiling, if practical. The minimum bending radius for entry conduit/ducts shall be no less than 10 times the inside diameter of the conduit. Ducts and openings around ducts shall be sealed to prevent moisture from entering the maintenance holes.

2.2.11.9. Excavation/Building Penetrations

All wall penetrations, including inside buildings, shall be restored to meet the required base fire ratings.

2.2.12 N/A

2.2.13. Outside Plant Installation

This section describes the underground cables, flexible geotextile multiple cell fabric, innerduct and MH/HH plus conduit system installation requirements. The Contractor shall design and install Customer-Owned Outside Plant Telecommunications Infrastructure in accordance with ANSI/TIA-758. Each cable installation shall be coordinated with 17 CS/SCXP so that the impact on the building users is properly coordinated. The sequence of installation is at the Contractor's discretion.

2.2.13.1. Infrastructure Installation

The Contractor shall install the following new infrastructure, 2,585 feet of one 3x3 inch Geo-textile Fabric, eight (8) 24 port FODP's and two (2) 144 port FODP's. Additionally, 342 feet of 72 strand, 1,862 feet of 144 strand, 5,077 feet of 24 strand single mode corning glass fiber. Contractor will also install relay racks, and provide patch cords per guidance in SoO. (Coordinate exact location with 17CS/SCXP).

2.2.13.1.1. Maintenance Holes

This project requires no new Maintenance Holes.

2.2.13.1.2. Ductbank Infrastructure

N/A to this project.

2.2.13.1.3. Geo-textile Fabric Installation

Install Geo-textile fabrics IAW the following Table:

From Building	To Maintenance Hole	Quantity	Approx. Distance (Feet)	Figure	Comment
B443	MH-162	1	140	1	Install one-3x3" Geo- textile fabrics (detectable type)
B423	MH-162	1	102	1	Install one-3x3" Geo- textile fabrics (detectable type)
B410	MH-162	1	289	1	Install one-3x3" Geo- textile fabrics (detectable type)
B430	MH-150	1	130	2	Install one-3x3" Geo- textile fabrics (detectable type)
B340	MH-270	1	120	2	Install one-3x3" Geo- textile fabrics (detectable type)
B337	MH-270	1	272	2	Install one-3x3" Geo- textile fabrics (detectable type)
B330	MH-280	1	180	2	Install one-3x3" Geo- textile fabrics (detectable type)
B334	MH-290	1	313	2	Install one-3x3" Geo- textile fabrics (detectable type)

2.2.13.2. Fiber Optic Cable Installation

Install outside plant FOC as described in the following paragraphs. The cable shall be all dielectric, loose buffer tube, water blocked, single mode, corning glass, outside plant (OSP) cable suitable for indoor/outdoor applications. The Contractor shall coordinate each cable installation with the 17CS/SCXP so as to minimize the impact on building users. The intent is to install the cable in one continuous length, to the extent that it is practical. The Contractor shall determine whether there is some practical reason for an intermediate splice in the cable at some maintenance hole/handhole between the cable end points. If an underground splice is necessary, it shall be accomplished IAW commonly accepted telecommunications industry practices for fusion splicing optical fiber cable and sealed with a splice case suitable for the application. If a splice case is installed in a maintenance hole/handhole it shall be pressure tested IAW the manufacturer's instructions. If a splice case leaks, it shall be reinstalled and retested. A coil of 50 feet of cable shall be provided on each cable entering or leaving a splice case in a maintenance hole or handhole and approved by 17CS/SCXP.

2.2.13.2.1. Fiber Optic Cable from ITB 448 to MH-162

The Contractor shall install approximately 342 feet of one continuous length, 72-strand SM FOC from ITB 448 to MH-162 utilizing existing Maintenance Hole Ductbank System. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 448 and/to MH-162:

- At ITB 448, one (1) fully welded relay rack with vertical wire managers, isolation pad, and power strip. Additionally, one (1) 4U, 144-size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At ITB 448, Fusion Splice 72-strand SM fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At MH-162, install one re-enterable corning, dome style splice case, capable of housing 144-strand splice.
- At ITB 448, OTDR and Power Meter/Light Source test in both directions to B443, B423, and B410.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable. Provide twenty four (24), FOC patch cords per 17CS/SCXP guidance.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.2. Fiber Optic Cable from MH-162 to B443/B423/B410

The Contractor shall install approximately 1,370 feet of one continuous length, 24-strand SM FOC from MH-162 to Buildings 443, 423, and 410 utilizing existing Maintenance Hole Ductbank System. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following at each building:

- At each building, one (1) fully welded relay rack with vertical wire managers, isolation pad, and power strip. Additionally, one (1) 24 port fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At each building, Fusion Splice 24-strand single mode fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At each building, OTDR and Power Meter/Light Source test in both directions to B448.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

Install Indoor/Outdoor or Outdoor rated Single Mode Fiber Optic Cable IAW the following Table and Figure 1:

From Building	To Bldg or MHole	FOC Size	FOC ID/Strands	Approx. Distance (Feet)	Figure	Comment
ITB 448	MH-162	72	FOC 448-1, 1-72	342	1	Corning specifications.
B443	MH-162	24	FOC 448-1, 1-24	420	1	Corning specifications. (Indoor/Outdoor Rated)
B423	MH-162	24	FOC 448-1, 25-48	381	1	Corning specifications. (Indoor/Outdoor Rated)
B410	MH-162	24	FOC 448-1, 49-72	569	1	Corning specifications. (Indoor/Outdoor Rated)

2.2.13.2.3. Fiber Optic Cable from ITB 448 to MH-270

The Contractor shall install approximately 1,392 feet of one continuous length, 144-strand SM FOC from ITB 448 to MH-270 utilizing existing Maintenance Hole Ductbank System. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 448 and/to MH-270:

- At ITB 448, one (1) fully welded relay rack with vertical wire managers, isolation pad, and power strip. Additionally, One (1) 4U, 144-size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At ITB 448, Fusion Splice 144-strand SM fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At MH-270, install one re-enterable corning, dome style splice case, capable of housing 144-strand splice.
- At ITB 448, OTDR and Power Meter/Light Source test in both directions to Buildings 430, 340, 337, 330, and 334.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable. Provide forty (40), FOC patch cords per 17CS/SCXP guidance.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.4. Fiber Optic Cable from MH-270 to B430/B340/B337/B330/B334

The Contractor shall install approximately 3,707 feet of one continuous length, 24-strand SM FOC from MH-270 to Buildings 430, 340, 337, 330, and 334 utilizing existing Maintenance Hole Ductbank System. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following at each building:

- At building's 340, 337, 330 and 334, one (1) fully welded relay rack with vertical wire managers, isolation pad, and power strip. Additionally, one 24 port fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At each building, Fusion Splice 24-strand single mode fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At each building, OTDR and Power Meter/Light Source test in both directions to B448.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

Install Indoor/Outdoor or Outdoor rated Single Mode Fiber Optic Cable IAW the following Table and Figure 2:

From Building	To Bldg or MHole	FOC Size	FOC ID/Strands	Approx. Distance (Feet)	Figure	Comment
ITB 448	MH-270	144 SM	FOC 448-2, 1-144	1,392	2	Corning specifications.
MH-270	MH-270	N/A	FOC 448-2, 1-24	N/A	2	Corning specifications.
B334	MH-270	24	FOC 448-2, 25-48	1,316	2	Corning specifications. (Indoor/Outdoor Rated)
B330	MH-270	24	FOC 448-2, 49-72	787	2	Corning specifications. (Indoor/Outdoor Rated)
B337	MH-270	24	FOC 448-2, 73-96	443	2	Corning specifications. (Indoor/Outdoor Rated)
B340	MH-270	24	FOC 448-2, 97-120	387	2	Corning specifications. (Indoor/Outdoor Rated)
B430	MH-270	24	FOC 448-2, 121-144	774	2	Corning specifications. (Indoor/Outdoor Rated)

2.2.14. Site Restoration/Debris Removal

The Contractor shall restore all disturbed grounds to the "as found" condition or better after installation. Base grounds restoration requirements shall be complied with. Common use areas shall be restored to their original condition. The Contractor shall be responsible for disposing of all residues from this project off base and in accordance with Federal, state and base environmental laws and regulations. All residue produced by directional drilling operations (i.e., slurry) shall be disposed of off base on the same day the residue is produced, at an appropriate disposal facility at the contractor's expense, IAW federal, state, local and Goodfellow AFB environmental laws and regulations. Under no circumstances will the contractor stage or store boring residue in slurry ponds or other containment areas on Goodfellow AFB.

2.2.15. Service Outages

The Contractor shall be responsible for preventing any unscheduled (i.e. cutting or disabling any in-service cables or equipment.), Contractor-caused, interruptions of communications capabilities that are properly identified. The Contractor shall coordinate planned outages with the site POC at least 10 calendar days in advance of the outage if the implementation necessitates disruption of service, (e.g., communications, electrical, or other utilities).

2.2.16. Identification/Marking

The Contractor shall clearly mark all Contractor-Furnished Property and Equipment (CFP/CFE) with their company's name. The Contractor shall place an easily read, very visible, sign (minimum 8.5 inches x 11 inches) on large containers, construction equipment, or un-manned rental vehicles while on the Government installation indicating the company name and both the Contractor and Site POC's names and local telephone numbers.

