

# DESIGN ANALYSIS REPORT FMS ISRAEL

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# DESIGN ANALYSIS REPORT FMS ISRAEL

## INTRODUCTION

**This document provides guidance and a template to be used in preparing the Design Analysis Report (DA) required for FMS projects in Israel.**

### **Design Analysis Report Requirement.**

The design analysis report (DA) is a document required (unless specifically exempted) for all new construction and projects involving major alteration or expansion of existing facilities executed as part of the Foreign Military Sales (FMS) program in Israel. The DA shall be submitted with the project drawings and specifications and is an integral part of the design submittal package.

### **Responsibilities:**

The DA shall be prepared by the designer of record for the project, which can be the contracted architect-engineer firm/professional or the in-house design unit of the Israel government agency responsible for the for the military construction project being designed.

### **Definition.**

The DA is a document that consolidates and describes all information related to the design steps followed for the project. Its purpose is to substantiate compliance with the customer/contract requirements, applicable codes and standards, and other applicable requirements.

The DA shall be prepared in coordination with members of the project delivery team including all designers, MOD and service branch staff, and installation command.

### **For each technical discipline the report should include, but not be limited to:**

- (1) Functional requirements established in coordination with the customer and the installation
- (2) Technical requirements and applicable codes and standards.
- (3) Design objectives and assumptions.
- (4) Clear summary of parameters used in design.
- (5) Detailed calculations performed for the design of the project.

### **The report should be prepared and formatted with the following goals in mind:**

- (1) Provision of basis for an easy and efficient review
- (2) Provision of project records
- (3) Presentation of the information so it can be readily used during construction to modify or update the original design.
- (4) Provision of useful information in the planning of operations and maintenance (O&M) and cost reduction.

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## Organization and Content.

The DA shall be organized into two major sections:

Part 1 - "General Description,"

Part 2 - "Design Requirements and Provisions,"

### Part 1 - General Description

This part of the DA will state the purpose, authorization, applicable criteria, and the project description for the project, and provide a summary of the factors influencing the choice of the civil, environmental, architectural, structural, mechanical, electrical, communications, fire protection, and physical security systems in the project, along with an indication of how the initial and life cycle costs were considered. Identify all additional utility requirements, calculate the total requirement, and compare the total existing capabilities.

### Part 2 - Design Requirements and Provisions

This part will include subparts for each major design discipline and basic project design requirements that should be addressed in the DA with justifications to validate the design decisions.

**The following template shall be used for the DA development for FMS projects in Israel. The template shall be tailored to each individual project as applicable. Non applicable section numbers shall be annotated with N/A.**

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## TEMPLATE

### PART - 1 GENERAL DESCRIPTION

- a. **Purpose.** Purpose, functions, and capacities of the project.
- b. **Scope of Work (SOW).** A synopsis of the authorized project will be included in this part of the design analysis, to include the authorized project SOW and programmed amount.
- c. **Authorization.**  
Provide MOD Project Initiation Form (PIF)
- d. **Technical Review Responsibilities.**  
If specific portions of the technical review are performed by the Israeli government, this section shall identify them within this section and describe the scope of the review performed.  
  
Typical items to be reviewed by the Israeli government include:
- Handicap accessibility
  - Security and access control
  - Life safety and other safety requirements
  - Environmental/green building codes
  - Building and room acoustics (noises from firing range/interior functional requirements)
  - Safe rooms
  - Kosher kitchens
- e. **Criteria.** References will be made to applicable technical criteria, specific studies and minutes of meetings held to define the scope of the project, cost limitations and the character of the design.
- f. **Project Description.**
- (1) **Project Site**  
Basic description and location of the site.  
Provide a synopsis that indicates
    - general site conditions
    - project siting requirements
    - existing utilities available to the site
    - topography
    - environmental characteristics that will impact the project or be impacted by it
    - conformance with the installation master plan.
  - (2) **Functional Objective.** The basic functional objective or objectives of the proposed project and the estimated functional life will be described.
  - (3) **Personnel and Equipment.** The number of civilian and military personnel and visitors, and the types of service and/or organizational equipment to be accommodated in the project will be described.
  - (4) **Constructability.** The basic construction materials and systems selected, and the estimated structural life of the project will be described. Describe type and method of construction-- permanent, temporary, or relocatable buildings.
  - (5) **Appearance.** Desired image or visual appearance to include the design of the exterior and interiors of the complex.

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- g. Economic Summary.** Economic factors relevant to decisions affecting the project initial costs will be described. The summary shall include factors influencing the choice of materials, and the civil, architectural, structural, mechanical, electrical, and fire protection systems that when compared to viable alternatives would have significant impact to the life cycle cost of the project.

