STATEMENT OF OBJECTIVES (SOO)

For

Installation of Diverse Fiber to New WGF Building
FE Warren AFB, WY

31 Oct 2023

Prepared By

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1. SCOPE.

This Statement of Objectives (SOO) defines the requirements for the Contractor to engineer, furnish, install and test (EFI&T) new infrastructure, the installation of two diversified 36-strand single mode (SM) fiber optic cable (FOC) connecting the new Weapons Generation Facility (WGF): primary path from WGF to ITN 232 & alternate path from WGF to ITN 333. New handholes, 4" conduits, and geo-textile fabric infrastructure shall also be installed where needed. The WGF shall be completed in 2024 under MIL-CON funding.

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. The Contractor shall comply with the current TIA telecommunication installation and testing commercial standard and base installation standards. All equipment, supplies, and materials provided shall be new and not refurbished.

2.0 REQUIREMENTS.

2.1 GENERAL REQUIREMENTS.

2.1.1 Safety Requirements.

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

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 Cultural Resources.

The contractor shall coordinate with FE Warren Cultural Resources Manager before proceeding for a review of any potential impacts to cultural resources.

2.1.2.2 Confined Space.

The Contractors and Sub-contractors entering confined spaces on FE Warren are responsible for the safety of their personnel and for their own permit space program as outlined in AFI 91-203. All confined space operations must be coordinated with the Base Safety Office prior to start of work. The primary Contractor is responsible for all Sub-contractor confined space operations.

2.1.2.3 Accident/Incident Reporting and Investigation.

The Contractor shall record and report all available facts relating to each instance of injury to either Contractor or Government personnel to the 90 CS/SCX Project Manager and the Base Safety Office unless otherwise stated in the SOO. 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 fully assist the Government personnel until the investigation is completed.

2.1.2.4 Work Area(s).

At day's end, the Contractor shall remove all debris and surplus materials from the workplace. 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 workday. Equipment and materials required to complete the work effort may remain on site if they are organized/stored in a manner that does not cause a

safety hazard. The contractor shall co-ordinate with the 90 CS/SCX to ensure that any locking manhole covers are put back in place at the end of the workday.

2.1.2.5 Traffic Control.

In the event base vehicular traffic is disrupted by trenching or horizontal directional boring, the Contractor shall notify the 90 CS/SCX PM NLT 10 calendar days in advance to inform base Security Forces and Emergency Services personnel of the planned disruptions.

2.1.2.6 Airfield Driving. Reserved

2.1.3 Security Requirements.

The Contractor shall process and provide a Site Visit Request Letter to 90 CS/SCX within 5 calendar days after contract award. This letter 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 SOO. 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 may take place in secure areas where Contractor employees must be escorted at all times. The Contractor must coordinate access to secure areas at least five (5) calendar days ahead of time. It is the Government's responsibility to provide escorts.

2.1.3.2 Operational Security (OPSEC).

Network infrastructure Drawings (MHDS, MH/HH locations, fiber paths, etc.) are on the 90 CS/SCX 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 "Controlled Unclassified Information (CUI)," and ensuring limited distribution of documents and schematics/drawings to only those individuals with a valid need to know. IAW AFI 10-701, OPSEC Considerations, the contractor shall follow the OPSEC guidance/plan (AFI10-701) to ensure the protection of CUI data either furnished by the government or produced by the contractor.

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 Contractors are responsible to know and follow all applicable Federal, State, Local and Air Force regulations for environmental protection, including waste disposal, sewer discharge, air emissions, and storm water requirements. The contractor shall maintain an awareness of changing environmental regulatory requirements to avoid environmental deficiencies for activities on FE Warren. The Prime Contractor shall ensure that their subcontractors (if any) comply with these specifications.

2.1.5 Permits.

The Contractor shall be responsible to coordinate, complete and process all permits required to complete the installation prior to any trenching, horizontal directional boring or modifications to a facility, maintenance hole or hand-hole. For example:

- Digging permit, AF Form 103 shall be submitted through BCE 14 calendar days in advance of digging activities. The Contractor is responsible for maintaining all markings and for ensuring AF Form 103 remains current.
- Confine space entry permit, AF Form 1024 shall be coordinated through base safety office. The Contractor shall be prepared to provide proof of their Confined Space Training Program along with the AF Form 1024 to base safety.
- Base Civil Engineering Work Clearance Request, AF Form 332 shall be submitted through BCE 14 calendar days in advance of planned work.

All utility markings, flags, etc. shall be maintained by the contractor after the responsible work center/shop identifies/locates them and ensure that the AF Form 103 remains current. The contractor shall take precautions to protect existing infrastructure. 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.

2.1.6 Integrated Process Team (IPT).

The Contractor shall chair a weekly IPT meeting that includes Contractor representatives, the Government Contracting Officer (CO), the 90 CS Project Manager, the CSI-B, the System Engineer(s), the 38 ES Project Manager, and other base personnel as required. The Contractor shall provide an agenda and a worldwide 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 NLT 1 working day after each meeting.

2.1.7 Quality Assurance.

The Contractor shall provide Quality Assurance Support for the entire 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.

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 for the duration of the project, up to and until final acceptance by the Government PM 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 involved alternate(s) shall be able to read, write, speak, and understand English and shall be on site to coordinate permits, clearances, and receive shipments/material related to the task order.

2.1.8.4 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.

2.1.8.5 System for Award Management (SAM).

The contractor shall report ALL contractor labor hours (including subcontractor labor hours) required for performance of services provided under this contract for Installation via a secure data collection site. The contractor is required to completely fill in all required data fields using the following web address https://www.sam.gov *SAM replaces the previous ECMRA application that was hosted on https://www.ecmra.mil. See https://www.dmdc.osd.mil/ecmra_splash/*

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 SAM help desk.

2.1.9 Warranty.

The Contractor shall provide a one-year warranty or manufacturer's standard commercial warranty, whichever is longer. The warranty shall be, at a minimum, IAW the NETCENTS standard or equivalent. 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.

2.1.10 Manuals and Practices.

The Contractor shall provide the latest version of operation, installation, and maintenance manuals and practices/users guide for each system installed as provided by the original manufacturer with all new equipment.

2.2 SPECIFIC REQUIREMENTS.

This section describes the underground cables, conduit and inner-duct installation requirements. The Contractor shall design and install Customer-Owned Outside Plant Telecommunications Infrastructure in according with TIA-758-B. Each cable installation shall be coordinated with 90 CS/SCX so that the impact on the building users is properly coordinated. The sequence of installation is at the Contractor's discretion. See Project Drawing for reference and estimated distances of existing and proposed infrastructure. This is only a proposed solution. The Contractor may make recommendations to the accomplishment of this requirement in their proposal.

2.2.1 Outside Plant Requirements.

As indicated in this SOO and attached sketches, the Contractor shall EFI&T the fiber optic cable, hand holes, conduits, & geo-textile fabric infrastructure. Requirements are to install two diverse 36-strand single mode (SM) fiber optic cable (FOC) connecting to new WGF: primary path from WGF to ITN 232 & alternate path from WGF to ITN 333. See project sketches for details.

2.2.1.1 Existing Maintenance Holes.

The Contractor shall be responsible for pumping out maintenance holes/handholes. Water from maintenance holes/handholes shall be drain onto grass, when possible, to act as a natural filter; then it may be pumped out onto the surrounding ground, if there is no impact to roads, driveways, or vehicle traffic. Mud and debris shall be disposed of IAW base requirements. If Contractor comes across a manhole with contaminated water, the Contractor shall coordinate with the Base CE environmental office.

2.2.1.2 Measurements.

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

2.2.1.3 Underground Utilities Markings.

The Contractor shall coordinate with base agencies to ensure markings are placed over existing base infrastructure prior to digging or horizontal directional boring and shall take precautions to protect existing infrastructure. The Contractor is responsible for repair of any damage caused during installation when the infrastructure is clearly marked. The Contractor is responsible for maintaining all markings and for ensuring AF Form 103 (Dig Permit) remains current.

2.2.1.4 Closures for Cable Splicing in Maintenance Holes.

Intermediate cable splices shall be minimized and consist of fusion splices in a high quality re-enterable splice case. Only splice closures intended for underground applications shall be used in the underground system. The Contractor shall use standard re-enterable fiber splice closures. The closures shall have adequate strength to protect the splice and maintain cable shield electrical continuity in the below ground environment. The Government quality inspector shall have the opportunity to inspect the inside of the splice case before closure pressure testing and encapsulation is performed. A coil of 25 feet of cable shall be provided on each cable entering and leaving a splice case in a MH or HH.

2.2.1.5 Splice Connectors.

All splicing shall be performed in accordance with RUS Bulletin 1735F-401, Standards for Splicing Copper and Fiber Cable. The contractor shall use pic-a-bonds, 3M 710 splice connectors, or equivalent, for all copper splices.

