REPUBLIC OF TÜRKİYE

MINISTRY OF ENVIRONMENT, URBANIZATION AND CLIMATE CHANGE (MoEUCC)

GENERAL DIRECTORATE OF CONSTRUCTION AFFAIRS (GDCA)

Seismic Resilience and Energy Efficiency in Public Buildings Project

Project ID: P175894

TERMS OF REFERENCE (TOR)

for

Retrofit Design and Construction Supervision of 5 Buildings in TÜBİTAK Gebze Campus

Reference No:

WB/CS-DESSUP-07

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PHASE I: STRUCTURAL and ENERGY EFFICIENCY RETROFIT DESIGN using INNOVATIVE TECHNIQUES (LUMP-SUM CONTRACT)

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PHASE I: STRUCTURAL and ENERGY EFFICIENCY RETROFIT DESIGN (LUMP-SUM)

I. INTRODUCTION AND BACKGROUND

Buildings with the greatest vulnerability to disasters are typically energy inefficient, as these buildings pre-date modern building codes, which is the case for a vast number of public buildings in Türkiye. In order to improve disaster resilience and energy savings in selected central government buildings, and to strengthen the institutional capacity to develop, finance and implement resilient and sustainable public buildings, the Government of Türkiye signed a loan agreement in the amount of USD 265 million for the Seismic Resilience and Energy Efficiency in Public Buildings Project (SREEPBP) that will be implemented by the Ministry of Environment, Urbanization and Climate Change (MoEUCC, also to be referred as Client). The General Directorate of Construction Affairs (GDCA) under the MoEUCC has been delegated to assume overall responsibility for the implementation and management of SREEPBP. The GDCA has created a Project Implementation Unit (PIU) to oversee all aspects of the project, including managing administrative tasks, procurement, coordination with the authorities and beneficiaries, environmental and social obligations, monitoring, evaluation, and reporting of the project.

Within the scope of the WB/CS-DESSUP-07 Terms of Reference (ToR) under SREEPB, a Consultant will be hired by the MoEUCC for the structural and energy efficiency retrofit designs and construction supervision of the three (3) buildings located in TÜBİTAK Gebze Campus (hereafter referred as "Buildings") shown in **Figure 1** and listed in **Table 1** (see **ANNEX I**: SELECTED BUILDINGS for more information).

Characterization (architectural, material, geotechnical, etc.), performance assessment and retrofit design of all Buildings were carried out under separate consultancies according to the Turkish Building Earthquake Code 2018 (TBEC2018) using non-linear time history analyses (NTHA). All generated site-specific ground motion time histories and retrofit designs were checked and approved by design supervisors defined in TBEC 2018. The Consultant will be responsible for checking the final structural retrofit designs, performing energy efficiency renovation designs, preparing environmental and social management plans (ESMPs), operational health safety (OHS) plans and full set of tender documents for construction works in the first phase of the ToR under a lump-sum contract. Consultancy services for the supervision of construction works including preparation of M&V reports and supervising remedial works to rectify defects that arise during the Defects Notification Period (DNP) will be within the scope of the second phase of the ToR under a time-based contract.

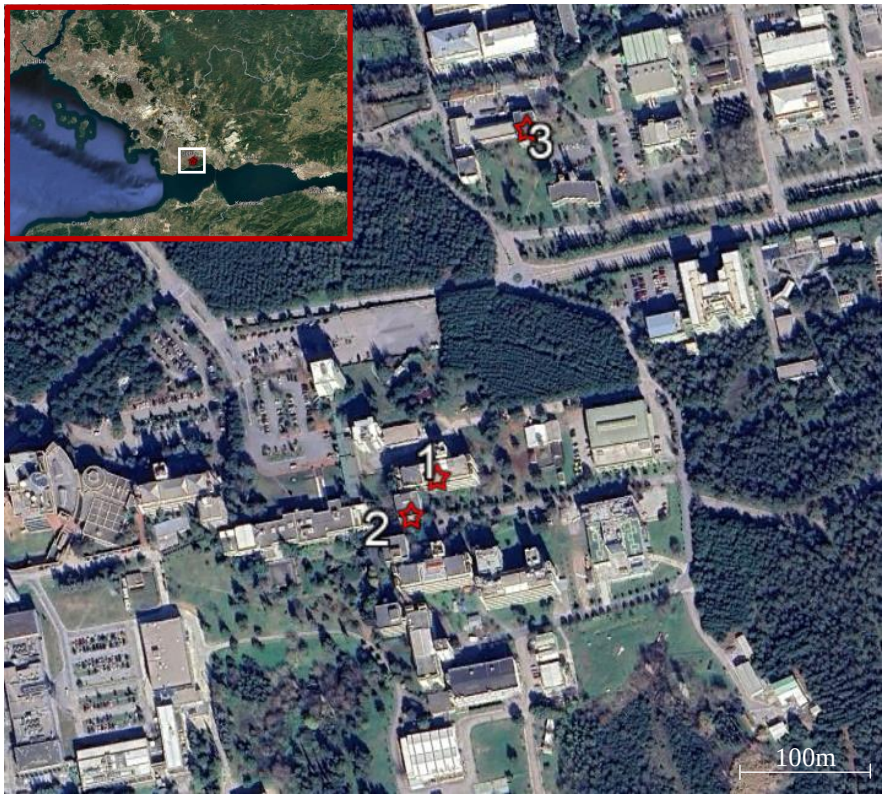

Figure 1. Annexed Buildings in TÜBİTAK Gebze Campus

Table 1. List of Annexed Buildings

#	Building Name	Construction Area (m^2)	Number of Stories	Structural Retrofit Method
1	MAM Gıda Laboratuvarı Binası	5.000	B+4	BRB
2	MAM Gıda Laboratuvarı İdari Bina	1.787	2B+5	FRP Wrap + FRP Plate + RC Wall
3	MAM İdari Bina	1.305	3	FRP Wrap + RC Wall + RC Column Jacketing
	Total Construction Area:	8.092		

II. PROJECT OBJECTIVES

The SREEPB project will primarily focus on improving the disaster resilience and energy efficiency of selected central government buildings, as well as on enhancing the policy framework and institutional capacity for the development, financing, and implementation of flexible and sustainable public buildings in Türkiye. Public buildings such as educational facilities, dormitories, hospitals, and government administrative buildings will be structurally strengthened and renovated or demolished and reconstructed under the SREEPB project.

The buildings to be retrofitted will be aimed to achieve minimum energy performance and minimum energy savings as specified in the Project Operational Manual[1]. Architectural, mechanical, and electrical renovations and some renewable energy (RE) systems (e.g. rooftop solar photovoltaic (PV), ground source heat pumps, solar water heaters), fire detection and extinguishing systems will also be included depending on their economic viability. The renovated buildings will also comply with all relevant national regulations and laws regarding shelter, fire, workplace safety, accessibility for persons with disabilities, and similar requirements, in addition to meeting all standards for the materials used.

III. SCOPE OF SERVICES

To be given the available building documents including but not limited to building survey drawings, material and geotechnical characterization reports, design supervisor (TGUA-1) approved site-specific ground motion time histories report, design supervisor (TGUA-3) approved structural performance analysis and structural retrofit design reports and final retrofit drawings, the Consultant will be required to

- Check completeness, adequacy and quality of provided documents (i.e. architectural survey drawings, retrofit design report and drawings, etc.) and suggest revisions (revisions to be made by project owners)
- Conduct energy audit survey
- Prepare:
    - Investment grade energy audit report,
    - Mechanical and electrical retrofit projects,
    - Bill of quantities,
    - Cost estimation report,
    - Detailed technical specifications,
    - Environmental and social management plan (ESMP),
    - Occupational health safety (OHS) plan,
    - Commissioning plan,
    - Measurement and verification (M&V) plan, etc.

The aforementioned consultancy services cover three (3) buildings in TÜBİTAK Gebze Campus having a total of 8.092 m^2 construction area.

[1]https://documents1.worldbank.org/curated/en/738871623549676664/pdf/Turkey-Seismic-Resilience-and-Energy-Efficiency-in-Public-Buildings-Project.pdf

IV. DESCRIPTION OF THE CONSULTANT'S TASKS

Task 1: Inception Report

The Inception Report should outline the scope of services defined in the contract and the headlines illustrated below:

- Background and Context: The objectives and goals of the services to be provided should be briefly summarized. In cases where multiple actors (i.e., sub-contractors) are planned to be involved in the process, it should be specified who will be involved to what extent.
- Software: Computer programs to be used in analysis, drawings, cost estimates and work plans, etc. should be identified.
- Logistics and Support Required from the Client: All assistance and arrangements expected from the Client for the fulfillment of their tasks should be specified.
- Work Plan: A detailed schedule presenting the details and key outputs of project services including the environmental, social and OHS issues following the initial report should be prepared.
- Contact Persons: Contact information of individuals representing the Consultant should be shared with the Client to facilitate communication during the project implementation.
- Field Evaluation: The Consultant shall organize a site visit to verify available survey drawings and assess the applicability of proposed retrofit systems for the Buildings. The Consultant shall propose revisions to the survey drawings, functionality renovations, improvements and required repairs and report these to the Client.

Additionally, The Consultant shall check available technical documents and drawings to be provided by the Client for the Buildings and request revisions if necessary. Checklists for technical drawings will be provided by the Client.

Task 1 Deliverables

D1.1. Inception report

D1.2. Review report to available documents

Task 2: Investment Grade Energy Audit Report

The consultant shall conduct investment grade energy audits of public buildings to identify and recommend energy efficiency measures (EEMs) for implementation of energy efficiency (EE) investments according to the Audit Template. The activities required to conduct investment grade energy audits include, but may not be limited to, the tasks described in the following sections. The work conducted should comply with the principles and processes described in ISO 50002.

Further definition and details of intended audit template is provided on the project's website in the form of "*Audit Template*[2]*"*. Please refer to this template document for detailed process overview and intended outcome of the process.

2.1. Conduct preliminary reviews:

Perform an initial energy use evaluation by reviewing all utility data and building or system diagrams, which can include architectural plans, electrical plans and cuts, electrical board schemes, thermal systems (production and distribution) plans, equipment lists and catalogues, operation and maintenance logs, and other available facility information.

The initial activities under this task include determining the required scope of work, identifying key personnel (including personnel responsible for Operation and Maintenance (O&M) and energy-related issues); and requesting specific information and data. The data to be requested and collected from the building managers should include, but may not be limited to:

[2] https://www.kabev.org/kutuphane/sablonlar/

- Meteorological data of the site: Monthly ambient temperature and humidity, heating degree days (HDD) and cooling degree days (CDD) for a 3 consecutive year period
- Energy bills for the past three calendar years; all forms of energy should be included in this analysis
- Online billing data
- Building Management System (BMS) history and data
- Building layout drawings and site plans
- Equipment lists for main energy-using equipment
- Process flow diagrams
- Process and instrumentation drawings (P&IDs) for large energy users
- Operational, weather and other data relevant for energy use (occupancy, weather, production data)
- Copies of any previous energy audits, studies or details of known opportunities for energy efficiency
- Details of upcoming organizational changes or other investment plans that are expected to affect energy efficiency or energy use

Review all available facility documentation with site representatives where possible. Review at least three years of energy data and discuss year-to-year variations and seasonal variations in energy use patterns. Calculate the baseline consumption, i.e., the expected energy consumption under current operating conditions, based on the monthly ambient temperature and the historical consumption data for a selected reference period. If national norms for lighting/heating/cooling are not met in the existing status of the building and current baseline does not represent a fair benchmark for energy use of previous years, an adjusted baseline shall be generated so that energy consumption of the building before and after energy efficiency measures are implemented can be accounted in a fair and correct way. The baseline consumption shall be normalized as defined in ISO 50006 and later be revised using data from site assessments. In the case that energy data is not available, energy modelling shall be performed to calculate the baseline consumption.