2.2.17. Installation Schedules

The Contractor shall provide a complete milestone schedule that denotes project activities to include time-phased start and completion dates for the project and sub-projects associated with the installation of the components and system. (CDRL A002)

2.2.18. Weekly Status Reports

The Contractor shall prepare a Weekly Status Report in English and shall distribute. The purpose of the report is to inform IPT members of project progress, problems being encountered, and other topics necessary/beneficial to ensure success and timely completion of the contract requirements. (CDRL A003)

2.2.19. As-Built Drawings

The Contractor shall submit red line drawings showing the "as-built" configuration in format specified by base SCX project manager. The base communications squadron will provide baseline drawings. The Contractor shall provide As-Built Rack Elevation, Inside Cable Plant and Outside Cable Plant drawings and distribute per Goodfellow Air Force Base, Standard Operating Procedures. (CDRL A001)

2.2.20. Test and Acceptance/Installation Test Plan

The Contractor shall provide a test plan as to how the system shall be pre-tested, in-progress-tested and post-tested to demonstrate to the Government that the system is fully operational ready to be placed into service. The Contractor shall test the system to demonstrate to the Government quality assurance representative. These tests shall be accomplished prior to the system being placed into service. (CDRL A005)

2.2.20.1 Outside Plant Cable testing

All strands of fiber optic cables shall be tested IAW TIA 526-7 Measurement of Optical Power Loss of Installed Single-mode Fiber Cable Plant, or equivalent. As a minimum, the following tests shall be performed. Both Optical Time Domain Reflectometer (OTDR) and Optical Power Meter tests will be used for all end-to-end circuits. Between FODPs, bi- directional testing at 1310 nm and 1550 nm is required.

NOTE: Testing of the Fiber Optic Cables on the reel shall be provided to the 17 CS/SCXP prior to installation.

2.2.21. Acceptance/Installation Test Report

The Contractor shall provide an installation test report of the results of the testing accomplished under the installation test plan IAW CDRL A006.

2.2.22. Final Acceptance

The Contractor shall schedule a final project walk-through with the 17 CS/SCXP. This should be scheduled 10 calendar days prior to acceptance.

2.2.23. As-Built Documentation in CVC

The Contractor shall record geospatial data and provide as-built documentation (shape files) of all new installed maintenance hole system components (including metadata) compatible with the Cyberspace Infrastructure Planning System (CIPS) Visualization Component (CVC) drawing system. Data points shall be recorded at the center of each manhole/handhole lid and at intervals not to exceed 25 feet along cable routes. Sufficient data points shall be recorded to capture any change in direction along the route. All GPS coordinates shall have +/- 3 feet accuracy for all readings. The government is responsible for providing the Contractor with a copy of the installation's most current GeoBase Common Installation Picture (CIP), and current CVC drawings of the areas of interest. The government will review the shape files in CVC and transcribe the information to the CVC system. Shape files shall be delivered upon project completion. (CDRL A001)

3. GENERAL INFORMATION

3.1. Period of Performance

The period of performance for the project shall be determined based on the proposed schedule and actual contract award date.

3.2. Place of Performance

The place of performance is Goodfellow AFB, TX.

3.3. Hours of Operation

The Contractor shall routinely work during normal duty hours of the site. However, mission requirements may necessitate work outside normal hours (nights and/or weekends), especially if existing service must be interrupted. Any site work requested by the Contractor to be performed outside of normal duty hours shall be coordinated with the 17 CS/SCXP and approved by the Contracting Officer at least 10 calendar days in advance.

3.4. Holidays/Down Days

The Contractor shall not perform under this contract on federal holidays or site-unique down-days unless expressly authorized by the CO and coordinated with the 17 CS/SCXP Project Manager.

3.5. Base Support

The Contractor shall identify any base support requirements (for example, laydown and storage areas) necessary to complete this project in their proposal. The contractor shall return all government furnished lay-down and storage areas to their original condition upon completion of the project.

3.6. Minimum Contractor Qualifications.

All work shall be performed by an experienced Telecommunications Contractor. The Contractor shall have a minimum of 3 years of experience in Telecommunications Systems installations and provide the technician's splicing certifications that are to perform work on this project.

APPENDIX A: APPLICABLE STANDARDS

The following list is not all-exclusive. The Contractor shall comply with applicable commercial code and standards

AFI 91-203 – Air Force Consolidated Occupational Safety Instruction

AFBAN-FS – AF Base Area Network Functional Specification, 2017

OSHA CFR 29 Part 1910-268 – Telecommunications

NEMA TC 2- Electrical Polyvinyl Chloride (PVC) Tubing and Conduit

ANSI/TIA-606-B Administration Standard for Telecommunications Infrastructure

TIA-568-C Commercial Building Telecommunications (568C.1, 568C.2, 568C.3) Cabling Standard

ANSI/TIA-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

TIA-569-C - Commercial Building Standard for Telecommunications Pathways and Spaces

TIA-570-C –Residential Telecommunications Infrastructure Standard

TIA-758 - Customer-owned Outside Plant Telecommunication Infrastructure Standard

T.O. 00-33A-1001, Methods and Procedures, General Cyberspace Support Activities Management Procedures and Practice Requirements

BICSI TDM Manual - Building Industries Consulting Services International Telecommunications Distribution Methods (TDM) Manual

BICSI – Outside Plan Design Reference Manual

RUS Bulletin 1751F-643 - Underground Plant Design

RUS Bulletin 1751F-644 - Underground Plant Construction Telecommunications Engineering Shield Continuity and Construction Manual (TE&CM) 451.2

RUS Bulletin 1751F-801 – Electrical Protection Fundamentals

RUS Bulletin 1753F-151 (515b) - Specifications and Drawings for Underground Cable Installation

NFPA 70 - National Electric Code

FGDC-STD-007.3-1998 - Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy

UFC 3-520-01. Interior Electrical Systems

UFC 3-580-01, Telecommunications Interior Infrastructure Planning and Design (Ch. 1 & 2)

Goodfellow Air Force Base Telecommunications Requirements (17CS, SOP)

APPENDIX B: LIST OF DELIVERABLES

All deliverables are subject to Government acceptance and approval. They shall meet professional standards and the requirements set forth in this SoO. All deliverables shall be produced using recommended software tools/versions as accepted by the Government. The Contractor shall submit the following deliverables:

CDRL	Data Item Title	Data Item Title
A001	As Built	
A002	Work Schedule	
A003	Status Report	
A004	Meeting Minutes	
A005	Test Plan	
A006	Test Report	

APPENDIX C: LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AFM	Airfield Management (BaseOPS)
Approx	Approximately
ATC	Air Traffic Control Tower
ATCALS	Air Traffic Control and Landing Systems
BCE	Base Civil Engineering
CDRL	Contract Deliverable
CFE	Contractor-Furnished Equipment
CFP	Contractor-Furnished Property
CIP	Common Installation Picture
CIPS	Cyberspace Infrastructure Planning System
CMA	Controlled Movement Area
CMHDS	Communications Maintenance Hole Duct System
CO	Contracting Officer
Comm	Communications
CS	Communications Squadron
CSI-B	Cyberspace Integrator-Base
CVC	CIPS Visualization Component
ECMRA	Contractor Manpower Reporting Application
EFI&T	Engineer, Furnish, Install and Test
FOC	Fiber Optic Cable
FODP	Fiber Optic Distribution Panels
FOUO	For Official Use Only
FY	Fiscal Year
HDPE	High Density Polyethylene
HH	Hand Hole
IAW	In Accordance With
ID	Inside Diameter
ILS	Instrument Landing System
IPT	Integrated Process Team
ITB	Information Transfer Building
LMR	Land Mobile Radio
MH	Maintenance Hole
MHDS	Maintenance Hole Duct System
NLT	No Later Than
NPDES	National Pollution Discharge Elimination System
OEM	Original Equipment Manufacturer
OPSEC	Operational Security
OSHA	Occupational Safety & Health Administration
OSP	Outside Plant
OSS	Operations Support Squadron
OTDR	Optical Time Domain Reflectometer
PDF	Portable Document Format
PM	Project Manager
POC	Point Of Contact
Prime	Prime Contractor

PSI	Pounds per Square Inch
PVC	Polyvinyl Chloride
QAE	Quality Assurance Evaluator
QCM	Quality Control Manager
Qty	Quantity
RUS	Rural Utilities Service Bulletin
SCOW	Supply Chain Operations Wing
SCX	Scheduler Planner
SE	System Engineer
SM	Single Mode
SOO	Statement of Objectives
Sub	Sub-Contractor
SWPPP	Storm Water Pollution Prevention Plan
TIA	Telecommunications Industry Association
TMGB	Telecommunication Main Ground Bus-Bar
TRD	Technical Requirements Document