2.2.1.6 Labeling.

The Contractor shall label all equipment & installed cables and cables identified for re-use in accordance with TIA-606-C and as directed by the 90 CS/SCX.

2.2.1.6.1 New Ducts.

New ducts shall be permanently labeled on the wall of each building/Maintenance hole (MH)/Handhole (HH) indicating the connecting building/Maintenance hole/Handhole at the other end of the duct (for example, “To MH-306H”). The same information shall appear on the Contractor’s completed as-built-Drawings.

2.2.1.6.2 Fiber Optic Distribution Panel (FODP) Marking.

Each FODP shall be stenciled/marked with black ink or adhesive backed decals in letters and numbers. The cover of all new fiber optic distributions (FODPs) shall be labeled to conform to the system used by local maintenance personnel to identify FODPs that terminate fiber. If the manufacturer has not identified the sequence in which ports on FODPs (pigtail modules) are

counted, the Contractor shall provide designation labels/strips to identify the sequence in which they are counted. Each splice tray shall be marked to identify the fiber count contained in the splice tray. The marking shall identify the FODP by number (building number), cable number, and count.

Example (FODP): FODP 1605-1738, 1-12

2.2.1.6.3 FOC Tags.

All tags shall be permanently labeled, easily visible and corrosion resistant. Install cable tags in all maintenance holes/hand-holes, 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. Tagging and labeling of new cables shall be IAW the following:

Example (Fiber Optic Tag): 12L8.3F
FOC 1605-1738, 1-12

First line: "12" stands for Fiber Count. "L" stands for Loose Tube Buffer or ("T") for Tight Tube Buffer. "8.3" stands for Single Mode. "F" stands for Filled Core (otherwise leave blank).

Second line and following: "FOC" stands for Fiber Optic cable. "1605-1738" stands for From Bldg Number 1605 to Bldg Number 1738. "1-12" stands for Strand Count.

2.2.1.7 FOC Terminations.

Newly installed fiber optic cables shall be terminated on new fiber optic distribution panels using fusion spliced pigtails with SC connectors. Distribution panels shall be designed for rack mounting in 19-in (48 cm) racks or wall mounted as required. Panels shall be sized accordingly to cable and method of termination.

2.2.1.8 FOC Maintenance Loop.

The Contractor shall install a minimum of a 50-foot fiber optic cable maintenance loop at the first MH/HH from the building, at each splice point MH location and at every third MH/HH. The maintenance loop shall be properly labeled and securely supported by two cable hooks. Cable hooks are to be positioned so the highest one supports the underside of the top of the coil and the bottom hook supports the underside of the bottom of the coil. The maintenance loop shall have a cable tag. The same information shall appear on the Contractor's completed as-built-draw.

Note: Maintenance loops shall be installed at every new hand hole referenced in this SOO.

2.2.1.9 Cable Racks and Cable Rack Supports.

Cable racks shall be installed in maintenance holes and hand 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.

2.2.1.10 Underground Conduit System.

The Contractor shall be responsible for any required trenching and/or boring necessary to lay the duct system. Contractor shall be responsible for backfilling ditch lines and compaction of fill materials with appropriate compaction tools. Provide a minimum of 12" cover of clean fill above the conduit. Backfill material shall be clean and free from all organic material, clay, marl or unstable materials, debris, lumps, or broken paving. No rocks or stones larger than 3 inches in diameter shall be allowed in backfill. Material for backfill may be material resulting from excavation, if meeting the above requirements. Directional drilling will be used for major road crossings. 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.

2.2.1.10.1 Composition.

The ducts shall be corrosion resistant and 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. For unique situations the ducts shall be 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. High density polyethylene (HDPE) SIDR 11.5 shall be used when directional boring is used. GIP or stainless steel shall be used under 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 requirements.

2.2.1.10.2 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. Ducts installed beneath roads and parking areas shall be protected. It is understood that in some locations, especially at paved surface crossings, the Contractor may bore and substitute 4-inch I.D. HDPE conduit (Roll pipe, suitable for the application) for 4-inch PVC conduit. Also, if HDPE is used, it shall be SIDR 11.5 so that the inside diameter of the HDPE will match the inside diameter of the PVC. HDPE shall not be placed directly into a MH. The Contractor shall transition to PVC from HDPE prior to terminating conduit into these structures. In maintenance holes (MH) with knockouts, conduits shall start at the bottom knockout, allowing for upward future expansion.

All ducts not installed across 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 and drain slope of ducts shall be accomplished IAW BICSI Outside Plant Design Reference Manual (OSPDRM) and RUS Bulletin 1751F-643. Do not allow the ducts to twist or tangle between Maintenance holes.

2.2.1.10.3 Paved Surface Crossings/Railroad Crossing

The Contractor shall cut and restore, and/or horizontal directional drilling (HDD) in order to cross paved surfaces. Paved surfaces may be asphalt, concrete, brick, or some type of paving stone. Paved surfaces include roads, driveways, sidewalks and parking lots. At a minimum, grade of PVC conduit at open trench paved surface crossings, or crossings which are planned for paving in

the future, shall be Schedule 40 and shall be concrete encased. If HDD is used, then it will follow commonly accepted telecommunications industry standards and practices relative to the installation, stabilization, and protection of conduits through a bore under a paved surface. The decision whether to trench (cut and patch) across or horizontal directionally drill under paved surfaces is at the discretion of BCE and will be made on a case-by-case basis.

The Contactor shall install the appropriate physical protection required [(concrete encasement, steel tube (casing)] for buried PVC conduits or HDPE Roll pipe, consistent with commonly accepted telecommunications industry practices relative to the task and to the environment in which they are installed and the loads (H-5, H-10, H-20, railroads, flight line, etc.) to which they are expected to be exposed. Type of protection may be dependent upon the specific application and shall be IAW applicable federal, state or local (FE Warren Civil Engineering construction requirements) procedures. However, at a minimum, nonmetallic conduits shall be encased in concrete of minimum 3000 lb. /in^2 compressive strength where vehicular traffic is above the pathway. The encasement shall be concrete of a wet type mix and shall be placed in such a manner as to ensure the concrete completely surrounds all conduits and no air voids are trapped in the mix a bend or sweep is placed in PVC nonmetallic duct bank between maintenance holes, the duct bank must be encased in concrete with a minimum compressive strength of 3000 pounds per square inch (psi).

2.2.1.10.4 Bends and Sealing.

All bends between MHs/HHs 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 90 CS/SCX if runs have bends that total more than 90 degrees is required. Ducts shall have bell ends and enter a MH/HH perpendicular to the surface of the wall through which it is entering. All ducts/innerducts entering MH/HH shall be sealed. Universal duct plugs or removable putty sealants may be used. Upon completion of conduit sections, a rigid 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.

2.2.1.10.5 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.

2.2.1.10.6 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. At least one duct or roll pipe shall have tracer wire or be otherwise locatable from the surface. All new tracer wire installed for this project needs to have a wire nut and label installed at all wire ends, and those wire ends secured but not connected to grounds. The tracer wire shall be exposed; free from the conduit and capped (insulated). The tracer shall be secured and routed to the maintenance hole or hand-hole neck to a point where maintenance personnel may access the wire without having to enter the maintenance hole/hand-hole and tagged with a label so indicating it as a "Duct Tracer Wire to xxx – Do Not Remove (where xxx is the other end of the wire)." Tracer wires shall not be connected to any grounding system. Tracer wire shall be pulled back from building entrances until it is underground to prevent lightning damage.

2.2.1.10.7 Warning Tape.

Cable warning tape shall be buried one (1) foot below the surface 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.

2.2.1.10.8 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 knockout doesn't 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 floor or ceiling of the maintenance hole if practical. Ducts shall have bell ends and enter the maintenance hole perpendicular to the surface of the wall through which it is entering and shall be installed flush with the interior wall of the maintenance hole. Ducts and openings around ducts shall be sealed to prevent moisture from entering the maintenance holes.

2.2.1.10.9 Conduit Protection.

The Contactor shall install the appropriate physical protection required [(concrete encasement, steel tube (casing)] for buried PVC conduits or HDPE Roll pipe, consistent with commonly accepted telecommunications industry practices relative to the task and to the environment in which they are installed and the loads (H-5, H-10, H-20, railroads, flight line, etc.) to which they are expected to be exposed. Type of protection may be dependent upon the specific application and shall be IAW applicable federal, state or local (FE Warren Civil Engineering construction requirements) procedures. However, at a minimum, nonmetallic conduits shall be encased in concrete of minimum 3000 lb. /in^2 compressive strength where vehicular traffic is above the pathway. The encasement shall be concrete of a wet type of mix and shall be placed in such a manner as to ensure the concrete completely surrounds all conduits and no air voids are trapped in the mix a bend or sweep is placed in PVC nonmetallic duct bank between maintenance holes, the duct bank must be encased in concrete with a minimum compressive strength of 3000 pounds per square inch (psi).

