

### **3.0 LIVE FIRE EXERCISE SHOOTHOUSE (LFSH) <VER>(REV 2.1 – 31 JAN 2013)</VER>**

#### **3.1. GENERAL REQUIREMENTS:**

- A. The controlling documents for this range project are the current approved DD1391 Military Construction Project Data and the CEHNC 1110-1-23 Live Fire Exercise Shoothouse (LFSH) Design Volume. The Design Volume can be found at [www.hnd.usace.army.mil/rdg/intertemplate.aspx](http://www.hnd.usace.army.mil/rdg/intertemplate.aspx) under the title (LFSH) Live Fire Exercise Shoothouse.
- B. The information in the Design Volume and this document is based on Training Circular (TC) 25-8 Training Ranges dated 2010, Facility Category Code (FCC) 17879
- C. Coordination at all stages of design development of LFSH new construction projects is required with the Installation DPW (facilities engineer), IMCOM Center of Expertise, and Installation DPTMS (Range Control)
- D. The designer/constructor of this range is strongly urged to coordinate closely with the customer's live-fire range training subject matter experts so that he can understand the training objectives of this type of facility. Even though the engineering and construction techniques in this type of range are not extremely complex, the objectives of the project are unique to live-fire training. The designer/constructor is required to have a live-fire range training subject matter expert on his team to ensure that all military training issues are understood.
- E. The designer/constructor of this range must be aware of and comply with the Construction Compliance Inspection (CCI) and Target Interface Inspection (TII) appendix of the Design Volume.
- F. Unexploded Ordnance (UXO): The potential for UXO always exists on military property and is a potentially serious problem on all range projects. Special restrictions on construction operations are specified in Paragraph 6 of this section

#### **3.1.1. FACILITY DESCRIPTION**

The Live Fire Exercise Shoothouse, FCC 17879, provides units with a facility to train and evaluate individual Soldiers and squads on tasks necessary to move tactically (enter and clear a room; enter and clear a building), engage targets, conduct breaches, and practice target discrimination in a live-fire environment.

#### **3.1.2. FACILITY RELATIONSHIPS**

A separate contractor will enter the project after construction is complete to install targetry and the targetry control system. They will be installing this equipment using the interface points established during this design-build contract. Therefore, deviation from standards depicted in the Design Volume is prohibited.

#### **3.1.3. ACCESSIBILITY REQUIREMENTS**

Training Ranges are restricted by occupancy classification to use only by able-bodied military personnel during the expected useful life of the building or facility and need not be accessible.

#### **3.1.4. BUILDING AREAS**

Refer to Project Definition Matrix (PDM).

#### **3.1.5. ADAPT BUILD MODEL – NOT USED**

### **3.2. FUNCTIONAL AND OPERATIONAL REQUIREMENTS**

#### **3.2.1. FUNCTIONAL SPACES**

- A. The LFSH is comprised of the Range Operations and Control Area (ROCA) and the down range area.

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Refer to Project Definition Matrix (PDM).

#### 3.1.5. ADAPT BUILD MODEL – NOT USED

### 3.2. FUNCTIONAL AND OPERATIONAL REQUIREMENTS

#### 3.2.1. FUNCTIONAL SPACES

- A. The LFSH is comprised of the Range Operations and Control Area (ROCA) and the down range area.

B. **RANGE OPERATIONS AND CONTROL AREA:** The Range Operations and Control Area (ROCA) is the center for overall control and operation of the range, training exercises, administrative services, and support facilities. From the range operations and control area, downrange target and simulation equipment are operated and activities are monitored for scoring and performance data review. The data is collected and distributed to the participants for an after action review. The location of the buildings is critical for the command and control during training operations on the range; therefore, coordination with the installation user is mandatory for the placement of the ROCA buildings on the construction site. The ROCA is comprised of multiple vertical construction components which are defined in the Project Specific Matrix. The command & control system and targetry equipment will be Government Furnished and Government Installed (GFGI).

1) **Down Range Area.** The Downrange Area consists of the actual Shoothouse and support equipment that provide the user the capability to meet current army training standards. In conjunction with this, each site-specific project may include necessary site amenities, such as site improvements, vehicle parking area, access roads, service trails, and exterior utilities. The command & control system and targetry equipment will be Government Furnished and Government Installed (GFGI).

2) **Surface Danger Zone (SDZ).** An SDZ for the layout depicted in Appendix J has been validated by the Installation safety office. Any changes made to the layout during design development that may affect the validated SDZ shall be approved by the Installation safety office.

### 3.3. SITE FUNCTIONAL REQUIREMENTS

The range's functional layout and adjacency requirements are as indicated on drawings contained in the Design Volume and, if applicable, as depicted in Appendix J. The extent to which the drawings represent required or preferred layouts and the allowable latitude for changes to them is as noted on the drawings. The layout of the Range Operations and Control Area is dependent on the user's training objectives and the facilities' terrain.

### 3.4. SITE AND LANDSCAPE REQUIREMENTS

Site design requirements are identified in the Design Volume. Special attention must be given to the Line-of-Sight (LOS) validation, the Surface Danger Zone (SDZ) verification and site drainage issues. Provide the LOS validation and SDZ verification in the design package.

### 3.5. ARCHITECTURAL REQUIREMENTS

A. Architectural design requirements are identified in the Design Volume.

B. Coordinate with the installation's Public Works office for the exterior and interior color finishes if not specified in the RFP Appendices.

### C. **SHOOTHOUSE WALL MATERIAL**

1) **Supplied System Qualifications:** Provide systems and materials which are the standard products of a manufacturer regularly engaged in the manufacture of such products and that essentially duplicate items that have been successfully installed in 5 military applications and in satisfactory use for at least 2 years prior to RFP as the main bullet stopping/absorbing wall system.

2) **Installation:** Install the shoothouse wall material/system as indicated and in accordance with manufacturer's instructions. A manufacturer's representative experienced in installation of this type of facility, shall supervise the erection.

#### 3.5.1. FINISHES AND INTERIOR SPECIALTIES:

A. **FINISHES:** Refer to Project Definition Matrix (PDM).

B. **INTERIOR SPECIALTIES:** Fire Extinguisher Cabinets and Brackets: Provide Fire Extinguisher cabinets and brackets in all occupied buildings in accordance with NFPA 10 and UFC 3-600-01. Provide cabinets in finished areas and brackets in non-finished areas (such as utility rooms, and storage rooms). Fire extinguishers are not included in this contract.