APPENDIX D: DRAWINGS

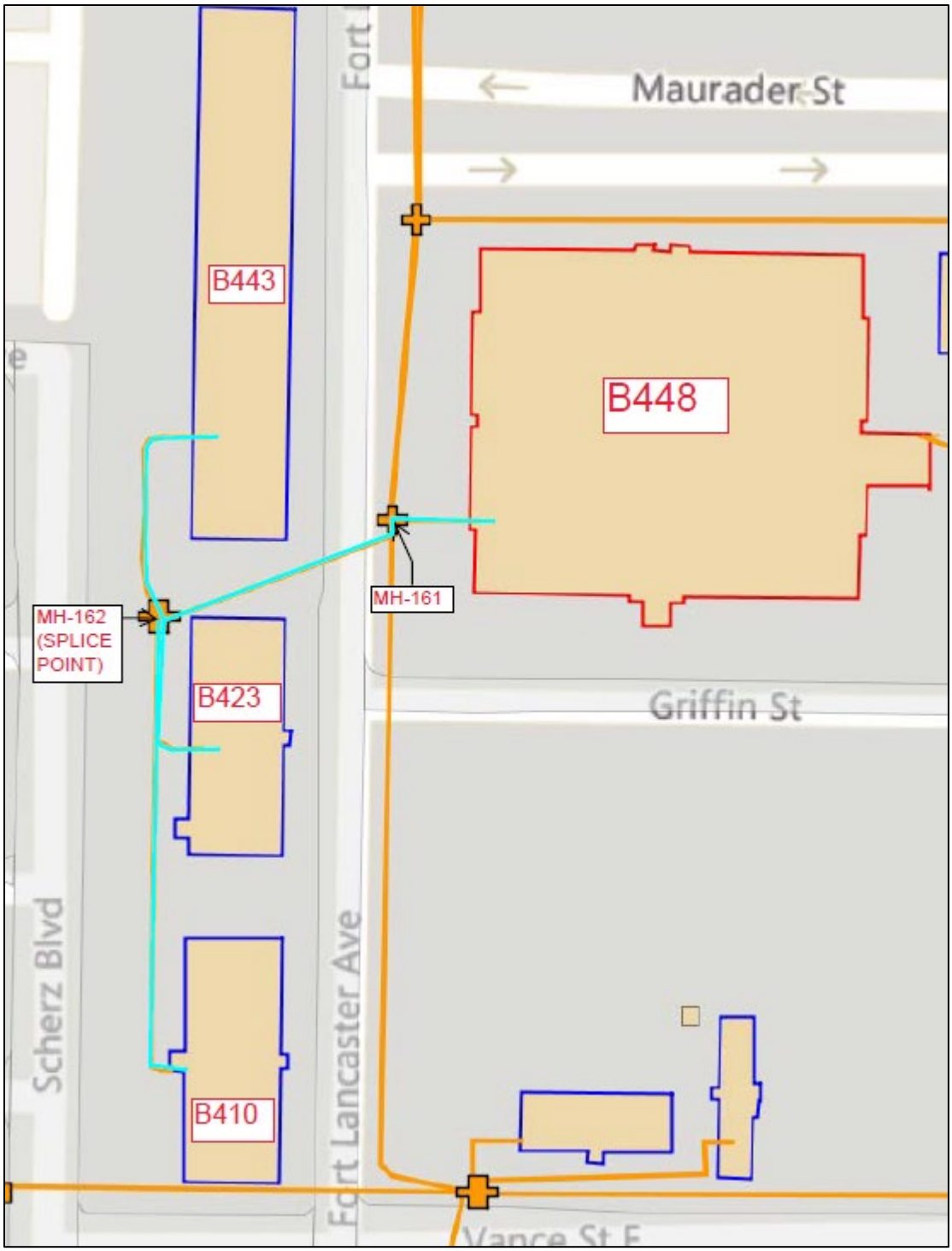


Figure 1: B448, FOC 448-1 Proposed FOC Upgrade

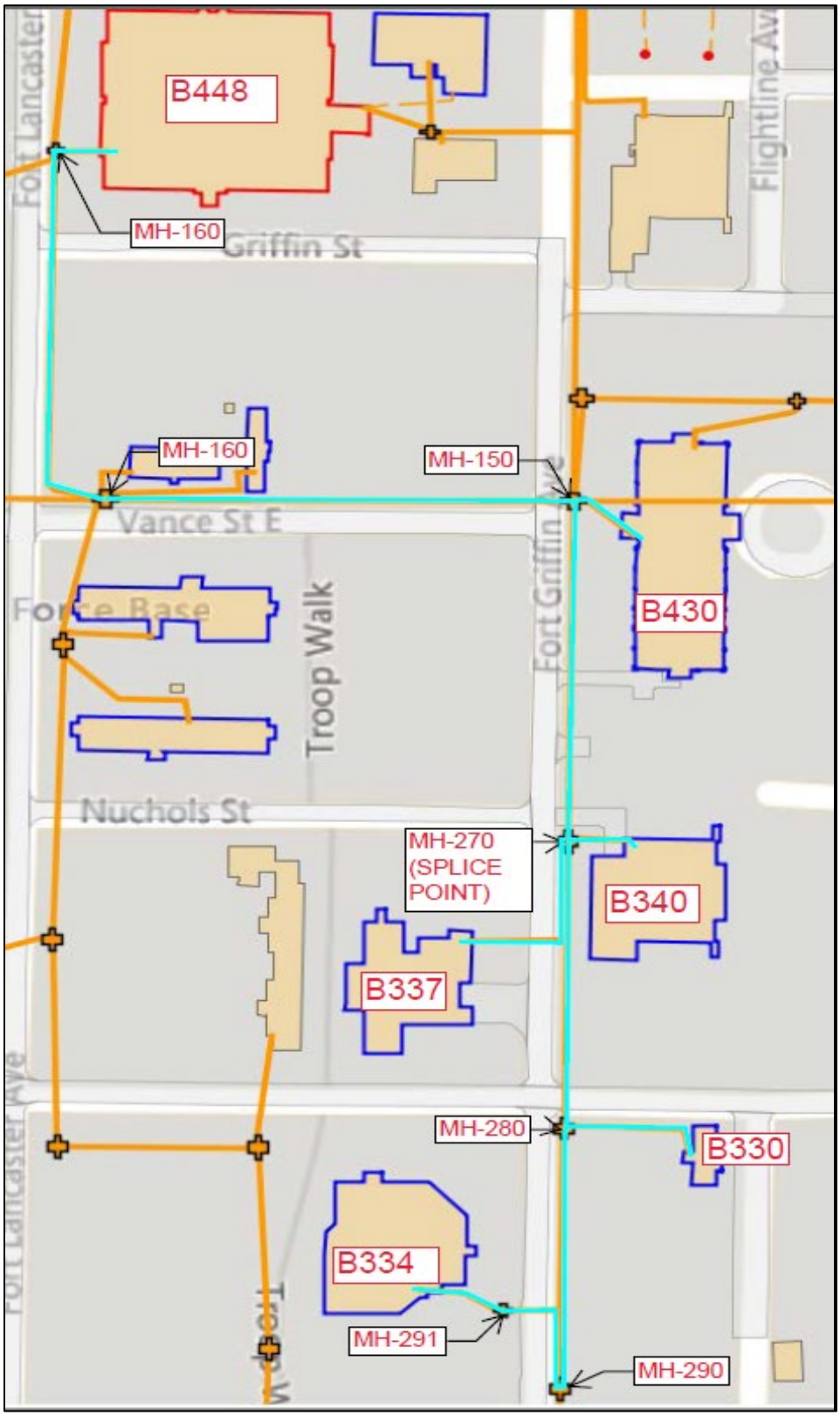
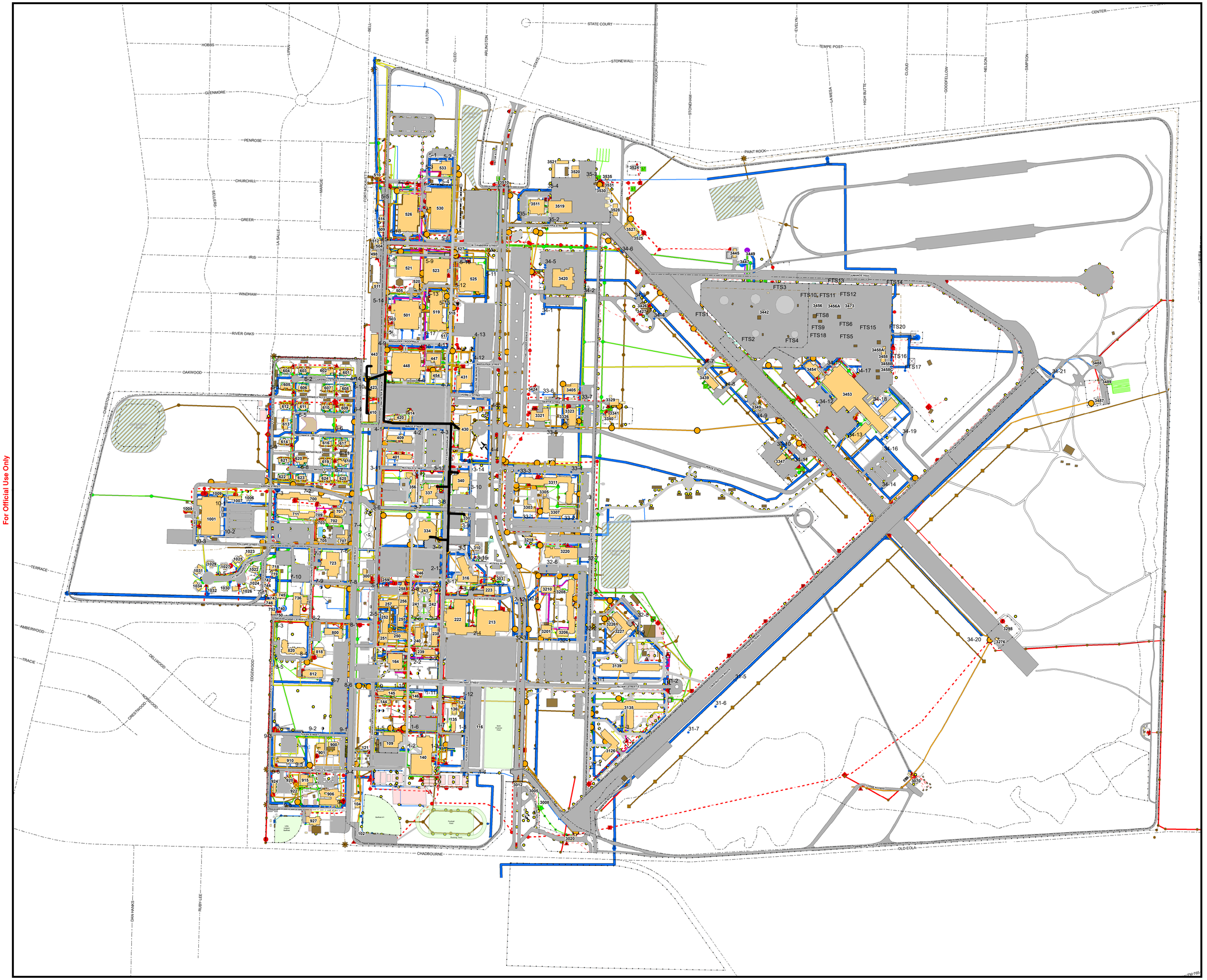
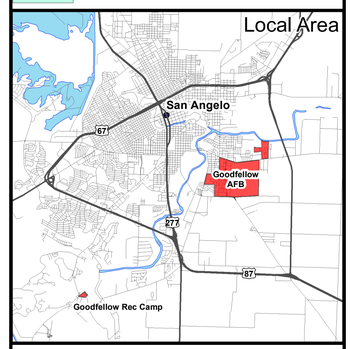