2.2. Conduct site assessments:

Further investigate the major energy-consuming processes in the facility. At the end of this task, the buildings and systems descriptions and collection of consumption and other relevant data to propose and describe EEMs should be completed. All relevant findings related to the visual inspections, field measurements, and interviews must be included in the energy audit report. The site assessment shall focus on all passive and active systems available on site and will include, but may not be limited to, the following subtasks:

- Conduct visual inspections
- Develop time plan for field visits and measurements
- Conduct field measurements, i.e., electricity measurements of the main consumption points per floor or per main use (e.g., X-rays in hospitals), develop monthly and daily load profiles for electricity consumption, cooling and heating, internal and ambient temperature and humidity per hour during the period of audits
- Conduct field interviews

2.2.1) Conduct visual inspections: Conduct visual inspections in a walk through to verify the completeness and accuracy of available documentation. This will include, but may not be limited to:

- Construction details of the building envelope (e.g., walls, roof, windows, doors) and related insulation values
- Heating and cooling production systems capacities (e.g., chillers, boilers), rated efficiency, and maintenance status
- Heating, Ventilation and Air Conditioning (HVAC) distribution system (e.g., pumps, heat exchangers) capacities, rated efficiency, and maintenance status
- Air handling units capacities, rated efficiency, and maintenance status
- Electrical motors, their end-use, efficiency data, and maintenance status
- Type of control methods and operation schedules
- Interior and exterior lighting systems and related controls
- Service/domestic hot water systems, their storage capacity, efficiency, and maintenance status
- Renewable Energy (RE) generation and integration with building systems
- Other relevant energy consumption drivers

The report should include images to present the current state of the facility, possible shortcomings in the construction or in systems maintenance.

2.2.2) Develop a time plan for field visits and measurements: Define and agree on a time plan for field visits and measurements with the building supervisor, the O&M team and inform the Client at least 10 business days before the visit. The time plan may be revised based on the operational conditions and availability of the building.

2.2.3) Conduct field measurements: Perform all necessary on-site measurements to detail the energy baseline and collect data required for identifying EEMs. Install and operate the necessary energy monitoring equipment on-site suitable for the relevant data collection (e.g., data loggers, flue gas meters, temperature and hygrometer sensors, electric/gas meters, air and water flow meters, thermal cameras). If it is not possible to measure the actual performance of systems and equipment (e.g., due to temporary malfunction, or out of season audit), performance of the systems and equipment shall be either simulated based on theoretical and inspection data or measured later before the final date of audit report submission depending on the time plan of the audit process. In case there are equipment/systems which cannot be measured despite all efforts, a clarification that explains the reasons why they cannot be measured shall be provided to MoEUCC along with supporting documentation such as site pictures, field interviews with Beneficiary's technical staff, etc. This clarification shall also be included in a relevant section of the final audit report.

Field measurements should include, but may not be limited to:

a) Building envelope: Windows, doors and insulation
   - Outside and inside surface temperatures
   - Thermal image for energy loss/gain and surface temperature
   - Layer by layer definition of building components
   - Insulation layer thickness
   - Glazing details/thickness (U-value, visual light transmittance percentage, SHGC, thickness of glass, U-value and construction details of frames, equivalent U-value of fenestration (frame + glass))

b) Heating/cooling production and distribution system
   - Input values like electrical instantaneous and continuous power consumption for electrical based systems (e.g., chillers, fan, pumps)
   - Enthalpy measurements for chillers and boilers
   - Output values like airflow, water flow, air and water temperatures (fans, pumps, chillers, cooling towers)

c) Efficiency of boilers and other heat-generating equipment
   - Flue gas temperature and chemical composition (O_2, CO_2)
   - Fuel/gas instantaneous consumption
   - Relevant measurements in order to calculate COP, SCOP, EER, SEER values

d) Ventilation system and air terminal units: Air handling units, heat recovery units, exhaust fans, etc.
   - Input values like electrical instantaneous and continuous power consumption for electrical based systems (e.g., fan, pumps)
   - Enthalpy measurements for heating and cooling coils
   - Output values like airflow, water flow, air and water temperatures (fans, heating/cooling coils)

e) Electrical consumption of lighting systems
   - Electrical instantaneous and continuous power consumption for sample circuits
   - Lighting level (lux) in sample representative locations

f) Motors (including fans, pumps) and other plugged systems
   - Electrical instantaneous and continuous power consumption for sample circuits.

g) Electrical loads and consumption of the buildings
   - Electrical instantaneous and continuous power consumption for at least 5 full days which shall include weekday and weekend operation profile for main distribution panels, transformers

h) Other energy consumption systems and equipment.

During the field measurement phase, building supervisor should provide the corresponding relevant variables, e.g., operating parameters, production data, occupation data. Additional measuring points, appropriate measuring

equipment, associated processes and feasibility of installation may be identified during field measurements.

2.2.4) Conduct field interviews: Interview key stakeholders (e.g., building manager, O&M staff, and users) to assess O&M routines, potential changes in user patterns (e.g., number of users or changes in user behaviour), and comfort levels (e.g. indoor temperature, air quality, lighting levels) and to collect/confirm other relevant information. Interviews shall consider data collected during the previous tasks and aim at obtaining relevant information to explain seasonal and year-to-year changes in historical energy consumption, identifying current energy management practices and improvement potential, and identifying the feasibility of potential EEMs.

2.1. Data analysis:

Revise the baseline energy consumption using data collected in previous tasks. If national norms for lighting/heating/cooling are not met in the existing status of the building and current baseline does not represent a fair benchmark for energy use of previous years, an adjusted baseline shall be generated so that energy consumption of the building before and after energy efficiency measures are implemented can be accounted in a fair and correct way. Identify EEMs and their investment costs, energy savings, and cost benefit. Develop scenarios for different combinations of EEMs with consideration of cross-effects between different EEMs. The audit report should document methodology, assumptions, and supporting calculations. This task will include, but may not be limited to, the following subtasks:

1) Describe audit scope
2) Review energy baseline and conduct EEM calculations
3) Determine investment costs
4) Establish different investment scenarios (base scenario, deep renovation, recommended scenario or mix scenario)
5) Conduct financial analysis
6) Determine energy performance class,

2.3.1) Describe audit scope: Describe buildings and systems analysed in the energy audit (e.g., areas/buildings covered, building envelope, heating/cooling, lighting and RE, alternatives to fossil fuel-based heating).

2.3.2) Review energy baseline and conduct EEM calculations: Review the preliminary assessment of the energy consumption baseline using data collected in the previous tasks, including:

a) Use measurement data to explain the consumption behaviour of the main users and refine the energy consumption baseline.
b) Compare energy consumption with specific energy use values of similar buildings if available (local and international experience)
c) Identify Best Available Techniques (BAT) at international level
d) Study the historical pattern of energy performance and establish relationships between energy performance and the relevant variables (e.g., heating/cooling degree days, occupation)
e) Assess existing energy performance indicators, e.g., kWh/m2, kWh/occupant, kWh/bed, and additional energy performance indicators, e.g., kWh/HDD or CDD

If there is insufficient quality data for setting up the baseline, dependencies and correlations between historical data, field data and other variables (e.g. weather-related variables, occupancy, events, documented equipment malfunctions, etc) should be used to establish a suitable baseline. If national norms for lighting/heating/cooling are not met in the existing status of the building and current baseline does not represent a fair benchmark for energy use of previous years, an adjusted baseline shall be generated so that energy consumption of the building before and after energy efficiency measures are implemented can be accounted in a fair and correct way. This process has to be documented in the report.

The field measurements and the catalogue/historical data must be used for the calculation to simulate the future energy performance with the proposed EEMs. If deemed necessary by the Consultant, several software tools may be used for baseline and EEM simulation calculation (not exhaustive): *Trace* for life cycle analysis; *Energy Plus*, *IESV* or *Carrier HAP* for energy modelling. Software tools to be used to simulate the level of service and envelope requirements may include: *Dialux* for lighting levels; *TS 825 Heat Insulation Standard* for insulation requirements.

EEMs shall be developed based on the specific building analysis, but typical measures that should be considered include:

- New or improved building envelope insulation
- Renewal of window and doors
- Heating boiler renewal

- Boiler burner adjustment
- Boiler waste heat recovery integration
- Heating fuel shift by replacement of boilers with heat pumps
- Renovation of cooling/chiller systems
- Replacement of chiller systems with 4-pipe heat pump chillers or reversible heat pumps
- Replacement of old chiller systems with ground or water or air sourced reversible heat pumps
- Hybrid solutions which integrate existing or renovated chillers and reversible heat pumps especially utilized for transitional season operations
- Variable speed circulation pumps and fans
- Piping and duct insulation
- Thermostatic valve usage in heating/cooling circuit
- Lighting ballast type renewal
- LED lighting systems
- Daylight harvesting, solar tubes
- Movement sensor integration to lighting systems
- Building automation systems
- Energy monitoring system
- Upgrade of electric motors with high-efficiency models
- Cogeneration/Trigeneration
- Photovoltaic (PV) systems both rooftop and over canopy in open parking lots
- Solar water heating (SWH)
- Biomass or other alternatives to fossil fuel-based energy
- Heat pumps

In all cases, the main energy-consuming vectors have to be addressed in the EEM proposal. The RE generation should be carefully detailed, with simulation production, grid connection point and relevant construction requirements, if any. No-cost measures, e.g., energy management and O&M, shall be stated but not included in the financial analysis.

The indirect effects of the EEM implementation have to be considered:

- Repairs or operational changes required for the EEM to be effective
- Impact on O&M procedures and cost
- Impacts on occupant health, comfort or safety, as well as non-energy benefits, especially improvements to health, safety and environment, changes in equipment run time, and maintenance labour hours
- Challenges of dismantling of old equipment and installation of new equipment or of scaffolding and civil construction works due to physical constraints on site
- Possible operational changes in human and vehicle mobility within the building site or campus due to location of proposed new system/equipment
- Commissioning requirement

2.3.3) Determine investment costs: Accurate investment cost need to be determined for the financial analysis by gathering equipment, installation and construction costs from a sample of vendors and contractors. Costs should include any specific considerations for the particular facility and all indirect costs needed for implementation (e.g., dismantling, transport, scrapping, recycling, scaffolding, pipe accessories, civil construction works, electrical connections, changes in electrical boards). O&M costs, commissioning, and reinvestment cost have to be included in the financial analysis.

