

**Statement of Work**

**Project Number:**

**Exercise Related Construction (ERC)Project**

**Undisclosed Location, Israel**

****

Prepared by:

**USAREUR, ODCSENG**

**South Team**

01 February 2019

**SECTION 01** **10 10**

**STATEMENT OF WORK**

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1.0 GENERAL

1.1 PROJECT DESCRIPTION

The Request for Proposal (SOW) Designs parameters for a Design With Build Services support type project for construction of facilities at undisclosed location, Israel in support of the US Joint Chiefs of Staff (JCS) Exercise Related Construction (ERC) program. This project requires the Consultant to design for US Department of Defense (DOD) military personnel to construct utilizing Military Troop Construction (MTC) for the following facilities (refer to Section 3.3 GENERAL FACILITY REQUIREMENTS and attached drawings for more information):

AREA A

1. Building #1 – Proposed structure will be for a Combined Joint Operations Center (CJOC);

(BASE CLIN 0001)

Att#1-Site Plan

All facilities designed under this contract shall be considered semi-permanent facilities in accordance with (IAW) UFC 1-201-01.

The structures are classified as low occupancy buildings per UFC 4-010-01. Subsequently, anti-terrorism force protection requirements per UFC 4-010-01 and OPORD 16-03 are not applicable.

Final utility purveyor connections will be designed by separate contract and are not part of this SOW. Utility line sources can be assumed to originate from the site starting at 4 meters from the outside of the building envelope unless noted otherwise (UNO) within this SOW. The Israeli/US government will connect these lines to the district/municipal utility mains at a as part of the larger ERC program.

1.2 GENERAL REQUIREMENTS

The Consultant shall deliver completed drawings, designs, calculations and any pertinent products for the successful completion of a US MTC Exercise Related Construction (ERC) constructed turnkey type facility (without furniture) as described in this document. The work includes - but is not limited to – design and certification of final building based upon designed Consultants documentation. The Consultant shall be prepared to provide construction support to include –but not limited to- QA/QC services, Request for Information (RFI) responses, create As-Built drawings and best practices advice through construction in order to ensure the final building is capable of being certified for occupancy per Israeli law. The consultant shall consider the facility and the installed equipment as semi-permanent construction.

The facility in this project shall be complete and usable to meet codes and technical and functional requirements per this Statement of Work (SOW). All design, calculations, approvals, certificates, fees, labor, material, equipment, direct overhead, indirect overhead, G&A and general conditions to complete this project as described in the SOW shall be included in the proposal price.

These design and product requirements are minimum requisites. Compliance with the provisions of this section by sub Consultants shall be the responsibility of the Consultant.

1.3 FUNCTIONAL AREAS

Refer to the attached drawings for a depiction of the required functional areas and spatial adjacencies for the site and facilities/structures.

1.4 SUBMITTALS

Government approval is required for submittals with “G” designation; submittals not having a “G” are for Consultant Quality approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Pre-Construction Submittals

 Construction Phasing Plan; G

SD-05 Design Data

 35% Design; G, DO

 65% Not Required

 95% Final Design; G, DO

 100% Corrected Final Design; G, DO

1.4.1 DESIGN SUBMITTALS

Design a complete design package at each milestone, as described in Specification Section 01 33 16 DESIGN AFTER AWARD. The milestones for this project are indicated above in Section 1.4 SUBMITTALS. The specific requirements of each milestone are described in each discipline-specific section of this Specification.

The Consultant shall submit all documents in hard copy and electronic format. Deliver four (4) hard copies with complete sets of drawings, calculations, analyses, bill of materials and reports as required by this SOW. Drawings shall be printed on A1 paper at a minimum. Calculations, analyses, bill of materials and reports shall be printed on A4 paper at a minimum and supplied in binders. All electronic documents shall be submitted using the .pdf and .xls format for text and calculations and both and .dwg and. rvt (AutoCAD and Revit, latest version) format for drawings. One copy shall be sent to:

**USAREUR ODCSENG**

**ATTN: AEEN, David Simons, PE, Architect**

**UNIT 29351, BOX 109**

**APO, AE 09014-9351**

Delivery locations for each remaining set of documents shall be coordinated with COR prior to each submittal. See Specification 01 33 00 SUBMITTAL PROCEDURES for additional information.

1.4.2 CLASSIFICATION OF DOCUMENTS

Unless direct otherwise, all documents developed in the execution of this Contract shall be considered controlled unclassified information (CUI) and shall be designated “UNCLASSIFIED//FOR OFFICIAL USE ONLY”. Document marking, preparation, storage, dissemination, and handling must be in accordance with Department of Defense Manual (DoDM) 5200.01 for this classification level.

Project documents shall use building and room numbers in lieu of building and room names to the greatest extent practicable. Drawings shall not include building or room names.

All data, reports, and material related to this project are property of the Government. The Consultant and all sub Consultants shall make no public announcements or disclosures relative to information designed for, contained in, or developed for this Contract. This also applies to all US Government or HN Government owned information made available to the Consultant. None of the documents developed in execution of this Contract may be released to anyone without the written permission of the Contracting Officer. The obligation to maintain the confidentiality of all project information extends beyond the completion of this project.

1.5 MATERIALS AND EQUIPMENT

Materials and products used, shall be durable, heavy duty industry standard. The equipment shall be the manufacturer’s standard quality and shall be compatible with all other equipment and materials within the system or assembly. Equipment and materials shall include all connections and accessories necessary to ensure operability and correct installation according to manufacturer’s requirements.

Each major piece of equipment shall have the manufacturer’s name, address, contact information, type or style, model or serial number, and catalog number on a plate secured to the piece of equipment. The definition of a “major piece of equipment” shall be at the discretion of the COR.

1.5.1 LIFE-SPAN

All construction shall be considered semi-permanent IAW UFC 1-201-01. Construction must have an expected life span of at least 10 years. With proper maintenance, life expectancy of the facility must be extendable to 25 years.

1.5.2 MAINTAINABILITY

Low maintenance materials and systems must be employed and shall be appropriate for the project climate and location.

1.5.3 OPERABILITY

Systems including but not limited to mechanical, electrical, communications, shall be simple to operate and easy to maintain.

1.5.4 STANDARDIZATION

The Consultant shall use standardized materials, products, equipment, and systems to minimize the requirements for replacement parts, storage facilities, and service requirements.

1.6 DESIGN DIMENSIONS

The design shall be developed using the metric system.

1.7 DESIGN CRITERIA

Project design, site facilities, utility systems and material standards shall be in accordance with the latest editions of the Host Nation and US building codes and following codes / criteria:

1. NFPA 101 Life Safety Code
2. International Building Code (IBC)
3. Host Nation Building Codes and Standards
4. Unified Facilities Criteria (UFC) 1-201-01 Non-Permanent DOD Facilities in Support of Military Operations
5. UFC 3-101-01 Architecture
6. UFC 3-110-03 Roofing
7. UFC 3-600-01 Fire Protection Engineering for Facilities
8. Engineering Manual (EM) 385-1-1 USACE Safety and Health Requirements
9. Host Nation Energy Conservation Requirements for 2019

While this SOW references various source standards and specifications, all design documents are to meet US and Host Nation codes and requirements. It is the designer's responsibility to demonstrate that the Host Nation standard is equal to the US cited standard or specifications being supplanted. The more restrictive standards shall apply when conflicts arise between the requirements of this SOW and any referenced or other applicable codes, standards or regulations. If equivalency cannot be met, the more stringent requirement shall be used and both codes shall be quoted verbatim in the Consultant’s correspondence to the COR. Where specific standards are not indicated, the designer shall determine the required material and execution standards.

Design an electronic copy of the local Host Nation standards and building codes in its original language as related to facility design and construction.

1.8 DESIGN CONFERENCES AND MEETINGS

The Consultant and the entire design team (including the Design Quality Control Manager) are required to participate in a design review conference for each design submittal. The Consultant shall bring the personnel that developed the design submittal to any review conference.

All design review conferences shall be held via teleconference or be reviewed and comments resolved via email.

The Consultant is responsible for taking meeting minutes during each design review conference and submitting to the COR for information and approval.

The Consultant is responsible for evaluating all Government comments prior to each design review conference. The Consultant is responsible for resolving all Government comments from each design phase. The Consultant shall Design annotated responses to each design review comment with the subsequent design submittal packages. Construction may not begin until all Government comments from all design phases have been resolved.

1.9 SPECIAL REQUIREMENTS

Consultant shall comply with all security and access requirements set by the Host Nation.

1.9.1 INSTALLATION ACCESS

All personnel accessing the installation will be required to clear a security check process with the Host Nation Ministry of Defense (MOD). The COR will Design contact information after Contract award. For EU citizens, this security check will take up to 10 calendar days. For non-US and non-Israeli citizens, this security check is expected to take in excess of 10 calendar days and the Consultant should expect to submit additional documentation, such as work permits, upon request. All personnel are required to Design, at a minimum, the following information to the MOD prior to accessing the installation:

1. ID or Passport Number;
2. Details of Transportation;
3. Last Name/Maiden Name;
4. First Name;
5. Birth Date;
6. Nationality;
7. Current Address;
8. Phone Number;
9. Father’s Name;
10. Mother’s Name/Maiden Name;
11. Vehicle Tag Number (vehicle being driven onto installation);
12. Name of Employer;
13. Reason for Access (name and type of the contract connect-customer, Consultant, or sub-Consultant); and
14. During of Access (do not overestimate the duration, time extensions are possible).

After providing the above information, the Consultant shall expect to complete additional forms at the request of the MOD.

The HN MOD may deny access for any reason. Those personnel not cleared through this security check will not be allowed to access the installation and those personnel who fail the security check will not be allowed to access the installation. The HN MOD reserves the right to change the security check process as threat levels change.

1.9.2 CONSTRUCTION PHASING

The Consultant shall develop a detailed Construction Phasing Plan including a construction schedule to demonstrate an understanding of the phasing requirements in order to assist the TMC team to better plan for placing resources against the project. The Consultant must coordinate the Construction Phasing Plan with the US TMC representative and the COR and inform the COR of any variances in the schedule during construction.

END OF SECTION

2.0 CIVIL AND GEOTECHNICAL

Design and perform civil engineering design and construction services as required to Design a complete, accessible, functional and usable project. The Consultant is required to extensively coordinate civil design and construction work with the scope of the other disciplines described in this SOW.

2.1 SCOPE SUMMARY

Civil works for this project include, but are not limited to, site survey, site layout, demolition, earthwork, storm system, sanitary system, water system, pavement, fencing, and landscaping required up to and completely with a 2 meter envelope UNO around the building. The HN MOD and US TMC team members will Design all site utilities up to 4 meters of the building envelope. Since this will be a TMC project, there are certain requirements for utility connections not able to be performed by TMC; therefore, the Consultant will be expected to assist in coordination and review of bid packages. The Consultant will be expected to refer to the bid schedule for which of these are base bid or optional.

2.2 EXISTING CONDITIONS

The exact location of the project is intentionally not designed.

2.2.1 TOPOGRAPHY

The existing site contains graded structural fill as shown in this SOW. Final and existing contours for the site are shown in Att#1-Site Plan and can be designed to the Consultant in .dwg and .pdf format. The final Finished Floor Elevation (FFE) identified has been established by the Civil Engineer assigned to the overall site project and is not part of this scope.

2.2.2 UTILITIES

There are no underground storm systems to tie into. Any building induced drainage or runoff shall be directed by underground pipe to the retention swales to the north, south or east of the building site. In any case, the Consultant shall be responsible for the design of the outfall into one of the approved swales.

There are existing water and sanitary connections located at the southeast corner of the site.

2.2.3 GEOTECHNICAL

Geotechnical information for the site will be provided once the final report is furnished. The site has records of high groundwater in certain locations. The consultant will be expected to review current geotechnical analysis performed by the US Government for validity.

2.2.4 ENVIRONMENTAL

There are no known environmental protection areas or archeological preservation areas on the project site. There is no prior knowledge of any hazardous or contaminated materials in the site’s soil.

2.2.5 UNEXPLODED ORDINANCE (UXO) CLEARANCE

There is no prior knowledge of UXO in the site’s soil.

2.2.6 EXISTING CONDITIONS INVESTIGATION

Prior to bid, investigate the general and local conditions which can affect the work and/or its cost, including but not limited to:

1. Weather, river stages, tides, or similar physical conditions at the site;
2. Surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site and due diligence research of as-built drawings, geotechnical reports, environmental reports, and publicly available information on the site.

2.3 DESIGN SUBMITTALS

Design civil design submittals in accordance with SOW Section 01 33 16, DESIGN AFTER AWARD and SOW Section 1.0 – GENERAL.

35% Design Submittal:

1. Preliminary Design Analysis of civil features.
2. Final Site Survey (include in the Design Analysis).
3. Final Existing Conditions Plan.
4. Preliminary Bill of Materials (BOM)
5. Preliminary Site Layout Plans - Indicate existing and proposed Civil features. Include other disciplines’ features (faded back) that affect the Civil Design (buildings, mechanical structures, electrical utilities, etc).
6. Preliminary Grading Plans, including contours, and finish floor elevations.
7. Preliminary Pavement Plans
8. Preliminary Utility Plans (Storm, Sanitary, and Water).
9. Preliminary Fencing Plans
10. Preliminary Civil Specifications (Table of Contents only).