2.2.1.10.10 Pull Tape.

All newly installed ducts left vacant shall be provided with a pull tape 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/hand-holes and be secured to a cable rack or pulling iron, etc.

2.2.1.11 Excavation/Building Penetrations.

All wall penetrations (inside/outside buildings) shall be restored to meet the required base fire ratings.

2.2.2 Installation Requirements.

This section describes the underground maintenance hole/conduit system, micro-duct, and fiber optic cable installation requirements. The Contractor shall design and install Customer-Owned Outside Plant Telecommunications Infrastructure in according with TIA-758-B. Each cable installation shall be coordinated with the 90 CS/SCX so that the impact on the building users is properly coordinated. The sequence of installation shall be at the Contractor's discretion.

See Project Drawing below for reference and estimated distances of existing and proposed infrastructure and cables routes. This is only a proposed solution. The Contractor may make any recommendations pertaining to the accomplishment of this requirement in their proposal.

The Contractor shall install underground outside plant infrastructure as described below.

2.2.2.1 Infrastructure Installation.

All locations and distances are approximations.

2.2.2.1.1 Fiber Optic Distribution Panel (FODP).

Primary Path:

The Contractor shall install two 36-port FODPs. One in the existing rack in ITN 232 and one in the Comm Room of the WGF. Coordinate with 90 CS/SCX for FODP placements.

Note: the comm room for WGF has not been established.

Alternate Path:

The Contractor shall install two 36-port FODPs. One in the existing rack in ITN 333 and one in the Comm Room of the WGF. Coordinate with 90 CS/SCX for FODP placements.

Note: the comm room for WGF has not been established.

2.2.2.1.2 Manholes/Hand-holes.

Alternate Path:

The Contractor shall provide and install three (3) new hand holes (HH): HH-A, HH-B, & HH-C at the approximate locations shown on Project Drawings. The dimensions of the HH shall be 4'W x 4' L x 4' H or 3'W x 5' L x 4' H. Coordinate exact HH locations with 90 CS/SCX.

2.2.2.1.3 Duct bank Infrastructure.

Install 4" conduit per the table below. Reference Project Drawings for details.

Alternate Path:

From Manhole	To Manhole	Qty	Approx. Distance (Feet)	Comment
MH-102	New HH-C	2-way	900	
New HH-C	New HH-B	2-way	905	
New HH-B	New HH-A	2-way	650	
New HH-A	MH-106	2-way	650	

2.2.2.1.2 Innerducts.

Install 3"x 3 geotextile fabric innerducts as shown in the table below. Each three cell shall have a separate thread color and one of the three cells must be detectable.

Also install 2 x 50' corrugated innerduct from wall entrance of WGF to WGF Comm Room. WGF Comm Room has not been established.

Primary Path:

Install the following 3"x 3-cell geotextile innerducts				
From	**To**	**Quantity**	**Approx. Distance (Feet)**	**Notes**
Entrance of WGF	Milcon-MH "A"	2	75	In vacant 4" duct.
Milcon-MH "A"	Milcon-MH "B"	2	220	In vacant 4" duct.
Milcon-MH "B"	MH-90	2	280	In vacant 4" duct.
MH-90	Milcon-MH "C"	2	360	In vacant 4" duct.
Milcon-MH "C"	MH-102	2	330	In vacant 4" duct.
MH-42A	MH-43A	2	420	In vacant 4" duct.

Alternate Path:

Install the following 3"x 3-cell geotextile innerducts				
From	**To**	**Quantity**	**Approx. Distance (Feet)**	**Notes**
MH-102	New HH "C"	2	900	In new 4" duct.
New HH "C"	New HH "B"	2	905	In new 4" duct.
New HH "B"	New HH "A"	2	650	In new 4" duct.
New HH "A"	MH-106	2	650	In new 4" duct.
MH-106	MH-105	2	370	In vacant 4" duct.
MH-69	MH-68	2	235	In vacant 4" duct.
MH-68	MH-67	2	325	In vacant 4" duct.
MH-56	MH-56A	2	50	In vacant 4" duct.
MH-56A	MH-56B	2	410	In vacant 4" duct.

2.2.2.1.3 Fiber Optic Cable Installation.

The Contractor shall install single mode (SM), outside plant (OSP) Microcore fiber optic cable (FOC) suitable for underground applications. The intent is to install the cable in one continuous length, to the extent that it is practical. The cable shall meet RUS 7 CFR 1755.900 criteria; shall comply with industry standards regarding manufacturers' cable marking, jacket, rip cords, water blocking, fiber color coding, jacketing materials, etc. In addition, the FOC shall comply with industry standards regarding mode field diameter, core cladding concentricity, attenuation, and dispersion characteristics at 1310 nm and 1550nm.

All fiber optic cables shall be installed using existing and newly installed innerducts.

Primary Path:

The Contractor shall install 36-strand SM FOC from WGF to ITN 232. Terminate 36-strand SM FOC in the new 36-port FODP in Comm Rm of WGF and in the new 36-port FODP in ITN 232. Reference Project Drawings for details.

Note: the comm room for WGF has not been established.

Install 36-strand SM FOC from WGF to ITN 232			
FROM	**TO**	**Approx. Distance (Feet)**	**Notes**
WGF Comm Rm	Milcon-MH "A"	175	
Milcon-MH "A"	Milcon-MH "B"	220	
Milcon-MH "B"	MH-90	280	
MH-90	Milcon-MH "C"	360	
Milcon-MH "C"	MH-102	330	
MH-102	MH-101	435	
MH-101	MH-100	460	
MH-100	MH-99	440	
MH-99	MH-98	420	
MH-98	MH-97	440	
MH-97	MH-94	465	
MH-94	MH-93	395	
MH-93	MH-92	445	
MH-92	MH-91	370	
MH-91	MH-83	50	
MH-83	MH-83A	20	
MH-83A	MH-82	235	
MH-82	MH-81A	250	
MH-81A	MH-80A	75	
MH-80A	MH-80	230	
MH-80	MH-79	210	
MH-79	MH-78	105	

MH-78	MH-77	250	
MH-77	MH-76	185	
MH-76	MH-75	280	
MH-75	MH-74	290	
MH-74	MH-73	270	
MH-73	MH-72A	300	
MH-72A	MH-40A	385	
MH-40A	MH-41	420	
MH-41	MH-42A	405	
MH-42A	MH-43A	420	
MH-43A	ITN 232	130	

Alternate Path:

The Contractor shall install 36-strand SM FOC from WGF to ITN 333. Terminate 36-strand SM FOC in the new 36-port FODP in Comm Rm of WGF and in the new 36-port FODP in ITN 333. Reference Project Drawings for details.

Note: the comm room for WGF has not been established.

Install 36-strand SM FOC from WGF to ITN 333			
FROM	**TO**	**Approx. Distance (Feet)**	**Notes**
WGF Comm Rm	Milcon-MH "A"	175	
Milcon-MH "A"	Milcon-MH "B"	220	
Milcon-MH "B"	MH-90	280	
MH-90	Milcon-MH "C"	360	
Milcon-MH "C"	MH-102	330	
MH-102	New HH "C"	900	
New HH "C"	New HH "B"	905	
New HH "B"	New HH "A"	650	
New HH "A"	MH-106	650	
MH-106	MH-105	370	
MH-105	MH-71	255	

MH-71	MH-70	470	
MH-70	MH-69	480	
MH-69	MH-68	235	
MH-68	MH-67	325	
MH-67	MH-66	35	
MH-66	MH-65	380	
MH-65	MH-64	435	
MH-64	MH-63	440	
MH-63	MH-62	315	
MH-62	MH-61	470	
MH-61	MH-60	460	
MH-60	MH-59	425	
MH-59	MH-58	475	
MH-58	MH-57	380	
MH-57	MH-56	455	
MH-56	MH-56A	50	
MH-56A	MH-56B	410	
MH-56B	MH-56C	445	
MH-56C	ITN 333	255	

2.2.3 Project Residue.

All residue from this project shall be disposed of off base and in accordance with Federal, State, local and base environmental laws and regulations. All residue produced by horizontal directional boring 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 and state environmental laws and regulations. Under no circumstances will the contractor stage or store boring residue in slurry ponds or other containment areas on FE Warren.

2.2.4 Site Restoration.

The Contractor shall restore all disturbed grounds to the "as found" condition or better after installation. The Contractor shall comply with all base grounds restoration requirements. Common use areas shall be restored with sod.