2.3.4) Establish different investment scenarios: Three different scenarios of combination of EEMs shall be presented in the audit report:

a) Base scenario with EEMs that save a minimum of 20%[3] of the baseline consumption and a payback period shorter than 12 years for the combination of EEMs
b) Deep renovation scenario with EEMs that save a minimum of 30%* of the baseline consumption and a payback period shorter than 20 years for the combination of EEMs

[3] Primary energy efficiency improvement percentage may be used for calculating overall energy efficiency calculation of the deep renovation scenario in case on-site electricity production measures are proposed such as cogeneration/trigeneration, etc.)

c) Recommended package of EEMs, which could be a selection of EEMs from the base and deep renovation scenario

All EEMs that were considered but not included in any of the scenarios should also be presented in the report.

The scenario construction will depend on the specific circumstances, but some general guidance can be provided in the next paragraphs and in the table below:

a) The base scenario should include retrofitting the insulation and fenestration according to the TS 825 Heat Insulation Standard, basic building-level energy metering, and other EEMs with shorter payback periods.
b) The deep renovation scenario should always include additional insulation and window/door upgrade, include upgrades of EEMs from the base scenario, and include additional EEMs not included in the base scenario. The payback period for the building envelop measure can be longer than 20 years, but the individual payback periods for all other EEMs should be shorter than 20 years.
c) The recommended package can comprise a combination of EEMs from the base or deep renovation scenario but should not include (i) EEMs with payback periods longer than 20 years except for the building envelope measure and (ii) EEMs with payback periods longer than the lifetime of the equipment.

Table 2. General Guidance on Scenario Construction

Existing situation	Base Scenario	Deep Scenario
Insulation/fenestration not standard	Insulation/fenestration as in TS 825 Heat Insulation Standard	Insulation/fenestration better than TS 825 Heat Insulation Standard
Insulation/fenestration as in TS 825 Heat Insulation Standard	-	Insulation/fenestration better than TS 825 Heat Insulation Standard
EFF1 or EFF2 motors	IE3 motors	IE4 motors
EFF1 or EFF2 motors	IE3 motors	Variable Frequency Drive (VFD) with IE3 motors
Conventional Boiler	Condensation Boiler	Heat pump or biomass boiler or hybrid system of heat pumps with condensing boilers
Air-Cooled Chillers	New Air-Cooled Chillers with VFD	4-pipe Heat Pump Chillers or reversible heat pumps
Water-Cooled Chillers	New Water-Cooled Chillers with heat recovery	4-pipe Heat Pumps or reversible heat pumps or New Water-Cooled Chillers with VFD compressors
Stand Alone Split System	New Inverter stand-alone Split System	New Volume Refrigerant Variable centralized system Discussed this issue, and evaluate the criteria's points and we decided to no changes these scores due to EEPB project and SREEPB project's evaluations established same path.
Old Air Handling Units (AHU)	VFD implementation to AHU Fans and CO2 based demand control ventilation	New AHU with heat recovery and VFD
-	PV Generation with shorter payback (e.g. on the roof)	PV Generation with longer payback (e.g. on a carpark)
-	Basic energy monitoring	Full BMS and energy monitoring system
-	Cogen with Shorter Payback (e.g. small packaged without chilled water production)	Cogen/Trigeneration with Longer Payback (e.g. full cogen with Abortion chiller)
-	Solar Water Heating (e.g. small system with natural convection)	Solar Water Heating (e.g. pump system with storage) in combination with waste energy of cooling system condensers
-	Insulation of Fittings, Valves, Piping	same with baseline
-	Application of Outdoor Air Compensation to Controlling of Boiler	-
-	Replacement of Circulation Pumps	Circulation Pumps with integrated VFD and enhanced controlled

Existing situation	Base Scenario	Deep Scenario
-	Application of Motorized Two-Way Valve	Application of combined control and balancing valves
-	Replacement of conventional Luminaires for LED	Replacement of conventional Luminaires for LED and motion automated system, daylight harvesting, solar tubes
-	Efficient belts for fan motors	Plug fans

Some EEMs presented in base, deep, and recommended scenario need to be recalculated for each scenario due to the cross effects that may arise (e.g., piping insulation savings will decrease with better envelope insulation).

Simultaneous implementation of energy efficiency measures addressing the same energy saving category leads to a cross-effect. (i.e., building envelope insulation retrofit and boiler replacement simultaneously) In such a case, total savings of a set of measures have to be calculated together and overall savings will be lower than the addition of individual savings, thus increasing the overall payback.

When considering multiple EEMs with interactive effects between measures, the order of analysis must start with load reduction measures and proceed with distribution systems and associated equipment efficiencies, and then plant and heat rejection systems.

For EEMs that involve system interactions within a single EEM (e.g., lighting retrofits that affect HVAC loads), those system interactions should be considered within that particular EEM analysis.

When analysing measures with interactive effects, include in the analysis:

1. Explanation of how EEMs interact with one another.
2. If and why savings from this EEM may be more or less effective depending on other EEMs.
3. Note if EEM is independent of all other EEMs in terms of savings or its practical application.
4. Interactions within lighting EEMs should be shown on the same row in the table (i.e., electrical savings entered as a positive value (net of cooling savings if any) and any non-electric heating should be entered as a negative value in appropriate heating fuel column. Assumptions on heating/lighting interactions (e.g., percentage of heat loss to conditioned space) should be explained in the EEM Section of the report.
5. If including mutually exclusive EEMs, list each as an individual row on the tables. Only one of the mutually exclusive EEMs should be included in the TOTAL EEM Energy Savings calculation (e.g., include only the recommended EEMs as to not "double count" measures in the total).

A basic energy monitoring system should be included in all scenarios, i.e., building-level energy meters, or submeters that can be aggregated to provide building-level energy use data (electricity, natural gas, fuel oil, propane, etc.). Utility-owned meters capable of aggregating base building-level resource use are acceptable. The basic system can be standalone, i.e., without automated report capabilities or software aggregation.

2.3.5) Conduct financial analysis: Each measure and scenario must include a Cost-Benefit Analysis with the calculation of energy cost savings, simple payback period, NPV and IRR over a 20-year period. The financial analysis must be presented in TRY. (The foreign exchange rates will be fixed for each audit for converting the cost of imported equipment/goods into TRY currency.) If the net life of the measure is lower than the NPV timeframe, re-investment costs need to be included in the analysis. If the economic lifetime of an equipment which is proposed to be installed in an energy efficiency measure is less than 20-year NPV timeframe (i.e. 8 years), reinvestments (i.e., at the 9^{th} year and 17^{th} year) of that equipment shall be included in the 20-year cash flows, net present value and internal rate of return calculations. Reinvestment costs are not included in the first investment cost and simple payback period of the energy efficiency measure which is shown in the EEMs list (alternative scenario). O&M costs and other indirect related costs should be included in the analysis. Investments are made in year 0 (or when re-investments take place) and the savings will start in year 1. Details of the financial analysis are laid out in the Audit Template.

2.3.6) Determine the energy performance class: Determine the energy performance class of the building in the current state by issuing an Energy Performance Certificate (EPC-EKB) so that it can be compared to the performance class after renovation (issuance of an actual energy performance certificate is not required for the building in the current state if the building already has an EPC (EKB) issued by the most recent version of national EPC software, BEP-TR2). The performance class to be achieved has to be calculated using the recommended measures list. Preliminary Calculation Result Report (Ön Hesap Sonuç Raporu) has to be obtained for the building to be achieved with proposed energy efficiency measures by using most recent version of national EPC software,

BEP-TR2. In any case, the proposed scenario must achieve at least an Energy Performance Class (EKB) B. After energy efficiency measures are implemented on site and construction works are finalized, a new EPC (EKB) shall be issued for the upgraded form of the building.

2.2. Applications based on green and innovative technologies to enable the behavioural change that support the implementation of energy efficiency measures:

Meeting the energy efficiency goals will require significant efforts to change consumer and user behaviours. Strategies and targets need to be in line with the motivations of individual building users and owners, and actions need to be easily integrated into daily behaviours to be effective. Changing these daily behaviours is a major challenge, requiring training and awareness activities, as well as feedback measures and incentives to trigger long-term change.

The Consultant shall develop innovative and green solutions derived from the energy efficiency measures applied in the buildings such as; PV powered mobile device and electric vehicle charging station, occupant information screens that shows the current energy consumption data of the building, etc. that can help awareness raising towards energy consumption and have high impact on user behaviours. The proposed innovative visibility technologies shall be building specific and have an impact assessment for each proposal. Additionally, the estimated cost for the proposed innovative technologic solutions shall be calculated and provided in a separate table other than the table prepared for energy efficiency measures.

2.3. Monthly Audit Progress Report:

Includes findings during site assessments, measurements and data analysis and shall be submitted monthly to the Client for tracking the progress of audits. Detailed work schedule of the Task.1 shall be submitted within the report of the first month. Preliminary energy efficiency measures (EEMs), based on different renovation scenarios, considered to be proposed, and their calculations if exits, shall also be added to the report of the second month.

2.4. Investment Grade Energy Audit Report:

The report should follow the Audit Template. Changes to the report structure have to be authorized by the Client. The audit report should be prepared both in English and Turkish concise and clearly written; capture all calculations, analyses and assumptions; and discuss difficulties encountered in data collection and field work.

Revisions shall be made by the Consultant, in calculations or other documents in case of any discrepancy or mistake recognized during the Construction Phase. Any problems related to the eligibility of audit reports are binding for the Consultant regardless of when the problem occurs.

Further definition and details of intended audit report is provided in the project's website in the form of "***Audit Report Checklist[4]"***. Please refer to this checklist document for detailed overview of how audit reports are going to be checked by MoEUCC and eventually approved as a result of this process.

2.5. Survey Plans and Drawings:

Survey plans and drawings of up-to-date status of zones/rooms in the building interrelating with the proposed EEMs shall be produced. These survey plans and drawings shall include architectural dimensioning including sections of zones/rooms and exact positioning, specifications and scaling of any equipment and mechanical/electrical infrastructure that are in. The Consultant shall also illustrate its comments and/or possible enhancements of these interventions and their interactions with other systems to the drawings. A scaled site-layout shall also be submitted with these plans and drawings.

Task 2 Deliverables

D2.1. Investment Grade Energy Audit Reports

D2.2. Survey Plans and Drawings

[4] https://www.kabev.org/kutuphane/kontrol-listeleri/

Task 3: Detailed (Final) Retrofit Design

Following the approval of the revised structural retrofit and architectural survey drawings, the Consultant shall prepare remaining detailed (final) retrofit designs (mechanical, electrical, etc.). The compliance of retrofit designs with standards and regulations in force in Türkiye shall be certified by the Consultant.