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## PART - 2 DESIGN REQUIREMENTS AND PROVISIONS

1. **CIVIL.** The civil engineering portion (CE) of the DA document needs to provide a clear description of all the CE project elements, which typically includes site topography, geotechnical characteristics, site grading, storm water drainage, streets/roadways, parking lots, pavements, utilities, and landscape and irrigation, as well as any other project features that are part of the civil SOW.

The narrative must include discussion of all assumptions made in the design process, site constraints and opportunities, and how they have been accounted for in the design, as well as any considerations that need to be taken into account during design and construction.

The following items should be included in the DA:

- (1) Clear description of the SOW, making reference to a site plan and clearly identifying all main project elements, as well as controlled and uncontrolled access points. Discuss any existing structures adjacent to the site and their relationship to the new project.
- (2) Site and vicinity characteristics, including physical setting, topography, vegetation, surface water, wetlands, and existing infrastructure. Discuss how they impact the project, preferably making reference to a topographic plan showing existing elevation contours and all existing features within the SOW limits. If contaminated soils or groundwater are known to exist, provide discussion and show the boundaries of contaminated area(s).
- (3) Report of geotechnical investigation including, as a minimum: plan showing location and elevation of borings; results of laboratory and field testing; boring logs including soil/rock classification; and groundwater elevations. The report should address special site considerations such as site geology and seismicity, expansive and/or collapsible soils, dewatering, soil permeability, corrosion potential, sulfate contents, and any other geotechnical factors that must be considered during design and construction of the project. Provide recommendations for site grading, excavations, suitability of onsite soils for use as fill materials, parameters for the design of foundations, retaining walls, and pavement.
- (4) Hydrologic report clearly identifying drainage basins, flood zones, hydrologic characteristics, design storm intensity, duration and frequency, and parameters required for design of the storm drain system. Provide recommendations for any best practices that should be implemented for storm water management. Discussion must address how the new project will impact the existing drainage regime and any provisions that must be incorporated in the design to ensure the overall area drainage remains unaffected by the new project.
- (5) Climate and weather data such as prevailing winds, sun angles, and seasonal temperature fluctuation. Whenever possible, project features should be oriented to conserve energy and to reduce site preparation.
- (6) Existing utilities and their relationship to the project. Confirm if capacity of existing utility systems has been verified to satisfy project requirements.
- (7) Transportation arteries and access roads in the vicinity of the site and their impact on the project.
- (8) Contractor's mobilization area, including access points to the site and utilities.
- (9) Site former use and how it may impact the project in terms of demolition requirements.

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- (10) Local construction practices that might impact execution of the project, availability of materials, labor and skills, and use of commercially available components.
- (11) Permit requirements, as applicable.
- (12) On-site presence of contaminants and requirements for disposal/mitigation.
- (13) Historic and cultural resources, including areas of archeological concern, if applicable.
- (14) Site grading concept, cut and fill quantities, suitability of onsite soils for use as fill, location of borrow pits and disposal sites, and any other factors that may impact the execution of earthworks,
- (15) Storm water drainage system, assumptions, features, discharge point, and treatment.
- (16) Site utilities, including water sources, assumptions for sizing of water supply, sewer and gray water lines, treatment facility for gray water and connection of sewer line to the public sewer system.
- (17) Traffic circulation concept, including assumptions, design vehicles for turning radii, pavement design assumptions and standards followed, traffic controls, and barriers.
- (18) Parking allowances for civilian and military personnel, visitors, and persons with disabilities.
- (19) Landscape design concept, planting, and irrigation system requirements.
- (20) Site development features including sidewalks, accessibility features for persons with disabilities, retaining walls, fencing, signage, and outdoor furnishings.
- (21) Helipad siting and approach/take-off path, if applicable
- (22) Coordination with outside agencies that might be required during construction of the project.

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2. **ENVIRONMENTAL.** The environmental portion of the DA document needs to provide clear description of the environmental conditions at the project site and surrounding area, how they impact the project, mitigation measures, and any permits that might be required.

The following items should be addressed, as applicable:

- (1) Scope of the environmental assessment performed, including sources of information used such as aerial photographs, satellite imagery, review of existing reports and records, and interviews to evaluate historical site use.
- (2) Site use, including chronology of known use.
- (3) Hazardous materials, including storage areas on site.
- (4) Solid waste, including disposal practices, recycling, and landfills. Discuss any evidence of waste dumping on the project site.
- (5) Hazardous waste observed on site.
- (6) Field investigation and testing of soils and groundwater, if performed.
- (7) Endangered species and habitats that could be affected by the project. Document the existence of any environmental controls or restrictions already in place.
- (8) Existing sources of noise that impact the project, sources of noise as part of the project, and their impact on the surrounding environment.
- (9) Air quality, documenting sources that impact either the ambient or indoor air quality.
- (10) Other environmental concerns and their impact on the project.
- (11) Compliance issues that may arise as a result of project construction and permits required.