65% Design Submittal:

NOT REQUIRED

95% Design Submittal:

1. Update all items from the 35% Design Submittal to 95% (Final) Design. Incorporate all 35% design comments.
2. Final Grading Profiles, Cross Sections, and Details. Include spot grades and slopes in Grading Plan.
3. Final Pavement Profiles, Cross Sections, and Details
4. Final Utility (Storm, Sanitary, and Water) Profiles, Cross Sections, and Details.
5. Final Fencing Details
6. Final Landscape Plan and Details, including seed mix and seed coverage rate
7. Final Civil Specifications

100% Submittal:

The 100% Submittal Designs a complete and final set of contract documents ready for construction. Update all Final submittals from 95% to a corrected Final submittal. Address all previous government review comments before submitting.

2.3.1 DESIGN ANALYSIS

Design a Design Analysis for all Civil features that documents significant design choices and substantiates design compliance with contract requirements, applicable codes and standards. Documentation includes narrative, calculations, photographs, sketches, and catalog cut sheets. Reference all applicable regulations, standards, and criteria for the design. Reference sources are subject to Government approval. Design assumptions. For design choices, discuss alternative systems considered, and Design rationale for the selected alternative.

The Design Analysis includes but is not limited to:

1. Discussion of Site Layout constraints and design decisions.
2. Discussion of Earthwork and Site Grading constraints and design decisions. Design cut and fill calculations. Include pertinent geotechnical information that affects earthwork and how this affects grading requirements outside of the 2 meter building envelope.

1. Discussion of Storm system constraints and design decisions. Design a hydrologic and hydraulic analysis of the building storm system, including offsite areas that contribute to and influence the project’s storm system. Design drainage basin map(s), rainfall data, and coefficients used. For each section of pipe, include analyses indicating pipe size, friction factor, length, elevations at each end of pipe, slope, design flow (Q), maximum flow capacity, design depth of flow, design percentage full, and design flow velocity. Analyze headwater and tailwater of culverts and storm system discharges. Design Inlet design calculations. Design calculations for sizing of structures, including detention, infiltration, and LID features. Use the Rational Method or TR-55 for analysis and design. In the absence of Host Nation requirements, use a minimum 100-year, 24 hour storm frequency for analysis and design. Design calculations on the pipe’s structural capacity if the pipe is shallower than required in section 2.10-Utilities. Confirm that the existing receiving system has adequate capacity to receive the additional stormwater flow generated by the project.

1. Discussion of Sanitary system constraints and design decisions. For each section of pipe, include analyses indicating pipe size, friction factor, length, elevations at each end of pipe, slope, design flow (Q), maximum flow capacity, design depth of flow, design percentage full, and design flow velocity. Design calculations on the pipe’s structural capacity if the pipe is shallower than required in section 2.10-Utilities. Include pertinent geotechnical information that affects the sanitary system. Confirm that the existing receiving system has adequate capacity to receive the additional sanitary flow generated by the project.

1. Discussion of Water system constraints, design decisions and source. Design calculations to demonstrate water system meets project requirements, including demand, water pipe sizing, design water pressure and flow rates at buildings and fire hydrants. Design field conducted flow tests from nearest hydrants (or other relevant water structures if hydrants unavailable). Design code analysis/calculations for distances of fire hydrants. Design calculations on the pipe’s structural capacity if the pipe is shallower than required in section 2.10-Utilities.
2. Site Survey as an appendix.
3. Geotechnical Information as an appendix.

2.3.2 DESIGN DRAWINGS

Design Civil design drawings of sufficient detail to address the requirements of each design submittal. Civil drawings include plans, profiles, cross sections, and details of Civil features for the project. Design drawings include all necessary information (labeling, dimensioning, legend, details, notes, etc.) to allow for complete understanding and constructability of all proposed features. Design comprehensible differentiation between features that are proposed, existing, future, or proposed to be demolished by use of appropriate choice of line styles, line weights, and/or colors. In the absence of the Installation’s drafting requirements, reference USACE *A/E/C Graphics Standard* for graphic requirements.

2.3.3 SPECIFICATIONS

Design Civil specifications of sufficient detail to address the requirements of each design submittal. Specifications, when combined with the design drawings, allow for complete understanding and constructability of all proposed Civil features.

2.4 DESIGN CRITERIA

Design civil design in accordance with the latest version of Host Nation codes, International Building Code (IBC), SOW Section 1.0-GENERAL, and the following codes and technical standards:

1. Uniform Facility Criteria (UFC) 3-201-01, *Civil Engineering*
2. UFC 3-210-10, *Low Impact Development*
3. UFC 3-460-01, *Design Petroleum Fuel Facilities*
4. USACE *A/E/C Graphics Standard* (ERDC/ITL TR-12-1)
5. Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA) Pamphlet 55-17, *Better Military Traffic Engineering*
6. Energy Independence and Security Act (EISA) Section 438
7. Installation Design Guide(s)

2.5 GEOTECHNICAL INVESTIGATION AND REPORT

The Consultant is not required to perform a geotechnical investigation for this project. Geotechnical information for the site will be provided. The Consultant may perform additional geotechnical investigations and/or collect additional existing geotechnical reports if desired to improve the design. In the absence of geotechnical information on allowable soil bearing pressure, an allowable soil bearing pressure is discussed in STRUCTURAL section 4.0. Design geotechnical information and assumptions in the Design Analysis to support design decisions.

Perform field and laboratory geotechnical work required for construction (i.e. compaction tests, inspection of structure foundation excavations). In the absence of Host Nation standards, perform the geotechnical scope of work per UFC 3-220-01, *Geotechnical Engineering* and IBC.

2.6 SURVEY

Consultant survey will not be required. The consultant will be designed with a .dwg file by the US Government.

2.7 SITE LAYOUT

Locate the proposed building, pavement, utilities, and other improvements as indicated on Attachment #1 –Site Plan. Amend the site layout as determined by site-specific constraints, code requirements, the owner’s preferences, future expansion, and opportunities that are identified and evaluated as part of the Consultant’s scope of work.

Site Layout must meet the standards of Installation Design Guide(s) andUFC 3-600-1*, Fire Protection Engineering for Facilities*

The Consultant is responsible for all aspects of design for the project whether they are shown on the conceptual plan or not.

2.8 EARTHWORK

Perform all earth work necessary for the installation of the proposed improvements.

2.8.1 PLANS AND SPECIFICATIONS

Define earthwork requirements in the plans and specifications. Include requirements for satisfactory material, borrow material, structural fill, topsoil, utility trenches, replacement and improvement of on-site soils, soil compaction (for subgrades of structures, paving, and landscaped areas), compaction for utility trenches, maximum lift depths, density testing frequency, maximum temporary and permanent slopes, and engineered support systems.

2.8.2 UNEXPLODED ORDINANCE (UXO) CLEARANCE

UXO clearance is a requirement of the HN and shall not be required by the Consultant.

2.8.3 CULTURAL RESOURCES

Cultural resources, such as archaeological remains, may be uncovered during excavation operations. If suspected cultural remains are found, coordinate with the COR for further guidance.

2.8.4 BACKFILL COMPACTION

In the absence of Host Nation requirements and geotechnical recommendations, design drawings shall note that fill and backfill must be placed in layers of 20 centimeters loose thickness and compacted to a minimum 95% of the maximum dry density as determined by Host Nation test method equivalent to ASTM D-1557 (Modified Proctor test). Design density tests on all lifts at a frequency of 1 test per 40 square meters for foundations, 1 test per 200 square meters for parking, and 1 test per 30 meters of road and utility trench. Round up to nearest whole number (i.e. a 25 square meter foundation requires one test). The location of all tests must be selected by the Consultant’s geotechnical engineer, and copies of all test results must be furnished to the COR. All structure foundation excavations must be inspected and approved by the Consultant’s Geotechnical Engineer prior to placing concrete. Repair earthwork areas as recommended by the Consultant’s Geotechnical Engineer, and approved by the COR.

2.8.5 SITE GRADING

Design site grading that directs storm water runoff away from buildings and structures either by drainage systems or by grading as follows:

1. Finished grades of earth/grass/gravel surfaces adjacent to buildings and structures must slope away from all exterior edges with a minimum slope of 2% and maximum of 5% for the first 4 meters.
2. Finished grades of paved surfaces adjacent to buildings and structures must slope away from all exterior edges with a minimum slope of 2% for the first 4 meters.
3. Finished grades must not create stagnating water or ponding anywhere on the project site, nor create ponding on adjacent properties. Design storm improvements if ponding is unavoidable.
4. Requirements of UFC 1-201-01, Chapter 3-3.1 Grading
5. FFE are set by the site Civil Engineer; therefore, set finished grade a minimum of 15 centimeters above finished grade at the perimeter of the building, with the exception of finished grade at entry points.

Site grading around the building must meet Host Nation accessibility guidelines. The Consultant must limit proposed landscape slopes to a maximum 4H:1V for grass areas requiring mowing and 2H:1V for non-grass areas, which will a require non-erodible surface (i.e. rock, shrubs with mulch.

2.9 UTILITIES

This section applies to all project underground utilities located outside the building, including but not limited to, sanitary sewer, water supply, storm drainage, electrical, communications, gas, liquid fuel, and heat. See Sections 5.0-ELECTRICAL and Section 6.0-MECHNICAL for additional utility requirements.

In the absence of Host Nation requirements, design utilities per IBC and UFC 3-201-01, Civil Engineering. Design utility main alignments outside the structural zone of influence of proposed buildings and structures. Design utility line depths, bedding, and backfill as required by applicable requirements and geotechnical recommendations. Minimum cover over pipes is 0.6 meters; greater than frost penetration; or sufficient to support imposed dead and live loads for the pipe materials used; whichever is more stringent. Place plastic warning tape along the route of the buried pipe after installation at a height of 0.3 meters above the pipe.

Coordinate all required installation, relocation, improvement and protection of utilities held by third party (e.g. public or private utility). This includes coordination of any work to be performed by the utility owner. Choice of materials and products for utility installation must be coordinated with the utility owner (customer or third party) to ensure proper integration and compliance with existing systems and allow for easy maintenance and repair of the utilities in the future.

Design corrosion protection for utilities that Designs the minimum life expectancy specified in GENERAL Section 1.0. Any piping or equipment exposed to sunlight must be coated with protective coatings suitable for UV exposure with a minimum expected coating life of 10 years before recoating.

Final utility connections will be designed by others and are not part of this SOW. Utility lines from the site and buildings shall run to the existing utility connection points of 4 meters from the building envelope whichever is larger, and be capped/valved within 0.5 meters of the final connection point. Coordinate with HN and US POC’s for final location of purveyor designed services.

2.9.1 STORM SYSTEM

##### Design a gravity storm drainage system to direct runoff away from improvements, eliminate ponding, and prevent erosion. A feasible schematic is indicated on Att#1- Site Plan. A pump system is not allowed. In the absence of Host Nation or Installation requirements, design the storm drainage system per the IBC and UFC 3-201-01, *Civil Engineering* Chapter 3-Storm Drainage Systems.

2.9.2 SANITARY SYSTEM

Design a sanitary system that connects the buildings to the existing sanitary system adjacent to the site – if required by the design. A feasible schematic is indicated on Att#1- Site Plan. In the absence of Host Nation requirements, design the sanitary system per the IBC and UFC 3-201-01, *Civil Engineering.*

See SOW Section 6.0 – MECHANICAL for indoor sanitary scope.

2.9.3 WATER SYSTEM

Design a water system to connect the proposed buildings to the existing water system. A feasible schematic is indicated on Att#1- Site Plan. Design the system to meet all flow requirements of the facility, including potable water and fire flows.

In the absence of Host Nation requirements, design the water system per the IBC and UFC 3-201-01, *Civil Engineering.*

See SOW Section 6.0 – MECHANICAL for indoor water scope.

2.10 PAVEMENT

Design pavement design to allow operational and maintenance access to the facility as shown on Att#1- Site Plan. Design geometric layout of the paved areas to allow for the design vehicles to access the site features and exit the site safely. Design vehicles for the project are a Mercedes Sprinter Van with raised roof and a local fire truck. Average daily traffic (ADT) is below 250 vehicles/day. Proposed pavements for the project include:

1. Building 1 Concrete apron. Portland cement concrete (PCC) apron, minimum 3.0 meters wide by the length of the building. Depth of pavement and subgrade is dependent on design, but in no case shall there be less than 15cm of pavement.
2. Gravel Parking Pad. Pad within the 2 meter building envelope shall connect to the existing parking pad so that the grades, as defined above, are not exceeded. Design a minimum 20cm depth of aggregate with a maximum rock size of 4cm.
3. Asphalt Concrete (AC). Design the design for asphaltic parking surface within the 4 meters of building envelope where concrete parking area isn’t utilized.

In the absence of Host Nation standards, design pavements per UFC 3-201-01, *Civil Engineering* andSDDCTEA Pamphlet 55-17, *Better Military Traffic Engineering.*

2.11 LANDSCAPING

Design of grass on the site in areas that do not have pavement or a building within the limits of disturbance. Seeds must be locally sourced from a certified plant nursery, and native to the area. Design of seed coverage density per manufacturer/supplier’s recommendations. Design recommendations of watering, weeding, and any other necessary care to establish growth.

END OF SECTION

3.0 ARCHITECTURAL

3.1 PROJECT DESCRIPTION

Design and construction work of Combined Joint Operations Center (CJOC) in undisclosed location in Israel. Refer to Section 1.1 PROJECT DESCRIPTION for a general description of the project. See below for detailed architectural requirements for the building.