3.1. Full Set of Final Design Documents

- Final designs shall include architectural (including comparative drawings clearly showing the revisions/differences/interventions before and after renovation), statical (including details of the proposed system and its connection to existing structure) and engineering services (all mechanical and electrical services, including but not limited to: heating, cooling, ventilation, hot and cold water supply systems, fire protection, electrical supply system, lighting system, gas distribution, power and service sockets, telephone/television/radio, lifts, building management/automation system (if any) etc.) related with retrofit and collateral works.
- Other eligible measures included in the retrofit and renovation of buildings will support universal access improvements (e.g., addition of wheelchair ramps), water efficiency improvements (e.g., rainwater harvesting during times of water scarcity) and measures to improve fire safety – particularly as they relate to the upgrading of heating systems, electricity supply (rooftop solar PV, capacitors, transformers, rewiring) – and for fire detection and warning.
- Revisions shall be made by the Consultant, in drawings or other documents in case of any discrepancy or mistake recognized during the Construction Phase.
- The final design drawings shall include:
    - Architectural drawings: Floor plans/construction plans with all partition types and details provided for the areas subject to intervention, system cross-sections from the points of renovation.
    - Structural drawings: Structural plans, sections and details along with structural calculations based on TBEC2018. Superposition plan of new components and existing structures. Structural design and calculation reports of newly added systems/components in compliance with in force codes/regulations (i.e. structural calculations and reports).
    - Mechanical drawings (in conformity with the heating zone where the building is located): The mechanical installation drawings should include the components recommended to be replaced by the energy audit. Heating, cooling, ventilation and sanitary plumbing projects and system drawings specific to each project should be prepared according to the obtained energy audit reports in conformity with electrical and architectural designs. Heat insulation calculations and reports should be prepared according to TS 825 Standard.
    - Electrical drawings: The electrical installation drawings should include the components recommended to be replaced by the energy audit. MV distribution, transformer, generator, UPS, lighting, socket (mains and UPS), mechanical and force distribution, cable transportation, earthing and lightning protection, elevator, table loading tables, strong current column diagram and calculations (lighting, heating, short circuit, voltage drop). Energy efficiency comparisons (comparison of current and new status) should be shown in the corresponding plans. Necessary infrastructure plans should be prepared for the remote monitoring of energy consumption.
- The design drawings should include the following aspects:
    - Plan views (focusing on the areas related with the renovation works) and system cross-sections and details as necessary from the points of renovation
    - Elevations showing scope of demolition and new works. Demolition drawings, plans, section and details as necessary
    - There will be three sets of technical drawings and details in 1/50 scale, and details including system details (for interventions 1/20, 1/5 scales, 1/1 scale if needed), which have to be compliant with the applicable in force regulations:
- Design drawings should be presented in such a way that:
    - The drawings can easily be understood
    - They visually communicate the concept to the beneficiary and the construction contractor

- They clearly show the renovation interventions before and after renovation so the beneficiary and construction contractor can easily understand what sections/areas/systems/components are to be renovated
- Clear and understandable "General Notes" and "Project Specific/Key Notes" should be embedded in the design plans/drawings so that the beneficiary and construction contractor can easily understand what to be done at which areas/sections/systems/components
- Scope of demolition work and new work shall be clearly identified on the drawings
- All information from previous revisions and updates are included.

Task 3 Deliverables

D3.1. Detailed Retrofit Design Drawings (Architectural, Structural, Mechanical, Electrical)

Task 4: ESMP and OHS Plan

4.1. Site specific Environmental and Social Management Plans (ESMPs):

A single Environmental and Social Management Plans (ESMPs) in line with the Environmental and Social Standards (ESSs) of the World Bank's Environmental and Social Framework (ESF), the World Bank Group (WBG) General Environment, Health and Safety (EHS) Guidelines, Good International Industrial Practices (GIIPs) and the Environmental and Social Management Framework (ESMF) disclosed on the web site: https://webdosya.csb.gov.tr/db/kamuguclendirme developed for the SREEP Project will be prepared for entire Campus.

The ESMP shall (i) describe the scope and type of project activities to be carried out, (ii) present the environmental and social baseline, (iii) present the potential environmental and social risks and impacts of the proposed project activities, (iv) identify and describe the mitigation measures (including specifications and bill of quantities for removal, packaging, transport and disposal/interim storage of hazardous materials, personal protective equipment, location where the asbestos can be disposed and the interim storage location for the mercury containing lightbulbs, etc.) to be taken during the life of the project and cost estimation for the identified mitigation measures, (v) set out the monitoring and reporting requirements, and (vi) roles and responsibilities of different parties involved in the project implementation. The Consultant shall submit the ESMPs to the PIU to be finalized and integrated into construction contractor bidding documents. In addition, the consultant shall update the ESMPs during the project implementation/construction in consultation with the construction contractors, if required

The Consultant shall prepare the ESMP in both English and Turkish languages for PIU approval, until otherwise advised by the World Bank at a later stage of the project implementation

The ESMP will be made publicly available on the websites of the MoEUCC and the respective buildings to be renovated. The physical copies will be accessible to the public at the offices in the construction yard during the construction activities. In this manner, all stakeholders will have full access to the ESMP which provides information regarding the potential environmental and social impacts and risks, and the details of the mitigation measures to be taken. The Consultant will make sure that site specific ESMP are publicly available both at the construction sites and at easily accessible places within the local area

4.2. Site specific Occupational Health and Safety (OHS) Plan:

- Prepare site specific Health and Safety plan in line with Turkish Occupational health and Safety regulation in Construction, the World Bank Group (WBG) General Environment, Health and Safety (EHS) Guidelines and developed for the Project and Good International Industrial Practices (GIIPs)
- The OHS Plan shall outline the health and safety hazards mitigation, monitoring and mitigation measures to be taken during project implementation to avoid or eliminate health and safety risks to the workers and community
- The Consultant shall prepare the OHS Plan in both English and Turkish languages for World Bank review, until otherwise advised by the World Bank at later stage of the project implementation
- The Consultants shall liaise with the MoEUCC in order to finalize the OHS Plan with the World Bank's approval and help MoEUCC to organize disclosure and consultation for the OHS Plan with the public

(especially including the stakeholders who might be affected from the renovations)

- The OHS Plan shall include specifications an, bill of quantities for scaffolding, packaging, transport and disposal/interim storage of hazardous materials, personal protective equipment, monitoring requirements and estimate of costs for the measures
- All occupational health and safety hazards which related with work shall be defined and OHS plan shall be prepared including that information such as risk mitigation measures, responsibilities, log out tag out procedure, work permit system, community safety and traffic management plan etc. as indicated in SREEPB ESMF[5]

Task 4 Deliverables

D4.1. Environmental and Social Management Plan (ESMP)
D4.2. Occupational Health and Safety (OHS) Plans

Task 5: Social Issues

The Consultant must carry out and submit all tasks described below to the satisfaction of the Client.

5.1. Stakeholder Engagement Meeting

The Consultant will organize stakeholder engagement meetings in accordance with the SREEPB Project Stakeholder Engagement Framework, prepare and deliver presentations explaining the Environmental and Social Management Plan, and submit meeting records (meeting minutes, sign-in sheet, photographs) to the Client within 2 business days.

5.2. Grievance Mechanism (GM) Procedure

- The Consultant will fulfill all the responsibilities defined in the SREEPB Project Grievance Mechanism Procedure.
- The Consultant will produce and set up grievance boxes approved by the Client in locations deemed suitable by the Client.
- The consultant will check the complaint boxes on Tuesdays and Fridays every week, share the photos of the check with the PIU's social expert via e-mail and make official correspondence regarding the complaints.
- The Consultant will register all grievances/suggestions/wishes/feedback received through grievance boxes or verbally in the Grievance Register, following the Grievance Mechanism, resolve the grievances, and provide feedback to the grievance owner.
- The Consultant will share the Grievance Log, with the Client in the last day of every week.

5.3. Trainings

- All project personnel assigned within the project scope will participate in the "Gender Equality and Gender-Based Violence, Code of Conduct " Training provided by the Client.
- The Consultant's social specialist will participate in the "Grievance Mechanism Procedure" Training provided by the Client.

5.4. Social Surveys

The consultant will implement the Stakeholder Engagement Meeting satisfaction surveys prepared by the Administration, conduct data analysis, and prepare the results evaluation report. The Consultant will implement the "Pre-Reconstruction Awareness Survey satisfaction surveys prepared by the Administration, conduct data analysis, and prepare the results evaluation report.

[5] https://webdosya.csb.gov.tr/db/kamuguclendirme/menu/sreepb-p175894_esmf_final-mayis_20210521123105.pdf

5.5. Visual Materials

The Consultant will design posters and brochures for the promotion of the Project and the Grievance Mechanism and submit them for approval by the Client. They will be responsible for the printing and placement of approved designs in relevant locations.

Task 5 Deliverables

D5.1. Stakeholder Engagement Meeting minutes, sign-in sheet and photographs
D5.2. Grievance Mechanism Report / Log (Turkish and English)
D5.3. Training sign-in sheet, photographs
D5.4. Stakeholder Engagement Meeting Satisfaction Survey Report (Turkish and English), Pre-Reconstruction Awareness Survey Report (Turkish and English).
D5.5. Posters (100 pcs) and brochures (1000 pcs).

Task 6:Tender Documents

In addition to the Final Retrofit Designs specified above, the technical specifications, bills of quantities, measurement and verification reports and commissioning plans shall be prepared and submitted to the Client for approval, following the decision of the Client on which parts of these works shall be integrated to the relevant parts of the tender documents.

6.1. Technical Specifications:

- General and specific technical specifications for all the renovation works shall be prepared in accordance with MoEUCC's "Construction Works, Civil, Mechanical Works and Electrical Works General Specifications", Turkish Building Earthquake Code 2018, current By-law Concerning Construction in Planned Areas, By-Law on Building Energy Performance and related Turkish legislation and standards. The consultant shall clarify and correct conflicts between project design and specification.

6.2. Bill of Quantities (BoQ):

- Relevant BoQ's and Technical specifications shall be prepared by the Consultant in detail and shall be submitted to the Client for approval, following the decision of the Client on which parts of these works shall be integrated to the relevant parts of the tender documents.
- Submit final Bill of Quantities (BoQ), all related design calculations, and relevant final cost comparison analysis. Prepare BoQ's in compliance with unit price guidelines of MoEUCC or other relevant state authorities or market prices. BoQ's prepared by the Consultant should be in compliance with pricing preambles, technical specifications and other relevant parts of the documents to be prepared for tender process. The BoQs and related cost estimation tables shall be prepared by using an accurate and easy-to-use cost estimating software that is approved by the Client.
- The structural retrofitting work, required energy efficiency and collateral upgrades shall be seen separately on the Bill of Quantities (BOQ).

6.3. Measurement and Verification (M&V) Plans:

The Consultant shall prepare Measurement and Verification (M&V) Plan that explain how to verify savings for each Energy Efficiency Measure, how to adjust the Reference Energy Consumption (or baseline) by using the data of the building, with methods and calculation details. The plan will include the verification method of savings, important measures to be taken, the timing of these activities, the duties and responsibilities of the parties and how to ensure quality assurance for this process. Further definition and details of intended M&V process is provided in the project's website ("M&V Guidelines[6]"). Please refer to this guideline document for detailed process overview and intended outcome of the process.

[6] https://www.kabev.org/kutuphane/kilavuzlar/

6.4. Commissioning Plans:

Commissioning is a quality-based process that focuses on verifying and documenting that the equipment and systems used during the implementation of energy efficiency measures are designed, installed, tested, and properly operated to meet the described requirements. Commissioning helps to deliver a safe and healthy project, optimizes energy use, reduces operating costs, provides adequate maintenance personnel orientation and training, and provides documentation. Commissioning is often perceived as focusing solely on testing at the end of the construction phase but commissioning is a collaborative process to plan, deliver and operate all processes so that they work as intended by the designer. Commissioning starts with project planning and includes design, construction, commissioning, acceptance and training, and warranty phase services. Commissioning process has four overarching principles that begin at project inception and continue throughout use and operation:

- Creating measurable project performance descriptors
- Planning and executing the commissioning process
- Verifying and documenting compliance with requirements
- Effectively transfer all acquired knowledge to the business team

Commissioning process requires good planning. In this context, the determination of the systems and equipment to be handled in the process and how the test and training activities to be developed will be carried out should be discussed at the planning stage. Planning is the coordination and integration of systems and equipment in the commissioning process with other construction phase activities. The detailed integration of the commissioning works with the construction program is critical to maintaining the milestones in the project program.