Figure 2: B448, FOC 448-2, Proposed FOC Upgrade



Legend

- CLIN 3a
- CLIN 3b
- CLIN 3c
- CLIN 3d
- CLIN 3e
- Handhole
- Manhole
- Water
- Sewer
- Gas
- Electrical
- Stormwater
- Communications
- HVAC
- Fuels



N

Meters
0 95 190 380

Feet
0 245 490 980 1,470

Fiber Backbone

17 CES/CENME, GeoBase
Building 3511, Room 124
17CES.CENME.GEOBASE@us.af.mil

GOODFELLOW AIR FORCE BASE

Map Date: January 2022

Map Path: F:\GeoBase Data\Maps\3 Work Requests\59800_Fiber Backbone\59800_Fiber_Backbone.mxd

For Official Use Only

STATEMENT OF OBJECTIVES (SoO)

For

OSP Standardization Bldg 448 Phase II

at GOODFELLOW AFB, TX

12 October 2021

Prepared By 17 CS SCXP

328 Ft. Lancaster

GAFB, TX 73145-2713

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1. SCOPE

This SOW defines the requirement for the Contractor to engineer, furnish, install and test (EFI&T) single mode (SM) fiber optic cable (FOC) at ITB 448 to eleven (11) buildings aboard Goodfellow Air Force Base, San Angelo Texas. The Contractor shall provide all equipment, tools, materials, supplies, transportation, labor, supervision, management, and other incidentals necessary to meet the requirements as stated in this SoO. All electronics equipment, supplies, and materials to be installed shall be new and not refurbished.

2. REQUIREMENTS

2.1. GENERAL REQUIREMENTS

2.1.1. Safety Requirements

The contractor shall remain in compliance with all Federal, State, and base security and safety laws, regulations, policies, and requirements.

2.1.1.1 Contractor Safety Standard Expectation

The Contractor will comply with all applicable OSHA and Air Force Safety Standards.

2.1.1.2 Base Fire Regulations

The Contractor shall comply with Base Fire Regulations as set forth in the latest edition of GAFB Instruction 32-2001, titled "Base Fire Protection Program". The Contractor shall use no explosives in performing the work. All work shall be in strict compliance with NFPA-101. Contract SOW must reference the USACE Safety and Health Manual EM-385-1-1 and NFPA 241 and must contain the requirement that the Installation's fire regulations be followed. All work shall be in strict compliance with NFPA-101.

2.1.2. Site Coordination

The Contractor shall meet with the base safety officer immediately upon arrival on site for review of the specific safety requirements prior to installation.

2.1.2.1. Confined Space

The Contractors entering spaces on Goodfellow AFB are responsible for the safety of their personnel and for their own confined spaces permit program as outlined in AFI 91-203. All confined space operations must be coordinated with the Base Safety Office prior to start of work.

2.1.2.2. Accident/Incident Reporting and Investigation

The Contractor shall record and report all available facts relating to each instance of injury to the Base Safety Office. The Contractor shall secure the scene of any accident and wreckage until released by the accident investigative authority through the Base POC. If the Government elects to conduct an investigation of the incident, the Contractor shall cooperate fully and assist the Government personnel until the investigation is completed.

2.1.2.3. Work Area(s)

At day's end, the Contractor shall remove all debris and surplus materials from the work place. Safety barriers shall be in place to protect unfinished work site at the end of the day. All open holes or trenches shall be completely enclosed by flexible orange construction safety fencing, or other safety barriers, at the end of the work day. Equipment and materials required to complete the work effort may remain on site as long as they are organized/stored in a manner that does not cause a safety hazard.

2.1.2.4. Traffic control

In the event base vehicular traffic is to be disrupted by trenching or horizontal directional boring, the Contractor shall make appropriate notifications NLT 10 calendar days in advance to 17 CS/SCXP of the planned disruptions.

2.1.3. Security Requirements

The Contractor shall process and provide a Site Visit Request Letter to 17 CS/SCXP within 5 calendar days after contract award. This spreadsheet shall identify the names (as shown on the driver's license), driver's license numbers and state of issue, and birth date of the personnel who will be performing work under this SOW, company name, address, phone number and contract number, start date and end date. This information is required to grant access to the base. If required by the base, the Contractor shall provide identification badges for their employees. All Contractor personnel shall wear these badges while on duty on the Government site. The badges shall identify the individual, company name, and be clearly and distinctly marked as Contractor and be in accordance with base regulations.

2.1.3.1. Security Clearances

Stated work and associated products shall be performed at the UNCLASSIFIED level. However, some of this work will take place in secure areas where Contractor employees must be escorted at all times. The Contractor must coordinate access to secure areas at least 24 hours ahead of time with the 17 CS/SCXP PM. It is the Government's responsibility to provide escorts.

2.1.3.2. Operational Security (OPSEC)

Network infrastructure (MHDS, MH/HH locations, fiber paths, etc.) is on the 17 CS Critical Information List and must be protected. The Contractor shall take appropriate measures to protect detailed information pertaining to the EFI&T effort, to include appropriate marking of documents as "For Official Use Only (FOUO)," and ensuring limited distribution of documents and schematics/drawings to only those individuals with a valid need to know. In accordance with (IAW) AFI 10-701, OPSEC Considerations, the contractor shall develop an OPSEC plan to ensure the protection of FOUO data either furnished by the government or produced by the contractor. The contractor's OPSEC plan provided in the RFP shall be incorporated into the SOW.

2.1.4. Environmental Compliance

The Contractor shall comply with the most stringent environmental federal, state, and local laws and regulations; and Air Force policies, instructions, and plans. The federal Government is not exempt from compliance with environmental regulations. The contractor shall maintain an awareness of changing environmental regulatory requirements to avoid environmental deficiencies for activities on Goodfellow AFB.

2.1.5. Permits

The Contractor shall complete and process all permits required to complete the installation prior to any trenching, or modifications to a facility, maintenance hole or hand hole; for example, the Base Civil Engineering Work Clearance Request, a digging permit, (AF Form 103) and Base Civil Engineer Work Request (AF Form 332). AF Form 103 and AF Form 332 {and any other required permits (as determined by Base Civil Engineering (BCE) or 17 CS/SCXP, etc.)} shall be submitted at IAW local procedures. All utility markings, flags, etc. shall be maintained by the contractor after the responsible work center/shop identifies/locates them. If a utility is severed or damaged due to neglect or if attributed to the fault of the contractor, then the contractor shall repair and return the utility back to the same condition it was in prior to the damage. The form(s)/permits shall be submitted within 10 calendar days after award.

2.1.6. Integrated Process Team (IPT)

The Contractor shall chair a weekly IPT meeting that includes Contractor representatives, the 38 ES Cyberspace Integrator-Base (CSI-B), the 38 ES System Engineer (SE), the 17 CS/SCXP Project Manager (PM), and other base personnel as required. The Contractor shall provide an agenda and a worldwide "Meet Me" teleconference capability for the duration of the project. The purpose of the IPT meeting is to discuss project progress, problems being encountered, and other information necessary/beneficial to ensure success and timely completion of contract requirements. The Contractor shall record meeting minutes and distribute to the attendees. The contractor shall provide at this meeting a weekly action register, in Microsoft excel, to capture items that need to be addressed. Action register shall have at a minimum Project Description, Contact list, Action Item List, Discrepancy List, and any pertinent information related to the project. (CDRL A004)

2.1.7. Quality Assurance

The Contractor shall provide Quality Assurance Support for the life of the project. The Contractor's quality assurance evaluator shall assist the Government representative in performing random spot checks and system acceptance tests. The Contractor shall be responsible for identifying system and outside plant deficiencies and /or discrepancies throughout the life of the project. A weekly report (soft copy) shall be submitted indicating progress/status and listing any deficiencies/discrepancies found and actions to correct them. (CDRL A003)

2.1.8. Contractor Personnel

2.1.8.1. Project Management

The Contractor shall provide a Project Manager (PM) and alternate(s) responsible for contract performance and continuity. The Contractor shall identify the Project Manager's or alternate's range of authority to act for the Contractor relating to daily contract operation.

2.1.8.2. Site Point of Contact (POC)

The Contractor shall designate the Contractor's on-site team leader and alternate(s) as the Site POC for individual projects in their Site Visit Request Letter. The Site POC or alternate(s) shall be on site during duty hours until project completion and shall oversee all facets of the installation tasks. The Site POC shall be the interface for all work site communications with the Government, including quality, safety, and discrepancy matters.

2.1.8.3. Personnel Requirements

The Project Manager, Site POC, and respective alternate(s) shall be able to read, write, speak, and understand English. All reporting and documentation shall be in English.

2.1.9. Electronic Contractor Manpower Reporting Application (ECMRA)

The contractor shall report ALL contractor labor hours (including subcontractor labor hours) required for performance of services provided under this contract for Goodfellow AFB single mode (SM) fiber optic cable (FOC) from ITB to ITB, via a secure data collection site. The contractor is required to completely fill in all required data fields using the following web address http://www.ecmra.mil Reporting inputs will be for the labor executed during the period of performance during each Government fiscal year (FY), which runs October 1 through September 30. While inputs may be reported any time during the FY, all data shall be reported no later than October 31 of each calendar year. Contractors may direct questions to the ECMRA help desk.

2.1.10. Warranty

The Contractor shall provide a one year warranty or manufacturer's standard commercial warranty, whichever is longer. This warranty shall include a one year workmanship warranty. The warranty period shall start from the date of system and/or project acceptance. The Contractor shall provide written procedures and required information for warranty services at or prior to site acceptance.