3.6. SEE PARAGRAPH 5.6 STRUCTURAL REQUIREMENTS – NOT USED

3.7. SEE PARAGRAPH 6.7 THERMAL PERFORMANCE – NOT USED

3.8. PLUMBING REQUIREMENTS

Water and Sewer service to a range project is a rare occurrence, the remoteness of most ranges from the Installation's existing infrastructure makes their use impractical. However, if water or sewer hookup is specified in the Project Definition Matrix, refer to Paragraph 6 and Appendix C for utility connection information.

3.9. COMMUNICATIONS AND SECURITY SYSTEMS

A. GENERAL:

1) If telephone service is included in the Scope of this project, coordination with the local NEC is required to ensure Installation compatibility and acceptance. Refer to Paragraph 6 of this section and Appendix C for utility connection information.

2) There shall be a clear delineation between the down range communications infrastructure and the facility telecommunication infrastructure. Each communication system enters the ROC Tower, but shall be terminated and housed in separate enclosures and backboards. The downrange communications infrastructure shall be installed in accordance with the Design Volume and the facility telecommunications infrastructure shall be installed in accordance with I3A.

3.10. ELECTRICAL REQUIREMENTS

A. GENERAL:

1) Refer to Paragraph 6 of this Section and Appendix C for utility connection information.

2) The Design Volume contains design submittal and construction submittal requirements that are in addition to those identified by Section 01 33 16 Design After Award and Section 01 78 02.00 10 Closeout Submittals. Project submittal register shall specifically include all submittals required by the Design Volume.

B. POWER: Provide power to the facilities and downrange area as specified below; all IEEE Standards (including Recommended Practice) where the scope is applicable to this design effort; all UL Standards where the UL scope is applicable to this design effort and where itemized in the combined interdisciplinary areas cited.

1) Provide the downrange power and data communications systems in accordance with CEHNC 1110-1-23 Live Fire Exercise Shoothouse (LFSH) Design Volume.

2) Perform a short circuit study as an integral part of selecting and sizing electrical distribution components (all equipment shall be fully rated; that is, do not use series-combination rated equipment).

3) For Ranges being provided power through Government owned utility systems, perform a coordination study to ensure that protective device settings are appropriate for the expected range of conditions (depending on the design and construction schedule, it is acceptable to design adequate protective devices with adjustable features, followed by a coordination study required during construction to specify the correct settings.)

4) Circuit breakers, disconnect switches, and other devices that meet the OSHA definition of energy-isolating device must be lockable.

5) Allowable Facility Voltage Drop: For transformer located exterior to the facility, limit the combined voltage drop for service conductors, feeders, and branch circuits to 5 percent. Individual voltage drop on branch circuits should not exceed 3 percent.

6) Allowable Downrange Voltage Drop: Voltage available to each target shall be no less than 95 percent of the target's rated operating voltage.

7) Medium voltage (MV) surge arrestors shall be provided on all riser poles, within each MV sectionalizer enclosures, within each pad mounted transformer, and wherever the medium voltage rises above grade.

C. NIGHT OPERATIONS LIGHTING: Where separate switching standard and red lighting is required, identify each switch with a label and provide the standard lighting switch with a locking tab that will permit the standard lighting to be locked "off" during night operations.

### 3.11. HEATING VENTILATING AND AIR CONDITIONING (HVAC) REQUIREMENTS

Heating, Ventilating and Air Conditioning (HVAC) requirements are identified in the Design Volume. HVAC requirements are addressed on a building-by-building basis.

### 3.12. ENERGY CONSERVATION REQUIREMENTS

Refer to paragraph 5.9 and paragraph 6.12 for energy conservation requirements.

### 3.13. FIRE PROTECTION REQUIREMENTS

Fire detection and alarm systems are seldom used in Army training ranges due to the low volume of personnel in any facility at any given time. If the project dictates a fire detection and/or a response system, coordinate directly with the Installation's Fire Department for specific requirements. Refer to Paragraph 6 of this section for installation requirements.

3.14. SEE PARAGRAPHS 5.12 AND 6.14 SUSTAINABLE DESIGN – NOT USED

3.15. SEE PARAGRAPH 6.15 ENVIRONMENTAL – NOT USED

3.16. SEE PARAGRAPH 6.16 PERMITS – NOT USED

3.17. SEE PARAGRAPH 6.17 DEMOLITION – NOT USED

3.18. SEE PARAGRAPH 6.18 ADDITIONAL FACILITIES – NOT USED

### 3.19. EQUIPMENT AND FURNITURE REQUIREMENTS

Furnishings, other than installed equipment, are Government-furnished and Government-installed (GFGI) unless otherwise specified in this document.

3.19.1. FURNISHINGS – NOT USED

3.19.2. EQUIPMENT – NOT USED

Targetry and Targetry Control Equipment GFGI unless otherwise specified in this document.

### 3.20. FACILITY SPECIFIC REFERENCES

A. In addition to submittals specified in other parts of this RFP, submit the following:

B. Design Submittals:

1) Line of Site profiles from:

a) Each firing position to their associated targets

b) Each firing position to the Lane Markers and Range Limit markers.

2) Emplacement details – both Civil and Electrical

3) Complete riser diagram indicating routing of data cables

4) Voltage drop calculations

C. Construction Submittals: Complete riser diagram indicating as-built routing of data cables.

**LIVE FIRE EXERCISE SHOOTHOUSE (LFSH)  
PROJECT DEFINITION MATRIX**

An "X" indicates selections

| General Project Information |   |
|-----------------------------|---|
| «LFSH_NNE»                  | No Known Environmental Issues on the Project Site   |
| «LFSH_PEI»                  | Environmental Issues Potentially on Project Site – addressed in more detail in Paragraph 6 and appendices.        |
| «LFSH_NNEU_XO»              | No Known Evidence of Unexploded Ordnance (UXO) on the Project Site  |
| «LFSH_UXO»                  | Unexploded Ordnance (UXO) Potentially on Project Site – UXO awareness instruction required for all site employees |
| «LFSH_ADA»                  | ADA and ABA Accessibility Guidelines do not apply to this project   |
| «LFSH_ATFP»                 | Constructive Anti-Terrorism/Force Protection (ATFP) measures are required for this project.                       |