The commissioning work will not just be the functional tests and training. It will also be used for the first or early performance evaluation of the project implementation. The objective is to have a first indication of the system behaviour regarding energy performance and compliance with the energy audit objectives in the form of an operational verification. Hence, operational verification of energy efficiency measures shall be clearly stated in the commissioning plan in order to have the preliminary energy performance assessment of the project.

Consultant shall prepare responsible commissioning plans and form commissioning teams of each project for the healthy execution of the whole process. Further definition and details of intended commissioning process is provided in the project's website in the form of "Commissioning Handbook". Please refer to this handbook for detailed process overview and intended outcome of the process.

Task 6 Deliverables

D6.1. Technical Specifications
D6.2. Bill of Quantities
D6.3. M&V Plans
D6.4. Commissioning Plans

Task 7:Project Evaluation Report

The Consultant shall submit a final project evaluation report after completion of all tasks defined above. The report shall at least cover;

- An executive summary report indicating overall information regarding the scope of the services, amendments, final decisions, energy efficiency measurements, innovative retrofit system selection and methodologies indicating comparison of energy consumption before and after renovation works, structural performance before and after the innovative retrofit. The report shall bring together in one place all the information used to produce the Consultant's recommendations for renovation and retrofit works of the buildings assessed in the project.
- The Consultant shall prepare graphic representation (rendering) of the annexed buildings including creation of three-dimensional images and animations showing the attributes of proposed structural retrofit and energy renovation designs including but not limited to heating system (Boilers, pumps, piping, valves, insulation, etc.), cooling system (chillers, cooling towers, pumps, valves, piping, insulation, outdoor a/c units, rooftop units, etc.), DHW (accumulation tanks, heat exchangers, pumps, insulation, piping, etc.), solar water heater system, ventilation system (air handling units, piping, ducts, etc.), lighting system (fixtures, bulbs, panels, etc.), room thermostats, radiators, fan-coil units, etc., automation system,

renewable energy systems, co-generation/tri-generation units, etc.

Up to 500 presentation visuals (i.e. posters, brochures, catalogues and leaflets) will be prepared, printed and distributed by the Consultant for each building complex to give information and to raise awareness about the energy efficiency and innovative structural retrofit measures implemented in the building, and the benefits of these applications.

The graphic designs of the presentation visuals will be subject to the Client approval before printing. All visual materials shall include the logo and the names of the Client and the project, the template of which will be provided by the Client. The posters will be presented especially in the areas/sections where innovative and green applications are implemented.

Task 7 Deliverables

D7.1. Executive Summary Report
D7.2. Visual Presentation Materials

V. PROJECT PROGRESS REPORTING REQUIREMENT

- **Baseline Schedule:** Within 15 calendar days after the signing contract is acknowledged submit the Baseline Project Schedule defining all disciplines and subcategories with including all deliverables which identified in Phase I.
- **Periodic Schedule Updates:** Each 2 weeks Periodic Schedule Update shall be included in the weekly progress report. All Network Diagrams for schedule updates shall be of a Gantt Chart style.

  The schedule updates shall include Baseline Start and Finish Dates, current planned Start and Finish Dates, total float, and duration. The chart shall show the baseline and actual/planned bars. All these schedule charts and reports will be documented and printed.
- **Weekly Progress Report:** The Consultant shall prepare a report in table form showing summary of cumulative progress in main work activities on weekly basis. The report shall be submitted to the Client by the approved Project Manager in an acceptable format by the Friday of each week via electronic mail. The weekly report shall include 2 Weeks Look Ahead Schedule and Critical Activities for the related week with considering the approved Baseline Schedule.
- **Monthly Progress Report:** The report shall be submitted to the Client by the approved Project manager on the fifth day of each month until issuing taking-over certificate. Report will describe the physical and financial progress of the works and will address contractual and technical matters. Upon two weeks after the issuance of taking-over certificate this report shall be submitted for a last time as Final Completion Report. Sample report outline is given with the table below:

Table 3. Weekly Progress Report Content for Phase I

Review of Previous Meeting Minutes	• Summarizing previous meeting minutes • Identify each open item from the minutes remaining from previous meeting • Keep the open items for the next meeting minutes
Critical Path Items	• Show all Critical Path Items extracted from the planning software with considering baseline schedule
2 Weeks Look Ahead	• Present all activities which will be planned to be executed 2 weeks per the updated schedule
Actual % Complete / Schedule % Complete	• Show the Actual Complete and Schedule Complete ratio per the updated schedule
Additional Comments	• Bring all issues regarding construction process or administration process which causing delay for the project

Table 4. Monthly Progress Report Content for Phase I

Report Section	**Required Content**
Introduction	• A concise outline in simple language, describing the project in general • Also include major milestones, obstacles, achievements, constraints on progress, problems encountered, appropriate identified solutions and remarks on procedural issues.
Description of Physical Progress	• Include progress charts and dated photographs in color giving all information regarding the progress of the Works • Give explanations for differences between actual and forecast progress
Description of Financial Progress	• a summary financial report containing cash-flow forecasts and budget expenditure • status of payments and requests for payment • explanations for differences between actual and forecast cash-flow on summary of claims and disputes
Projections	• variations and proposals for future variations to the timing and budgets of individual activities • a projection of activities for the forthcoming month • recommendation for further actions and improvements, both short- and long-term
Summary of Records	• Records of variation/change orders, design changes and shop drawings issued. • records of human resources, mechanical equipment and materials, testing and quality control, with copies of the test results and, statistical evaluation of the test results in table or graphical form. Action taken with regard to poor results shall be stated; • local issues/stakeholder issues (including any grievances received by nearby communities and/or workers);
Appendices	• Include relevant background documents, such as correspondences, photographs, revised drawings, change orders, as-builts (with Final Completion Report), etc. • PowerPoint presentation (based on above information)

VI. TIMELINE

This assignment is expected to initiate in the first half of 2025 and finalized in a period of three (3) months. The Consultant shall submit all the documents in a timely manner to complete the services on time without any delay.

Table 5. Tentative Timeline for Phase I

Task	Description	Deliverables/Tasks	Months											
			1				2				3			
1	Inception	D1.1 - Inception Report D1.2 - Review report to available documents												
2	Energy Audit	D2.1 - Investment Grade Energy Audit Reports D2.2 - Survey Plans and Drawings												
3	Detailed Retrofit Designs	D3.1 - Detailed Retrofit Design Drawings (Architectural, Structural, Mechanical, Electrical)												
4	ESMP and OHS Plans	D4.1 - Environmental and Social Management Plan (ESMP) D4.2 - Occupational Health and Safety (OHS) Plan												
5	Social Issues	D5.1 - Stakeholder Engagement Meeting minutes, sign-in sheet and photographs D5.2 - Grievance Mechanism Report D5.3 - Training sign-in sheet, photographs D5.4 - Stakeholder Engagement Meeting Satisfaction Survey Report, Pre-Reconstruction Awareness Survey Report D5.5 - Posters and brochures												
6	Tender Documents	D6.1 - Technical Specifications D6.2 - Bill of Quantities D6.3 - M&V Plans D6.4 - Commissioning Plans												
7	Project Evaluation Report	D7.1. Executive Summary Report D7.2. Visual Presentation Materials												

VII. TIME SCHEDULE for DELIVERABLES

The deliverables for each task will be submitted to and approved by the Client. The Consultant must obtain approval for each deliverable before moving to subsequent tasks. The table below summarizes the deliverables for each building and includes an indicative timeline and payment schedule. The deadlines stated in the table mean calendar days after the effectiveness of the contract.

Table 6. Deliverables for each Building for Phase I

Task	Deliverable	Deadline	Submission Requirement
1	D1.1 - Inception Report D1.2 - Review report to available documents	15 days	• All the documents need to be prepared in Turkish except ESMP, OHSP and Social Reports. These Reports shall be prepared both English and Turkish. • Only one selected Investment Grade Energy Audit Report and executive summary sections of every deliverable will be translated into English. • All deliverables shall be initialed (executive summary sections shall be signed, if exists) and delivered as one hard copy and twenty (20) DVD soft copies (including drawings in PDF and AutoCAD format). • Electronic copies of all deliverables shall be submitted with an external SSD. • All deliverables shall be uploaded into the online platform which the Client addresses
2	D2.1 - Investment Grade Energy Audit Reports D2.2 - Survey Plans and Drawings	45 days	
3	D3.1 - Detailed Retrofit Design Drawings (Architectural, Structural, Mechanical, Electrical)	60 days	
4	D4.1 - Environmental and Social Management Plan (ESMPs) D4.2 - Occupational Health and Safety (OHS) Plan	75 days	
5	D5.1 - Stakeholder Engagement Meeting minutes, sign-in sheet and photographs D5.2 - Grievance Mechanism Report D5.3 - Training Reports, sign-in sheet, photographs D5.4 - Stakeholder Engagement Meeting Satisfaction Survey Report, Pre-Reconstruction Awareness Survey Report D5.5 - Posters and brochures	90 days	
6	D6.1 - Technical Specifications D6.2 - Bill of Quantities D6.3 - M&V Plans D6.4 - Commissioning Plans	90 days	
7	D7.1. Executive Summary Report D7.2. Visual Presentation Materials	90 days	

All deliverables need to be prepared in Turkish except ESMP, OHSP and Social Reports. These Reports shall be prepared both English and Turkish. Only one selected Investment Grade Energy Audit Report, M&V plan, and commissioning plan of one of the buildings and executive summary sections of every deliverable will be translated into English.

All deliverables will be submitted as (i) one hard copy (signed and stamped), (ii) soft copy (on a SSD (Solid State Drive)), and (iii) uploaded to an online platform, which the Client addresses. The file transfer between the consultant and the client will be carried out over the online platform addressed by the Client.

The metric system of weights and measures shall be used. The drawings shall be submitted in the format, labelling, grouping and details as required by the Client. The plot size, parcel, map sheet for all buildings shall be listed and integrated into the drawings and other required documents.

Digital formats shall be as follows:

- Format of Reports/Documents : MS Office Word/Excel/PowerPoint & PDF
- Format of Drawings : AutoCAD 2006 (or newer) & PDF

Printing formats shall be as follows;

- Format of Reports/Documents : A4 or A3 including where appropriate drawings could be

reduced to A3 size

- Format of Drawings : A1 size (unless otherwise required or agreed)
- Scale of Drawings : To be agreed with the Client.
- Format of Visual Presentation Materials
    - Format of Posters : A0, A1 and A2 size /min. 300dpi
    - Format of Others : A4 size/min. 300dpi

As indicated in the General Conditions of Contract all the drawings, reports, plans, specifications, and any other documents produced under this Contract are the property of the Client.