2.2. SPECIFIC REQUIREMENTS

The Contractor shall EFI&T, single mode, indoor/outdoor or outdoor rated FOC's from ITB 448 to eleven (11) buildings aboard Goodfellow Air Force Base using the existing maintenance hole duct bank system. Contractor shall also install associated relay racks, and fiber optic distribution panels, with pre-terminated, factory certified connectors within cassette style modules all fusion spliced.

2.2.1. Maintenance Holes (MHs)

The Contractor shall pump out water as required. Water shall be drained IAW BCE and base environmental requirements.

2.2.2. Measurements

Any distances provided in this SoO are approximations and should NOT be used for ordering materials or determining duct lengths.

2.2.3. Splice Conductors

All fiber splicing shall be performed in accordance with RUS Bulletin 1735F-401, Standards for Splicing Copper and Fiber Cable. The fusion splice method shall be used for all splicing and terminations of fiber optic cable. Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors.

2.2.4. Cable Racks and Cable Rack Supports

Cable racks shall be installed in maintenance holes as required – this includes new and existing MHs/HHs. Splices shall not be supported by the cables that enter each end of the splice case. The splices shall be supported by cable hooks under the splice case. Telecommunications industry standard cable hooks of the appropriate length shall be provided to support cables and

splice cases. The cable hooks shall be secured using cable rack locking clips. All cables shall be supported using racking clips, cable racks, and cable hooks.

2.2.5. Labeling

The Contractor shall label all equipment and cables they install and cables identified for re-use IAW TIA-606-B-2012 and as directed by the 17CS, SCXP. New ducts shall be permanently labeled on the wall of each building/maintenance hole indicating the connecting building/maintenance hole at the other end of the duct (for example, “To MH-200”). Tagging and labeling of new cables shall be IAW 17CS labeling scheme.

2.2.6. Cable Tags

All tags shall be permanently labeled, easily visible and corrosion resistant. Install cable tags in all maintenance holes/handholes, cable vaults, pull boxes and building entrance terminal locations. When cables pass through a maintenance hole, put a tag on the cable, approximately 2 feet from each duct entrance. Information on the cable tag shall identify cable by size, type, cable number and count. See Para 2.2.5 (above) for nomenclature for tagging.

2.2.7. Pulling Tape

All newly installed ducts left vacant shall be provided with a waterproof, corrosion resistant, pre-lubricated flat woven polyester pull tape with sequential footage markings (1250 lb. pulling strength) for future cable installations. The pull tape shall extend into the maintenance holes and be secured to a cable rack or pulling iron, etc.

2.2.8. Cable Terminations

Fiber optic cables shall be terminated via fusion splice to pigtails with SC connectors in cassette style housing. The pigtails shall be sized the same as the OSP fiber they are spliced to, i.e., 125/8.3 micron to 125/8.3 micron. The pigtails shall be duplex (or simplex) unless otherwise agreed to by 17 CS/SCXP.

2.2.9. OSP Maintenance Loop(s)

The Contractor shall install a minimum of a 50 foot fiber optic cable maintenance loop at the first MH from the building, at every splice point MH location and at every 3rd MH in the route. The maintenance loop slack shall be properly labeled, securely supported to the cable ladder and off the MH floor or in telecomm room.

2.2.10. Grounding/Bonding

Grounding/Bonding hardware such as corrosion resistant wire, bonding ribbon, clamps, ground rod, etc. necessary to properly bond/ground the cable in MHs shall be provided by the Contractor. In addition, grounding/bonding of telecommunication racks to telecomm busbar and building ground if necessary. Reference UFC 3-580-01, TIA 607, and TIA 758.

2.2.11. Underground Conduit System

The Contractor shall be responsible for any required trenching and/or boring necessary to lay the duct system. The Contractor is also responsible for backfilling ditch lines and compaction of fill materials with appropriate compaction tools. Directional drilling shall be used for major road crossings, taxiways, runways, etc. Otherwise, crossing of paved surfaces may be performed by

pavement cuts and resurfacing with appropriate matching road material. This does not prevent the Contractor from using directional drilling if it is more cost effective. Ducts will be appropriately protected when placed under paved surfaces (i.e., concrete encasement).

2.2.11.1. Composition. N/A

2.2.11.2. Typical Situations

The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-40 Polyvinyl Chloride (PVC) (Schedule 40) IAW NEMA TC-2. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell-end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirements.

2.2.11.3. Unique /Site Specific Situations

The ducts shall be 4-inch inside diameter (I.D.) round or metric equivalent. The ducts shall be made of EPC-80-PVC (Schedule 80) IAW NEMA TC-2; high density polyethylene (HDPE) SIDR 11.5, Galvanized Iron Pipe (GIP) or "thickwall" stainless steel. Schedule 80 PVC shall be limited to risers, all above ground conduit and under the roadway/parking pavement. High density polyethylene (HDPE) SIDR 11.5 shall be used when directional bring is used. GIP or stainless steel shall be used under major roadways, taxiways, and runways. The ducts shall be appropriately labeled indicating the composition material. Ducts shall have a sleeve or bell-end type coupling and shall be watertight when assembled. In addition, the Contractor shall adhere to any additional Host Base/site specific requirement.

2.2.11.4. Installation

Installation of underground conduits/ducts shall be IAW RUS Bulletin 1751F-643 and RUS Bulletin 1753F-151. Ducts installed beneath roads, sidewalks, parking areas, other paved surfaces or areas to be paved, etc. shall be installed a minimum of 36" below grade. In a MH with knockouts, ducts shall start at the bottom knockout, allowing for upward expansion in the MH. All ducts not installed under roads, sidewalks, parking areas, or areas to be paved, etc. shall have a minimum of 36 inches ground cover, where possible. The Contractor shall provide other protective measures, concrete cap, etc., in those areas where the minimum ground cover cannot be achieved. Grading of ducts shall be accomplished IAW RUS Bulletin 1751F-643. All conduits shall be continuous between MH/HHs (i.e., no breaks or separations in the conduit runs between MH/HHs).

2.2.11.5. Bends and Sealing

All bends between MHs shall be a minimum of ten times (10X) the diameter of the duct size (i.e., 4 inch duct = 40 inches) with the sum of bends in all directions not exceeding a total of 90 degrees, where practical. Coordinate with 17 CS/SCXP if runs have bends that total more than 90 degrees is required. Ducts shall have bell-ends and enter a MH perpendicular to the surface of the wall through which it is entering. All ducts/inner-ducts entering MH shall be sealed. Universal duct plugs or removable putty sealants may be used. Upon completion of conduit sections, a rigid 12" long test mandrel ¼" (6.4mm) smaller than the inside diameter of the conduit shall be pulled through two diagonally opposite ducts to ensure proper alignment. In addition, all ducts shall be cleared of loose materials such as concrete, mud, dirt, stones, etc.

2.2.11.6. Utility Separation

When communications ducts cross either power duct or buried power cable, maintain a minimum separation of 3 inches of concrete or 12 inches of well-tamped earth between the two or 12 inches of well tamped earth when parallel; for pipes (e.g., gas, water, oil) maintain 6 inches when crossing or 12 inches when parallel.

2.2.11.7. Spacers and Tracer Wire

Along the length of the duct run, if the ducts are installed by trenching, spacers shall be placed at five (5) foot intervals and cable warning tape shall be buried one (1) foot above the conduit and shall follow the duct route. The tape shall be a minimum of three inches wide and orange in color with the appropriate warning message. At least one duct shall have tracer wire or be otherwise locatable from the surface.

2.2.11.8. Entrance Conduits into Existing Maintenance Holes

When new entrance conduits/ducts or sleeves are required, the Contractor shall bore and install the necessary holes and install the ducts or sleeves, if a knockout does not exist. Penetration shall not be in such a location through the wall as to block use of existing ducts in the maintenance hole. New ducts will be a minimum of 18 inches from either the maintenance hole floor or ceiling, if practical. The minimum bending radius for entry conduit/ducts shall be no less than 10 times the inside diameter of the conduit. Ducts and openings around ducts shall be sealed to prevent moisture from entering the maintenance holes.

2.2.11.9. Excavation/Building Penetrations

All wall penetrations, including inside buildings, shall be restored to meet the required base fire ratings.

2.2.12 N/A

2.2.13. Outside Plant Installation

This section describes the underground cables, flexible geotextile multiple cell fabric, innerduct and MH/HH plus conduit system installation requirements. The Contractor shall design and install Customer-Owned Outside Plant Telecommunications Infrastructure in accordance with ANSI/TIA-758. Each cable installation shall be coordinated with 17 CS/SCXP so that the impact on the building users is properly coordinated. The sequence of installation is at the Contractor's discretion.

2.2.13.1. Infrastructure Installation

The Contractor shall install the following new infrastructure, 1,425 feet of one 3x3 inch Geo-textile Fabric, eleven (11) 24 port FODP's and two (2) 144 port FODP's. Additionally, 1,593 feet of 144 strand, 8,303 feet of 24 strand, and 2,312 feet of 12 strand single mode corning glass fiber. Contractor will also install relay racks, and provide patch cords per guidance in SoO. (Coordinate exact location with 17CS/SCXP).

2.2.13.1.1. Maintenance Holes

This project requires no new Maintenance Holes.

2.2.13.1.2. Ductbank Infrastructure

N/A to this project.