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## 3. ARCHITECTURAL.

**a. Functional and Technical Requirements.** Provide a description of each different building type, identifying any special requirements. If an item applies to all items, then a general statement at the beginning of the architectural section is sufficient. Items to be addressed are:

- (1) Functional description of each building type (what will the building be used for?)
- (2) Number and type (military only, civilians, visitors, etc.) of occupants
- (3) Building layout to establish convenient circulation flows for people, services, materials, and equipment, to include evacuation during emergencies.
- (4) Exterior and interior finish materials to include maintainability, damage resistance, slip resistance, etc.
- (5) Any special equipment or furniture needs to be accommodated, i.e. overhead cranes, built-in furniture, medical equipment, etc. Note if any equipment is to be government furnished. Each piece of equipment shall identify any utility connections required, including size, and any clearances required. Specification sheets of major pieces equipment shall be included.
- (6) Identify which buildings require accessibility for handicapped persons and what items need to be provided. It should be noted in the DA that review of accessibility specifics is the responsibility of the Israeli government.
- (7) Energy conservation methods such as building orientation, insulation values, solar sun shades, photovoltaic panels, etc.
- (8) Acoustical design such as sound and vibration control and isolation. While the review of this will be done by the Israeli government, the U.S. needs to have sufficient information to review and ensure that the features have been coordinated for constructability purposes.
- (9) Any future building expansion and flexibility.
- (10) Roof issues:
  - Type of roof materials
  - Insulation requirements
  - How access to the roof for maintenance is to be done and if fall protection is required
- (11) Any special security requirements such as safe rooms (emergency shelters), intrusion detection, window guards, etc. If classified, please state so.

**b. Calculations.** The calculations for architectural design elements, such as those listed below, will utilize metric units.

- (1) Determination of net room areas, occupant capacity and gross building areas.
- (2) Determination of the number of sanitary objects (WC, lavatory, showers, drinking-fountains, etc.).
- (3) Determination of thermal insulation features to include dimensions and properties, location (inside/outside), dew point consideration.
- (4) Roof drainage pipe sizing.

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## 4. STRUCTURAL.

### a. **General Parameters.** General structural parameters that need to be addressed are:

- (1) Foundation characteristics based on geotechnical survey and subsurface investigation.
- (2) Consideration of possible seismic activity
- (3) Description of the overall structural approach for this project. Include adaptation of existing designs and the consideration of available design documents (for renovation projects). Note: Description of structural systems shall be provided under "calculations."
- (4) Description of specific environmental conditions that impact the structural components.

### b. **Functional and Technical Requirements.**

- (1) Allowable settlement soil bearing capacity and pile loads, as applicable.
- (2) Dead, live, wind, snow and seismic design loads. Applicable Codes for load assumptions.
- (3) Allowances for future loads or expansion. Describe type of allowance.
- (4) Dynamic loads, to include weapons effects, as applicable. If this requirement is classified information please state so.
- (5) Material of structural components including design properties like design stresses; allowable unit stress or yield stress of materials.
- (6) Applicable Structural Codes and Criteria
- (7) Nuclear radiation (fallout) protection. If applicable. If not please delete. If classified please state so.

### c. **Calculations.** The calculations for structural design elements will utilize metric units.

- (1) Provide a separate set of structural calculations for each building (if more than one building). The structural calculations shall follow the NAU Engineering Guideline 01/2016 as far as it is applicable for this project.
- (2) For renovation projects: Provide the existing structural calculations for information only.

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## 5. MECHANICAL.

**a. Heating, Ventilating and Cooling (HVAC) Functional and Technical Requirements.** Mechanical related functional and technical requirements that need to be addressed are:

- (1) Identify codes and standards applicable to the HVAC design.
- (2) Identify outdoor design conditions.
- (3) Identify indoor design conditions to include ventilation, temperature, and humidity requirements for each zone type.
- (4) Identify design requirements for unique HVAC zones/occupancies established by the user or based facility type and use (i.e. kitchens, training areas, vehicle maintenance shops, etc.).
- (5) Description of the design heating and cooling plants (boilers, chillers, or central utility plants), HVAC systems and equipment. Provide narrative describing the sequence of operations for the HVAC systems. Provide manufacturer's cut-sheets for major HVAC equipment (chillers, boilers, etc.) to establish a basis of design for the major equipment.
- (6) Description of possible alternative HVAC systems and equipment considered and evaluated by the design team as a reasonable solution. Economic justification and documentation to support the selected HVAC system (life cycle cost, available utilities/energy sources, etc.)
- (7) Description of design energy conservation measures and sustainability features and systems when mandated by contract requirements, codes, local laws, etc.
- (8) Energy capacity requirements to include heating, cooling, gas/fuel, and fuel storage.
- (9) Description of functional and verification testing.
- (10) Redundancy requirements when relevant to facility security and performance requirements.