Extensive coordination will be required between the architectural work and the civil, geotechnical, structural, fire protection, mechanical, communications, and electrical requirements of this project.

3.1.1 DESIGN

The Consultant shall Design a design and construction package that uses the space allocations, functional adjacencies, design details, and features given or referenced in this SOW. The design shall incorporate all referenced codes and regulations. Additional details shall be created by the Consultant as required, but shall conform to the requirements of this SOW and are subject to the approval of the COR. Schematic designs have been attached for reference. The schematic plans are designed for diagrammatic purposes only and do not necessarily represent an approved floor plan or design. Refer to Section 3.3 GENERAL SCOPE OF WORK for room/space descriptions. The Consultant is responsible for providing a design that meets all requirements of the User and the codes and criteria referenced in this Statement or Work.

3.1.2 DESIGN SUBMITTALS

The Consultant shall make the architectural submittals after contract award in accordance with Section 01 33 16 DESIGN AFTER AWARD and Section 01 33 00 SUBMITTAL PROCEDURES. The documents listed below shall be prepared and submitted by the Consultant.

3.1.2.1 35% DESIGN SUBMISSION

Include the following drawings and reports as applicable to the project:

* 1. Code Summary – Design a tabular code compliance summary per UFC 3-600-01;
	2. Life Safety Plans – Design plans depicting smoke/fire resistance ratings, egress routes, dead-end corridors, exits, and other aspects of life safety pertaining to the design;
	3. Floor Plans – Design all floor plans, indicating room names, areas, and basic dimensions, scale 1:50;
	4. Ceiling Plans – Design reflected ceiling plans for all rooms, indicating ceiling materials and fixtures, scale 1:50;
	5. Building Elevations – Design all building elevations indicating all exterior materials;
	6. Roof Plan – Design a plan of all roof areas, indicating direction of slope and method of drainage;
	7. Building Section – Indicate heights of critical building elements;
	8. Preliminary Design Analysis – Design a narrative explaining the design and indicating how the design and materials meet the requirements of this SOW.
	9. Outline Specifications – List the technical titles for all performed work.
	10. Initial project schedule outlining all major and minor milestones. To be submitted in MS Project format.
	11. Bill of Material (BOM) for all building materials

3.1.2.2 95% DESIGN SUBMISSION

The 95% Submittal Designs a complete and final set of contract documents essentially ready for construction by the MTC team. All previous government review comments must have been addressed. Include the following drawings and reports as applicable to the project:

1. All documents from the 35% submittal updated to incorporate 35% review comments;
2. Interior Elevations – Design interior elevations depicting critical heights of all fixtures and equipment;
3. Stair Section and Details – Depict and dimension all critical elements including treads, risers, guardrails, and handrails;
4. Window and Door Schedule – Design a schedule of all windows and doors, indicating sizes, hardware, and operation;
5. Finish Schedule – Indicate all proposed finishes;
6. Final Design Analysis - Design a narrative explaining the final design and indicating how the design and materials meet the requirements of this SOW. Design product specific manufacturer information (brochures, technical information, cut sheets) as the basis of design for all materials and products to be designed/installed; and
7. Final Specifications – Design detailed explanations of requirements for all performed work.
8. Final Bill of Materials – Design a detailed BOM for ordering of construction materials.

3.1.2.3 100% DESIGN SUBMISSION

The 100% Submittal Designs a complete and final set of contract documents ready for construction by the MTC team. All previous government review comments must have been addressed. Include all drawings, specifications and calculations from the 95% Submittal updated to incorporate all previous review comments. Final project schedule outlining the period of performance and all major and minor milestones. Schedule to be submitted in MS Project format.

3.2 TECHNICAL CRITERIA AND STANDARDS

Project design shall be in accordance with the requirements outlined in Section 1.7 DESIGN CRITERIA.

3.2.1 LIFE SAFETY REQUIREMENTS

The Consultant shall meet all Host Nation and local life safety and fire suppression system codes and requirements as well as the International Building Code (IBC) and NFPA 101 Life Safety Code as required by UFC 1-201-01 and UFC 3-600-01 Fire Protection Engineering. Current building is not required by Israeli Law to be sprinklered. Fire hose outlet boxes shall be designed for fire protection.

3.2.2 HANDICAPPED ACCESSIBILITY REQUIREMENTS

These facilities shall be designed for combat capable, able-bodied personnel only. IAW UFC 1-201-01, these facilities are not required to be handicap accessible.

3.3 GENERAL SCOPE OF WORK

Design the stand-alone facility as described below. Schematic drawings for the structure in section 3.3.1 below. All architectural features on all facilities shall be designed in accordance with the general description of each facility and the detailed requirements that follow. Refer to other sections of this SOW for detailed descriptions of the civil, geotechnical, structural, electrical, communications, mechanical, plumbing, and fire protection requirements for this project.

3.3.1 CJOC BUILDING

Design a one-story, form and poured concrete structure with sloped concrete roof. Exterior finishes shall include HN approved exterior paint and coloring, torch down or equivalent roof covering, parapets and scuppers. Colors and profiles of exterior finishes shall be approved by HN. Building #1 shall comply with the requirements for UFC 4-141-04 Emergency Operations Center. Design the following functional areas for Building #1:

The facility shall have a gross footprint of approximately 700 m2 (7,535 sf).

Overall building height and structural system shall be designed to accommodate a 30cm high anti-static floor system throughout the entire building. The ceiling shall be placed high enough to enable for large screen television screens to be attached to the exterior and/or interior walls. All HVAC ductwork and electrical support shall be located above ceiling or below anti-static floor system.

The elevated anti-static floor system may be designed at grade level or above grade level whichever is more economical.

3.4 DETAILED SCOPE OF WORK

The Consultant is responsible for the following specific tasks required for the construction of this facility.

3.4.1 DEMOLITION

The Consultant is responsible for all required demolition as indicated in this scope. Demolition work for this project is limited to demolition required under Section 2.0 CIVIL AND GEOTECHNICAL. There currently isn’t any demolition expected; however, there may be utility conflicts with current siting of building location. Care should be taken when considering final building design as to reduce demolition as much as possible.

3.4.2 BUILDING SYSTEM AND MATERIALS

The intent of this SOW is to allow the Consultant the maximum flexibility to design and construct this facility in an economical manner without sacrificing good architecture and engineering practices, quality materials and systems. The Government requires low or no maintenance finish materials to the greatest extent possible. Building materials as described herein for roofing, walls, ceilings, doors, windows and floors are minimum requirements and may require revision based on code compliance and criteria.

The architectural elements of this facility shall be designed to withstand all site-specific environmental conditions such as wide seasonal temperature swings, local wind, rain, snow and earthquake conditions. All architectural features shall be appropriately braced for anticipated seismic activity. The Consultant shall have flexibility to propose alternate building materials to meet the facility’s requirements, but final selection of materials shall be subject to the approval of the COR. Materials and building systems shall be selected with consideration given to economics not only in the initial acquisition, but also in the future maintenance of the materials when incorporated into the work.

3.4.2.1 FIRE PROTECTION RATINGS OF INTERIOR FINISHES

All interior finishes shall conform to Host Nation fire protection standards/requirements and equivalent US standards/requirements.

3.4.2.2 ACOUSTICAL DESIGN

Doors and walls shall meet the minimum sound protection per Host Nation and US requirements, including the acoustic requirements contained with UFC 3-101-01. All wall and ceiling assemblies in administrative areas shall be designed to meet the requirements for sound transmission class 65 (STC-65) rated construction at a minimum. At all door and window assemblies in administrative areas shall be designed to meet the requirements for STC-55 rated construction at a minimum.

3.4.2.3 THERMAL INSULATION

Design systems meeting the most stringent thermal insulation requirements in accordance with this SOW and US, HN, and local energy and sustainability codes. The Consultant may have to Design systems with increased thermal insulation to meet the occupant comfort and energy usage goals of this facility, refer to Section 6.0 MECHANICAL. Minimum R-values and maximum U-factors required by this SOW shall be considered minimally acceptable levels of thermal insulation.

3.4.3 EXTERIOR CONSTRUCTION WORK

Design the following exterior architectural systems.

3.4.3.1 EXTERIOR WALLS

Design new exterior walls in accordance with (IAW) the requirements of this SOW. Refer to Section 4.0 STRUCTURAL.

Design a form and poured concrete wall design at all exterior wall locations. Walls shall be continuous from floor to and through the roof diaphragm extending to the top of the roof parapet. Walls shall be designed to resist small arms fire per UFC 4-023-07. Exterior walls shall have smoke/fire resistance ratings as required by US, Host Nation, and local fire and life safety codes. Design exterior wall finishes appropriate for the wall structure as required below.

3.4.3.2 EXTERIOR PERSONNEL DOORS

Design of new exterior doors meeting STC, Security and UFC 4-023-07 ratings and per this SOW.

Doors specified shall be of new factory finished, insulated steel exterior doors and frames to include new exit / escape doors. All main entry doors shall contain no glazing. Flush exterior doors shall have a maximum assembly U-factor of U-0.37 (USI 2.10). The Consultant shall design of all necessary hardware for all doors including panic hardware locking mechanisms. All door frames shall be mounted flush with surrounding walls and seams shall be sealed. Exterior doors shall include a commercially manufactured threshold with a vinyl or silicone rubber weather stripping insert in the face of the stop. Weather stripping shall be held in an extruded non-ferrous metal housing. All doors shall have heavy-duty closers. The Consultant shall size closers in accordance with the specific door application and size, and with manufacturer's recommendations. Coordination of key system shall be completed with the COR and end user.

Each specified door must have the following hardware identified on the door schedule at a minimum:

1. Continuously geared hinge on each leaf;
2. One floor or wall mounted doorstopper, as appropriate;
3. Lever latch handles;
4. Fully mortised lockset compatible with existing keying system;
5. Electrified lockset or electric strike;
6. Fully adjustable hydraulic door closer;
7. Door coordinator on all door pairs;
8. Panic push bar in compliance with NFPA 101 on each leaf, as required;
9. Weather seals and gasketing; and
10. Door threshold and door bottom.
11. Hinges shall be interior facing

3.4.3.3 EXTERIOR WINDOWS

No exterior windows are required.

3.4.3.4 ROOFING

Roof design and materials shall comply with Host Nation requirements and the requirements of UFC 3-110-03 Roofing.

3.4.3.4.3 ROOF GUTTERS, DOWNSPOUTS AND FLASHING

Design for a new pre-finished galvanized steel roof gutters, downspouts and flashing. PVC gutters and downspouts are not acceptable. Size gutters and downspouts for roof drainage area and maximum expected rainfall intensity (100yr, 24hour). Submit gutter and downspout sizing calculations in the Design Analysis. Coordinate storm drainage connections with the requirements of Section 2.0 CIVIL AND GEOTECHNICAL. Submit material and color to COR for review and approval.

3.4.3.5 EXTERIOR METAL

All new exterior metal shall be painted. Any element that has not received a factory applied finish shall be painted in the field. Surfaces shall be scraped and cleaned of rust and dirt before painting. Paint system shall be one coat of rust inhibitive primer and two coats of finish for all surfaces that are not painted. Finish coat paint shall be an alkyd base paint. Color shall be as approved by the COR.

3.4.4 INTERIOR CONSTRUCTION WORK

Design the following interior architectural systems.

3.4.4.1 INTERIOR WALLS

Design for new interior partition walls IAW functional requirements. Design penetration openings (for example for ventilation, piping and cables) as required by other sections and drawings of this SOW and per the NFPA 101 and IBC building codes. Design markings and labels on all fire/smoke rated partitions in accordance with the requirements of the IBC. All interior walls shall meet the STC requirements of the SOW as well incorporate structural strength for any required attachment of equipment of electronics.

3.4.4.1.1 INTERIOR CONCRETE/MASONRY WALLS

Design for new masonry or concrete walls as required. All concrete walls will originate at floor level and terminate at the concrete roof above unless otherwise noted. Unless specified otherwise, design new primer and paint on all masonry walls in all areas. Primer and paint shall be applied directly to masonry walls installed IAW manufacturer's guidelines. Refer to Section 4.0 STRUCTURAL for additional requirements for masonry and concrete construction. Walls shall span from floor to roof diaphragm above.

3.4.4.2 INTERIOR WALL FINISHES

Design of new interior wall finishes as described below. Color and pattern of all wall finishes must be submitted to COR for approval.

3.4.4.2.1 INTERIOR PAINT

Design of paint at all interior walls with a minimum of two coats of latex enamel paint over compatible primer. Paint shall be lead free, water resistive and open to vapor diffusion. All paint shall be low VOC. All paint shall be washable after drying. All paint colors shall be approved by COR.

3.4.4.3 SUSPENDED ACOUSTIC CEILINGS

Design and specification of a new suspended acoustic ceilings in all spaces. Acoustic tile ceilings shall be level and flat. Design and install all required components for a suspended acoustic tile ceiling system including mounting and supports of light fixtures, HVAC penetrations, fire alarm connection points etc. Ceilings shall have a minimum noise reduction coefficient (NRC) of 0.70. Light fixtures and mechanical grilles shall be integrated in the ceiling grid.

3.4.4.4 FLOOR SLABS

Design floor slabs in accordance with the requirements of Section 4.0 STRUCTURAL and the following.