2.2.13.1.3. Geo-textile Fabric Installation

Install Geo-textile fabrics IAW the following Table:

From Building	To Maintenance Hole	Quantity	Approx. Distance (Feet)	Figure	Comment
B501	MH-163	1	310	1	Install one-3x3" Geo- textile fabrics (detectable type)
B520	HH-G	1	130	1	Install one-3x3" Geo- textile fabrics (detectable type)
B504	HH-F	1	140	1	Install one-3x3" Geo- textile fabrics (detectable type)
B505	HH-G	1	140	1	Install one-3x3" Geo- textile fabrics (detectable type)
B420	MH-160	1	115	2	Install one-3x3" Geo- textile fabrics (detectable type)
B409	MH-249	1	160	2	Install one-3x3" Geo- textile fabrics (detectable type)
B401	MH-249	1	240	2	Install one-3x3" Geo- textile fabrics (detectable type)
B356	MH-246	1	190	2	Install one-3x3" Geo- textile fabrics (detectable type)

2.2.13.2. Fiber Optic Cable Installation

Install outside plant FOC as described in the following paragraphs. The cable shall be all dielectric, loose buffer tube, water blocked, single mode, corning glass, outside plant (OSP) cable suitable for indoor/outdoor applications. The Contractor shall coordinate each cable installation with the 17CS/SCXP so as to minimize the impact on building users. The intent is to install the cable in one continuous length, to the extent that it is practical. The Contractor shall determine whether there is some practical reason for an intermediate splice in the cable at some maintenance hole/handhole between the cable end points. If an underground splice is necessary, it shall be accomplished IAW commonly accepted telecommunications industry practices for fusion splicing optical fiber cable and sealed with a splice case suitable for the application. If a splice case is installed in a maintenance hole/handhole it shall be pressure tested IAW the manufacturer's instructions. If a splice case leaks, it shall be reinstalled and retested. A coil of 50 feet of cable shall be provided on each cable entering or leaving a splice case in a maintenance hole or handhole and approved by 17CS/SCXP.

2.2.13.2.1. Fiber Optic Cable from ITB 448 to MH-163

The Contractor shall install approximately 535 feet of one continuous length, 144-strand SM FOC from ITB 448 to MH-163 utilizing existing Maintenance Hole Ductbank System. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 448 and/to MH-163:

- At ITB 448, one (1) fully welded relay rack with vertical wire managers, isolation pad, and power strip. Additionally, one (1) 4U, 144-size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At ITB 448, Fusion Splice 144-strand SM fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At MH-163, install one re-enterable corning, dome style splice case, capable of housing 144-strand splice.
- At ITB 448, OTDR and Power Meter/Light Source test in both directions to B501, B520, B511, B504, B505, B526, and B530.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable. Provide tweny fifty six (56), FOC patch cords per 17CS/SCXP guidance.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.2. Fiber Optic Cable from MH-163 to B501/B520/B511/B504/B505/B526/B530

The Contractor shall install approximately 5,307 feet of one continuous length, 24-strand SM FOC from MH-163 to Buildings 501, 511, 504, 526, 530 and 2,312 feet of 12-strand SM to Buildings 520 and 505 utilizing existing Maintenance Hole Ductbank System. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following at each building:

- At buildings 511, 504, and 530, one (1) fully welded relay rack with vertical wire managers, isolation pad, and power strip.
- At each building one (1) 24 port fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At each building, Fusion Splice 24-strand single mode fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At each building, OTDR and Power Meter/Light Source test in both directions to B448.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable and label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

Install Indoor/Outdoor or Outdoor rated Single Mode Fiber Optic Cable IAW the following Table and Figure 1:

From Building	To Bldg or MHole	FOC Size	FOC ID/Strands	Approx. Distance (Feet)	Figure	Comment
ITB 448	MH-163	144	FOC 448-3, 1-144	535	1	Corning specifications.
B530	MH-163	24	FOC 448-3, 1-24	2438	1	Corning specifications. (Indoor/Outdoor Rated)
B526	MH-163	24	FOC 448-3, 25-48	N/A	1	Corning specifications.
B504	MH-163	24	FOC 448-3, 49-72	1291	1	Corning specifications. (Indoor/Outdoor Rated)
B505	MH-163	12	FOC 448-3, 73-84	1205	1	Corning specifications. (Indoor/Outdoor Rated)
B520	MH-163	12	FOC 448-3, 85-96	1107	1	Corning specifications. (Indoor/Outdoor Rated)
B511	MH-163	24	FOC 448-3, 97-120	940	1	Corning specifications. (Indoor/Outdoor Rated)
B501	MH-163	24	FOC 448-3, 121-144	638	1	Corning specifications. (Indoor/Outdoor Rated)

2.2.13.2.3. Fiber Optic Cable from ITB 448 to MH-249

The Contractor shall install approximately 1,058 feet of one continuous length, 144-strand SM FOC from ITB 448 to MH-249 utilizing existing Maintenance Hole Ductbank System. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following at ITB 448 and/to MH-249:

- At ITB 448, one (1) 4U, 144-size fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At ITB 448, Fusion Splice 144-strand SM fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At MH-249, install one re-enterable corning, dome style splice case, capable of housing 144-strand splice.
- At ITB 448, OTDR and Power Meter/Light Source test in both directions to Buildings 420, 409, 401, and 356.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable. Provide thirty two (32), FOC patch cords per 17CS/SCXP guidance. Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

2.2.13.2.4. Fiber Optic Cable from MH-249 to B420/B409/B401/B356

The Contractor shall install approximately 2,996 feet of one continuous length, 24-strand SM FOC from MH-249 to Buildings 420, 409, 401, and 356 utilizing existing Maintenance Hole Ductbank System. Length of run in SoO is an estimate and shall be verified by contractor. The contractor shall also install the following at each building:

- At each building install one (1) fully welded relay rack with vertical wire managers, isolation pad, and power strip. Additionally, one 24 port fiber optic distribution panel, along with cassette style fiber panels. Verify placement with 17CS.
- At each building, Fusion Splice 24-strand single mode fiber optic cable to pre-factory certified pigtails in cassette style fiber panels.
- At each building, OTDR and Power Meter/Light Source test in both directions to B448.
- Provide audit of existing cabling and fiber optic patch cords for transition to newly installed cable.
- Label all FODP's and FOC per 17CS Standard Operating Procedures.
- Provide one (1) CAD drawings for all work performed.
- MHDS templates can be provided at the appropriate time in the project.

Install Indoor/Outdoor or Outdoor rated Single Mode Fiber Optic Cable IAW the following Table and Figure 2:

From Building	To Bldg or MHole	FOC Size	FOC ID/Strands	Approx. Distance (Feet)	Figure	Comment
ITB 448	MH-249	144	FOC 448-4, 1-144	1058	2	Corning specifications.
B356	MH-249	24	FOC 448-4, 1-24	1525	2	Corning specifications. (Indoor/Outdoor Rated)
B401	MH-249	24	FOC 448-4, 25-48	509	2	Corning specifications. (Indoor/Outdoor Rated)
B409	MH-249	24	FOC 448-4, 49-72	430	2	Corning specifications. (Indoor/Outdoor Rated)
B420	MH-249	24	FOC 448-4, 73-96	532	2	Corning specifications. (Indoor/Outdoor Rated)
MH-249	MH-249	N/A	FOC 448-4, 97-144	N/A	2	Corning specifications.

2.2.14. Site Restoration/Debris Removal

The Contractor shall restore all disturbed grounds to the "as found" condition or better after installation. Base grounds restoration requirements shall be complied with. Common use areas shall be restored to their original condition. The Contractor shall be responsible for disposing of all residues from this project off base and in accordance with Federal, state and base environmental laws and regulations. All residue produced by directional drilling operations (i.e., slurry) shall be disposed of off base on the same day the residue is produced, at an appropriate disposal facility at the contractor's expense, IAW federal, state, local and Goodfellow AFB environmental laws and regulations. Under no circumstances will the contractor stage or store boring residue in slurry ponds or other containment areas on Goodfellow AFB.

2.2.15. Service Outages

The Contractor shall be responsible for preventing any unscheduled (i.e. cutting or disabling any in-service cables or equipment.), Contractor-caused, interruptions of communications capabilities that are properly identified. The Contractor shall coordinate planned outages with the site POC at least 10 calendar days in advance of the outage if the implementation necessitates disruption of service, (e.g., communications, electrical, or other utilities).

2.2.16. Identification/Marking

The Contractor shall clearly mark all Contractor-Furnished Property and Equipment (CFP/CFE) with their company's name. The Contractor shall place an easily read, very visible, sign (minimum 8.5 inches x 11 inches) on large containers, construction equipment, or un-manned rental vehicles while on the Government installation indicating the company name and both the Contractor and Site POC's names and local telephone numbers.

2.2.17. Installation Schedules

The Contractor shall provide a complete milestone schedule that denotes project activities to include time-phased start and completion dates for the project and sub-projects associated with the installation of the components and system. (CDRL A002)

2.2.18. Weekly Status Reports

The Contractor shall prepare a Weekly Status Report in English and shall distribute. The purpose of the report is to inform IPT members of project progress, problems being encountered, and other topics necessary/beneficial to ensure success and timely completion of the contract requirements. (CDRL A003)

2.2.19. As-Built Drawings

The Contractor shall submit red line drawings showing the "as-built" configuration in format specified by base SCX project manager. The base communications squadron will provide baseline drawings. The Contractor shall provide As-Built Rack Elevation, Inside Cable Plant and Outside Cable Plant drawings and distribute per Goodfellow Air Force Base, Standard Operating Procedures. (CDRL A001)

2.2.20. Test and Acceptance/Installation Test Plan

The Contractor shall provide a test plan as to how the system shall be pre-tested, in-progress-tested and post-tested to demonstrate to the Government that the system is fully operational ready to be placed into service. The Contractor shall test the system to demonstrate to the Government quality assurance representative. These tests shall be accomplished prior to the system being placed into service. (CDRL A005)

2.2.20.1 Outside Plant Cable testing

All strands of fiber optic cables shall be tested IAW TIA 526-7 Measurement of Optical Power Loss of Installed Single-mode Fiber Cable Plant, or equivalent. As a minimum, the following tests shall be performed. Both Optical Time Domain Reflectometer (OTDR) and Optical Power Meter tests will be used for all end-to-end circuits. Between FODPs, bi- directional testing at 1310 nm and 1550 nm is required.