| Downrange Area (Training Facility) |   |
|------------------------------------|---|
| A. Configuration                   |   |
| «LFSH_CONF_IG_STANDARD»            | Standard - 8 Rooms, 2 Hallways                                  |
| «LFSH_CONF_IG_NONSTD»              | Non-Standard:<br>«LFSH_ROOMS» Rooms<br>«LFSH_HALLWAYS» Hallways |
| «LFSH_LIGHTNING_PROTECTION»        | Lightning Protection  |
| B. Wall Material                   |   |
| «LFSH_WM_SHOCK_ABC»                | Shock Absorbing Concrete (SACONS)                               |

| Downrange Area (Training Facility)              |  |
|---|--|
| ON»   |  |
| «LFSH<br>_WM_<br>MS»                            | Manufactured Steel and Rubber System                                       |
| «LFSH<br>_WM_<br>SAND»                          | Sand Filled  |
| C. Canopy                                       |  |
| «LFSH<br>_CANO<br>PY_ST<br>D»                   | Open Sided Pre-Manufactured Building                                       |
| «LFSH<br>_PARTI<br>AL_WA<br>LLS»                | Partial Walls -<br>Wall configuration specified in Paragraph 6             |
| «LFSH<br>_BALLI<br>STIC_<br>CEILIN<br>G»        | Ballistic Ceiling -<br>Ceiling configuration specified in Paragraph 6      |
| «LFSH<br>_CANO<br>PY_OT<br>HER»                 | Other  |
| D. Target, Camera and Speaker Power and Control |  |
| «LFSH<br>_POW<br>ER_HA<br>RD»                   | Hardwired Electricity and Data   |
| «LFSH<br>_POW<br>ER_HA<br>RDPLU<br>S»           | Hardwired Electricity and RF/WiFi Data (provided under separate contract)  |
| «LFSH<br>_POW<br>ER_BT<br>RY»                   | Battery and RF/WiFi Data (power and data provided under separate contract) |
| «LFSH<br>_POW<br>ER_OT<br>HER»                  | Other:<br>«LFSH_POWER_SPECIFY»   |

**Range Operations and Control Area (ROCA)**

«LFSH  
\_AAR\_  
QTY» After Action Review - Small  
Standard size: 1064 SQ FT, 34' x 28' enclosed

**A. Construction**

«LFSH  
\_AAR\_  
CONS\_  
DISC» D/B Contractors Discretion

«LFSH  
\_AAR\_  
CONS\_  
CMU» Concrete Masonry Unit (CMU)

«LFSH  
\_AAR\_  
CONS\_  
METAL  
» Metal

«LFSH  
\_AAR\_  
CONS\_  
OTHER  
» Other:  
«LFSH\_AAR\_CONS\_SPECIFY»

**B. Building Infrastructure and Features**

«LFSH  
\_AAR\_  
BI\_EL» Electrical Service

«LFSH  
\_AAR\_  
BI\_DN» Day and night operations lighting

«LFSH  
\_AAR\_  
BI\_LP» Lightning protection

«LFSH  
\_AAR\_  
BI\_PA» Public Address (PA) System

«LFSH  
\_AAR\_  
BI\_C2» Hardwired Command & Control Data Service-Downrange Data

«LFSH  
\_AAR\_  
BI\_TEL Telephone Service: «LFSH\_AAR\_BI\_COPFIB»

| Range Operations and Control Area (ROCA)       |   |
|--|---|
| »  |   |
| «LFSH_AAR_BI_FE»                               | Fire Extinguisher Cabinets or Brackets                                  |
| «LFSH_AAR_BI_FD»                               | Fire Detection & Alarm (connected to Installation Emergency Services)   |
| C. HVAC<br>Power Source: «LFSH_AAR_HVAC_POWER» |   |
| «LFSH_AAR_HVAC_BOTH»                           | Both heat and air conditioning  |
| «LFSH_AAR_HVAC_HEAT»                           | Heat only   |
| «LFSH_AAR_HVAC_FREEZE»                         | Freeze protection only  |
| «LFSH_AAR_HVAC_VENT»                           | Ventilation only  |
| D. Other                                       |   |
|  | «LFSH_AAR_OTHER»  |
| «LFSH_OSB_QTY»                                 | Operations Storage Building<br>Standard Size: 20 ft x 40 ft – 800 SQ FT |
| A. Construction                                |   |
| «LFSH_OSB_CONS_DISC»                           | D/B Contractors Discretion  |
| «LFSH_OSB_CONS_CMU»                            | Concrete Masonry Unit (CMU)   |
| «LFSH»   | Metal   |

| Range Operations and Control Area (ROCA)       |   |
|--|---|
| «_OSB_CONS_METAL»                              |   |
| «LFSH_OSB_CONS_OTHER»                          | Other: «LFSH_OSB_CONS_SPECIFY»  |
| B. Building Infrastructure and Features        |   |
| «LFSH_OSB_BI_EL»                               | Electrical Service  |
| «LFSH_OSB_BI_DN»                               | Day and night operations lighting                                     |
| «LFSH_OSB_BI_LP»                               | Lightning protection  |
| «LFSH_OSB_BI_INTERNET»                         | Data Service - Internet   |
| «LFSH_OSB_BI_TEL»                              | Telephone Service: «LFSH_OSB_BI_COPFIB»                               |
| «LFSH_OSB_BI_FE»                               | Fire Extinguisher Cabinets or Brackets                                |
| «LFSH_OSB_BI_FD»                               | Fire Detection & Alarm (connected to Installation Emergency Services) |
| C. HVAC<br>Power Source: «LFSH_OSB_HVAC_POWER» |   |
| «LFSH_OSB_HVAC_BOTH»                           | Both heat and air conditioning  |
| «LFSH_OSB_HVAC_HEAT»                           | Heat only   |