VIII. FACILITIES PROVIDED BY THE CONSULTANT

The Consultant must ensure that its professional staff has adequate support and equipment. All costs for equipment and administrative and logistic support must be covered by the Consultant and included in the bid price, including:

- All costs arising from the activities of its staff during the contract period, including accommodation, allowances, transportation, insurance, etc.
- Automotive, equipment, equipment for field and lab tests, office supplies, hardware and software (software for modeling and static/dynamic analysis of critical structures) etc.
- All communication costs, including fax, email, telephone, etc.
- All the equipment, instruments, services and logistical support required for the implementation of the contract, and any costs incurred during its preparation of documents and drafts, copying, printing, qualified translation, interpretation etc.
- Technical equipment at the monitoring site.
- Appropriate approvals, permissions and precautions shall be taken to protect the health and safety of workers during field works. Employees shall work using personal protective equipment suitable for the job after receiving occupational safety training.
- The Consultant shall provide simultaneous translation during the activities such as workshop, training and technical visit if needed.
- The Consultant is responsible for having key expert(s) and representatives available at any meetings reasonably convened by the Client including but not limited to periodical progress meetings to be held at least once a month, kick-off meetings with consultants of the Project and meetings with World Bank authorities. Any information or evidence reasonably required by the Client at meetings that might be held in connection with the Project shall be provided. Minutes of meetings shall be prepared and shared with the Client no late than two days after each meeting.

IX. SUPPORT TO BE PROVIDED BY THE CLIENT TO THE CONSULTANTS

- The Client provides all available information and data for the annexed Buildings.
- If any delay or no response received from the beneficiary or other third parties during the execution of aforementioned tasks, the Consultant shall inform the Client in a timely manner with indicating the possible grounds. The Client will accelerate the process or give consent to proceed the task.

X. TEAM COMPOSITION & QUALIFICATION REQUIREMENTS FOR THE KEY STAFF

The Consultant shall provide experienced staff with proven technical and managerial competence and experience in the **Innovative Engineering Approaches for retrofit of existing buildings and design of new buildings,** structural and energy efficiency assessments, related to the latest Turkish Earthquake Code and Energy Performance Regulation in Buildings. The Consultant shall separately indicate the task assignments for each staff.

i) Consultant Profile:

The Consultants should be in consulting business, have structural and energy retrofit experience within the scope of services and be open to working with innovative technologies, demonstrate sound administrative and financial capacity and availability of the key experts for the performance of the services described in this TOR.

The attention of interested Consultants is drawn to Section III, paragraphs, 3.14, 3.16, and 3.17 of the World Bank's "Procurement Regulations for IPF Borrowers" November 2020 and The Bank's 'Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants,' (revised as of July 01, 2016) ('Anticorruption Guidelines').

Consultants may associate with other firms to enhance their qualifications but should indicate clearly whether the association is in the form of a joint venture and/or a sub-consultancy. In the case of a joint venture, all the partners in the joint venture shall be jointly and severally liable for the entire contract, if selected.

ii) Team Composition:

The working language of the project is English. All the team members assigned by the Consultant must possess proficiency in the English language. Day-to-day communication language will be Turkish or English at the field level to ensure smooth communication among all participants, direct and indirect of the Project.

All key staff and support staff shall be mobilized immediately after the contract signature. Key and support staff qualifications shall include but not be limited to the following table.

All expatriate staff who will work in Türkiye should obtain a work permit and all who are resident for more than 90 days should obtain a non-resident visa. The consultant will obtain all required permits, visas for all expatriate staff at his own cost. Furthermore, the Consultant will be responsible to ensure that all proposed personnel are eligible to obtain such permits and visas. The information related to visas can be obtained from the embassies and consulates of Türkiye. The Client will assist the consultant for the issue of work permits. The Consultant is required to obtain all the necessary permits, approvals, payment of all fees and contributions, as well as all the other elements necessary for the work of his professional staff who is engaged at his own expense for the performance of this Contract.

Table 7. Staff Qualification Requirements for Phase I (Duration: 3 months)

Tasks	Position (Min. Number of Staff Required)	Total Est. Staff Months	Required Experience
All	[K-1] - Project Manager (1):	3	Civil Engineer with minimum fifteen (15) year professional experience including at least ten (10) year experience in structural retrofit design of buildings and five (5) year experience in manager position.
1-3-6	[K-2] - Structural Engineer (1):	2	Civil Engineer with minimum ten (10) year professional experience, including at least five (5) year experience in structural retrofit design and experience in non-linear time history analysis of RC buildings. An academic degree (MSc or PhD) and temporary or permanent "Special Buildings Design Supervision Certificate" in TGUA-3 profession field would be an asset.
1-3	[K-3] - Architect (1):	1	Architect with minimum ten (10) year professional experience including at least five (5) year experience in retrofit design and design of energy efficiency renovation works in similar buildings.
2-3	[K-4] - Mechanical Engineer (1):	2	Mechanical Engineer with minimum ten (10) year professional experience including five (5) year energy audit experience in similar buildings. Energy manager or audit-project certification given by Ministry of Energy and Natural Resources is mandatory.
	[K-5] - Electrical Engineer (1):	2	Electrical Engineer with minimum ten (10) year professional experience including five (5) year energy audit experience in similar buildings. Energy manager or audit-project certification given by Ministry of Energy and Natural Resources is mandatory.

Tasks	Position (Min. Number of Staff Required)	Total Est. Staff Months	Required Experience
1	[K-6] - Geotechnical Engineer (1)	0,5	Civil Engineer (Geotechnical Engineer, MSc. or above) with minimum ten (10) year professional experience, including at least five (5) year experience in geotechnical design and assessment of superstructures. Temporary or permanent "Special Buildings Design Supervision Certificate" in TGUA-2 profession field would be an asset.
6	[K-7] - Cost and Planning Engineer (1):	0,5	Civil Engineer with minimum five (5) year professional experience, including at least two (2) year experience in similar buildings or projects. These experiences should be mainly on development of time schedules and budgets of prepared designs of similar buildings.
4	[K-8] - Environmental Specialist (1):	1	Environmental Engineer with minimum seven (7) year professional experience including at least five (5) year experience in the national environmental legal framework, environmental impact/risk assessment, preparation of environmental assessment tools (ESMP, Environmental and Social Impact Assessment (ESIA), etc.)
5	[K-9] - Social Specialist (1):	2	Graduate in relevant social sciences (sociology, etc.) with minimum five (5) year professional experience including at least three (3) year experience in social impact/risk assessment, preparation and /or implementation of social assessment tools (ESMF, ESMP, SEP), experience in survey preparation, implementation and reporting, ability to use quantitative data analysis programs.
4	[K-10] - Occupational Health and Safety (OHSE) Expert (1)	1	Occupational Health and Safety Specialist with minimum ten (10) year OHS professional experience, including at least three (3) year experience in OHS assessment and management in construction projects financed by international finance institutions or other international donors, preferably the World Bank and with a knowledge in environmental and social safeguard policies and ESSs of the World Bank's ESF or other international development institutions, having A Class Occupational Safety Expert certificate received from the Directorate General of Occupational Health and Safety or equivalent international certificate.
6	[K-11] - Measurement & Verification Expert (1)	0,5	Certified Measurement and Verification Expert with minimum five (5) year professional experience.
	[K-12] - Commissioning Specialist (1)	0,5	Engineer with minimum ten (10) year professional experience including 3 years of test & commissioning works experience.
3	[K-13] - Academic Advisor (1)	1	Civil Engineering Professor/Authority/University Experts with the appropriate and specialized qualifications in the area of retrofit design from Bosphorus University, Hacettepe University, Istanbul Technical University, Karadeniz Technical University, Middle East Technical University, or from any other national or international universities or institutes who have published at least 2 papers on innovative retrofit systems in journals listed in the web of science database.

Tasks	Position (Min. Number of Staff Required)	Total Est. Staff Months	Required Experience
All	[N-…] - Technical Support Staff Requirement	3	Support staff for the technical services with minimum three (3) years of professional experience shall be proposed additionally as required (architects, surveyors, mechanical and electrical technicians/junior engineers, OHS personnel, etc.)
	[N-…] - Administrative Support Staff Requirement	3	Support staff for the administrative services shall be proposed additionally as required (surveyors, clerks, drivers, secretary etc.)
All Tasks	Total Man-Month	17	Key experts
		6	Non-key experts

PHASE II: SUPERVISION OF CONSTRUCTION WORKS (TIME-BASED CONTRACT)

I. INTRODUCTION AND BACKGROUND

Buildings with the greatest vulnerability to disasters are typically energy inefficient, as these buildings pre-date modern building codes, which is the case for a vast number of public buildings in Türkiye. In order to improve the disaster resilience and energy savings in selected central government buildings, and to strengthen the institutional capacity to develop, finance and implement resilient and sustainable public buildings, the Government of Türkiye signed a loan agreement in the amount of USD 265 million for the Seismic Resilience and Energy Efficiency in Public Buildings Project (SREEPBP) that will be implemented by the Ministry of Environment, Urbanization and Climate Change (MoEUCC). The General Directorate of Construction Affairs (GDCA) under the MoEUCC has been delegated to assume overall responsibility for the implementation and management of SREEPBP. The GDCA has created a Project Implementation Unit (PIU) to oversee all aspects of the project, including managing administrative tasks, procurement, coordination with the authorities and beneficiaries, environmental and social obligations, monitoring, evaluation, and reporting of the project.

Within the scope of the WB/CS-DESSUP-07 Terms of Reference (ToR) under SREEPB, a Consultant will be hired by the MoEUCC for the structural and energy efficiency retrofit designs and construction supervision of the three (3) buildings located in TÜBİTAK Gebze Campus (hereafter referred as "Buildings") shown in **Figure 1** and listed in **Table 1** (see **ANNEX** I: SELECTED BUILDINGS for more information).

Characterization (architectural, material, geotechnical, etc.), performance assessment and retrofit design of all Buildings were carried out under separate consultancies according to the Turkish Building Earthquake Code 2018 (TBEC2018) using non-linear time history analyses (NTHA). All generated site-specific ground motion time histories and retrofit designs were checked and approved by design supervisors defined in TBEC 2018. The Consultant will be responsible for checking the final structural retrofit designs, performing energy efficiency renovation designs, preparing environmental and social management plans (ESMPs), operational health safety (OHS) plans and full set of tender documents for construction works in the first phase of the ToR under a lump-sum contract. Consultancy services for the supervision of construction works including preparation of M&V reports and supervising remedial works to rectify defects that arise during the Defects Notification Period (DNP) will be within the scope of the second phase of the ToR under a time-based contract.

II. PROJECT OBJECTIVES

The SREEPB project will primarily focus on improving the disaster resilience and energy efficiency of selected central government buildings, as well as on enhancing the policy framework and institutional capacity for the development, financing, and implementation of flexible and sustainable public buildings in Türkiye. Public buildings such as educational facilities, dormitories, hospitals, and government administrative buildings will be structurally strengthened and renovated or demolished and reconstructed under the SREEPB project.

The buildings to be retrofitted will be aimed to achieve minimum energy performance and minimum energy savings as specified in the Project Operational Manual[7]. Architectural, mechanical, and electrical renovations and some renewable energy (RE) systems (e.g. rooftop solar photovoltaic (PV), ground source heat pumps, solar water heaters), fire detection and extinguishing systems will also be included depending on their economic viability. The renovated buildings will also comply with all relevant national regulations and laws regarding shelter, fire, workplace safety, accessibility for persons with disabilities, and similar requirements, in addition to meeting all standards for the materials used.