2.2.5 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).

2.2.6 National Pollution Discharge Elimination System (NPDES).

If required by Base Civil Engineer (BCE), the Contractor shall obtain approvals for NPDES at State and/or Federal level [in some locations this may be called the Storm Water Pollution Prevention Plan (SWPPP)]. The storm water/environmental plan is the sole responsibility of the Contractor. Base Civil Engineering/CEV will review and advise to ensure minimum standards and storm water controls/BMPs are in place to ensure compliance; this is a compulsory item in the SOO and contract. The Contractor shall implement storm water controls/BMPs to ensure sediment, as a result of storm water runoff, does not enter storm drainage channels and/or inlets.

The Contractor shall conduct an initial meeting within 10 days of the Contractor site survey with the base environmental office to identify NPDES preparations and/or the storm water/environmental plan.

The Contractor shall review the NPDES requirements applicable to the base; develop a plan to comply with the NPDES; obtain approval of the NPDES plan from all appropriate government agencies; and comply with any other applicable state requirements for construction.

2.2.7 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" x 11") 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.

2.2.8 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. All submissions shall be delivered electronically in MS Office-compatible format NLT 10 business days after contract award and as significant schedule changes occur to be determined by the IPT.

2.2.9 Weekly Status Reports.

The Contractor shall prepare a Weekly Status Report and distribute to the Government Contracting Officer (CO), the System Engineer(s), the Government Project Manager, and other base personnel as required. 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.

2.2.10 Drawings.

2.2.10.1 As-Built Drawings.

The 90 CS/SCX shall supply existing system Drawings, and the Contractor shall provide updated Drawings in Visio for building and rack elevation; Visio and .pdf for OSP. These Drawings shall depict the entire pathway and details of the installation, including but not limited to: labeling, cables, innerducts and maintenance holes/handholes, conduits, maintenance loops, distances, bores, trenches, building entrances. Detailed butterfly Drawings will also be required. If the existing cable diagram or butterfly Drawings are not available; the contractor shall create the

missing cable diagram/ butterfly Drawings to include all the components used in this project. The Contractor shall record/deliver geospatial data of new outside plant distribution system.

2.2.10.2 Butterfly Drawings.

The Contractor shall record and submit butterfly, cable path and building penetration Drawings information for all new installations including butterfly Drawings for all maintenance holes and pull boxes that contain new or reused FOC. Drawings shall record the path and arrangement of new and reused fiber optic cables, splices, and the arrangement duct banks, ducts, inner-duct and shall show maintenance hole orientation with respect to geodetic north. Drawings shall be submitted in an easily read electronic format such as pdf. Scanned data sheets or legible sketches are acceptable.

2.2.11 Geospatial Deliverables.

The Contractor shall collect and record geospatial data and provide as-built documentation (shape files) of all new installed maintenance hole/duct system components and new cable components (including metadata) compatible with the Cyberspace Infrastructure Planning System (CIPS) Visualization Component (CVC) Drawings system. Data points shall be recorded at the center of each manhole/hand-hole 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 will review the shape files and transcribe the information to the CVC system. Provide geospatial data via CD as Environmental Systems Research Institute (ESRI) Shape files. Shape files shall be delivered within 30 days of project completion.

2.2.12 Test and Acceptance/Installation Test Plan.

The Contractor shall provide a test plan as to how the FOC shall be pre-tested, in-progress-tested and post-tested. Draft Cut-over Test Plan shall be submitted NLT 10 calendar days after contract award. Government comments will be provided after review of the draft. A final plan will be submitted 30 calendar days before the actual cut-over date. The Contractor shall test the system to demonstrate to the Government quality assurance representative that the system is fully operational and meets or exceeds the specified requirements and that the system is fully ready to be placed into service. These tests shall be accomplished prior to the system being placed into service.

2.2.12.1 Testing.

The Contractor shall conduct on-site testing IAW OEM's installation manuals, practices and the appropriate vendor's test procedures. The Contractor shall furnish all test equipment and personnel required to conduct all required testing. During any testing phase, the Government reserves the right to perform any of the contractor performed inspections and tests to assure solutions conform to prescribed requirements. The Contractor shall provide on-site support during the acceptance testing. The Contractor shall participate with the Government in testing the complete communications system. When any system, subsystem, component or requirement test fails to meet the requirements of the test, Government acceptance and payment will be withheld until such time as the cause of the failure is corrected to the Government's satisfaction. After appropriate corrective action has been taken, all tests including those previously completed, related to the failed test and the corrective action shall be repeated and successfully completed prior to Government acceptance.

2.2.12.1.1 Fiber Optic Tests.

All strands of all fiber optic cables shall be tested in accordance with 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. For incomplete circuits that end in Maintenance Holes, only one-way OTDR testing is required.

2.2.12.1.1.1 Optical Attenuation.

End to end attenuation tests shall be conducted on all fiber optic cable strands. Tests shall be accomplished to ensure the installed cable is within the specified parameters.

2.2.12.1.1.2 Distance.

Test to determine the installed cable length between optical patch panels. All strands of all fiber optic cables shall be tested.

2.2.13 Acceptance/Installation Test Report.

The Contractor shall provide an installation test report of the results of the testing accomplished under the installation test plan NLT 10 business days after Government Witness Testing is complete.

2.2.14 Final Acceptance.

The Contractor shall schedule a final project walk-thru with the Base POC, including Quality Assurance Officer and Subject Matter Expert. The walk-thru should be scheduled 5 calendar days prior to acceptance. The contractor shall route the AFTO 747 after the base has signed the test report and the walk-thru has been completed.

2.2.15 Deliverable Summary.

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

3.0 GENERAL INFORMATION.

3.1 Period of Performance.

The period of performance for the project shall be one (1) year post contract award date.

3.2 Place of Performance.

The place of performance is FE Warren AFB, Wyoming.

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 90 CS/SCX 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 base POC.

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.

4.0 APPENDICES. Appendix A: APPLICABLE STANDARDS.

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

AFMAN 91-203 – Air Force Consolidated Occupational Safety Instruction

OSHA CFR 29 Part 1910-268 – Telecommunications

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

TIA-606-C Administration Standard for Telecommunications Infrastructure

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

TIA-607-D Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications

TIA-526-7- Measurement of Optical Power Loss of Installed Single-mode Fiber Cable Plant

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

TIA-570-D –Residential Telecommunications Infrastructure Standard

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

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

BICSI – Outside Plan Design Reference Manual

RUS Bulletin 345-65 (PE-33) – Specification for Shield Bonding Connectors

RUS Bulletin 1735F-401, Standards for Splicing Copper and Fiber Cable

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

RUS Bulletin 1753F-201 (PC-4) – RUS Standard for Acceptance Tests and Measurements of Telecommunications Plant