3.4.4.4.1 PERIMETER SLAB INSULATION

Design a continuous perimeter insulation under structural slabs. Insulation shall have a minimum width of 600 mm at perimeter. Insulation shall be rigid board insulation with a minimum R-value of R-10 (RSI 1.76). Insulation shall be appropriate for continuous contact with soil.

3.4.4.4.2 HORIZONTAL WATERPROOFING AGAINST MOISTURE FROM OUTSIDE

Design a vapor barrier below all ground floor slabs in the building. Refer to Section 4.0 STRUCTURAL for additional vapor barrier requirements. The Consultant shall Design photographic documentation to the COR showing the application of the waterproofing material.

3.4.4.4.3 FLOOR FLATNESS

Design floor slabs in Building #1 with a minimum Face flatness (FF) of 40 and Face levelness (FL) of 25 when tested IAW ASTM E 1155M Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.

3.4.4.5 FLOOR FINISHES

Design new interior floor finishes as described below. Color and pattern of all floor finishes must be submitted to COR for approval.

3.4.4.5.1 CONCRETE FLOOR SEALER

Design low VOC, clear epoxy concrete sealer on all exposed concrete floors in all rooms. Concreate sealer shall be appropriate for high-traffic areas and have high oil and chemical resistance. Apply epoxy concrete sealer in accordance with manufacturer instructions. Test concrete for appropriate moisture content prior to application. A coefficient of friction (COF) of 0.5 will be required for all epoxy surfaces. Specify an epoxy anti-slip material as part of the design specifications.

3.4.4.5.2 RAISED ANTI-STATIC FLOOR SYSTEM

Design new interior raised anti-static floor system at the operations area. The floor shall be supported on pedestals with stringers supporting edges of each panel. Each panel shall be easily removable and be covered with a vinyl (or equivalent) style covering for easy maintenance. Coordinate color of floor panels with COR.

3.4.4.6 INTERIOR DOORS

Design new single or steel doors and steel frames. All hardware shall meet the fire rating assemblies for the doors and frames. Design standard door 45mm thickness. Moisture resistant doors and door frames shall be designed for all bathrooms and shower rooms. Consultant shall paint all interior doors and frames using one coat primer and two coats of a finish paint. Color shall be approved by COR. All steel doors shall meet the following specifications:

a)1 ¾ inch-thick minimum with face steel equal to 18 gauge.

b) Hinges reinforced to 7 gauge and internal facing.

c) Door closure reinforced to 12 gauge.

3.4.4.6.1 DOOR HARDWARE

Specify door hardware on the door schedule including but not limited to the following:

All door hardware shall be heavy-duty. Finish shall be brushed chrome. All hardware shall be installed in accordance with the manufacturer’s instructions.

Each door must have the following additional hardware as a minimum:

1. Three hinges on each leaf and inward facing
2. One floor or wall mounted doorstopper, as appropriate;
3. Lever latch handles;
4. Fully mortised lockset;
5. Electrified lockset or electric strike;
6. Rough-in for key card access control terminal;
7. Rough-in for balanced magnet switch for intrusion detection system;
8. Fully adjustable hydraulic door closer;
9. Door coordinator on all door pairs;
10. Panic push bar in compliance with NFPA 101 on each leaf, as required;
11. Acoustic gasketing, as required; and
12. Door threshold.

All doors shall have a mortise lockset. All locksets shall be keyed to one master key system. Panic hardware and smoke tight fire rated doors in egress routes shall be designed as required by the Life Safety Code.

3.4.4.7 INTERIOR WINDOWS

Design interior windows as indicated on attached drawings.

3.4.4.7.1 INTERIOR WINDOW FRAMES AND GLAZING

Design new steel window frames and glazing as indicated on attached drawings. All interior windows shall be fixed. Caulk all joints between window frames and building with acoustical sealant. All interior windows shall meet the acoustic and/or fire resistance ratings required for their installation location. Windows shall have a minimum width of 1500 mm and a minimum height of 1220 mm. All windows shall meet the STC ratings defined within this SOW.

3.4.4.8 INTERIOR WINDOW ACCESSORIES

Design the following accessories on all windows.

3.4.4.8.1 INTERIOR WINDOW SILLS

Design laminated interior window sills at all windows except walls with ceramic tiles.

3.4.4.8.2 WINDOW COVERINGS

Design frame mounted mini-blinds on the interior of all new windows. Blinds and housing shall be made from aluminum. New blinds shall be capable of fully obscuring vision into the space in which they are mounted. New blinds shall be manually operated. Raising and lowering shall be achieved with pull string, opening and closing slats shall be achieved by rotating a rod. The vertical position of the blinds shall be maintained by a safety cord lock. Submit material and color samples to the COR for approval.

3.4.4.9 STAIRS

Design stairs as required for a fully functional facility as indicated on the attached drawings. Stairs shall have structural steel stringers with concrete filled steel pan treads. Design all necessary components and accessories for a complete stair system including necessary structure, bracing, risers, treads, nosings, landings, guardrails, and handrails. Design cast-in abrasive, anti-slip nosings on all stairs and landings. Nosings shall be the full width of the stair tread or landing. Stair and stair components shall comply with US and Host Nation Life Safety Codes. Stair and stair components must be standalone allowing for installation, maintenance and removal of raised floor anti-static flooring. Stairs and all stair components shall conform to the requirements of Section 4.0 STRUCTURAL.

3.4.4.10 EXPOSED PIPES

Design for painting of all exposed ferrous piping. Paint system shall be one coat of rust inhibitive primer and two coats of finish for all pipes that are not painted. Pipes that are already painted shall be cleaned and painted with adequate coats to Design uniformity with newly painted surfaces. Finish coat paint shall be an alkyd base paint. Color shall be as approved by the COR.

3.4.5 SPECIAL FACILITIES

Design the following special facilities in the locations described below.

3.4.6 SIGNAGE

Design all signage in accordance with UFC 3-120-01 Design: Sign Standards and Host Nation standards.

3.4.6.1 INTERIOR SIGNAGE

Design industry standard aluminum or second-surface painted acrylic signs with applied graphics. All interior signs shall be of the same material and construction type, with a coordinated text and graphical appearance.

3.4.6.1.1 INTERIOR ROOM SIGNAGE

Design interior room identification signage for each room. For room signs on offices, Design two slots for paper inserts to allow the User to readily change information such as room name and employee name. Where applicable, Design corresponding international icons/symbols on room signs (for example: toilet rooms and stairs). Signage shall be surface mounted with concealed mechanical fasteners adjacent to room entry doors.

3.4.6.1.2 INTERIOR REGULATORY SIGNAGE

Design the following regulatory signs in the indicated locations with the indicated minimum quantities. Where applicable, Design corresponding international icon/symbol on signs:

1. One of the following regulatory signs at each door equipped with IDS:
	1. Message: “This Facility is Protected by an Alarm System. Unauthorized entry is prohibited. Violators will be prosecuted under the provisions of the UCMJ or other applicable laws”

3.4.6.2 EXTERIOR SIGNAGE

Design exterior signage as described below. All exterior signs shall be constructed from corrosion resistant materials and be made for continuous exposure to the elements.

3.4.6.2.1 EXTERIOR BUILDING NUMBER SIGN

Design exterior building identification signage for each building. Sign plate shall be factory finished made from corrosion resistant metal or acrylic plastic with holes to fasten sign on walls with screws and expansion shield. Signage shall be surface mounted with concealed mechanical fasteners at building corners. Coordinate sign appearance, buildings numbers, and mounting location with COR prior to procuring the signs.

3.4.6.2.2 EXTERIOR REGULATORY SIGNAGE

Design the following regulatory signs in the indicated locations with the indicated minimum quantities. Where applicable, Design corresponding international icon/symbol on signs:

1. One of the following regulatory signs at each door or gate equipped with intrusion detection system (IDS):
	1. Message: “This Facility is Protected by an Alarm System. Unauthorized entry is prohibited. Violators will be prosecuted under the provisions of the UCMJ or other applicable laws”
2. One of the following regulatory signs at the ladder to the raised antenna platform:
	1. Message: “Caution, RF Radiation Hazard, No Unauthorized Access”, Icon: Non-ionizing Radiation Hazard

END OF SECTION

4.0 STRUCTURAL

4.1 GENERAL

The Consultant shall design and perform structural engineering design services as required to provide a complete, accessible, functional and usable project.

The primary structural effort of this project includes

* Design Building 1 as a form and pour concrete structural system with concrete roof and parapets.
* Elements shall include but are not limited to lateral load stability and diaphragm design, framing and connection of any architectural features, and support of mechanical and electrical equipment.

The Consultant shall have as part of his design team a licensed or approved structural engineer, unless otherwise approved by the COR. The Consultant’s structural engineer shall be responsible for the design of any part of the building structural systems and must be licensed per Israeli law.

The structural design of the foundation, superstructure and any other structural aspects shall be in accordance with the design criteria within this SOW. The superstructure of the project buildings and the foundations shall be constructed from locally available materials. The construction shall be designed with a minimum service life of 10 years which may be extended to 25 years with maintenance.

4.2 APPLICABLE DESIGN CRITERIA

Design specifications shall consider Safety in Construction, Materials, and Performance of Construction Services in accordance with the referenced US standards referenced in section 1.7 and current local or national Host Nation codes and standards. In case of conflicting requirements between the various requirements, the more stringent criteria shall govern.

Any material or construction that does not meet the requirements of this SOW or does not meet the applicable codes and standards shall be redesigned and new specifications provided at the Consultant’s expense.

Structural design methods and allowable stresses or load factors for the various structural materials shall be in accordance with criteria paragraph 1.7 of this document.

4.3 SUBMITTALS

4.3.1 DESIGN SUBMITTALS

The Consultant shall provide the structural submittals after contract award in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. In addition to General Section 1.4 SUBMITTALS of this document the following documents shall be submitted.

4.3.1.1 DRAWINGS

The following structural detail drawings shall be designed by the Consultant as required, but shall conform to the requirements of this SOW and are subject to the approval of the Contracting Officer Representative (COR). Construction drawings shall include:

35% Design Submittal

* Preliminary floor plans which Design information of the main structural system of the construction giving general information about dimensions of main elements such as columns, beams, bearing walls, etc. (min. scale 1:50)
* Preliminary foundation plans which include for all typical structures, showing dimensions, arrangements, locations referred to a column line grid system, type of foundation and foundation obstructions. Include the layout of all slabs, footings, piers, grade beams, piles, etc., showing all foundation features of the design. (min. scale 1:50)
* Preliminary bill of materials (BOM) for the structural scope

65% Design Submittal

* Not Required

95% Design Submittal

* All items from the 35% Design Submittal requirements
* Formwork drawings of the load bearing structure including shoring and reshoring as required (min. scale 1:50)
* Reinforcement drawings for primary framing members (min. scale 1:50)
* Details of connections for primary steel framing members (min. scale 1:10)
* Complete reinforcement drawings (min. scale 1:50)
* All necessary sections and details of the load bearing structure (min. scale 1:20)
* Shop drawings of the steel structure (min. scale 1:50)
* Roof framing plan with member sizes and connection details.
* Details of all connections for the steel structure (min. scale 1:10)
* Detailed specifications that are typically sent to sub-Consultants.
* Final BOM

100% Submittal

* The 100% Submittal Designs a complete and final set of contract documents ready for construction. All previous government review comments must have been addressed. Include all updated drawings, specifications and calculations from the 95% Submittal.
* The design criteria actually used for the structural design shall be included in the structural notes on the drawings including but not limited to applicable codes, standards and specified material strengths.

Record Drawing Submittal

* The Record Drawing Submittal Designs a complete and final set of record drawings documenting site conditions based on a survey of the final construction performed by the Consultant.

CAD files of all construction drawings and as-built drawings shall be submitted in .dwg (latest AutoCAD version) and in .pdf format. A Revit BIM file may be submitted in lieu of a .dwg file. Coordinate with the COR for approval.

The design documents actually used for the structural design shall be included in the structural notes on the drawings.

4.3.1.2 STRUCTURAL CALCULATIONS

The Consultant shall submit the structural calculations of all load bearing structural elements and their connections related to this SOW. The current local or national Host Nation codes and standards on which the structural calculation are based shall be included in the calculations. Structural calculations shall be sequentially numbered for ease of referencing for all submittal stages.

4.3.1.3 DESIGN ANALYSIS

The Design Analysis shall state and list the basis of design for all project aspects and features.

4.4 PROOFING OF STRUCTURAL DESIGN

The Consultant shall have an equally qualified engineer other than the designer perform an independent review of all specifications, drawings, design analysis, calculations, and other required data prior to submission to the Government. Submit a letter of certification from the structural engineer performing the independent review stating that they “have checked the structural design calculations, analysis, and drawings and certify that these comply with the applicable building code requirements and standards.” This is in addition to any host nation requirements for structural engineering oversight.

4.5 STRUCTURAL DESIGN CRITERIA

Structural design methods and allowable stresses or load factors for the various structural materials shall be in accordance with the Applicable Design Criteria paragraph 4.2. Recommendations made in the codes, specifications and industry standards are requirements of this document, unless specified otherwise. The references used for the project design and contract documents shall be included in the design analysis required for this project.