| Range Operations and Control Area (ROCA) |   |
|--|---|
| «LFSH<br>_OSB_<br>HVAC_<br>FREEZ<br>E»   | Freeze protection only  |
| «LFSH<br>_OSB_<br>HVAC_<br>VENT»         | Ventilation only  |
| D. Other                                 |   |
|  | «LFSH_OSB_OTHER»  |
| «LFSH<br>_ABB_<br>QTY»                   | Ammunition Breakdown Building<br>Standard Size: 185 SQ FT, 10' x 12' enclosed |
| A. Construction                          |   |
| «LFSH<br>_ABB_<br>CONS_<br>DISC»         | D/B Contractors Discretion  |
| «LFSH<br>_ABB_<br>CONS_<br>CMU»          | Concrete Masonry Unit (CMU)   |
| «LFSH<br>_ABB_<br>CONS_<br>METAL<br>»    | Metal   |
| «LFSH<br>_ABB_<br>CONS_<br>OTHER<br>»    | Other: «LFSH_ABB_CONS_SPECIFY»  |
| B. Building Infrastructure and Features  |   |
| «LFSH<br>_ABB_<br>BI_EL»                 | Electrical Service  |
| «LFSH<br>_ABB_<br>BI_DN»                 | Day and night operations lighting   |
| «LFSH<br>_ABB_                           | Lightning protection  |

| Range Operations and Control Area (ROCA) |   |
|--|---|
| BI_LP»                                   |   |
| «LFSH<br>_ABB_<br>BI_FE»                 | Fire Extinguisher Cabinets or Brackets                                |
| «LFSH<br>_ABB_<br>BI_FD»                 | Fire Detection & Alarm (connected to Installation Emergency Services) |
| C. HVAC                                  |   |
| Power Source: «LFSH_ABB_HVAC_POWER»      |   |
| «LFSH<br>_ABB_<br>HVAC_<br>BOTH»         | Both heat and air conditioning  |
| «LFSH<br>_ABB_<br>HVAC_<br>HEAT»         | Heat only   |
| «LFSH<br>_ABB_<br>HVAC_<br>FREEZ<br>E»   | Freeze protection only  |
| «LFSH<br>_ABB_<br>HVAC_<br>VENT»         | Ventilation only  |
| D. Other                                 |   |
|  | «LFSH_ABB_OTHER»  |
| «LFSH<br>_LAT_<br>QTY»                   | Latrine   |
| «LFSH<br>_LAT_<br>AV»                    | Aerated Vault Latrine<br>Standard Size: 330 SQ FT, 26' x 12'-8"       |
| «LFSH<br>_LAT_<br>WLSEP<br>»             | Wet Latrine – Septic Field<br>Standard Size: 550 SQ FT, 22' x 25'     |
| «LFSH<br>_LAT_<br>WLSE<br>W»             | Wet Latrine – Sewage System<br>Standard Size: 550 SQ FT, 22' x 25'    |

| Range Operations and Control Area (ROCA) |  |
|--|--|
| «LFSH<br>_LAT_<br>OTHER<br>TYPE»         | Other:<br>«LFSH_LAT_SPECIFY»                                 |
| «LFSH<br>_LAT_<br>PORT»                  | Port-A-John Slab<br>«LFSH_LAT_PORT_SIZE»                     |
| A. Construction                          |  |
| «LFSH<br>_LAT_<br>CONS_<br>DISC»         | D/B Contractors Discretion                                   |
| «LFSH<br>_LAT_<br>CONS_<br>CMU»          | Concrete Masonry Unit (CMU)                                  |
| «LFSH<br>_LAT_<br>CONS_<br>METAL<br>»    | Metal  |
| «LFSH<br>_LAT_<br>CONS_<br>OTHER<br>»    | Other: «LFSH_LAT_CONS_SPECIFY»                               |
| B. Building Infrastructure and Features  |  |
| «LFSH<br>_LAT_<br>BI_EL»                 | Electrical Service   |
| «LFSH<br>_LAT_<br>BI_DN»                 | Day and night operations lighting                            |
| «LFSH<br>_LAT_<br>BI_LP»                 | Lightning protection   |
| «LFSH<br>_LAT_<br>BI_WS<br>»             | Water Supply:<br>Linear feet to source: «LFSH_LAT_BI_LF2SRC» |
| «LFSH<br>_LAT_<br>BI_WS                  | Water Supply - Well  |

| Range Operations and Control Area (ROCA)       |   |
|--|---|
| W»   |   |
| «LFSH<br>_LAT_<br>BI_SE<br>W»                  | Sewage Hookup:<br>Linear feet to tie in: «LFSH_LAT_BI_LF2TI»          |
| «LFSH<br>_LAT_<br>BI_FE»                       | Fire Extinguisher Cabinets or Brackets                                |
| «LFSH<br>_LAT_<br>BI_FD»                       | Fire Detection & Alarm (connected to Installation Emergency Services) |
| C. HVAC<br>Power Source: «LFSH_LAT_HVAC_POWER» |   |
| «LFSH<br>_LAT_<br>HVAC_<br>BOTH»               | Both heat and air conditioning  |
| «LFSH<br>_LAT_<br>HVAC_<br>HEAT»               | Heat only   |
| «LFSH<br>_LAT_<br>HVAC_<br>FREEZ<br>E»         | Freeze protection only  |
| «LFSH<br>_LAT_<br>HVAC_<br>VENT»               | Ventilation only  |
| D. Other                                       |   |
|  | «LFSH_LAT_OTHER»  |
| «LFSH<br>_NSTD<br>_QTY»                        | Non-Standard Building: «LFSH_NSTD_NAME»<br>Size: «LFSH_NSTD_SIZE»     |
| A. Construction                                |   |
| «LFSH<br>_NSTD<br>_CONS<br>_DISC»              | D/B Contractors Discretion  |
| «LFSH  | Concrete Masonry Unit (CMU)   |

| Range Operations and Control Area (ROCA) |   |
|--|---|
| _NSTD<br>_CONS<br>_CMU»                  |   |
| «LFSH<br>_NSTD<br>_CONS<br>_META<br>L»   | Metal   |
| «LFSH<br>_NSTD<br>_CONS<br>_OTHE<br>R»   | Other : «LFSH_NSTD_CONS_SPECIFY»                              |
| B. Building Infrastructure and Features  |   |
| «LFSH<br>_NSTD<br>_BI_EL<br>»            | Electrical Service  |
| «LFSH<br>_NSTD<br>_BI_DN<br>»            | Day and night operations lighting                             |
| «LFSH<br>_NSTD<br>_BI_LP<br>»            | Lightning protection  |
| «LFSH<br>_NSTD<br>_BI_PA<br>»            | Public Address (PA) System                                    |
| «LFSH<br>_NSTD<br>_BI_IN<br>ET»          | Data Service - Internet                                       |
| «LFSH<br>_NSTD<br>_BI_TE<br>L»           | Telephone Service: : «LFSH_NSTD_BI_COPFIB»                    |
| «LFSH<br>_NSTD<br>_BI_W<br>S»            | Water Supply:<br>Linear feet to source: «LFSH_NSTD_BI_LF2SRC» |
| «LFSH<br>_NSTD<br>_BI_W                  | Water Supply - Well   |