**b. Plumbing, Functional and Technical Requirements.** Plumbing related functional and technical requirements that need to be addressed are:

- (1) Identify codes and standards applicable to the plumbing design.
- (2) Potable Water quality, supply flow and pressure requirements.
- (3) Overall system description of plumbing water, sanitary, and venting system(s) and equipment.
- (4) Description of compressed air, vacuum, and other gas systems and components.
- (5) Coordination with the connection to site utilities.

**c. Calculations.** The calculations for mechanical and plumbing design elements:

- (1) Heating and cooling loads.
- (2) Indoor Air Quality ventilation and exhaust demands.
- (3) Energy modeling as required to demonstrate compliance with Host Nation energy conservation requirements.

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- (4) Heating and cooling sizing calculations and unit capacities.
  - (5) Supply, return and exhaust air duct sizing and pressure drop.
  - (6) Heating and chilled water distribution sizing and pressure drop.
  - (8) Domestic hot and cold water supply system sizing.
  - (9) Waste water and sewage drainage systems.
- d. **Coordination with Installation or Outside Agencies.** Coordination should include, but not be limited to:
- (1) Total energy and selective energy planning.
  - (2) Operations and maintenance support.
  - (3) Equipment to be installed along with utility requirements, environmental requirements, and heat release.

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## 6. ELECTRICAL.

a. **General Parameters.** Examples of general electrical parameters that need to be addressed are:

- (1) Adequacy of existing systems (power & communications) to supporting this project.
- (2) Specialized functions and equipment.
- (3) Communications support.

b. **Functional and Technical Requirements.** Examples of electrical related functional and technical requirements that need to be addressed are:

- (1) Point of interface between the existing electrical system and the system to be constructed needs to be defined.
- (2) Load characteristics including connected load, demand load, diversity factors, power factor and load growth provisions.
- (3) Exterior distribution; voltage drop, interrupting requirements, physical characteristics of the circuits including types of conductors, ampacity of service, feeder and branch conductors.
- (4) Illumination levels, to include general and task lighting, and lighting requirements.
- (5) Loads and load factors, to include allowances for future loads.
- (6) Lighting, emergency lighting, electrical distribution, communications and standby generation systems.
- (7) Power, lighting, communications and security for site elements.
- (8) Electronic security; access control, surveillance and Intrusion Detection Systems (IDS).

c. **Calculations.** The calculations for electrical design elements, such as those listed below, will utilize metric units.

- (1) Maintained lux [Foot candle (FC)] levels in all areas. Where areas are similar in size and usage, only a typical calculation is required.
- (2) Individual circuit and system loads tabulated in amperes for each panel board or switchboard.
- (3) Transformers, generators, switchboards and feeders indicating all demand, diversity, and ambient-temperature or conductor-grouping factors considered in the selection of equipment or conductor sizes.
- (4) Ground fault and its circuitry protection.
- (5) Selective system protection.
- (6) Voltage-drop on all service and feeder circuits, and on worst-case branch circuits supplied by each panel board and switchboard.
- (7) Short circuit calculations.

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## 7. FIRE PROTECTION AND LIFE SAFETY.

**a. General Parameters.** Identify that protection and life safety review is to be performed by the Israeli government and the information provided is for coordination of the various architectural and engineering reviews by USACE. Examples of general fire protection parameters that need to be addressed are:

- (1) Types of occupancies.
- (2) Any special hazards and methods for protection.
- (3) Water supply, including new or additional water storage, pumping, and/or water distribution mains.
- (4) Fire resistance of building components, to include floor and ceiling assemblies, exterior and interior walls, shafts, and location of fire separation walls and partitions.
- (5) Any flame spread and smoke development rating of interior finishes and insulations that needs to be accommodated in the specifications.
- (6) Smoke control methods.
- (7) Identify if automatic extinguishing, fire alarm, or fire detection systems are required.
- (8) Fire hydrants and standpipes.
- (9) Any existing water supply and fire hydrants.

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## 8. PHYSICAL SECURITY.

a. **General Parameters.** Identify that physical security review is to be performed by the Israeli government and the information provided is for coordination of the various architectural and engineering reviews by USACE. Examples of general physical security parameters that need to be addressed are:

- (1) Fencing
- (2) Access Control Points
- (3) Building Access
- (4) Glazing requirements, if any
- (5) Locations for security cameras
- (6) Special locks

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