4.5.1 MINIMUM STRUCTURAL DESIGN LOADS

The design loads shall be determined in accordance with the codes and standards listed in the Applicable Design Criteria paragraph 4.2. The design load criteria specified herein are minimums; the Consultant is responsible for verifying the actual design loads for this site. If actual design loads are different than that listed herein, the Consultant shall notify the COR. The Consultant should determine if special loadings must be considered and notify the COR. The minimum design load criteria for this project as follows:

4.5.1.1 DEAD LOADS

The structural system shall be designed and constructed to safely support all dead loads, permanent or temporary, including but not limited to self-weight, partitions, insulation, ceiling, floor covering, and all equipment that is fixed in position. Loads from architectural/mechanical/electrical/communication equipment shall be coordinated with the appropriate discipline. All loads and load case combinations shall be in accordance with the codes and standards listed in the Applicable Design Criteria paragraph 4.2. Load factors for designs shall be based on the applicable material design standard.

4.5.1.2 LIVE LOADS

4.5.1.2.1 FLOOR LIVE LOADS

Floor live loads shall be in accordance with the codes and standards listed in the Applicable Design Criteria paragraph 4.2 for the anticipated usage but no less than the following:

4.5.1.2.2 ROOF LOADS

Roofs shall be designed to support live loads; snow loads, including drifting loads, sliding loads, and rain on snow; and support wind loads including components and cladding in accordance with the Applicable Design Criteria paragraph 4.2.

4.5.1.2.3 ROOF SNOW LOADS

Design for a minimum ground snow load for the regional conditions. If the design roof snow loading is less than 1.0 kPa, a minimum roof live load for construction and maintenance of 1.0 kPa shall be used for design of the structure. This roof live loading is in lieu of and not in addition to the snow loading. However, unbalanced snow loads, sliding and drifting loads (in particular areas), or wind loads may be the controlling load case for particular elements.

4.5.1.2.4 HORIZONTAL LOADS

The structural system wind design, including components and cladding, and the seismic design shall be in accordance with the codes and standards listed in the Applicable Design Criteria paragraph 4.2. When IBC 2016 and latest edition of ASCE 7-16 are employed for the wind design, the minimum design wind speed shall be 177 km/h (110 mph). When IBC 2016 and ASCE 7-16 are employed for the seismic design, a Site Class D and seismic spectral accelerations Ss = 0.10 g and S1 = 0.01 g shall be used as minimums unless higher values should be used based on local requirements. Consult the provided Geotechnical report.

4.6 MATERIALS

The use of the recommended materials and/or alternative materials shall be in conformance with the publications listed in the Applicable Design Criteria paragraph 4.2. Any exceptions shall be noted. Alternative materials may be submitted to the COR for approval if the Consultant determines the materials are more economically viable for this geographic region.

4.6.1 REINFORCED CONCRETE

All concrete shall be at least equivalent to C 25/30 and reinforcing steel shall be equivalent Grade B500A conforming to the applicable Israel standard.

4.6.1.1 CONCRETE MIXTURE PROPORTIONS

Concrete mixture proportions shall be the responsibility of the Consultant. Mixture proportions shall include the dry weights of cementitious material(s); the nominal maximum size of the coarse aggregate; the specific gravities, absorptions, and saturated surface-dry weights of fine and coarse aggregates; the quantities, types, and names of admixtures; and quantity of water per cubic meter concrete. All materials included in the mixture proportions shall be of the same type and from the same source as will be used on the project.

4.6.2 FORMS

Materials for forms shall be plywood, metal, metal-framed, reinforced fiberglass, or plywood-faced to Design continuous, straight, smooth, exposed surfaces. Form work for heavy loaded areas such as tall walls and roofs shall be included as part of the design.

4.6.3 MASONRY

Clay bricks, solid bricks, perforated bricks or any other masonry materials used in the project shall conform to the appropriate Local or Host Nation Standard.

4.6.4 STRUCTURAL STEEL

Structural steel shall be of a minimum steel grade equivalent S 235 conforming to the applicable Israel or Eurocode standard.

4.6.5 HOLLOW STEEL SECTIONS

Hollow steel sections shall be of a minimum steel grade equivalent S 235 conforming to the applicable Israel or Eurocode standard.

4.6.6 COLD-FORMED STEEL FRAMING MEMBERS

Cold-formed steel framing members shall have a minimum steel grade equivalent S 235 conforming to the applicable Israel or Eurocode standard.

4.6.7 WELDING

Design of welding shall in accordance with the Applicable Design Criteria paragraph 4.2. Note, field welding shall not be performed without approval of the COR.

4.6.8 WOOD

If wood is used for framing, it shall be designed by the Consultant to accommodate dead and live loads as designed in Section 4.5.1 of this SOW. Note, wood shall be new lumber, undamaged, not infected with insects and show no signs of previous use. It shall be chemically protected against termites and other harmful insects or deterioration. Chemical treatment of wooden construction shall be non-toxic and harmless to the environment.

4.7 BUILDING STRUCTURAL SYSTEMS

4.7.1 FOUNDATION SYSTEMS

Foundations shall be permanent reinforced concrete foundations in accordance with the structural calculations. Foundations shall be appropriately sized for anticipated loading, both live and dead. If foundations are near or below water table, appropriate water proofing measures shall be implemented into foundation design, e.g. waterproof membranes, coatings, drains, etc. Water and storm drainage piping is prohibited under building foundations without special provisions and approval by the COR.

4.7.1.1 SLABS-ON-GROUND

Floor slabs-on-ground shall be a minimum of 15 cm thick. Floor slabs-on-ground shall be reinforced with either bar or mat reinforcing having a minimum area of reinforcing of 0.2% of the slab cross sectional area and located 4 cm clear from the top surface of the slab. Fiber mesh reinforcing in the slab concrete will not be allowed. Design of structural slabs may be considered to remove the need for costly pile systems. Post tensioning design shall include all required tendons, anchors, pull strengths as part of the final plan.

4.7.1.2 CAPILLARY WATER BARRIER

A 15 cm thick capillary water barrier shall be designed under all new interior slabs-on-ground. Recycled crushed material from demolition of pavements shall not be used as granular fill below building slabs-on-ground.

4.7.1.3 VAPOR BARRIER

If used, vapor barrier shall be polyethylene sheeting with a minimum thickness of 15 mils. The vapor barrier shall comply with Class B, five ply, nylon, or polyester cord reinforced high density polyethylene sheets. Place 8 cm of compacted granular sand material between the underside of the slab and the vapor barrier. The use of a vapor barrier under new slabs-on-ground is discouraged except under sensitive floor finishes within the building where its use is required by the flooring finish material manufacturer. Tile, and PVC flooring are not normally considered sensitive floor finishes such that they require a vapor barrier under the slabs-on-ground.

4.7.1.4 ALLOWABLE SOIL BEARING PRESSURE

The allowable soil bearing pressure used for foundation design shall be based on the provided geotechnical investigation. Reference the Civil Design section of this document for geotechnical investigation requirements. In the absence of a soils investigation, foundations for single story structures may be designed using allowable bearing pressures of 1500 PSF (72 kN/m2) designed that no unsuitable soils, such as such as muck or expansive clays, are discovered during excavation of the foundations. If unsuitable soils are discovered, the structural engineer shall be notified to direct corrective measures as required.

4.7.1.5 MINIMUM EXCAVATION AND GRADING REQUIREMENTS

Minimum excavation and grading requirements shall be in conformance with the requirements in the Applicable Design Criteria paragraph 4.2.

4.8 SUPERSTRUCTURE SYSTEMS

4.8.1 GENERAL

The superstructure system shall Design vertical and lateral load carrying capacity and shall Design durability, maintainability, and cost effectiveness. Roof openings and all supports for electrical and mechanical equipment must be detailed or adequately described on the drawings or in the specifications. The structural designer shall ensure that all architectural/mechanical/electrical equipment is properly anchored/braced and that these elements are adequately framed and connected as required by the design criteria, especially where seismic design is required.

4.8.2 NEW BUILDINGS

The new building shall be constructed with a reinforced concrete floor slab and a form and poured concrete wall and roof system. All load bearing elements shall be designed in accordance to the codes and standards listed in the Applicable Design Criteria paragraph 4.2.

4.9 DOD MINIMUM ANTITERRORISM STANDARDS

The structures are classified as low occupancy buildings per UFC 4-010-01. Subsequently, anti-terrorism force protection requirements per UFC 4-010-01.

4.10 TESTS AND INSPECTIONS

Construction inspections and material testing shall be specified by the Designer of Record in accordance with local building codes and UFC 1-201-01 Chapter 3-2.1.7.

END OF SECTION

5.0 ELECTRICAL

5.1 GENERAL

This section includes requirements for the design, procurement, installation, and testing of a complete electrical power system. The Consultant shall Design a complete electrical system and shall specify for all materials, equipment, machinery, supervision, and any and all other items necessary to complete the electrical systems.

Electrical design shall conform to the design criteria, standards, codes, and locally accepted equivalent host nation practices. Specially selected design products shall have been proven reliable and trouble-free in commercial service locations for two years and longer in an environment similar to that of the project site.

No aluminum conductors shall be used in the construction of this facility.

5.1.1 APPLICABLE DESIGN DOCUMENTS

Project design shall be in accordance with the requirements outlined in Section 1.7 DESIGN CRITERIA.

In the absence of Host Nation Building Codes the Consultant shall use the International Building Codes (IBC) and/or the following U.S. Codes and Technical Standards and regulations:

IEC 60309 Standard for plugs, socket-outlets, and couplings for industrial purposes

IEC 60144 Degrees of protection of enclosures for low voltage switchgear and control gear

IEC 60227 Polyvinyl chloride insulated cables of rated voltages to and including 450/750V

IEC 60423 Outside diameters of conduits for electrical and threads for conduits and fittings

IEC 60454-1-3 Specifications for pressure-sensitive adhesive tapes for electrical purposes

IEC 60614 Specification for conduits for electrical installations

IEC 61537 Cable Tray Systems and Cable Ladder Systems for (2001) Cable Management

IEC 60331-21 Insulation integrity for 180 minutes

IEC 60364 Low voltage electrical installations

IEC 60865 Short-circuit currents - Calculation of effects - Part 1: Definitions and calculation methods

IEC 60909-0 Short circuit currents in three-phase AC systems

IEC 61439 Low-voltage switchgear and control gear assemblies

IEC 60990 Methods of measurement of touch current and protective conductor current

NFPA 70 National Electrical Code

NFPA 72 National Fire Alarm Code

NFPA 75 Standard for the Protection of Information Technology Equipment

NFPA 780 Lightning Protection Code

NFPA 101 Life Safety Code

UFC 1-201-01 Non-Permanent DoD Facilities in Support of Military Operations

UFC 3-501-01 Electrical Engineering

UFC 3-510-01 Foreign Voltages and Frequencies Guide

UFC 3-530-01 Interior and Exterior Lighting Systems and Controls

UFC 3-575-01 Lightning and Static Electricity Protection Systems

UFC 3-580-01 Telecommunications Building Cabling Systems Planning and Design

2nd Theater Implementing Inside and Outside Plant (CDS/ICDS)

Signal Brigade Cabling Distribution Systems within USAREUR, June 2017

I3A TC U.S. Army Technical Criteria for the Installation Information Infrastructure Architecture - February 2010

5.1.2 SD-03 PRODUCT DATA:

1. Metal Tubing
2. Conduit Fittings
3. Conductors
4. Outlet and splice boxes
5. Receptacles
6. Toggle Switches
7. Panel board
8. Circuit Breakers
9. Terminal Cabinets
10. Disconnect Switches
11. Conduits
12. Cable Trays
13. Surface Metallic Raceway
14. Electrical Wires and Cables
15. Lighting Fixtures, including Ballasts and Lamps
16. Blank RJ-45 Compatible Data Outlets
17. Automatic Transfer Switch

5.1.3 SD-02 SHOP DRAWINGS:

Shall include, but shall not be limited to, the following:

a. Panel boards

b. Circuit Breakers (to be submitted together with Item a)

c. Panel board Accessories (to be submitted together with Item a)

5.1.4 SD-06-09 FIELD TEST REPORTS

a. 600V Wiring Test

b. Grounding System Test

c. GFI Interrupter Test

d. Lighting

e. Lightning, Grounding, and Potential equalization system

5.1.5 DESIGN CRITERIA

The Consultants design submittals shall contain the following information as applicable to the project as the specified design submittal:

35% DESIGN SUBMITTAL

* Narrative description of the proposed electrical and communication systems
* Legend and abbreviations
* Demolition plans showing existing conditions and demolition work.
* Electrical and communication site plans identifying the new electrical service, the location of new and existing electrical panels, and exterior electrical cable installations.
* Preliminary floor plans with dedicated space clearly identified for electrical and telecomm equipment as required.
* Preliminary communications floor plans
* Preliminary single line diagrams for the building electrical system.
* Preliminary design analysis including preliminary load calculations
* Lighting illumination calculations
* Preliminary bill of materials (BOM)

65% DESIGN SUBMITTAL

* NOT REQUIRED

95% DESIGN SUBMITTAL

* Electrical Site Plans identifying the new electrical service, the location of new and existing electrical panels, and exterior electrical cable installations.
* Electrical Site Plans identifying the electrical service, the location of new electrical panels, and exterior electrical cable installations.
* Lighting Plan(s).
* Power Plan(s) for electrical distribution
* Communication Plan(s) showing rack locations, data outlets, and other special system connections requiring Data
* Cable Tray Plans
* Rack Elevation Plan
* Special Systems Plans.
* Grounding drawings.
* Single Line Diagram.
* Additional Plans/Risers: to include Fire alarm, communications, and other special systems.
* Lightning Protection System Plan
* Electrical and communication - Design analysis including load calculations for utility connections.
* Electrical Calculation Package-include voltage drop calculation, short circuit and ground fault calculation, short circuit coordination study, lighting illumination calculations, and lightning risk assessment
* Detail drawings
* Specifications
* Final BOM

100% Design Submittal:

• All requirements for the 95% submittal, updated per comments from the 95% review meeting.