| Range Operations and Control Area (ROCA)        |   |
|---|---|
| SW»   |   |
| «LFSH<br>_NSTD<br>_BI_SE<br>W»                  | Sewage Hookup:<br>Linear feet to tie in: «LFSH_NSTD_BI_LF2T1»         |
| «LFSH<br>_NSTD<br>_BI_FE<br>»                   | Fire Extinguisher Cabinets or Brackets                                |
| «LFSH<br>_NSTD<br>_BI_FD<br>»                   | Fire Detection & Alarm (connected to Installation Emergency Services) |
| C. HVAC<br>Power Source: «LFSH_NSTD_HVAC_POWER» |   |
| «LFSH<br>_NSTD<br>_HVAC<br>_BOTH<br>»           | Both heat and air conditioning  |
| «LFSH<br>_NSTD<br>_HVAC<br>_HEAT<br>»           | Heat only   |
| «LFSH<br>_NSTD<br>_HVAC<br>_FREE<br>ZE»         | Freeze protection only  |
| «LFSH<br>_NSTD<br>_HVAC<br>_VENT<br>»           | Ventilation only  |
| D. Other  |   |
|   | «LFSH_NSTD_OTHER»   |

B. **RANGE OPERATIONS AND CONTROL AREA:** The Range Operations and Control Area (ROCA) is the center for overall control and operation of the range, training exercises, administrative services, and support facilities. From the range operations and control area, downrange target and simulation equipment are operated and activities are monitored for scoring and performance data review. The data is collected and distributed to the participants for an after action review. The location of the buildings is critical for the command and control during training operations on the range; therefore, coordination with the installation user is mandatory for the placement of the ROCA buildings on the construction site. The ROCA is comprised of multiple vertical construction components which are defined in the Project Specific Matrix. The command & control system and targetry equipment will be Government Furnished and Government Installed (GFGI).

1) **Down Range Area.** The Downrange Area consists of the actual Shoothouse and support equipment that provide the user the capability to meet current army training standards. In conjunction with this, each site-specific project may include necessary site amenities, such as site improvements, vehicle parking area, access roads, service trails, and exterior utilities. The command & control system and targetry equipment will be Government Furnished and Government Installed (GFGI).

2) **Surface Danger Zone (SDZ).** An SDZ for the layout depicted in Appendix J has been validated by the Installation safety office. Any changes made to the layout during design development that may affect the validated SDZ shall be approved by the Installation safety office.

### 3.3. SITE FUNCTIONAL REQUIREMENTS

The range's functional layout and adjacency requirements are as indicated on drawings contained in the Design Volume and, if applicable, as depicted in Appendix J. The extent to which the drawings represent required or preferred layouts and the allowable latitude for changes to them is as noted on the drawings. The layout of the Range Operations and Control Area is dependent on the user's training objectives and the facilities' terrain.

### 3.4. SITE AND LANDSCAPE REQUIREMENTS

Site design requirements are identified in the Design Volume. Special attention must be given to the Line-of-Sight (LOS) validation, the Surface Danger Zone (SDZ) verification and site drainage issues. Provide the LOS validation and SDZ verification in the design package.

### 3.5. ARCHITECTURAL REQUIREMENTS

A. Architectural design requirements are identified in the Design Volume.

B. Coordinate with the installation's Public Works office for the exterior and interior color finishes if not specified in the RFP Appendices.

### C. **SHOOTHOUSE WALL MATERIAL**

1) **Supplied System Qualifications:** Provide systems and materials which are the standard products of a manufacturer regularly engaged in the manufacture of such products and that essentially duplicate items that have been successfully installed in 5 military applications and in satisfactory use for at least 2 years prior to RFP as the main bullet stopping/absorbing wall system.

2) **Installation:** Install the shoothouse wall material/system as indicated and in accordance with manufacturer's instructions. A manufacturer's representative experienced in installation of this type of facility, shall supervise the erection.

#### 3.5.1. FINISHES AND INTERIOR SPECIALTIES:

A. **FINISHES:** Refer to Project Definition Matrix (PDM).

B. **INTERIOR SPECIALTIES:** Fire Extinguisher Cabinets and Brackets: Provide Fire Extinguisher cabinets and brackets in all occupied buildings in accordance with NFPA 10 and UFC 3-600-01. Provide cabinets in finished areas and brackets in non-finished areas (such as utility rooms, and storage rooms). Fire extinguishers are not included in this contract.

3.6. SEE PARAGRAPH 5.6 STRUCTURAL REQUIREMENTS – NOT USED

3.7. SEE PARAGRAPH 6.7 THERMAL PERFORMANCE – NOT USED

3.8. PLUMBING REQUIREMENTS

Water and Sewer service to a range project is a rare occurrence, the remoteness of most ranges from the Installation's existing infrastructure makes their use impractical. However, if water or sewer hookup is specified in the Project Definition Matrix, refer to Paragraph 6 and Appendix C for utility connection information.

3.9. COMMUNICATIONS AND SECURITY SYSTEMS

A. GENERAL:

1) If telephone service is included in the Scope of this project, coordination with the local NEC is required to ensure Installation compatibility and acceptance. Refer to Paragraph 6 of this section and Appendix C for utility connection information.

2) There shall be a clear delineation between the down range communications infrastructure and the facility telecommunication infrastructure. Each communication system enters the ROC Tower, but shall be terminated and housed in separate enclosures and backboards. The downrange communications infrastructure shall be installed in accordance with the Design Volume and the facility telecommunications infrastructure shall be installed in accordance with I3A.

3.10. ELECTRICAL REQUIREMENTS

A. GENERAL:

1) Refer to Paragraph 6 of this Section and Appendix C for utility connection information.

2) The Design Volume contains design submittal and construction submittal requirements that are in addition to those identified by Section 01 33 16 Design After Award and Section 01 78 02.00 10 Closeout Submittals. Project submittal register shall specifically include all submittals required by the Design Volume.