III. SCOPE OF SERVICES

Within the second phase framework of the Project, the employed consulting firm ("Consultant") will conduct construction supervision consultancy services in compliance with the Environmental and Social Management Plan (ESMP), Occupational Health and Safety (OHS) Plan, Measurement and Verification (M&V) Plan, Commissioning Plan and Detailed Retrofitting and Renovation Designs prepared during the first phase design

[7]https://documents1.worldbank.org/curated/en/738871623549676664/pdf/Turkey-Seismic-Resilience-and-Energy-Efficiency-in-Public-Buildings-Project.pdf

services contract and rectify defects that arise during the Defects Notification Period (DNP) for the annexed Buildings (**ANNEX** I: SELECTED BUILDINGS).

IV. DESCRIPTION OF THE CONSULTANT'S TASKS

The Consultant as "the Engineer" or "the Project Manager" shall be responsible to carry out all the duties envisaged in World Bank's Standard Procurement Documents (SPD). The Consultant shall also be responsible as the "Engineer" or "the Project Manager" to provide details and instruct the contractors whenever it necessitates, during the course of works and execute the services in accordance with recent laws and regulations (including the sub-project specific ESMPs). Significant issues shall be subject to approval of the Client as indicated in the General Conditions (GCC) or Special Conditions (SCC) of the Construction Contracts.

The Consultant's Structural, Mechanical, Electrical Engineers and Architects shall check and review the existing designs for their applicability to field. If any revision is needed in the existing designs, a report will be provided to the Client.

The Consultants shall provide sufficient, qualified and experienced staff to ensure proper construction supervision of the works and engineering services both during the Construction period and during the Defects Notification/Maintenance period.

Task 1: Carry out Construction Supervision and Building Commissioning Services

Consultant's responsibilities (included but not limited to) for this task are summarized as follows:

Initiation of the Works:

- The Consultant shall follow up evacuation of buildings respect to Contractors' work programs closely on site and shall communicate with related authorized persons for public buildings (in compliance with the mitigation measures identified within the sub-project specific ESMPs). The Client shall be informed simultaneously of the actual evacuation progress. In case evacuation does not take place on time, necessary actions to ensure the completion of works without delay in close cooperation with the Client and the Contractors shall be taken by the Consultant.
- The Consultant shall prepare initial inspection reports of the blocks for each room and use digital camera for this purpose to prove that work is executed according to initial status or agreed modifications.
- The Consultant shall collect necessary documents required for obtaining the modification construction permit from the municipality and assist the contractors for obtaining the modification construction permit. The Consultant shall also sign the documents be submitted for construction permit.
- The Consultant shall review the designs, plans, technical specifications, BOQs, etc. that were originally prepared during the Lump-Sum (first phase design services) Contract and any alteration request of Contractor(s). In case of existence of any findings that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works, the Consultant may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the contract price and completion date of the Works. In case it is considered that any alterations in any of the Contract Documents necessary by the Consultant, the Consultant shall prepare and submit such alterations to the Client with the Initial Inspection Report, upon two (2) weeks from initiation of the works. The report should be supported by the necessary calculations, details and, time and cost implications. The Consultant shall state whether the alterations will cause any delay in the work program, and therefore the contractor(s) to be entitled any time extension or not, supported by necessary documentation. On receiving written approval from the Client, the Consultant shall promptly amend the existing designs or supply any additional designs, plans, drawings and specifications where required or found necessary for the satisfactory completion of the works. The Client shall not be responsible from the consequences of the fact of which the Client is not informed in advance.

Retrofitting/Installation Supervision Stage

- The Consultant shall be responsible for supervising the construction and installation of the works as well as the inspection and testing of all materials, plant and equipment both during the construction period and for any works that have to be completed during the Defects Notification Period (DNP). The consultant shall be responsible to ensure that Contractor will conduct a Preparatory Meeting before starting each Definable Future of Work (DFOW). These meeting shall include material approval check, Method of Statement for the related DFOW, equipment and materials to be used on site and approved Activity Hazard Analysis (AHA) related this work.

- The Consultant shall approve materials and application methodologies submitted by Contractor according to national and international standards. The Consultant shall provide sufficient, qualified and experienced staff to ensure proper construction supervision of the works and engineering services during the construction period.
- The Consultant shall supervise and oversee all aspects of the construction and installation of the various components of the works and engineering services to ensure strict compliance with the drawings and contract documents.
- The Consultant, shall ensure the construction progress is in compliance with the workplan, building access plan, also the E&S instruments: ESMP, OHS Plan, etc. and restrictions (for access to users during the construction phase).
- The Consultant shall carry out the Services with all due diligence, care and in timely manner so as not to cause any delay. It is deemed that the Consultant familiarized himself with the nature of Project and is expected to take all sorts of precautions during the performance of Services so as to get the works completed by the Contractors on time.
- The Consultant shall not delay any action required to be taken by the Consultant during the construction.
- It is the duty of the Consultants to interpret the drawings and specifications and to consult with the Contractors as required to ensure compliance with the Contract Documents and the construction/installation programme.
- Ensure that all occupational health & safety measures are respected by the construction company in compliance with the mitigation, management, monitoring and reporting requirements of relevant official authorities and the World Bank
- Placement of concrete may be executed by the Contractor in night hours rather than daily hours because of traffic or other reasons not allowed by related authorities. In that case, Contractor will inform the Consultant in a timely manner before placement of concrete, Consultant will arrange his staff employment according to this condition without any cost to the Client and the Contractor.
- The Consultant shall arrange weekly and monthly meetings with contractors, inform the Client about progress of the work and activities, attend any meetings reasonably convened by the Client and provide any information or evidence reasonably required by the Client at any public meetings or inquiries which might be held in connection with the Project.
- Consultant shall follow the Long Lead Item Schedule not to cause any delay about the project.
- Since the similar construction works may also be supervised by other Consultants in other sites, the Consultant shall co-operate with the other Consultants and join the meetings whenever required by the Client.
- The Consultant shall take necessary measures for environmental, social and occupational health and safety (OHS) aspects. In this context, alongside with the Occupational Health and Safety Plan (OHS Plan), Environmental and Social Management Plan (ESMP) prepared based on the ESMF, the Environmental and Social Standards (ESSs) of the World Bank's Environmental and Social Framework and the World Bank Group (WBG) General Environment, Health and Safety (EHS) Guidelines, and Good International Industrial Practices (GIIPs), the most recent Turkish environmental, OHS and social legislative requirements are required to be followed particularly during the supervision of the construction works.
- The Consultant shall supervise the Contractor on behalf of the Client for performing and implementation of all Occupational Health and Safety activities in accordance with the enforcement of the related Turkish Laws and legislations, and measures specified in the ESMP. In this context, the consultant duties and responsibilities shall include, but not limited to:
    - Conduct regular visits to all construction sites to check the contractor's OHS documents and compliance, provide on-the job trainings, ensure compliance of the works with OHS practices and regulations, and issue non-compliance notices to the contractor and report the same to the Client.
    - Ensure that the workers are provided OHS training and have complete health records and personal files in accordance with pertinent legal requirements, and avoid access of the workers to work site if there any non-compliance
    - Make available an OHS expert in high-risk worksites (e.g.: high elevations scaffolds, confined space, crane works, digging works, etc.).
    - Check conformity of equipment/ machines on worksites with national standard, and avoid their use in case of non-compliances

- Promptly notify the Client within 48 hours of any incident or accident related to the Project which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers including health and safety serious injuries and road accidents. Provide sufficient detail regarding the incident or accident, indicating immediate measures taken or that are planned to be taken to address it, and any information provided by any contractor
- Participate in the contractor's regular OHS meetings and provide input for needed improvements.
- Provide the contractor with a copy of key OHS documents (Law 6331 on OHS Code, 5510 Social Security and General Health Insurance Law, 4857 Labour Code, World b-Bank ESSs and also IFC Environmental, Environmental Health and Safety (EHS) Guidelines) and check the compliance.
- The Consultant shall conduct periodic checks whether lifting vehicles, boiler and tanks and control scaffolding, welding tubes, small hand tools, etc. are in compliance with the standards (e.g. CE, TSE, BS)
- The Consultant shall control and approve method statements, which will be prepared by contractor before each work activity starts. If needed, consultant will help contractor to prepare the documents.
- Consultant shall conduct safety visits to site periodically with project manager, construction manager and OHS manager.
- In case of urgent, imminent and life-threatening non-conformities, the Consultant suspends the construction of the relevant work until the nonconformity related to that work is rectified. In this case, the Consultant promptly informs the Client about the status.

- The Consultant shall ensure that the Contractor’s activities are following the ESMP. The Consultant shall supervise the Contractor’s implementation of environmental and social mitigation measures as identified in the ESMP. The Consultant should ensure Contractor that the Project’s Grievance Mechanism set forth by Client is utilized and made available, accessible and visible in Project site.
- The Consultant shall ensure that the Contractor records any grievance received by local community or worker and report it in monthly ESMP monitoring reports to PIU.
- The Consultant shall provide feedback and give notice to the Client regarding environmental and social issues at sites.
- The Consultant shall be responsible for assisting the Client with supervision of the implementation of environmental and social aspects of the project as part of its overall supervision responsibilities, in accordance with ESMP.
- If the Contractor is found to be non-compliant with the ESMP requirements, the Consultant shall file a non-conformity report and any relevant payment orders should be put on hold, until non-compliance issues are remedied satisfactorily or issue a fine in consultation with Client.
- The Consultant shall attend workshops to be organized by the Client that may be related to the project implementation, environmental and social safeguards, occupational health and safety, communication and public information, and grievance redress mechanism.
- The Consultant shall ensure that brochures, posters, grievance forms and other visual communication products to be provided by the Client are available and properly displayed at construction sites from beginning to end of the construction work.
- The consultant will check the complaint boxes on Tuesdays and Fridays every week, share the photos of the check to the PIU's social expert via e-mail and make official correspondence regarding the complaints.
- The Consultant shall prepare survey questions for the ""Post-Retrofitting and Renovation Survey"", submit the questions for the Client's approval, conduct the surveys, perform data analysis and prepare a survey evaluation report in Turkish and English for submission to the Client.
- The Consultant's Social Specialist shall provide the "Gender Equality and Gender-Based Violence" Trainings to the Contractor's all personnel. Records of the training (sign-in sheet, photographs, training report) will be submitted to the Client within three (2) business days.
- The Consultant's Social Specialist shall provide the "Grievance Mechanism Procedure" Training to the Contractor's Site Manager and social specialist. Records of the training (sign-in sheet, photographs, training report) will be submitted to the Client within three (2) business days.