As-Built Submittal:

• All requirements for the 100% submittal, updated to reflect actual project conditions as constructed.

5.2 ELECTRICAL WORK

The Consultant shall Design the following items within the scope of work, including but not limited to:

1. Exterior Distribution Panel
2. Electrical service cable, Main Distribution Panels
3. Lighting systems
4. Electrical power to mechanical equipment specified in 6.3.5 EQUIPMENT
5. Electrical infrastructure, including but not limited to, pedestals and power receptacles for each buildings and areas
6. Lightning protection and grounding systems for each buildings, areas and general site area
7. Manholes, raceways/conduits equipped with pull string/rope for future communication connection to all buildings and areas as part of the exterior cable distribution system
8. Complete internal communication system including cable runs, cabling and outlets in building working areas
9. Electrical and communication infrastructure for subsequent installation of CCTV, IDS, and ACS components to support buildings and area security

5.2.1 EXTERIOR ELECTRICAL WORK

The main electrical power supply line is being designed by the Israeli government and is not a part of this SOW. The main supply from the substation is 400V, 3 phase, 50Hz. The Consultant shall Design and start the electrical installation with an Exterior Distribution Panel at the electrical tie-in point. The final connection into this Exterior Distribution Panel shall be performed by the Israeli government. The distribution shall be inspected by authorized Israeli authority. Through the COR, the Consultant shall coordinate with the Israeli government in regards to utility line locations, exact installation location of the Exterior Distribution Panel and any required installation phasing.

5.2.2 LIGHTNING PROTECTION AND GROUNDING SYSTEM

General: The potential equalization system according to IEC 60364-5-54 shall consist of the integration of all metal parts of electrical grounding, sanitary, ventilation, and heating systems, to include metallic cable support systems.

Supply cable system (from Power Source) shall be TN-S with division of neutral conductor into neutral conductor and grounding conductor. Facility cable system shall be TN-S.

5.2.2.1 CJOC BUILDING

The lightning protection and grounding system for this building shall be tied into the grounding system of the general area. Design grounding connection point on the concrete apron for emergency generator operation.

Design lighting protection and grounding for each facility. Connection of the Grounding System and all sub systems at the main equalization bus bar located in the building (electrical room) is required. The potential equalization system shall consist of the integration of all metal parts of electrical grounding, sanitary, to include metallic cable support systems. Refer to the local Guide for requirements. The grounding strip material shall be 16 mm2 bare copper wire or hot-dip galvanized steel St/tZn (30 x 3.5 mm) buried 800 mm deep, 1 meter outside building foundation with a 16mm x 2.4m copper clad steel ground rod at each corner. Connection of the Grounding System and all sub systems at the main equalization bus bar located in the building (electrical room) is required. A ground bus bar shall be located in all electrical and telecommunications rooms.

Design a new lightning protection system shall be installed according IEC 62305 and tied together with disconnecting sleeves and test joints at each arrester to the building grounding. The roof and down conductor shall be 8mm Aluminum. A risk analysis shall be designed in the calculations.

The ground resistance shall be based upon IEC 60364-5-54, determined from the soil conductivity, local conditions, and embedded earth electrodes in the foundations. Based upon the dimensions of the facility, the ground resistance will normally not exceed 10 ohms earth transition resistance. In the event that the measured ground resistance exceeds this value, additional ground rods shall be installed by the Consultant. Testing shall not be done within 48 hours of rain.

Air terminal shall be of 10 m hot-dip galvanized steel high pole type, consisting of a conical pole section and an intercepting rod. The poles and fastening cables shall be structurally designed in such a way that they can withstand wind gusts of 160 km/h. The poles shall be interconnected with stainless steel cable, minimum diameter of 16 mm.

The Consultant shall determine the amount of poles to be installed IAW risk analysis calculation.

The material for the grounding elements shall be copper. For connections to other metals, corresponding connectors/connection elements have to be designed. A mesh of copper grounding strips 25 x 2.5 mm shall be embedded into the gravel, at a depth of 70 to 80 cm. The mesh size shall not exceed 10 x 10 m. Design test wells in accordance with UFC 4-420-01, 3-8.4.c. Each lightning protection pole shall have two connections to the ground mesh, preferably 180 degrees apart, in accordance with NFPA 780, 8.3.2.2.2.

5.2.3 EXTERIOR DISTRIBUTION PANEL

An exterior distribution panel shall be designed for the whole building site, located at the electrical tie-in point. This panel shall serve as the termination point where the Consultant’s electrical work for this site begins.

Exterior Distribution Panel characteristics shall be the following:

Nominal low voltage: 400/230 V

Protection class: IP65 (minimum requirement)

Frequency: 50 Hz

Phases: 3 Phase

System Type: TNS (L1, L2, L3, N and E) with busbar

The Panel shall be dimensioned to have at least 2 reserves for NH-fuse strips. All building main distribution panels within this work scope shall be supplied from this exterior distribution panel.

5.2.4 MAIN DISTRIBUTION PANEL (MDP)

New MDPs shall be designed at building #1. The MDP shall be sized to carry the total load of each building it serves plus 25% for possible future expansion. This panel shall be constructed of material to meet a minimum 1 hour fire rating. A new feeder (cable) shall be designed from the outside Utility power source, and underground to MDP, via a new exterior Cable Distribution Box. The MDP shall Design all power for the interior power distribution electrical equipment.

Design of the MDP shall conform to partially tested switchgear combination IAW IEC 61439. This includes the requirements of IEC 60909 and 60865. Short-circuit currents shall be limited as specified in IEC 60364-4-31 and IEC 61439. No live parts shall be installed at the front of the distribution panels. (Dead front panels) Construction of the system shall be in accordance with IEC 60439-1. Protection against contact (dimensioning and arrangement of parts) must comply with the IEC 60990.

MDP electrical characteristics shall be the following:

Nominal low voltage: 400/230 V

Frequency: 50 Hz

Phases: 3 Phase

System Type: TNS (L1, L2, L3, N and E)

It is intended that (Main Circuit Breakers) MCBs are used generally within the Low Voltage (LV) distribution system. Circuit breakers shall be of one common manufacturer. Breakers shall comply with IAW IEC 61439.

* Sized for a minimum of 125% of the demand load plus expandable for 25% future growth.
* Design in accordance with national standards
* Ammeters must be designed for each out going main circuit with 15 min average maximum indication integration period.
* Voltmeters shall be designed.
* Fully rated for the available fault current and furnished with main circuit breakers full sized bolt-on branch breakers, insulated neutral busses and bonded equipment-grounding busses.
* Panel board bus bars shall be copper. Aluminum buses are not allowed.
* The panels are to be designed with one plastic-covered diagram in Estonian and English, indicating all electrical circuits.
* Surge/over voltage protection is to be designed within the panels in accordance with IEC 62305-4
* Design a Cable Distribution (CD) Box, rated for outdoors, on the exterior, on the line side of the MDP, as part of the loop system power feed.

5.2.5 EXTERIOR PEDESTAL

The Consultant shall design pedestals in all construction areas without walls. Pedestal shall be equipped with weatherproof outlets enclosure of at least IP55 protection rating.

5.2.6 INTERIOR ELECTRICAL INSTALLATIONS

Cable installation throughout the facility shall be surface mounted (on walls) with approved conduit conveyance specified as part of the plans. Cables for receptacle circuits will be plastic coated NYM-J. Lighting circuit cables shall be plastic coated NYM-J cable. Maximum voltage loss for any branch circuit shall be 3% and for a feeder shall not be more than 2%. The minimum cross sections of the cables shall be 125% of the required maximum load. The cross-section shall not be less than 1.5 mm² for lighting circuits, and 2.5 mm² for electrical outlets. These minimum cable sizes may need to be increase in size to stay within the voltage drop requirements. Calculations and design analysis shall be designed for all circuits.

The design of the interior electrical distribution system shall match existing incoming supply feeder and utilize a separate equipment ground conductor run continuous throughout the facility. Actual electrical loads and demand factors, where known, shall be used for electrical calculation purposes. Where loads are unknown, the Consultant shall utilize loading, demand factors as appropriate, and conduit fill limited to 40%. Branch circuits feeding receptacles of unknown loads shall be limited to 1200 VA per circuit. Design electrical connections for mechanical heating system as required.

All receptacle and lighting circuits shall be connected to 230 volt, single-phase power. Separate lighting and power outlet circuits will be designed. No lighting shall be connected to a power circuit and no outlets/power items shall be connected to a lighting circuit.

European style 230 volt (16A) receptacles (high standard type) shall be designed. Outlet circuits shall be limited to no more than six (6) 16 A outlets per 16A-1P circuit breaker. Hard wired connections to electrical equipment shall be done with separate circuit breakers.

Bathrooms, janitor rooms and exterior power receptacles shall be protected by residual current operated Circuit-Breaker with Overcurrent protection (RCBO), 2-pole, with 10mA differential residual current trip, 6kA combination breaker. All other branch circuits shall be protected with 30mA RCBO breaker in combination with a B16A miniature circuit breaker. Hard wired connections to electrical/mechanical equipment shall be done with separate circuit breakers.

The general installation method shall be surface mounted installation throughout all areas. If cable trays are used in the corridors, they shall be designed with solid covers and fire rated. All openings in fire compartment walls and through ceilings shall be closed with fire stops.

5.2.6.1 CJOC BUILDING

Room schedule for the installation of standard power receptacles: These are minimum requirements. The Consultant’s proposal shall show proposed outlet quantities and locations.

All outlets shall be designed as Type F duplex located every 3 m of wall length plus 4 at each work station. Where the work stations fall out at the elevated anti-static flooring system, 4-Type F duplex receptacle pig tail may be utilized to allow for maximum flexibility of floor space. Each pig tail shall be no longer than 3 meters in length.

General receptacle installation height: 450 mm AFF. The receptacles shall be of weatherproof, general purpose type. Final location of receptacles shall be coordinated with furniture layouts and equipment placement.

Design electrical connections for all mechanical equipment listed under 6.3.5 EQUIPMENT.

Design an automatic transfer switch (ATS, transfer between the commercial power and the generator power) for a future generator power connection. Provide for the design of a generator and resultant hardware, concrete pad and grounding requirements. The ATS shall contain 3 positions (source A, source B, and maintenance).

5.2.7 LIGHTING SYSTEM

All rooms, corridors and emergency exit discharge areas, shall be equipped with LED type lighting fixtures where possible. The Consultant proposal shall Design proposed light fixtures and proposed layout that is coordinated with room usage and ceiling/mounting type.

The lighting fixtures shall be installed according to their characteristics as XXXW LED fixture type or better. Exterior/waterproof rated lighting fixtures shall be designed at all entrances to the buildings as well as on specified exterior areas. Waterproof lighting fixtures shall be designed where applicable.

Lighting calculations shall be designed showing that all rooms are designed with the minimum lighting requirements. Provide calculations result as part of the light fixture schedule in the drawings.

Entrances: Surface-mounted LED fixtures, with vandal-proof lenses, in building entries.

Exterior Lighting: Vandal-proof fixtures with photocell controllers; except main entrance will have both motion detection and photoelectric control. An illuminated building number will not be designed. All exterior and area lighting shall be automatically controlled via photo sensors with manual switch override. Main control location for all exterior and area lighting shall be clarified with the user during the design process.

5.2.8 EMERGENCY LIGHT SYSTEM

Egress lighting shall be designed in the exit access areas (corridors leading from occupied spaces to an exit), exits, and exit discharges. Egress illumination shall be continuous and arranged so that failure of any single egress lighting unit shall not leave any area in darkness or less than 2 lux. Exit light must be furnished with a battery to Design lighting also during a common power voltage drop out. The capacity of the integrated battery shall feed the lamp for 90 min. These exit fixtures should be connected to regular lighting circuit. In general spaces, emergency lights shall be wired to be able to be switched off with the normal grouping of lights and only function when there is loss of power. All doors leading to the corridor or to the outside shall have Exit signs.

5.3 COMMUNICATIONS

5.3.1 COMMUNICATIONS SCOPE

Consultant shall Design Outside Cable distribution (OCDS) pathways and cabling from the communications tie-in point, located about 50 m away (accuracy ± 10 m measured from the center of the project area) to the facility manhole. Conduit for a minimum of 12 strands single-mode fiber optic cable shall be run from the tie-in point to facility entrance at building #1. A telecommunication manhole design shall be provided at the tie-in point.

OCDS will be routed from the tie-in point to designated location of exterior to interior building telecommunications termination points. Consultant shall Design a plywood backboard in all communication rooms for the OCDS termination point into the ICDS. The Consultant shall therefore Design communication pathways including conduits, manholes, and raceways and cabling running to these areas from the nearest planned building telecommunication termination point (Building #1). If the maximum distance between the building telecommunication racks to the end of any communication infrastructure exceeds 90 m, the Consultant shall Design a plywood backboard placeholder for another telecommunications switch board. The location of the placeholder shall be determined during the design process, while taking into account that the maximum cabling distance shall not be breached, that the proposed location Design adequate shelter and weather protection, and that the location allows controlled personnel access. Designer shall maintain separated conduit runs from the OCDS to each of the internal communication rooms within the CJOC. No conduit runs may pass through a communication room unless it is terminating in that room.