NOTE: Testing of the Fiber Optic Cables on the reel shall be provided to the 17 CS/SCXP prior to installation.

2.2.21. Acceptance/Installation Test Report

The Contractor shall provide an installation test report of the results of the testing accomplished under the installation test plan IAW CDRL A006.

2.2.22. Final Acceptance

The Contractor shall schedule a final project walk-through with the 17 CS/SCXP. This should be scheduled 10 calendar days prior to acceptance.

2.2.23. As-Built Documentation in CVC

The Contractor shall record geospatial data and provide as-built documentation (shape files) of all new installed maintenance hole system components (including metadata) compatible with the Cyberspace Infrastructure Planning System (CIPS) Visualization Component (CVC) drawing system. Data points shall be recorded at the center of each manhole/handhole lid and at intervals not to exceed 25 feet along cable routes. Sufficient data points shall be recorded to capture any change in direction along the route. All GPS coordinates shall have +/- 3 feet accuracy for all readings. The government is responsible for providing the Contractor with a copy of the installation's most current GeoBase Common Installation Picture (CIP), and current CVC drawings of the areas of interest. The government will review the shape files in CVC and transcribe the information to the CVC system. Shape files shall be delivered upon project completion. (CDRL A001)

3. GENERAL INFORMATION

3.1. Period of Performance

The period of performance for the project shall be determined based on the proposed schedule and actual contract award date.

3.2. Place of Performance

The place of performance is Goodfellow AFB, TX.

3.3. Hours of Operation

The Contractor shall routinely work during normal duty hours of the site. However, mission requirements may necessitate work outside normal hours (nights and/or weekends), especially if existing service must be interrupted. Any site work requested by the Contractor to be performed outside of normal duty hours shall be coordinated with the 17 CS/SCXP and approved by the Contracting Officer at least 10 calendar days in advance.

3.4. Holidays/Down Days

The Contractor shall not perform under this contract on federal holidays or site-unique down-days unless expressly authorized by the CO and coordinated with the 17 CS/SCXP Project Manager.

3.5. Base Support

The Contractor shall identify any base support requirements (for example, laydown and storage areas) necessary to complete this project in their proposal. The contractor shall return all government furnished lay-down and storage areas to their original condition upon completion of the project.

3.6. Minimum Contractor Qualifications.

All work shall be performed by an experienced Telecommunications Contractor. The Contractor shall have a minimum of 3 years of experience in Telecommunications Systems installations and provide the technician's splicing certifications that are to perform work on this project.

APPENDIX A: APPLICABLE STANDARDS

The following list is not all-exclusive. The Contractor shall comply with applicable commercial code and standards

AFI 91-203 – Air Force Consolidated Occupational Safety Instruction

AFBAN-FS – AF Base Area Network Functional Specification, 2017

OSHA CFR 29 Part 1910-268 – Telecommunications

NEMA TC 2- Electrical Polyvinyl Chloride (PVC) Tubing and Conduit

ANSI/TIA-606-B Administration Standard for Telecommunications Infrastructure

TIA-568-C Commercial Building Telecommunications (568C.1, 568C.2, 568C.3) Cabling Standard

ANSI/TIA-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

TIA-569-C - Commercial Building Standard for Telecommunications Pathways and Spaces

TIA-570-C –Residential Telecommunications Infrastructure Standard

TIA-758 - Customer-owned Outside Plant Telecommunication Infrastructure Standard

T.O. 00-33A-1001, Methods and Procedures, General Cyberspace Support Activities Management Procedures and Practice Requirements

BICSI TDM Manual - Building Industries Consulting Services International Telecommunications Distribution Methods (TDM) Manual

BICSI – Outside Plan Design Reference Manual

RUS Bulletin 1751F-643 - Underground Plant Design

RUS Bulletin 1751F-644 - Underground Plant Construction Telecommunications Engineering Shield Continuity and Construction Manual (TE&CM) 451.2

RUS Bulletin 1751F-801 – Electrical Protection Fundamentals

RUS Bulletin 1753F-151 (515b) - Specifications and Drawings for Underground Cable Installation

NFPA 70 - National Electric Code

FGDC-STD-007.3-1998 - Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy

UFC 3-520-01. Interior Electrical Systems

UFC 3-580-01, Telecommunications Interior Infrastructure Planning and Design (Ch. 1 & 2)

Goodfellow Air Force Base Telecommunications Requirements (17CS, SOP)

APPENDIX B: LIST OF DELIVERABLES

All deliverables are subject to Government acceptance and approval. They shall meet professional standards and the requirements set forth in this SoO. All deliverables shall be produced using recommended software tools/versions as accepted by the Government. The Contractor shall submit the following deliverables:

CDRL	Data Item Title	Data Item Title
A001	As Built	
A002	Work Schedule	
A003	Status Report	
A004	Meeting Minutes	
A005	Test Plan	
A006	Test Report	

APPENDIX C: LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AFM	Airfield Management (BaseOPS)
Approx	Approximately
ATC	Air Traffic Control Tower
ATCALS	Air Traffic Control and Landing Systems
BCE	Base Civil Engineering
CDRL	Contract Deliverable
CFE	Contractor-Furnished Equipment
CFP	Contractor-Furnished Property
CIP	Common Installation Picture
CIPS	Cyberspace Infrastructure Planning System
CMA	Controlled Movement Area
CMHDS	Communications Maintenance Hole Duct System
CO	Contracting Officer
Comm	Communications
CS	Communications Squadron
CSI-B	Cyberspace Integrator-Base
CVC	CIPS Visualization Component
ECMRA	Contractor Manpower Reporting Application
EFI&T	Engineer, Furnish, Install and Test
FOC	Fiber Optic Cable
FODP	Fiber Optic Distribution Panels
FOUO	For Official Use Only
FY	Fiscal Year
HDPE	High Density Polyethylene
HH	Hand Hole
IAW	In Accordance With
ID	Inside Diameter
ILS	Instrument Landing System
IPT	Integrated Process Team
ITB	Information Transfer Building
LMR	Land Mobile Radio
MH	Maintenance Hole
MHDS	Maintenance Hole Duct System
NLT	No Later Than
NPDES	National Pollution Discharge Elimination System
OEM	Original Equipment Manufacturer
OPSEC	Operational Security
OSHA	Occupational Safety & Health Administration
OSP	Outside Plant
OSS	Operations Support Squadron
OTDR	Optical Time Domain Reflectometer
PDF	Portable Document Format
PM	Project Manager
POC	Point Of Contact
Prime	Prime Contractor

PSI	Pounds per Square Inch
PVC	Polyvinyl Chloride
QAE	Quality Assurance Evaluator
QCM	Quality Control Manager
Qty	Quantity
RUS	Rural Utilities Service Bulletin
SCOW	Supply Chain Operations Wing
SCX	Scheduler Planner
SE	System Engineer
SM	Single Mode
SoO	Statement of Objectives
Sub	Sub-Contractor
SWPPP	Storm Water Pollution Prevention Plan
TIA	Telecommunications Industry Association
TMGB	Telecommunication Main Ground Bus-Bar
TRD	Technical Requirements Document