B. POWER: Provide power to the facilities and downrange area as specified below; all IEEE Standards (including Recommended Practice) where the scope is applicable to this design effort; all UL Standards where the UL scope is applicable to this design effort and where itemized in the combined interdisciplinary areas cited.

1) Provide the downrange power and data communications systems in accordance with CEHNC 1110-1-23 Live Fire Exercise Shoothouse (LFSH) Design Volume.

2) Perform a short circuit study as an integral part of selecting and sizing electrical distribution components (all equipment shall be fully rated; that is, do not use series-combination rated equipment).

3) For Ranges being provided power through Government owned utility systems, perform a coordination study to ensure that protective device settings are appropriate for the expected range of conditions (depending on the design and construction schedule, it is acceptable to design adequate protective devices with adjustable features, followed by a coordination study required during construction to specify the correct settings.)

4) Circuit breakers, disconnect switches, and other devices that meet the OSHA definition of energy-isolating device must be lockable.

5) Allowable Facility Voltage Drop: For transformer located exterior to the facility, limit the combined voltage drop for service conductors, feeders, and branch circuits to 5 percent. Individual voltage drop on branch circuits should not exceed 3 percent.

6) Allowable Downrange Voltage Drop: Voltage available to each target shall be no less than 95 percent of the target's rated operating voltage.

7) Medium voltage (MV) surge arrestors shall be provided on all riser poles, within each MV sectionalizer enclosures, within each pad mounted transformer, and wherever the medium voltage rises above grade.

C. NIGHT OPERATIONS LIGHTING: Where separate switching standard and red lighting is required, identify each switch with a label and provide the standard lighting switch with a locking tab that will permit the standard lighting to be locked "off" during night operations.

### 3.11. HEATING VENTILATING AND AIR CONDITIONING (HVAC) REQUIREMENTS

Heating, Ventilating and Air Conditioning (HVAC) requirements are identified in the Design Volume. HVAC requirements are addressed on a building-by-building basis.

### 3.12. ENERGY CONSERVATION REQUIREMENTS

Refer to paragraph 5.9 and paragraph 6.12 for energy conservation requirements.

### 3.13. FIRE PROTECTION REQUIREMENTS

Fire detection and alarm systems are seldom used in Army training ranges due to the low volume of personnel in any facility at any given time. If the project dictates a fire detection and/or a response system, coordinate directly with the Installation's Fire Department for specific requirements. Refer to Paragraph 6 of this section for installation requirements.

3.14. SEE PARAGRAPHS 5.12 AND 6.14 SUSTAINABLE DESIGN – NOT USED

3.15. SEE PARAGRAPH 6.15 ENVIRONMENTAL – NOT USED

3.16. SEE PARAGRAPH 6.16 PERMITS – NOT USED

3.17. SEE PARAGRAPH 6.17 DEMOLITION – NOT USED

3.18. SEE PARAGRAPH 6.18 ADDITIONAL FACILITIES – NOT USED

### 3.19. EQUIPMENT AND FURNITURE REQUIREMENTS

Furnishings, other than installed equipment, are Government-furnished and Government-installed (GFGI) unless otherwise specified in this document.

3.19.1. FURNISHINGS – NOT USED

3.19.2. EQUIPMENT – NOT USED

Targetry and Targetry Control Equipment GFGI unless otherwise specified in this document.

### 3.20. FACILITY SPECIFIC REFERENCES

A. In addition to submittals specified in other parts of this RFP, submit the following:

B. Design Submittals:

1) Line of Site profiles from:

a) Each firing position to their associated targets

b) Each firing position to the Lane Markers and Range Limit markers.

2) Emplacement details – both Civil and Electrical

3) Complete riser diagram indicating routing of data cables

4) Voltage drop calculations

C. Construction Submittals: Complete riser diagram indicating as-built routing of data cables.

**LIVE FIRE EXERCISE SHOOTHOUSE (LFSH)  
PROJECT DEFINITION MATRIX**

An "X" indicates selections

| General Project Information |   |
|-----------------------------|---|
| «LFSH_NNE»                  | No Known Environmental Issues on the Project Site   |
| «LFSH_PEI»                  | Environmental Issues Potentially on Project Site – addressed in more detail in Paragraph 6 and appendices.        |
| «LFSH_NNEU_XO»              | No Known Evidence of Unexploded Ordnance (UXO) on the Project Site  |
| «LFSH_UXO»                  | Unexploded Ordnance (UXO) Potentially on Project Site – UXO awareness instruction required for all site employees |
| «LFSH_ADA»                  | ADA and ABA Accessibility Guidelines do not apply to this project   |
| «LFSH_ATFP»                 | Constructive Anti-Terrorism/Force Protection (ATFP) measures are required for this project.                       |

| Downrange Area (Training Facility) |   |
|------------------------------------|---|
| A. Configuration                   |   |
| «LFSH_CONF_IG_STANDARD»            | Standard - 8 Rooms, 2 Hallways                                  |
| «LFSH_CONF_IG_NONSTD»              | Non-Standard:<br>«LFSH_ROOMS» Rooms<br>«LFSH_HALLWAYS» Hallways |
| «LFSH_LIGHTNING_PROTECTION»        | Lightning Protection  |
| B. Wall Material                   |   |
| «LFSH_WM_SHOCK_ABC»                | Shock Absorbing Concrete (SACONS)                               |

| Downrange Area (Training Facility)              |  |
|---|--|
| ON»   |  |
| «LFSH<br>_WM_<br>MS»                            | Manufactured Steel and Rubber System                                       |
| «LFSH<br>_WM_<br>SAND»                          | Sand Filled  |
| C. Canopy                                       |  |
| «LFSH<br>_CANO<br>PY_ST<br>D»                   | Open Sided Pre-Manufactured Building                                       |
| «LFSH<br>_PARTI<br>AL_WA<br>LLS»                | Partial Walls -<br>Wall configuration specified in Paragraph 6             |
| «LFSH<br>_BALLI<br>STIC_<br>CEILIN<br>G»        | Ballistic Ceiling -<br>Ceiling configuration specified in Paragraph 6      |
| «LFSH<br>_CANO<br>PY_OT<br>HER»                 | Other  |
| D. Target, Camera and Speaker Power and Control |  |
| «LFSH<br>_POW<br>ER_HA<br>RD»                   | Hardwired Electricity and Data   |
| «LFSH<br>_POW<br>ER_HA<br>RDPLU<br>S»           | Hardwired Electricity and RF/WiFi Data (provided under separate contract)  |
| «LFSH<br>_POW<br>ER_BT<br>RY»                   | Battery and RF/WiFi Data (power and data provided under separate contract) |
| «LFSH<br>_POW<br>ER_OT<br>HER»                  | Other:<br>«LFSH_POWER_SPECIFY»   |