Similar to the electrical power counterpart, installation of telecommunication conduits shall be underground, laid in concrete duct bank to withstand heavy vehicle and traffic loads. The Consultant shall design a minimum of 4 conduits with the minimum size of 125 mm for every communication route. One shall serve as the main cable run, the other shall be spare. The end of conduits shall be stubbed-up min. 15 cm in each communication room.

5.3.2 FACILITY ENTRANCE

The Consultant shall use the incoming OSP cable (minimum 12 strand single mode fiber optic) as near to the conduit point of entrance. Design a Protected Entrance Terminal (PET) assembly factory equipped with LSA+ blocks and LSA+ quick disconnect surge protectors. OSP shall be terminated at the PET. Facility entrance design shall be in accordance with 2nd Signal CDS and UFC 3-580-01.

A grounding electrode from the facility grounding system must be within 1 meter of the PETs. If not, then Design a grounding system directly outside of the facility. OSP copper cable metallic sheath shall be bonded to the facility ground with a separate 16mm2 grounding conductor.

Design a rigid 25mm diameter inner-duct (halogen free) supported vertically in a cable ladder system and horizontally in a cable tray system to serve as cable runs for the fiber optic cables. Termination point on a new fiber optic patch panel mounted in the floor cabinet.

5.3.3 INSIDE CABLE DISTRIBUTIONS SYSTEMS (ICDS)

All ICDS design and installation shall be done in such a manner as to Design complete and fully functional LAN system.

All components used shall be CAT 6 certified. When used together (either from one manufacturer or from multiple manufacturers) the components shall Design a CAT 6 compliant system. Cable colors shall follow standard for system classification level as approved by the COR.

5.3.4 OUTLETS

5.3.4.1 WORK AREA OUTLET (WAO)

The Local Area Network (LAN) systems for office environments must be designed with network outlets. Fiber optic quad gang outlet faceplates shall be used with two connectors labeled voice use and one labeled data use. These outlets shall be installed within office and desk working areas. In Buildings #1, these shall installed every 3.0 m on the back wall of the buildings where the desk working areas are planned. Office shall be equipped with a minimum of 6 double gang outlets.

See architectural floor plans for functional space configurations. Outlet requirements for other space types can be found in UFC 3-580-01. The Consultant must ensure that all data drops, conduit and other items are designed and installed at locations agreed to by the COR and Government end user.

One Category 6 shielded twisted pair (STP) cable must be installed to each standard fiber optic connector provisioned at the outlet.

5.3.4.2 UTILITY ROOMS AND CLOSETS

All utility rooms and closets, such as electrical, mechanical and telecommunications, must be equipped with at least one wall mounted telecommunications outlet.

5.3.4.3 SAFETY, COURTESY, & CONVENIENCE

Design wall outlets at all logical locations to support safety, courtesy, & convenience. Examples include safety: mechanical/electrical rooms, building lobby/entrance, and stairways.

5.3.4.4 BUILDING AUTOMATION SYSTEMS

When requested by the building support systems planner, Design wall outlets at identified locations to support building automation systems. For example, one such outlet may be a direct digital controller (DDC) outlet for the HVAC system.

5.3.4.5 OUTLET LABELING

The outlet(s) shall be labeled according to the CDS standards

5.3.5 CLOSED CIRCUIT TELEVISION SYSTEM (CCTV)

Design a rough-in design for CCTV for the ready facility. CCTVs shall be located along perimeter access points, building entrances, on building/area corners (interior & exterior) as a minimum.

Cable pathways, junction boxes, pull string, pull boxes, and component boxes shall be designed for installation of the cables and power. The components of the CCTV will be completed by others. The CCTV shall be independent of systems safeguarding other facilities and be compatible with the installation’s central monitoring system.

5.3.6 ACCESS CONTROL SYSTEM (ACS)

Design a fully functional ACS system that is compatible with the existing base system to be installed at the secure areas of the Building #~~2~~1 and pedestrian/personnel gate. Refer to Attachment #2 for ACS locations. Buildings shall include ACS at the entrances. ACS must meet PIV II and FIPS 201 requirements. Cable Pathways, junction boxes, pull string, pull boxes, and component boxes shall be designed. Components include HID iClass SE card readers with keypad, magnet locks and/or electric strikes. The ACS shall be coordinated with the architect and electrical power system for integration into doors and power for the head unit. Head unit shall be located near building telecommunication rack.

5.3.7 INTRUSION DETECTION SYSTEM (IDS)

Entire structure should be constructed to meet a SIPRNET capable building standard and adhere to Section 2-2 of UFC-3\_580\_01, “TELECOMMUNICATIONS INTERIOR INFRASTRUCTURE PLANNING AND DESIGN.” Design a rough-in design for IDS for the facilities. Cable pathways, junction boxes, pull string, pull boxes, and component boxes shall be designed for installation of the cables and power. The IDS system design shall include pathways/power for door position (balance magnetic switch) sensors/alarms, 360° motion detectors, window position sensors, and system activation/deactivation keypads. The components of the IDS will be completed by others. The IDS shall be independent of systems safeguarding other facilities and be compatible with the Installation’s, central monitoring system.

5.3.8 TELECOMMUNICATION ROOM (TR)

Data and phone cables shall be terminated to the nearest Telecommunications Rooms. New terminations and cabling shall be designed. CAT 6 cabling shall not exceed 90 meters in length from the TR to the room outlets. Network designs that have users beyond 90 meters from the main TR will require additional TRs to support them. Each TR shall have one wall-outlet installed at or near the entry door for emergency or voice communications. The door shall have ACS. The telecommunications room will have racks for horizontal cabling. The rack shall have a 1-meter clearance on all sides of the rack and shall not be located against a wall. Other clearance criteria discussed in the SIPRNET documentation shall also be met. If required, design TRs and supporting infrastructure in accordance with the local applicable criteria. TRs may not be located or co-located with steam, electrical power (except for what is required for the space), or environmental control rooms. All cable trays shall be designed as open air trays to prevent tampering and allow for ease of removal and placement multiple times a year.

Fiber optic and copper patch panels shall be designed. Fiber optic patch panels will be one rack unit and have 12 SC duplex couplers installed. Power copper patch panels shall be designed for VOIP.

5.3.9 COPPER AND FIBER OPTIC TERMINATIONS

Terminations shall be in accordance with the UFC 3-580-01 and CDS. Room terminations shall be dual RJ-45 outlets with fiber optic terminations as indicated. If a higher outlet density is required, a four or six position outlet (faceplate) may be used. All fiber optic distribution cable must be terminated in cabinet/rack-mounted patch panels, and at the outlet. All fiber strands shall be terminated with TIA/EIA 604-3A “SC” type connectors. Other small form factor connectors may be terminated at the user’s request. Design fiber optic adapters and connectors in accordance with TIA/EIA-604 Fiber Optic Connector Intermateability Standard (FOCIS) and the corresponding FOCIS for the type of connector used.

5.3.10 BUILDING TELECOMMUNICATIONS WIRING

All horizontal and backbone wiring must be designed in a star-configuration as defined in TIA/EIA-568-B.1. All Cables must be terminated within telecommunications rooms, telecommunications equipment rooms, and work areas.

5.3.11 BACKBONE CABLING

Fiber and copper backbone cabling shall be designed in accordance with UFC-3-580-01 and I3A. The building backbone must have no more than two hierarchical levels of cross-connects. Copper backbone cable must be used only for voice circuits. Data backbone circuits must be fiber optics. Single mode fiber optic riser cable will be installed in buildings with multiple floors. Single mode fiber optic cabling will be installed in buildings without splices and be a homerun back to MAIN TR.

5.3.12 CABLE TRAY

Cable tray shall be designed in accordance with UFC 3-580-01, USAREUR CDS and I3A. Cables will be supported by racks, ducting or cable tray throughout the building installation. The racks, ducts, or cable trays will be routed following the contours of the building and secured to the walls or hung from the ceiling. All metallic ducts/raceways and cable trays will be open air type and be strapped together with ground straps and grounded.

5.3.13 CABLE REQUIREMENTS

Design all computer connection cables as fiber optic. Building system cabling (i.e. security systems, alarms, HVAC) may be designed as copper. All cables will be designed to be placed in a conduit system or other approved method by the COR. Cable conduit installed for host nation use shall be done so in a 4”x6” closed conduit. Host nation conduits shall be run in conjunction with US communication requirements.

END OF SECTION

6.0 MECHANICAL DESIGN

The services covered by this section include all labor, material supplies, and incidental work required for the design, installation and testing of all heating, air conditioning, ventilation, and plumbing systems to provide support for Israeli Minor Construction Projects, Building #1 in a secure location. The Consultant shall perform design and construction services as required to design a complete and usable facility.

The mechanical design and construction shall be coordinated with all other trades. The facility and equipment shall be permanent construction. The Consultant shall reference applicable host nation laws, codes and standards for design, except when specifically noted in this scope of work. The designer shall reference the architectural description and perform site surveys to determine mechanical equipment capacities, locations, sizing constraints, fixture quantities and other relevant design and construction requirements when not stated in this mechanical section.

All mechanical systems shall be designed in accordance with the criteria designed herein and with the minimum standards specified in the applicable referenced codes. Should conflicts occur between the criteria designed and the codes, the more stringent requirements shall govern.

6.1 TECHNICAL CRITERIA AND STANDARDS

6.1.1 MECHANICAL DESIGN, ANALYSIS AND NARRATIVE

The Consultant shall submit the mechanical design, design analysis, and design narrative for the facilities for acceptance. Designs following local codes or regulations shall be accompanied with the related referencing standard.

6.1.2 APPLICABLE DESIGN DOCUMENTS

Project design shall be in accordance with the requirements outlined in section 1.7.

In the absence of Host Nation Building Codes the Consultant shall use the following Codes, Technical Standards, and Regulations:

INTERNATIONAL CODE COUNCIL

International Code Council - International Building Code

International Code Council - International Plumbing Code

International Code Council - International Mechanical Code

UNITED FACILITIES CRITERIA

UFC 1-201-01 Non-Permanent DOD Facilities in Support of Military Operations

6.2 GENERAL REQUIREMENTS

6.2.1 EQUIPMENT

Equipment shall be selected based on calculated design values, manufacturer recommendations, and accepted engineering practice. All equipment shall be designed and installed in accordance with the equipment manufacturer’s clearance recommendations for operations and maintenance. Required maintenance access areas shall be shown on the design drawings.

All materials and equipment designed shall be the standard cataloged product of manufacturers regularly engaged in production of such materials and equipment, and shall be the manufacturer’s latest standard design. All mechanical components, including all equipment, piping, and ducts shall be new. Previously installed or used equipment is not acceptable. Consultant shall only select materials and equipment that is readily available in the area.

6.2.2 STRUCTURAL LOADING AND EQUIPMENT SELECTION

Mechanical system design, equipment selection and placement must consider the allowable structural loading of the floors and roof. Designer is responsible for evaluating the structural capabilities of the building and ensuring that design loads are not exceeded.

6.2.3 OVERHEAD MOUNTED FEATURES

Consultant shall ensure that overhead mounted features weighing 14 kilograms (31 pounds) or more (excluding distributed systems such as suspended ceilings that collectively exceed that weight) are mounted using either rigid or flexible systems to minimize the likelihood that they will fall and injure building occupants. Mount all such systems so that they resist forces of 0.5 times the component weight in any horizontal direction and 1.5 times the component weight in the downward direction. This standard does not preclude the need to design architectural featured mountings for forces required by other criteria such as seismic standards.

6.2.4 NOISE AND VIBRATION

Quiet and vibration free operation of all equipment is a requirement of this installation. The design of the mechanical systems shall comply with host nation standards. In the absence of host nation standards ASHRAE recommended standards shall be used to minimize noise to occupied spaces.

6.2.5 MECHANICAL PENETRATIONS

All penetrations required to install the mechanical systems shall be designed. Any penetration through a fire rated wall shall be fire stopped to match the fire rating of the penetrated wall.

6.2.6 PIPING AND DUCTWORK

All newly installed piping and ductwork shall be new. Piping and ductwork shall be concealed except in mechanical rooms or on the roof when serving roof mounted equipment (i.e. air conditioning condensers, water storage, etc.). No piping shall be routed through communications, elevator machine or electrical rooms.

6.2.7 SUBMITTALS

6.2.7.1 DESIGN SUBMITTALS

The Consultant shall provide the mechanical submittal in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. In addition to General Section 1.7.1 Design Submittals of this document the following documents shall be submitted.