RUS Bulletin 1753F-207 (PE-87) – REA Specification for Terminating Cables

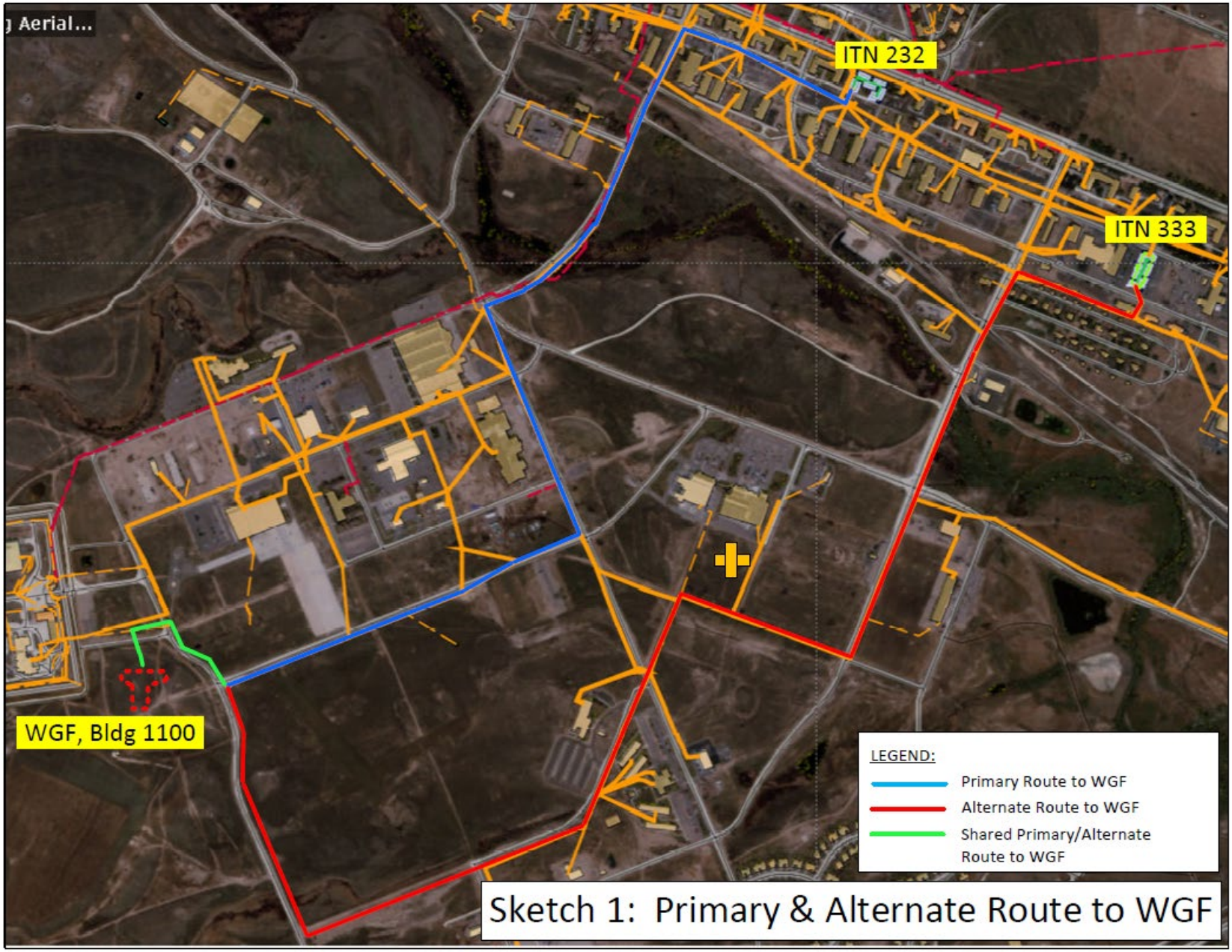
NFPA 70 - National Electric Code

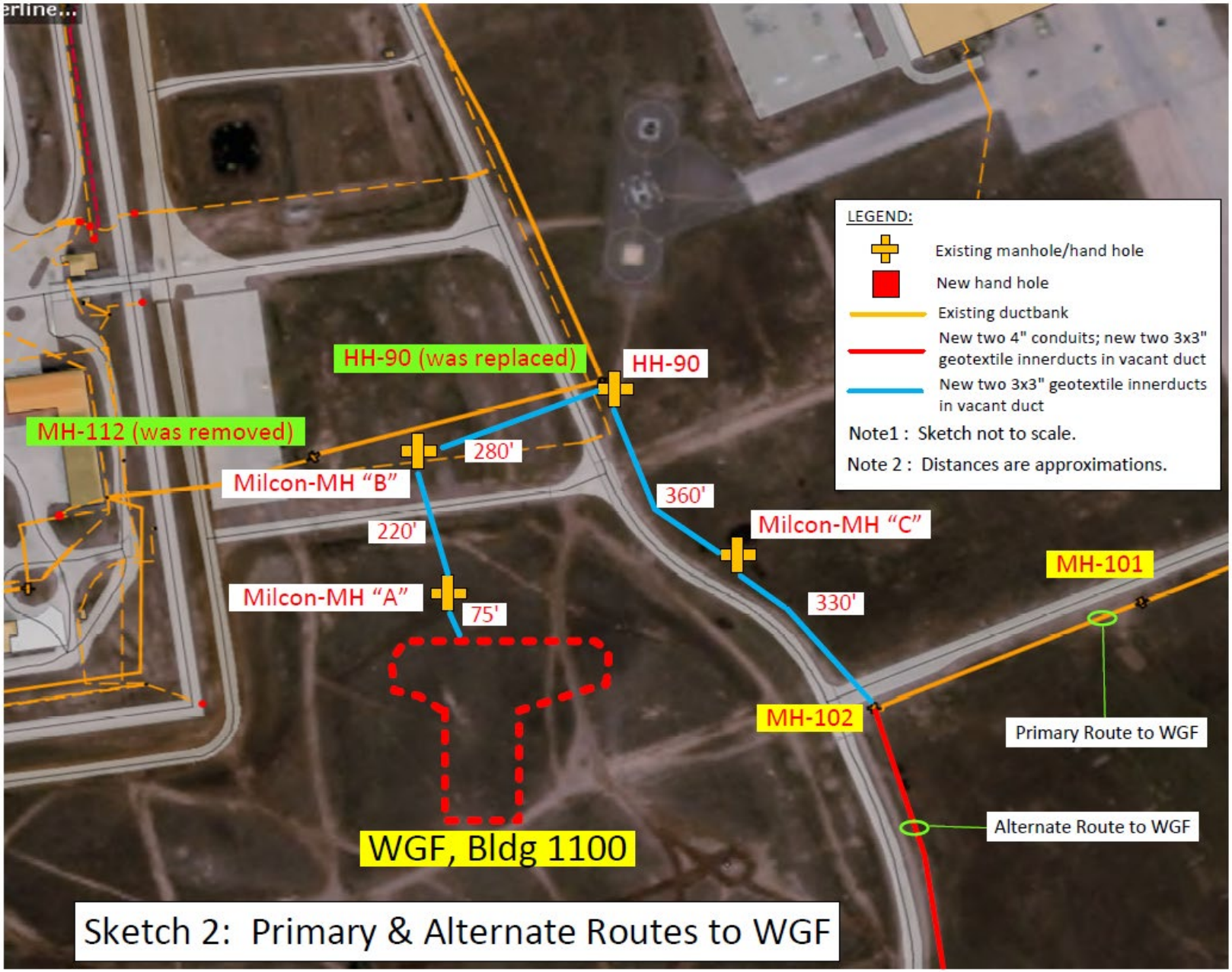
Unified Facilities Criteria 3-260-01

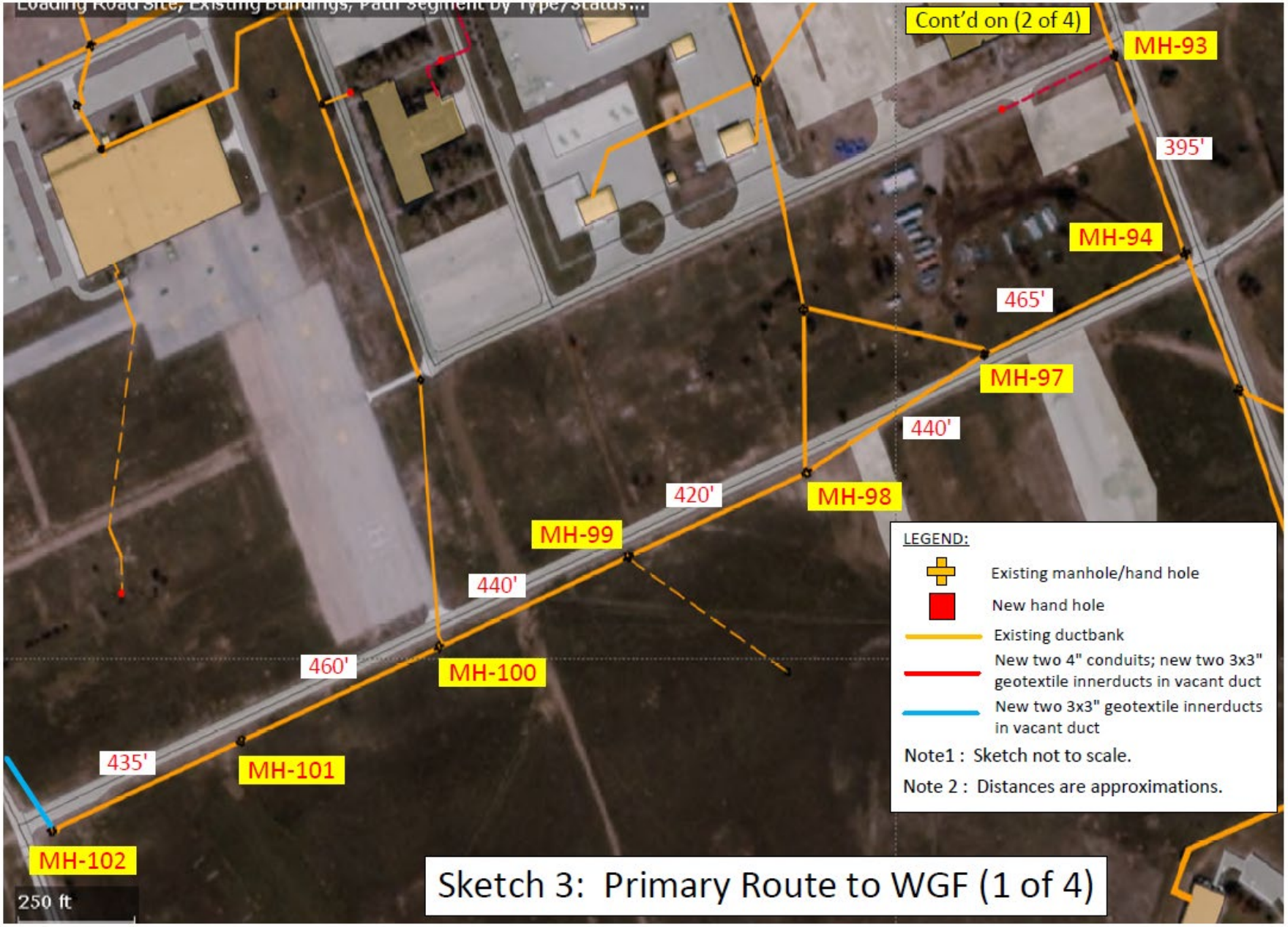
Unified Facilities Criteria 3-580

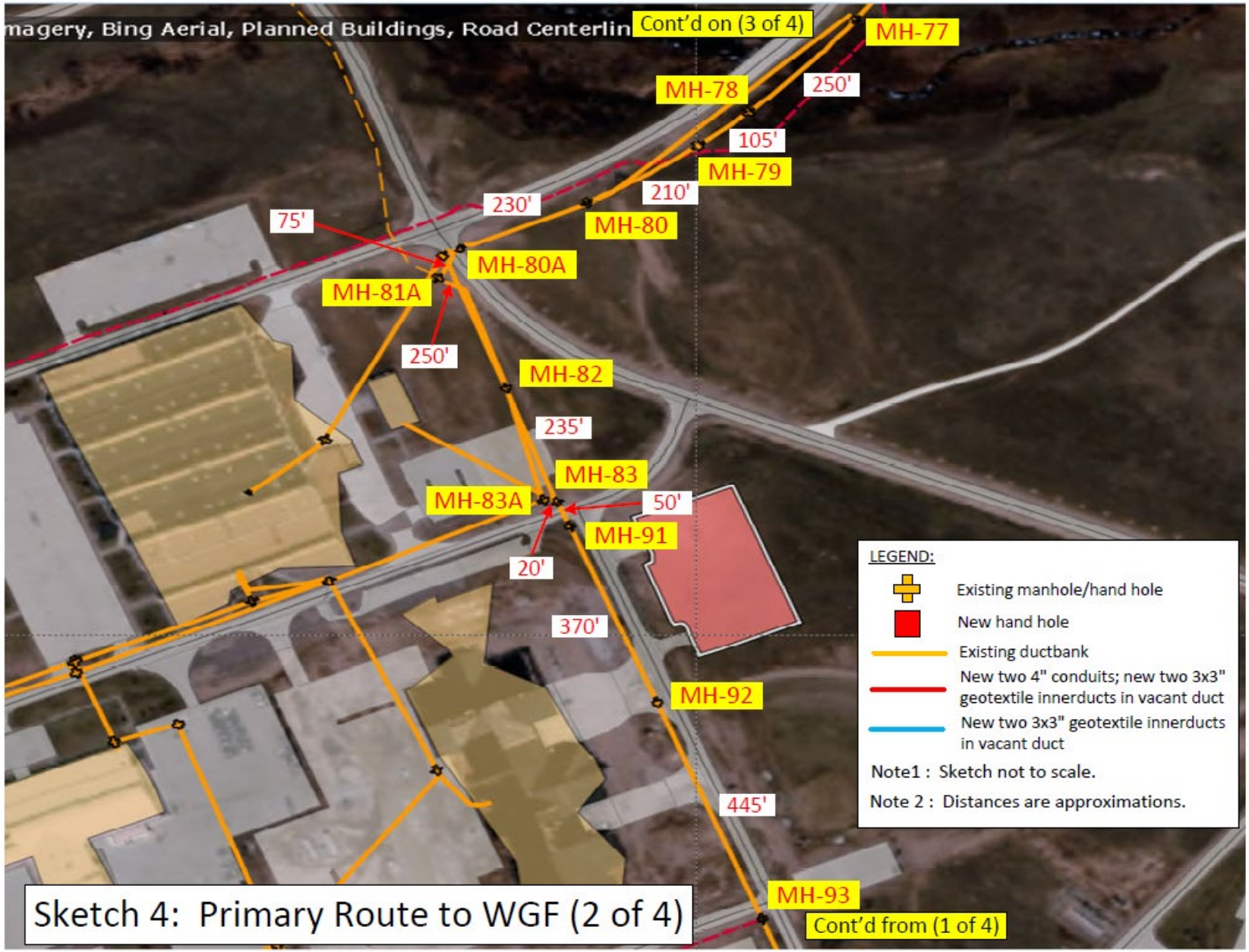