**Range Operations and Control Area (ROCA)**

«LFSH  
\_AAR\_  
QTY» After Action Review - Small  
Standard size: 1064 SQ FT, 34' x 28' enclosed

**A. Construction**

«LFSH  
\_AAR\_  
CONS\_  
DISC» D/B Contractors Discretion

«LFSH  
\_AAR\_  
CONS\_  
CMU» Concrete Masonry Unit (CMU)

«LFSH  
\_AAR\_  
CONS\_  
METAL  
» Metal

«LFSH  
\_AAR\_  
CONS\_  
OTHER  
» Other:  
«LFSH\_AAR\_CONS\_SPECIFY»

**B. Building Infrastructure and Features**

«LFSH  
\_AAR\_  
BI\_EL» Electrical Service

«LFSH  
\_AAR\_  
BI\_DN» Day and night operations lighting

«LFSH  
\_AAR\_  
BI\_LP» Lightning protection

«LFSH  
\_AAR\_  
BI\_PA» Public Address (PA) System

«LFSH  
\_AAR\_  
BI\_C2» Hardwired Command & Control Data Service-Downrange Data

«LFSH  
\_AAR\_  
BI\_TEL Telephone Service: «LFSH\_AAR\_BI\_COPFIB»

| Range Operations and Control Area (ROCA)       |   |
|--|---|
| »  |   |
| «LFSH_AAR_BI_FE»                               | Fire Extinguisher Cabinets or Brackets                                  |
| «LFSH_AAR_BI_FD»                               | Fire Detection & Alarm (connected to Installation Emergency Services)   |
| C. HVAC<br>Power Source: «LFSH_AAR_HVAC_POWER» |   |
| «LFSH_AAR_HVAC_BOTH»                           | Both heat and air conditioning  |
| «LFSH_AAR_HVAC_HEAT»                           | Heat only   |
| «LFSH_AAR_HVAC_FREEZE»                         | Freeze protection only  |
| «LFSH_AAR_HVAC_VENT»                           | Ventilation only  |
| D. Other                                       |   |
|  | «LFSH_AAR_OTHER»  |
| «LFSH_OSB_QTY»                                 | Operations Storage Building<br>Standard Size: 20 ft x 40 ft – 800 SQ FT |
| A. Construction                                |   |
| «LFSH_OSB_CONS_DISC»                           | D/B Contractors Discretion  |
| «LFSH_OSB_CONS_CMU»                            | Concrete Masonry Unit (CMU)   |
| «LFSH»   | Metal   |

| Range Operations and Control Area (ROCA)       |   |
|--|---|
| «_OSB_CONS_METAL»                              |   |
| «LFSH_OSB_CONS_OTHER»                          | Other: «LFSH_OSB_CONS_SPECIFY»  |
| B. Building Infrastructure and Features        |   |
| «LFSH_OSB_BI_EL»                               | Electrical Service  |
| «LFSH_OSB_BI_DN»                               | Day and night operations lighting                                     |
| «LFSH_OSB_BI_LP»                               | Lightning protection  |
| «LFSH_OSB_BI_INTERNET»                         | Data Service - Internet   |
| «LFSH_OSB_BI_TEL»                              | Telephone Service: «LFSH_OSB_BI_COPFIB»                               |
| «LFSH_OSB_BI_FE»                               | Fire Extinguisher Cabinets or Brackets                                |
| «LFSH_OSB_BI_FD»                               | Fire Detection & Alarm (connected to Installation Emergency Services) |
| C. HVAC<br>Power Source: «LFSH_OSB_HVAC_POWER» |   |
| «LFSH_OSB_HVAC_BOTH»                           | Both heat and air conditioning  |
| «LFSH_OSB_HVAC_HEAT»                           | Heat only   |

| Range Operations and Control Area (ROCA) |   |
|--|---|
| «LFSH<br>_OSB_<br>HVAC_<br>FREEZ<br>E»   | Freeze protection only  |
| «LFSH<br>_OSB_<br>HVAC_<br>VENT»         | Ventilation only  |
| D. Other                                 |   |
|  | «LFSH_OSB_OTHER»  |
| «LFSH<br>_ABB_<br>QTY»                   | Ammunition Breakdown Building<br>Standard Size: 185 SQ FT, 10' x 12' enclosed |
| A. Construction                          |   |
| «LFSH<br>_ABB_<br>CONS_<br>DISC»         | D/B Contractors Discretion  |
| «LFSH<br>_ABB_<br>CONS_<br>CMU»          | Concrete Masonry Unit (CMU)   |
| «LFSH<br>_ABB_<br>CONS_<br>METAL<br>»    | Metal   |
| «LFSH<br>_ABB_<br>CONS_<br>OTHER<br>»    | Other: «LFSH_ABB_CONS_SPECIFY»  |
| B. Building Infrastructure and Features  |   |
| «LFSH<br>_ABB_<br>BI_EL»                 | Electrical Service  |
| «LFSH<br>_ABB_<br>BI_DN»                 | Day and night operations lighting   |
| «LFSH<br>_ABB_                           | Lightning protection  |

| Range Operations and Control Area (ROCA) |   |
|--|---|
| BI_LP»                                   |   |
| «LFSH<br>_ABB_<br>BI_FE»                 | Fire Extinguisher Cabinets or Brackets                                |
| «LFSH<br>_ABB_<br>BI_FD»                 | Fire Detection & Alarm (connected to Installation Emergency Services) |
| C. HVAC                                  |   |
| Power Source: «LFSH_ABB_HVAC_POWER»      |   |
| «LFSH<br>_ABB_<br>HVAC_<br>BOTH»         | Both heat and air conditioning  |
| «LFSH<br>_ABB_<br>HVAC_<br>HEAT»         | Heat only   |
| «LFSH<br>_ABB_<br>HVAC_<br>FREEZ<br>E»   | Freeze protection only  |
| «LFSH<br>_ABB_<br>HVAC_<br>VENT»         | Ventilation only  |
| D. Other                                 |   |
|  | «LFSH_ABB_OTHER»  |
| «LFSH<br>_LAT_<br>QTY»                   | Latrine   |
| «LFSH<br>_LAT_<br>AV»                    | Aerated Vault Latrine<br>Standard Size: 330 SQ FT, 26' x 12'-8"       |
| «LFSH<br>_LAT_<br>WLSEP<br>»             | Wet Latrine – Septic Field<br>Standard Size: 550 SQ FT, 22' x 25'     |
| «LFSH<br>_LAT_<br>WLSE<br>W»             | Wet Latrine – Sewage System<br>Standard Size: 550 SQ FT, 22' x 25'    |