APPENDIX D: DRAWINGS

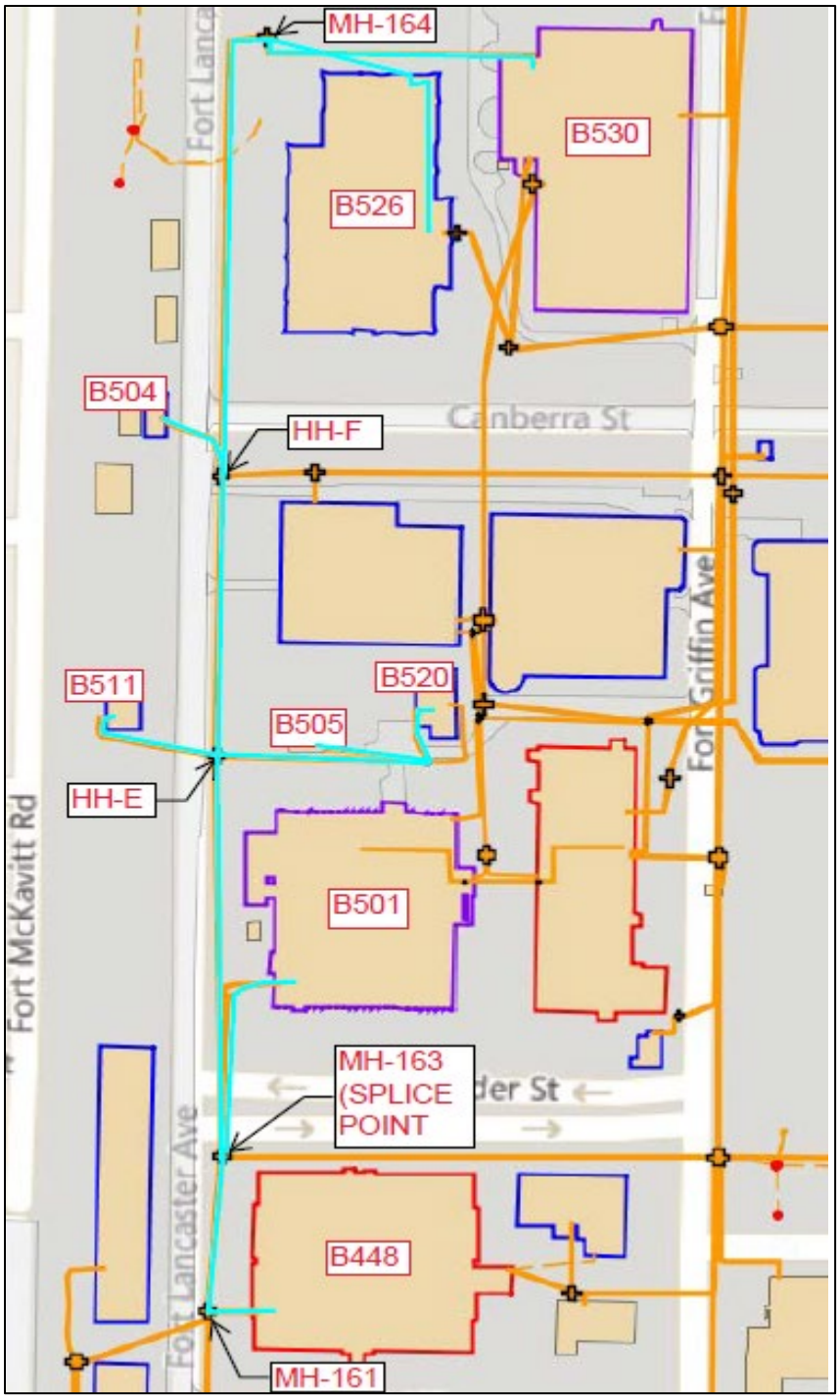


Figure 1: B448, FOC 448-1 Proposed FOC Upgrade

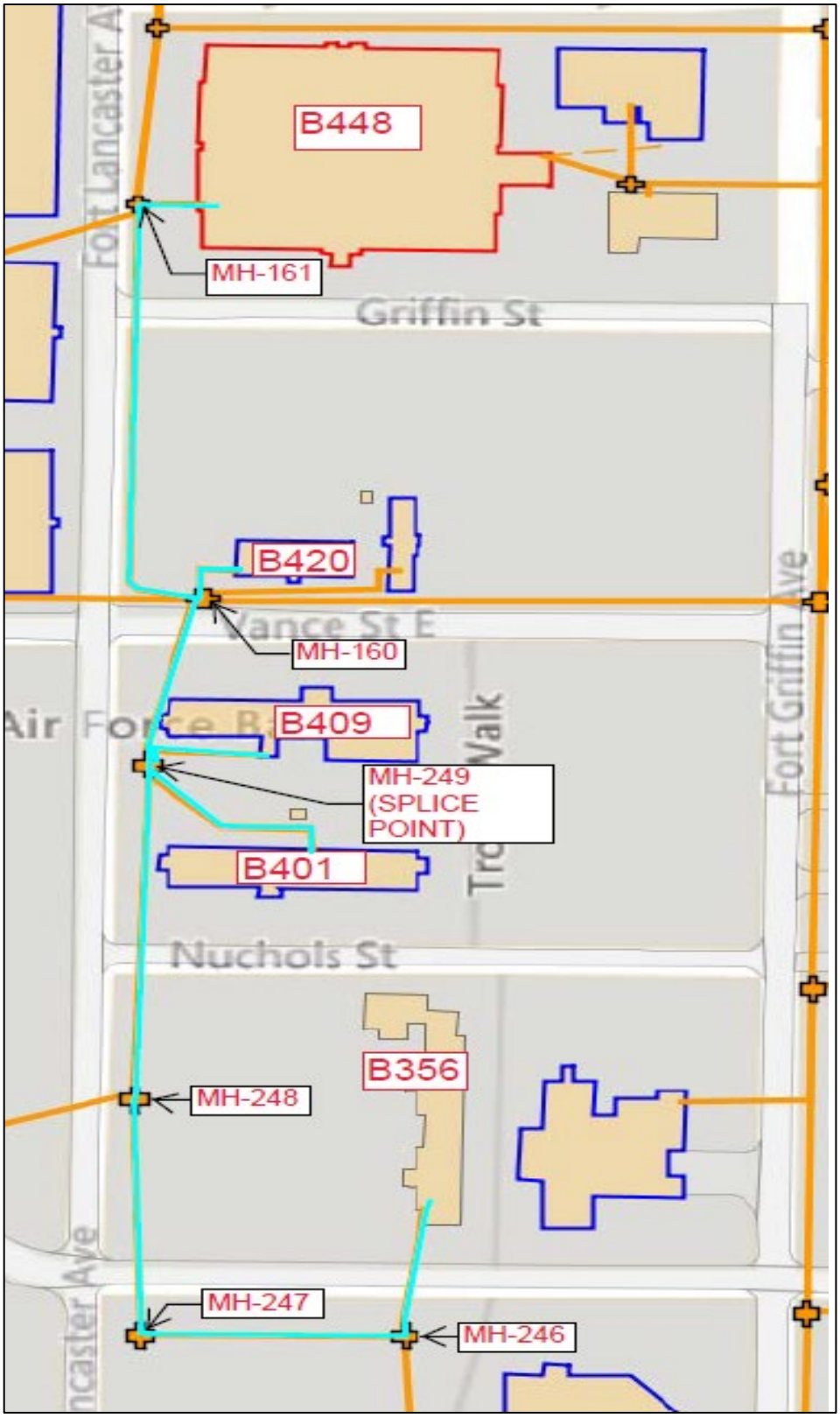
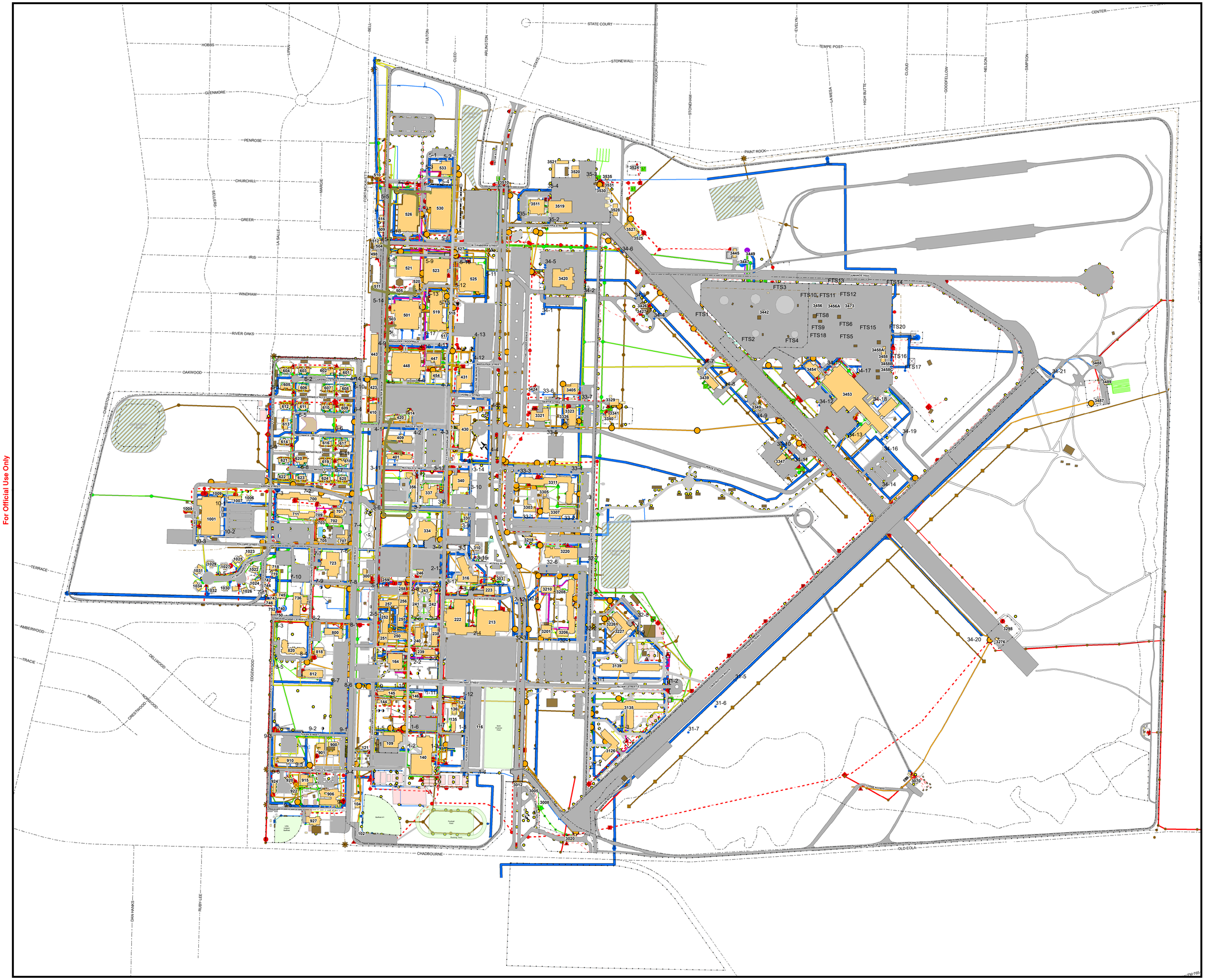
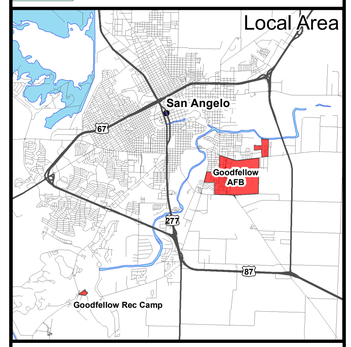


Figure 2: B448, FOC 448-2, Proposed FOC Upgrade



Legend

- CLIN 3a
- CLIN 3b
- CLIN 3c
- CLIN 3d
- CLIN 3e
- Handhole
- Manhole
- Water
- Sewer
- Gas
- Electrical
- Stormwater
- Communications
- HVAC
- Fuels



N

Meters
0 95 190 380

Feet
0 245 490 980 1,470

Fiber Backbone

17 CES/CENME, GeoBase
Building 3511, Room 124
17CES.CENME.GEOBASE@us.af.mil

GOODFELLOW AIR FORCE BASE

Map Date: January 2022

Map Path: F:\GeoBase Data\Maps\3 Work Requests\59800_Fiber Backbone\59800_Fiber_Backbone.mxd

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