FGDC-STD-007.3-1998 - Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy

5.0 Project Drawings.

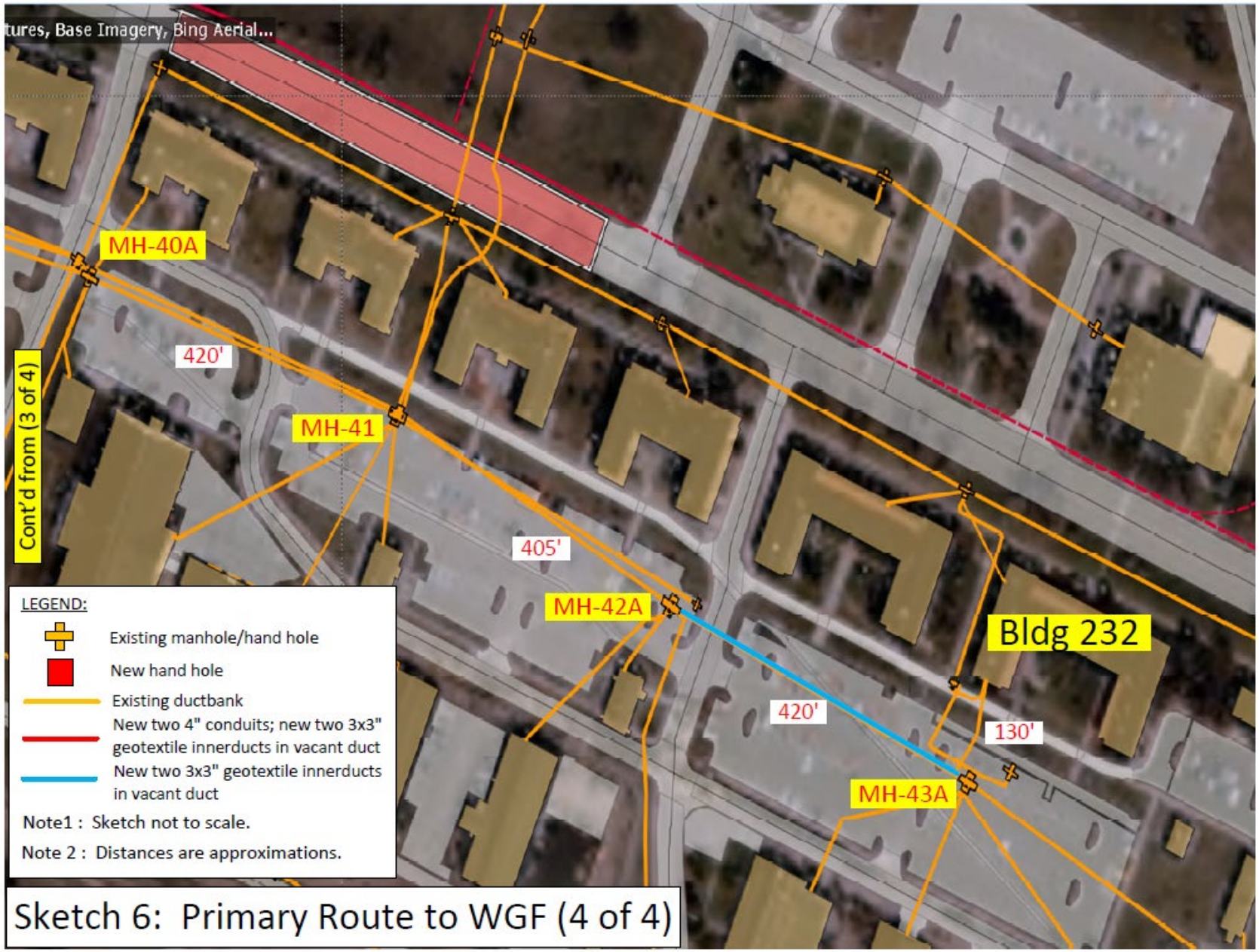

Aerial...
ITN 232
ITN 333
WGF, Bldg 1100
LEGEND:
Primary Route to WGF
Alternate Route to WGF
Shared Primary/Alternate Route to WGF
Sketch 1: Primary & Alternate Route to WGF