| Range Operations and Control Area (ROCA) |  |
|--|--|
| «LFSH<br>_LAT_<br>OTHER<br>TYPE»         | Other:<br>«LFSH_LAT_SPECIFY»                                 |
| «LFSH<br>_LAT_<br>PORT»                  | Port-A-John Slab<br>«LFSH_LAT_PORT_SIZE»                     |
| A. Construction                          |  |
| «LFSH<br>_LAT_<br>CONS_<br>DISC»         | D/B Contractors Discretion                                   |
| «LFSH<br>_LAT_<br>CONS_<br>CMU»          | Concrete Masonry Unit (CMU)                                  |
| «LFSH<br>_LAT_<br>CONS_<br>METAL<br>»    | Metal  |
| «LFSH<br>_LAT_<br>CONS_<br>OTHER<br>»    | Other: «LFSH_LAT_CONS_SPECIFY»                               |
| B. Building Infrastructure and Features  |  |
| «LFSH<br>_LAT_<br>BI_EL»                 | Electrical Service   |
| «LFSH<br>_LAT_<br>BI_DN»                 | Day and night operations lighting                            |
| «LFSH<br>_LAT_<br>BI_LP»                 | Lightning protection   |
| «LFSH<br>_LAT_<br>BI_WS<br>»             | Water Supply:<br>Linear feet to source: «LFSH_LAT_BI_LF2SRC» |
| «LFSH<br>_LAT_<br>BI_WS                  | Water Supply - Well  |

| Range Operations and Control Area (ROCA)       |   |
|--|---|
| W»   |   |
| «LFSH<br>_LAT_<br>BI_SE<br>W»                  | Sewage Hookup:<br>Linear feet to tie in: «LFSH_LAT_BI_LF2TI»          |
| «LFSH<br>_LAT_<br>BI_FE»                       | Fire Extinguisher Cabinets or Brackets                                |
| «LFSH<br>_LAT_<br>BI_FD»                       | Fire Detection & Alarm (connected to Installation Emergency Services) |
| C. HVAC<br>Power Source: «LFSH_LAT_HVAC_POWER» |   |
| «LFSH<br>_LAT_<br>HVAC_<br>BOTH»               | Both heat and air conditioning  |
| «LFSH<br>_LAT_<br>HVAC_<br>HEAT»               | Heat only   |
| «LFSH<br>_LAT_<br>HVAC_<br>FREEZ<br>E»         | Freeze protection only  |
| «LFSH<br>_LAT_<br>HVAC_<br>VENT»               | Ventilation only  |
| D. Other                                       |   |
|  | «LFSH_LAT_OTHER»  |
| «LFSH<br>_NSTD<br>_QTY»                        | Non-Standard Building: «LFSH_NSTD_NAME»<br>Size: «LFSH_NSTD_SIZE»     |
| A. Construction                                |   |
| «LFSH<br>_NSTD<br>_CONS<br>_DISC»              | D/B Contractors Discretion  |
| «LFSH  | Concrete Masonry Unit (CMU)   |

| Range Operations and Control Area (ROCA) |   |
|--|---|
| _NSTD<br>_CONS<br>_CMU»                  |   |
| «LFSH<br>_NSTD<br>_CONS<br>_META<br>L»   | Metal   |
| «LFSH<br>_NSTD<br>_CONS<br>_OTHE<br>R»   | Other : «LFSH_NSTD_CONS_SPECIFY»                              |
| B. Building Infrastructure and Features  |   |
| «LFSH<br>_NSTD<br>_BI_EL<br>»            | Electrical Service  |
| «LFSH<br>_NSTD<br>_BI_DN<br>»            | Day and night operations lighting                             |
| «LFSH<br>_NSTD<br>_BI_LP<br>»            | Lightning protection  |
| «LFSH<br>_NSTD<br>_BI_PA<br>»            | Public Address (PA) System                                    |
| «LFSH<br>_NSTD<br>_BI_IN<br>ET»          | Data Service - Internet                                       |
| «LFSH<br>_NSTD<br>_BI_TE<br>L»           | Telephone Service: : «LFSH_NSTD_BI_COPFIB»                    |
| «LFSH<br>_NSTD<br>_BI_W<br>S»            | Water Supply:<br>Linear feet to source: «LFSH_NSTD_BI_LF2SRC» |
| «LFSH<br>_NSTD<br>_BI_W                  | Water Supply - Well   |

| Range Operations and Control Area (ROCA)        |   |
|---|---|
| SW»   |   |
| «LFSH<br>_NSTD<br>_BI_SE<br>W»                  | Sewage Hookup:<br>Linear feet to tie in: «LFSH_NSTD_BI_LF2T1»         |
| «LFSH<br>_NSTD<br>_BI_FE<br>»                   | Fire Extinguisher Cabinets or Brackets                                |
| «LFSH<br>_NSTD<br>_BI_FD<br>»                   | Fire Detection & Alarm (connected to Installation Emergency Services) |
| C. HVAC<br>Power Source: «LFSH_NSTD_HVAC_POWER» |   |
| «LFSH<br>_NSTD<br>_HVAC<br>_BOTH<br>»           | Both heat and air conditioning  |
| «LFSH<br>_NSTD<br>_HVAC<br>_HEAT<br>»           | Heat only   |
| «LFSH<br>_NSTD<br>_HVAC<br>_FREE<br>ZE»         | Freeze protection only  |
| «LFSH<br>_NSTD<br>_HVAC<br>_VENT<br>»           | Ventilation only  |
| D. Other  |   |
|   | «LFSH_NSTD_OTHER»   |