6.2.7.2 DRAWINGS

The following mechanical detail drawings shall be designed by the Consultant as required, but shall conform to the requirements of this SOW. All submittals are subject to the approval of the Contracting Officer Representative (COR). Construction drawings shall include, but are not limited to:

35% Design Submittal

* Preliminary floor and roof plan drawings showing equipment locations, two-line duct layout and piping runs
* Preliminary sectional and elevation views
* Preliminary mechanical detail drawings
* Preliminary flow and riser diagrams
* Preliminary bill of materials (BOM)

65% Design Submittal

* Not Required

95% Design Submittal

* All items from the 35% Design Submittal requirements
* Complete floor and roof plan drawings showing equipment locations, two-line duct layout and piping runs
* Complete sectional and elevation views
* Complete Mechanical detail drawings
* Complete air balance, flow and riser diagrams
* Complete equipment schedules
* Complete control diagrams, sequences of operations, and points list(s)
* Complete BOM

100% Design Submittal

* The 100% Submittal Designs a complete and final set of contract documents ready for construction by the D/B Consultant. All previous government review comments must have been addressed. Include all updated drawings, specifications and calculations for the 95% Submittal.
* Consultant shall submit a complete Design Submittal for the 100% Design Submittal

6.2.7.3 DESIGN ANALYSIS

The following mechanical design analysis shall be designed by the Consultant as required, but shall conform to the requirements of this SOW and are subject to the approval of the Contracting Officers Representative (COR). The design analysis shall include:

35% Design Submittal

* Narrative description of the proposed mechanical systems
* Code review for the project
* Preliminary calculations (reference Section 6.3.2 of this document)
* Building heating and cooling loads shall be designed in a bound copy of the computerized load calculations with input and output data in their entirety
* Preliminary construction specifications
* Preliminary bill of materials (BOM)

65% Design Submittal

* Not Required

95% Design Submittal

* All items from the 35% Design Submittal requirements
* Complete narrative description of the proposed mechanical systems
* Manufacturer’s data sheets for all major equipment
* Complete calculations (reference Section 6.3.2 of this document)
* Building heating and cooling loads shall be designed in a bound copy of the computerized load calculations with input and output data in their entirety
* Complete construction specifications
* Complete BOM

100% Design Submittal

* The 100% Submittal provides a complete and final set of contract documents ready for construction. All previous government review comments must have been addressed. Include all updated drawings, specifications and calculations for the 95% Submittal.
* Consultant shall submit a complete Design Submittal for the 100% Design Submittal

6.3 HEATING, VENTILATION, AND AIR CONDITIONING

6.3.1 GENERAL DESIGN CRITERIA

The minimum acceptable outdoor air requirements for ventilation shall be in accordance with the International Mechanical Code and host nation standards; in the event that there are differences or conflicts between the two, the more stringent of the standards shall be adhered to.

Design working space around all equipment. Design all required fittings, connections and accessories required for a complete and usable system. All equipment shall be designed and specified per the criteria in this document and the manufacturer’s recommendations. Where the word “should” is used in manufacturer’s instructions, substitute the word “shall”.

Access panels/doors shall be designed for valves and appurtenances where concealed. All panel locations and sizes shall be indicated on the design drawings. Panels shall be clearly labeled in English and host nation language as to the system and function. Access panels shall be designed for access to mechanical valves, duct dampers, resets, etc.

6.3.2 LOAD CALCULATIONS

Design calculations in accordance with the codes and standards listed in Section 6.1.2 as well as the requirements below.

Perform HVAC calculations for each room. Use a 10% factor of safety for all calculations to allow for deterioration of equipment over its life, and to compensate for equipment start-up. Do not use any additional safety factors in airside or waterside calculations.

Calculate heating and cooling loads in accordance with listed standards. Complete HVAC load calculations using the latest version of Blast, Carrier HAP, Trane Trace 700 Load Design Programs, or an equivalent approved host nation standard. Documentation of the load calculation program may be requested, including a written summary of the program intent and function, assumptions, formulas, numerical methods used, nomenclature, limitations of the program, and references used in developing the program.

Design ventilation calculations in accordance with applicable ICC, UFCs, and host nation standards. Include air change calculations for each space; verify ventilation rates with the referenced publications.

Design static pressure loss, duct sizing, and pipe sizing calculations in accordance with ICC, UFCs, and host nation standards.

Design submissions of the analysis shall include complete input data and the following output data (as a minimum):

a) Systems summary

b) Room by room HVAC loads

c) Load summaries for each cooling unit

d) Equipment energy consumption

e) Energy use summary

f) Input data. Design an electronic and hard copy file in English and host nation language. An electronic copy of the actual input file shall be designed.

6.3.3 DESIGN CONDITIONS

6.3.3.1 OUTSIDE DESIGN CONDITIONS

System design shall be based on the following regional design conditions:

|  |  |
| --- | --- |
| Winter Design Temp (99.6% dry bulb): | 1.1 C dry bulb |
| Summer Design Temp (0.4% dry bulb): | 32.22 C dry bulb |
| Summer Design Temp (coincident wet bulb): | 18.33 C wet bulb |

6.3.3.2 INTERIOR DESIGN CONDITIONS

6.3.3.2.1 BUILDING #1

|  |  |  |  |
| --- | --- | --- | --- |
| **Room** | **Winter Temp** | **Summer Temp** | **Ventilation** |
| Admin Spaces | 20 C (68 F) | 22 C (71.6 F) | IMC/UFC |
| Storage | n/a | n/a | Note 1 |
| Operations Floor | 20 C (68 F) | 20 C (68 F) | IMC/UFC |
| Communications | n/a | 26 C (78.8 F) | Note 2 |
| Mechanical Spaces | 4.5 C (40 F) | n/a | Note 3 |

\* Note 1 – Mechanical exhaust shall be designed in accordance with this SOW and transfer grills are not allowed to be installed in doors due to STC requirements. A slightly positive pressure shall be maintained.

\* Note 2 – Design ventilation as required for the installed equipment but no less than 2 air changes per hour, activated by room thermostat and in accordance with UFC 3-410-01FA.

\* Note 3 - Mechanical ventilation/exhaust shall be designed in accordance with this SOW

6.3.4 SCOPE

6.3.4.1 CJOC BUILDING

The following pieces of work shall be accomplished in Building #1. For further information on relevant equipment and material, refer to the Section 6.3.5.

* Heating shall be designed to administration spaces via air from the HVAC system. Refer to Section 6.3.3.2 for interior space condition requirements.
* Design dedicated, split-system cooling and heating for all communications spaces.
* Make up air ventilation shall be designed to administration spaces via functional make up air systems.
* Design mechanical exhaust to all storage spaces janitor’s closets, and mechanical spaces.

6.3.6 EXHAUST

6.3.6.1 RESTROOM/JANITOR’s EXHAUST

Design mechanical exhaust systems for all applicable storage spaces and janitorial spaces. Design aluminum or stainless steel exhaust grilles and duct (a minimum of 3 meters upstream of grilles) in spaces subject to high humidity. Slope duct towards the exhaust grille. Exhaust duct may be combined where spaces are in close proximity to each other.

6.3.6.2 MECHANICAL SPACE EXHAUST

Design mechanical exhaust and make-up air system for the mechanical/technical room. Design thermostatically controlled exhaust fan and associated make-up air damper. Design motorized dampers at make-up air intake and exhaust air outlet. Design make-up air path for all spaces that include exhaust.

END OF SECTION

7.0 FIRE PROTECTION

7.1 GENERAL SCOPE

Perform a life safety (NFPA 101) analysis and International Building Code (IBC) Analysis. Design smoke extraction where required per Host Nation codes. Design fire extinguishers in accordance with NFPA 10. The fire alarm system shall be in accordance with US and HN requirements. A sprinkler system is not required.

7.2 GENERAL REQUIREMENTS

Design working space around all equipment. Design all the required fittings, connections and accessories required for a complete and usable system. All design documents (i.e. building code/life safety analysis, plans, specifications, and calculations development) shall be prepared by or under the supervision of the design/build Consultants Qualified Fire Protection Engineer (QFPE). The QFPE shall be an individual who is a registered professional engineer with experience designing all facets of fire protection and life safety systems for at least three projects with the same type of facility and system(s) as utilized in the project, including responsibility for fire suppression, life safety (including building code analysis) and fire alarm and mass notification systems. All fire protection construction submittals shall be reviewed by a Fire Protection Expert.

The services covered by this section include all labor, material supplies, and incidental work required for the design, installation and testing of all.

7.3 FIRE PROTECTION EXPERT

A Fire Protection Expert shall be an individual who is a registered professional engineer with experience designing all facets of fire protection and life safety systems for at least three projects with the same type of facility and system(s) as utilized in the project, including responsibility for fire suppression, life safety (including building code analysis) and fire alarm and mass notification systems. The Qualified Fire Protection Engineer and the Fire Protection Expert can be the same person, but must be registered and authorized to practice per Israeli law.

The fire protection design analysis and drawings shall be submitted and approved by a certified Host Nation Fire Protection Expert at the Consultant's expense. The certified Fire Protection Expert shall be an integral part of the design/Consultants team, and must be involved in every aspect of the design/construction as it relates to fire protection. This includes, but is not limited to, US and HN building code analysis, code conflict resolution, life safety code analysis, coordination with approving authorities, design of automatic detection and suppression systems, water supply analysis, and a multi-discipline review of the entire project in accordance with the applicable host nation standards and the Unified Facilities Criteria (UFC) UFC 1-201-01 Non-Permanent DOD Facilities in Support Of Military Operations. The Fire Protection Expert shall be responsible for assuring the proper construction and installation of life safety and fire protection features across all disciplines and trades. The Fire Protection Expert shall be responsible for assuring that life safety and fire protection features are designed in accordance with the design documents, approved construction submittals, and manufacturer's requirements. Examples include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as spray-applied fire proofing of structural components and fire rated walls/partitions, fire alarm and detection systems, fire suppression and standpipe systems, and emergency and exit lighting fixtures. The fire protection expert shall review the 100% design submission of plans and specifications and certify in writing that the design is in compliance with the UFC and all applicable host nation criteria. The letter must be submitted with the 100% submission. The Fire Protection Expert shall be in attendance at all design review meetings.

Construction Surveillance: The Fire Protection Expert shall visit the construction site as necessary to ensure life safety and fire protection systems are being constructed, applied, and installed in accordance with the approved design documents, approved construction submittals, and manufacturer's requirements. Frequency and duration of the field visits are dependent upon particular system components, system complexity, and phase of construction. The Fire Protection Expert shall prepare a written report detailing compliance of any outstanding submittal review comments, summarizing the results of all tests, detailing all discrepancies discovered, corrective action taken, all forms as required by the respective NFPA codes, and recommendations/certifications for acceptance. Forward one copy of the report with attachments to the USACE Fire Protection Engineer.

Final Life Safety/Fire Protection Certification: The Fire Protection Expert shall design certification requirements so that all life safety and fire protection systems can be certified as installed in accordance with the contract documents, approved submittals, and manufacturer's requirements. This certification shall summarize all life safety and fire protection features, and shall bear the professional seal of the Fire Protection Expert.

7.4 SUBMITTALS

The Consultants design submittals shall contain the following information:

* Drawing/Narrative Basis of Design (can be combined)
* A fire protection summary discussing the following minimum fire protection provisions, based on UFC 1-201-01 and UFC 3-600-01:
* Building code analysis summary drawing (i.e., type of construction, height and area limitations, and building separation or exposure protection,
* Classification of occupancy, mixed use requirements, any hazardous areas,
* Requirements for fire and smoke barriers, fire rated walls,
* Life safety plan showing locations of fire rated walls, egress paths, travel distances, and emergency response vehicle access,
* Fire protection plan (include type of system and location of equipment), and water supply information (if system is required),
* Fire alarm/mass notification system plan showing type of system and location of equipment, indicating reporting method to a central station/base location (if system is required),
* Interior finish ratings required and designed
* Coordination with security and antiterrorism requirements.

Submittals related to system configuration, calculations, equipment selection, including manufacturers catalog data, working drawings, connection drawings, control diagrams, and certificate’s shall be submitted concurrently as a complete package. Data and system design shall be prepared in Host Nation and English languages (five copies each). The package will be submitted to the COR for review. The fire protection system installation shall not start until the design is reviewed and approved by the COR.

Manuals shall be in loose-leaf binder format and grouped by technical sections consisting of manufacturer’s standard brochures, schematics, printed instructions, general operating procedures and safety precautions. The manuals shall list routine maintenance procedures and troubleshooting guide. The manuals include procedures and instructions pertaining to frequency of preventive maintenance, inspection, adjustment, lubrication and cleaning necessary to minimize corrective maintenance and repair

Manufacturer’s catalog data for each separate piece of equipment proposed for use in the system shall be submitted for approval. Data shall indicate the name of the manufacturer of each item of equipment, with data highlighted to indicate the model, size, options, etc. proposed for the installation. In addition, a complete equipment list including equipment description, model number, and quantity shall be designed.

As-built drawings shall be submitted no later than 14 days after completion of the final tests. HN will be responsible for testing. Coordination with HN testing authorities shall be coordinated through the COR.

7.5 APPLICABLE DESIGN DOCUMENTS

The Publications listed below form a part of this specification, but are not limited to these. The publications are referred to in the text by the basic designation only. The most currently dated version of each reference code shall be applicable from the start of construction. All Host Nation codes shall be fulfilled.

Unified Facilities Criteria (UFC)

UFC 1-201-01 Non-Permanent DoD Facilities In Support Of Military Operations

UFC 3-600-01 Fire Protection Engineering for Facilities

IBC International Building Code

NFPA 10 Standard for Portable Fire Extinguishers

NFPA 101 Life Safety Code

NFPA 51B Standard for Fire Protection During Welding, Cutting, and other

 Hot Work

END OF SECTION