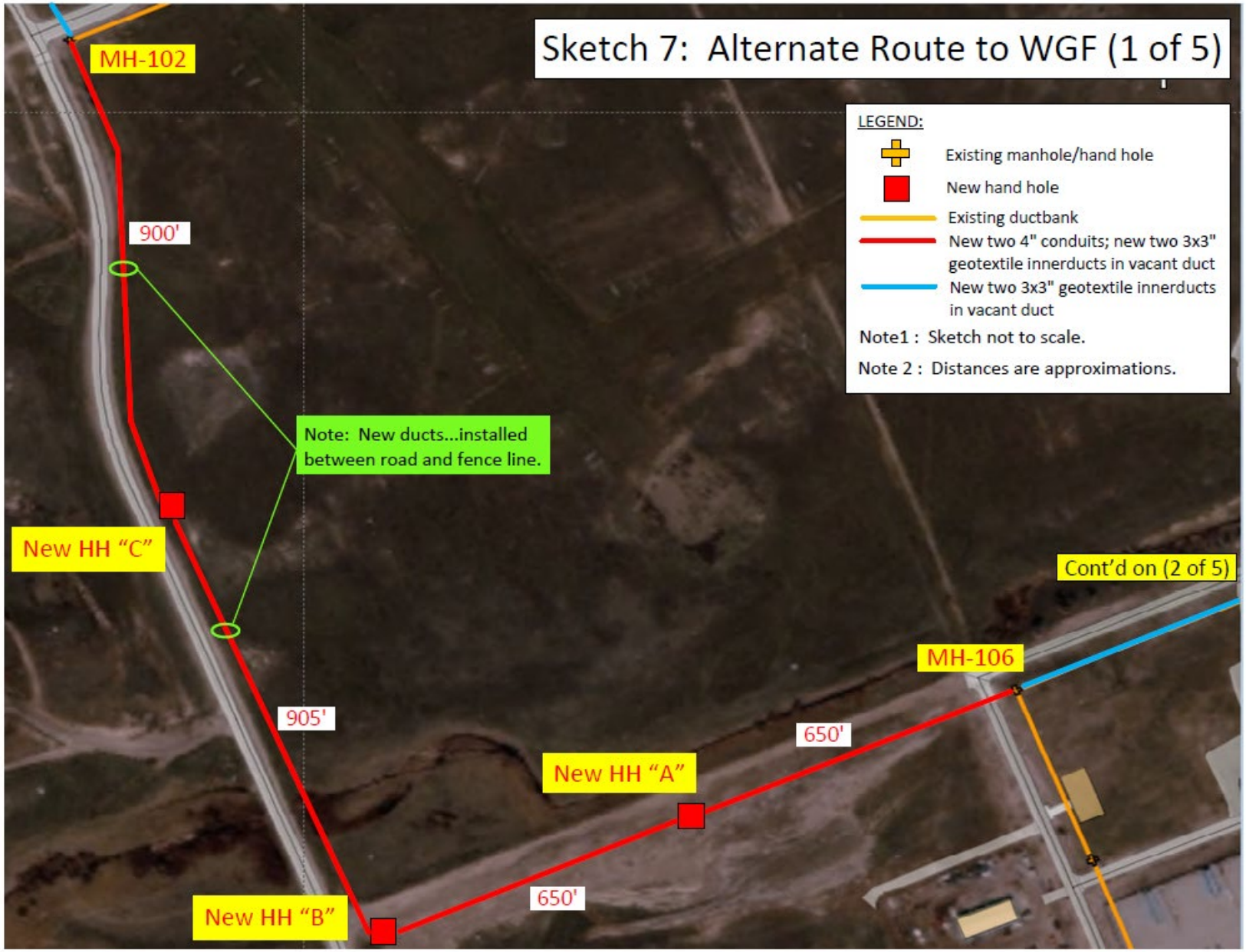

LEGEND:
Existing manhole/hand hole
New hand hole
Existing ductbank
New two 4" conduits; new two 3x3" geotextile innerducts in vacant duct
New two 3x3" geotextile innerducts in vacant duct
Note1 : Sketch not to scale.
Note 2 : Distances are approximations.
HH-90 (was replaced)
HH-90
MH-112 (was removed)
280'
Milcon-MH "B"
360'
Milcon-MH "C"
220'
MH-101
Milcon-MH "A"
75'
330'
MH-102
Primary Route to WGF
Alternate Route to WGF
WGF, Bldg 1100
Sketch 2: Primary & Alternate Routes to WGF

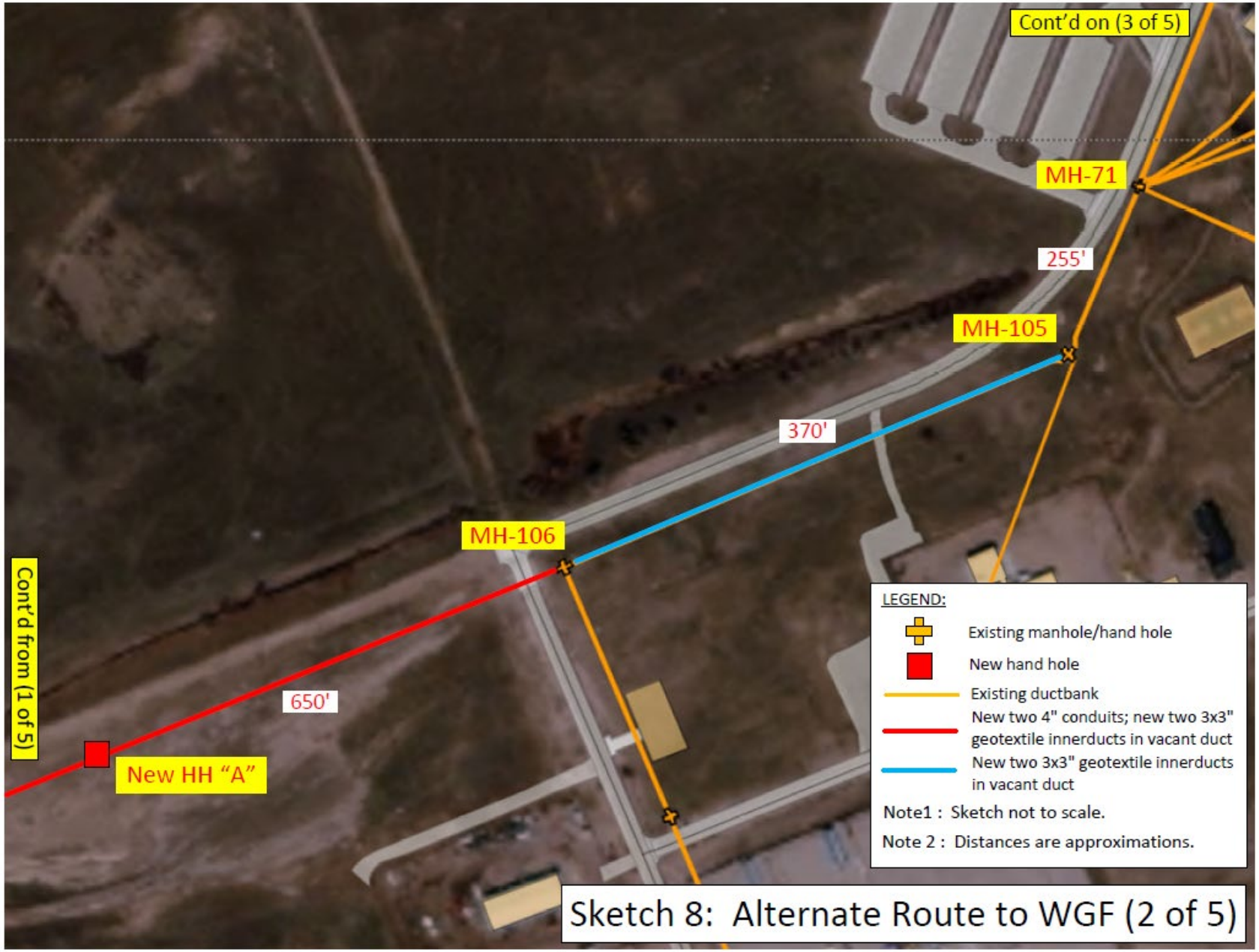

Cont'd on (2 of 4)
MH-93
395'
MH-94
465'
MH-97
440'
MH-98
420'
MH-99
440'
460'
MH-100
435'
MH-101
MH-102
250 ft
LEGEND:
Existing manhole/hand hole
New hand hole
Existing ductbank
New two 4" conduits; new two 3x3" geotextile innerducts in vacant duct
New two 3x3" geotextile innerducts in vacant duct
Note1 : Sketch not to scale.
Note 2 : Distances are approximations.
Sketch 3: Primary Route to WGF (1 of 4)


magery, Bing Aerial, Planned Buildings, Road Centerlin
Cont'd on (3 of 4)
MH-77
MH-78
250'
105'
MH-79
210'
230'
MH-80
75'
MH-80A
MH-81A
250'
MH-82
235'
MH-83
MH-83A
50'
MH-91
20'
370'
MH-92
445'
MH-93
Cont'd from (1 of 4)
LEGEND:
Existing manhole/hand hole
New hand hole
Existing ductbank
New two 4" conduits; new two 3x3" geotextile innerducts in vacant duct
New two 3x3" geotextile innerducts in vacant duct
Note1 : Sketch not to scale.
Note 2 : Distances are approximations.
Sketch 4: Primary Route to WGF (2 of 4)


Raster Features, Base Imagery, Bing Aerial...
MH-40A
MH-41
385'
Note: Approximate distances provided on next Sketch 6.
MH-42A
MH-72A
Cont'd on 4 of 4)
300'
MH-73
270'
MH-74
290'
MH-75
280'
MH-76
MH-77
185'
Cont'd from (2 of 4)
LEGEND:
Existing manhole/hand hole
New hand hole
Existing ductbank
New two 4" conduits; new two 3x3" geotextile innerducts in vacant duct
New two 3x3" geotextile innerducts in vacant duct
Note1 : Sketch not to scale.
Note 2 : Distances are approximations.
Sketch 5: Primary Route to WGF (3 of 4)

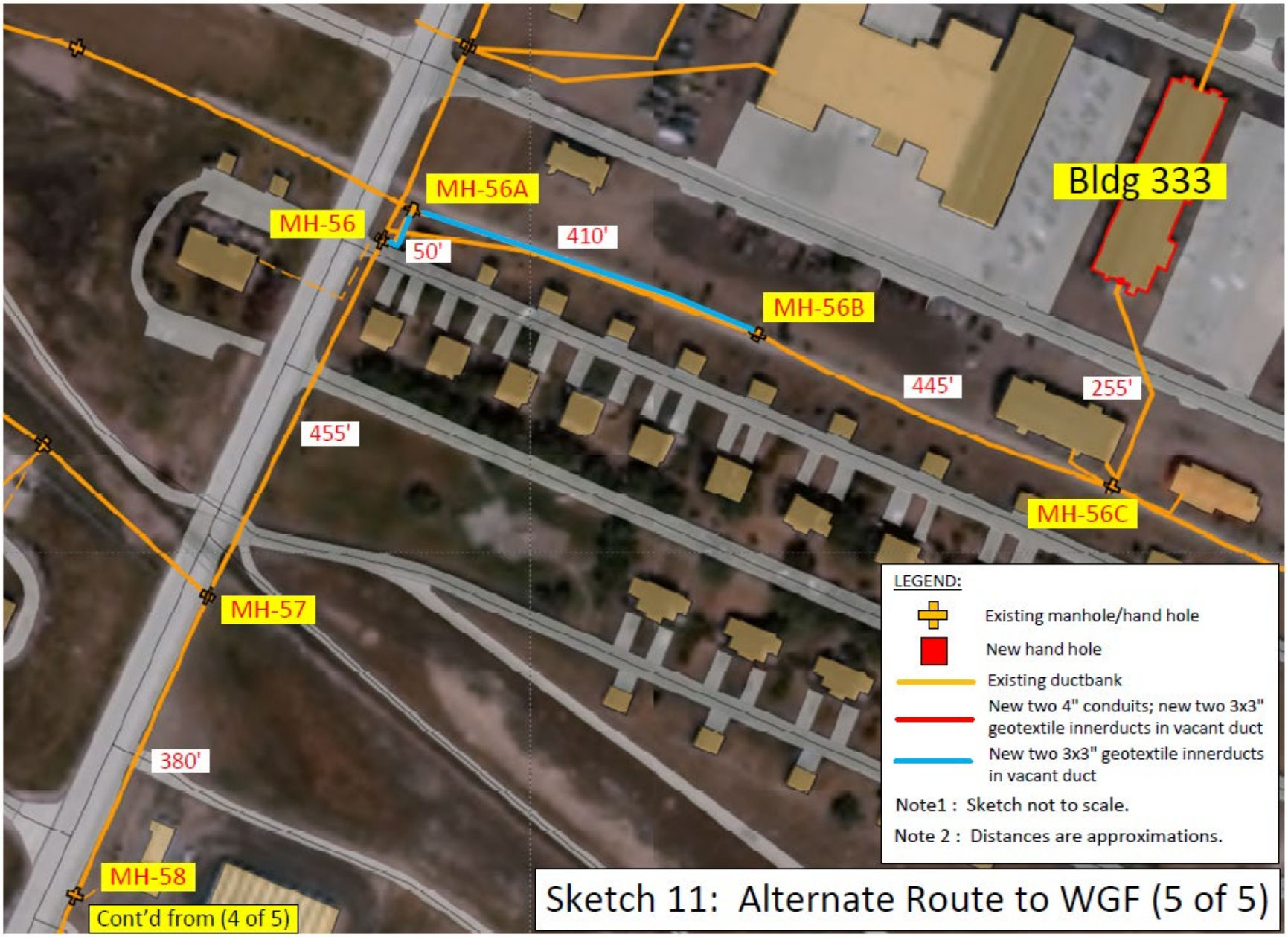

tures, Base Imagery, Bing Aerial...
MH-40A
420'
MH-41
405'
MH-42A
420'
130'
MH-43A
Bldg 232
Cont'd from (3 of 4)
LEGEND:
Existing manhole/hand hole
New hand hole
Existing ductbank
New two 4" conduits; new two 3x3" geotextile innerducts in vacant duct
New two 3x3" geotextile innerducts in vacant duct
Note1 : Sketch not to scale.
Note 2 : Distances are approximations.
Sketch 6: Primary Route to WGF (4 of 4)


Sketch 7: Alternate Route to WGF (1 of 5)
LEGEND:
Existing manhole/hand hole
New hand hole
Existing ductbank
New two 4" conduits; new two 3x3" geotextile innerducts in vacant duct
New two 3x3" geotextile innerducts in vacant duct
Note1 : Sketch not to scale.
Note 2 : Distances are approximations.
MH-102
900'
Note: New ducts...installed between road and fence line.
New HH "C"
905'
New HH "B"
650'
New HH "A"
650'
MH-106
Cont'd on (2 of 5)


Cont'd on (3 of 5)
MH-71
255'
MH-105
370'
MH-106
Cont'd from (1 of 5)
650'
New HH "A"
LEGEND:
Existing manhole/hand hole
New hand hole
Existing ductbank
New two 4" conduits; new two 3x3" geotextile innerducts in vacant duct
New two 3x3" geotextile innerducts in vacant duct
Note1 : Sketch not to scale.
Note 2 : Distances are approximations.
Sketch 8: Alternate Route to WGF (2 of 5)


erline...
35'
MH-66
MH-67
380'
Cont'd on (4 of 5)
MH-62
325'
MH-65
435'
MH-64
315'
MH-68
440'
235'
MH-63
MH-69
480'
MH-70
470'
MH-71
Cont'd from (2 of 5)
LEGEND:
Existing manhole/hand hole
New hand hole
Existing ductbank
New two 4" conduits; new two 3x3" geotextile innerducts in vacant duct
New two 3x3" geotextile innerducts in vacant duct
Note1 : Sketch not to scale.
Note 2 : Distances are approximations.
Sketch 9: Alternate Route to WGF (3 of 5)


Cont'd on (5 of 5)
MH-58
475'
MH-59
425'
MH-60
460'
MH-61
470'
MH-62
Cont'd from (3 of 5)
LEGEND:
Existing manhole/hand hole
New hand hole
Existing ductbank
New two 4" conduits; new two 3x3" geotextile innerducts in vacant duct
New two 3x3" geotextile innerducts in vacant duct
Note1 : Sketch not to scale.
Note 2 : Distances are approximations.
Sketch 10: Alternate Route to WGF (4 of 5)


Bldg 333
MH-56A
MH-56
50'
410'
MH-56B
445'
255'
455'
MH-56C
MH-57
380'
MH-58
Cont'd from (4 of 5)
LEGEND:
Existing manhole/hand hole
New hand hole
Existing ductbank
New two 4" conduits; new two 3x3" geotextile innerducts in vacant duct
New two 3x3" geotextile innerducts in vacant duct
Note1 : Sketch not to scale.
Note 2 : Distances are approximations.
Sketch 11: Alternate Route to WGF (5 of 5)