- The Consultant is obliged to notify the Client on a weekly basis of all comments/suggestions/complaints received in the grievance boxes or verbally communicated to the staff on site.
- The Consultant shall ensure that the Contractor deliver the hoarding panels and install them around the construction site appropriately before construction work starts.
- The Consultant shall be in contact with the Client in responding to inquiries and grievances received at construction sites in timely manner, provide including but not limited to logistical and data collection support to communication activities to be carried out at such as informative meetings and trainings in the project site before construction work starts and contribute to community awareness raising operations.
- The Consultant shall ensure that all activities related to the Consultant's tasks are carried out according to best environmental, social and OHS practices to avoid any associated impacts.
- The Consultant shall monitor, evaluate, and submit the Contractor's Environmental and Social Management Plan (C-ESMP), Waste Management Plan, Pollution Prevention Plan, Contractor's Occupational Health and Safety Plan, Community Safety and Traffic Management Plans, and other sub-management plans to the PIU for approval.
- Consultant shall ensure that the Contractor is informed on and has updated the ESMP/OHSP and other management plans prepared by the Consultant, with relevant project specific requirements.
- The Consultant shall monitor/assess Contractors' activities in compliance with the site-specific ESMP (including environmental, social, occupational health and safety, community safety, received grievances, if any, etc.), include ESMP issues and grievances (if any), **in the monthly progress reports, and provide feedback and give notice to the MoEUCC.**
- The details of the Environmental and Social Management and the responsibilities of the "Engineer/Project Manager" shall also be detailed in the Contractor's contract. Consultant shall have the responsibility for relevant supervision and instruction of the applications to the Contractor.
- If any alterations in any of the contract drawings, documents occur during construction excavation for foundations of buildings, the Consultant shall immediately inform Client by providing all data for redesign.
- The consultant will assist PIU in the Stakeholder Consultation Meetings for SREEPB Project that will be led by PIU. The consultation meetings will be held with participation of PIU representative(s). Presentation material(s) including relevant content of per sub-project to be shared during the consultation meetings shall be prepared by the consultant and the presentation shall be delivered by the relevant personnel of the consultant. Content of each presentation for per sub-project is subject to review and approval of the PIU.
- Consultant will ensure that the mitigation measures identified for the management of simultaneous risks and associated mitigation measures (including cumulative ES impact assessment) are in place by the Contractor,

Consultant will ensure that the Contractor fencing, access and ingress control, traffic, waste, vehicle movement management plans are in place and implemented. Progress Payments to Contractors, Variations

- The Consultant shall check the Contractor's valuations for payment on account and issue certificates according to the Conditions of Contract used and shall also be responsible for agreeing with the Client on each payment certificates in payable amount. The actual procedure and presentation of the certificates, supporting documents, etc. shall be discussed and agreed with the Client.
- The Consultant shall review and report on any financial claims submitted by the Contractors within 2 weeks of receipt of such claim submission. Report on any claim shall include (not limited to) determinations, the justification letter, cost-benefit analysis, all probable effects on approved work plan and the final decision on any variation.
- If payment certificate is not prepared by contractor, consultant will prepare payment certificate for contractor,

Tests

- The Consultant shall approve an appropriate Material Testing Laboratory for all tests required that will be mentioned in Contractors' Technical Specification and shall discuss the various testing requirements stipulated in its documents with personnel of the laboratory. The Consultant shall give at least 24 hours' prior notice to the laboratory for all tests which are required to be undertaken. All samples shall be properly labeled in accordance with the requirements of the laboratory and the Consultant shall be responsible for the delivery of all samples for testing and for the collection of all test reports.

- The involvement of the approved Materials Testing Laboratory is limited to the actual performance of the tests in accordance with the Consultant's laid down procedures and/or the specified standards stated in the Contract. The Consultant shall be responsible for interpreting the results received, instructing the repetition or the carrying out of additional tests and taking whatever action necessary to ensure compliance with the contract requirements. The Laboratory staff may from time to time offer advice to the Consultant on any matter within the scope of their competence but it is up to the Consultant whether to accept or reject such advice or suggestion. If any advice or suggestion is accepted by the Consultants, they shall become completely responsible for it as if the advice or suggestion has been of its own initiative.
- The Consultant shall stipulate the criteria, the planning and the procedure for all tests and inspections necessary for the materials (such as pull-out tests for anchorages (embedded new reinforcements)), equipment, plant and workmanship and the commissioning of the Works and shall provide supervision and inspection for these tests. The Consultant shall compile a record of all such tests and compare the results with the specifications, standards or with the performance criteria that has been guaranteed by the suppliers or contractors.

Accounts, Claims

- In any case, all the correspondences received from the contractor shall be reviewed, evaluated and responded within one week. Any claim from the contractor(s) under the construction contracts shall be evaluated by the Consultant and necessary recommendation shall be made the latest within two weeks, as well.
- The Consultant shall review and report on any financial claims submitted by the Contractors within 2 weeks of receipt of such claims.

Disputes

- The Consultant shall assist in the setting of all disputes or differences, which may arise between the Client and the Contractors, in a timely manner. In the case of litigation and arbitration the Consultant shall assist the Client in the preparation of the documents needed by the Client.

Completion of Works and Commissioning

- Confirm the projects' compliance with the investment plan. In case of deviation from those plans, justification of the differences and evaluation of consequences in terms of compliance of the project with the eligibility criteria of the facility.
- Before issuing the Certificate of Completion of the Works, the Consultant will enforce any obligation placed on the construction contractor to remove all obstructions, surplus materials, plant, wreckage, rubbish and temporary works.
- Upon completion of the works, the Consultant will require the construction contractor to remove all plant, equipment and materials except those required to complete any outstanding or remedial works and facilities required by the Consultant during the Defects Notification Period.
- The Consultant shall witness the performance tests carried out after completion and will analyze, evaluate and approve the final performance tests with the concurrence of the Client. The analyses, results and conclusions with recommendations shall be compiled in the Final Completion Report to be submitted to the Client.
- The Consultant shall oversee training of O&M staff on new equipment.
- The Certificate of Completion of the Works shall be prepared and issued by the Consultant in consultation with the Client. Defects are expected to be minimum for a competent Consultant Firm during issuance of Certificate of Completion of the Works.
- The issuance of the Certificate of Completion of the Works shall be subjected to:
    - The Contractor having provided the operating and maintenance manuals, training of O&M staff on new equipment, as well as all the drawings and documents handed over to the Client requested in the construction contract.
    - Non-existence of major defects
    - Preparation of Consultant's Final Inspection Report

Task 2: Supervise Remedial Works to Rectify Defects that Arise During the Defects Notification Period (DNP)

The DNP period covers 12 months, starting on the date of building commissioning.

- The Consultant shall continue to be responsible for the supervision and inspection of the construction and completion of the Works during the DNP as defined in the works contracts.
- The level of supervision shall be appropriate to the scale of the works being carried out. The Consultant will provide adequate number of field technical staff acceptable to the Client on each construction site during the DNP.
- These inspections and supervision are to ensure that works, agreed to be carried out during the DNP, are properly carried out and have been completed and that any failure of any part of the Works has been rectified. If any defect is discovered, during this period, the Consultant shall promptly investigate the reason for it, report to the Client and take required actions to rectify the defect. These inspections shall be submitted to the Client under DNP Quarterly Report, which shall include all details of any defects, faults, accidents or breakdowns, which have occurred together with the estimated costs of repair and the time scales within which they will be completed. Once all the defects have been remedied, DNP Final Report shall be submitted.
- The Consultant should prepare a Final Completion Report in 2 months' time after the issuance of the Certificate of Completion of the Works. Final Completion Report is a formal document and the Consultant shall strictly follow-up the Contractor to obtain the required documents such as as-built and draft final account of the contractors. Otherwise, the Client may ask to the Consultant for preparation of these documents according to the construction contract therefore, the consultant is encouraged to estimate and include the required staff-months to complete the missing documents upon Client's request.

Task 3: Preparation of Measurement and Verification (M&V) report

The M&V period covers 12 months, starting on the date of building commissioning.

- Conduct required measurements to prepare the M&V Report. Measurement and verification of savings will be made in accordance with TS ISO 50.006 and IPMVP Option C (full facility renovation) the consultant should compare the baseline and final energy bills and adjust for degree days (HDD and CDD), changes in operating use, changes in energy prices, occupancy rates, etc.
- Prepare M&V reports for all buildings by the end of DNP. The M&V reports need to be consistent with the format to be published by MENR. The PIU will review and approve the M&V report or request from the contractor to revise the report. The M&V report shall demonstrate the amount of savings realized by comparing the actual energy consumption with the reference energy consumption in which the necessary adjustments are made according to the TS ISO 50.006 standard and IPMVP will be calculated.

V. TIME SCHEDULE

This assignment is expected to initiate in the first quarter of 2026 and finalized in a period of in eighteen (18) months period (6 months for construction and 12 months for Defects Notification Period), subject to completion of the construction contract. A tentative time schedule for the completion of the consultants' services for the various parts of the Project is given below;

Table 8. Tentative Timeline for Phase II

Task	Deliverables/Tasks	Months																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Construction supervision and building commissioning services																		
2	Supervise remedial works to rectify defects that arise during DNP																		
3	Measurement and verification report																		

VI. REPORTING REQUIREMENTS

The reports will be submitted to the Client according to the table given below. The Consultant must obtain consent for each report before proceeding.

Table 9. Reports for Phase II

Task	Reports	Deadline	Submission Requirement
1	Initial Inspection Reports	Upon two (2) weeks from Initiation of the Works	• All Reports shall be initialled and prepared in 2 hard copies for both English and Turkish (except electronic mail submissions) • Interim Payments to Contractors shall be signed by Project Manager and responsible Key-Staff and submitted only Turkish • Electronic copies of all reports shall be submitted with an External SSD • All Reports shall be uploaded into the online platform which the Client addresses
	Weekly Site Pictures	Every Friday via electronic mail starts from Initiation of the Works	
	Weekly Progress Report		
	Monthly Progress Report	Fifth day of each month starts from Initiation of the Works till issuance of Taking-Over Certificate	
	Interim Payments to Contractors	Monthly starts from Initiation of the Works till issuance of Final Acceptance	
	Final Inspection Report	Upon with issuance of Taking-Over Certificate	
2	DNP Quarterly Report and DNP Final Report	Starts from first quarter following the issuance of Taking-Over Certificate and shall be submitted quarterly till issuance of Final Acceptance	
	Final Completion Report	in 2 months after the issuance of each Certificate of Completion of the Works.	
3	Measurement and Verification (M&V) Report	At the time of submitting the DNP Report	

The consultant can submit all reports in a single SSD (Solid State Drive) with sufficient capacity. The metric system of weights and measures shall be used. The drawings shall be submitted in A1 paper size (unless otherwise required or agreed) and includes drawings in PDF and AutoCAD format, labeling, grouping and details as required by the Client. The plot size, parcel, map sheet for all buildings shall be listed and integrated into the drawings and other required documents.

As indicated in the General Conditions of Contract all the drawings, reports, plans, specifications, and any other documents produced under this Contract are the property of the Client and therefore the Consultants shall also submit all the originals of the drawings and the other documents in required format.

6.1. Project Progress Reporting Requirements for Task 1:

- **Initial Inspection Report:** The report should indicate the early findings on tendered documents for the Works and if any alterations needed, include the necessary calculations, details, the opportunities that the effects may be avoided or reduced, and time and cost implications.
- **Periodic Schedule Updates :** Each week Periodic Schedule Update shall be included in the weekly progress report . All Network Diagram for schedule updates shall be of a Gantt Chart style.

  This schedule updates will be consist of Baseline Start and Finish Dates, current planned Start and Finish Dates, total float, and duration. The chart shall show the baseline and actual/planned bars.All these schedule charts and reports will be documented and printed
- **Weekly Site Pictures:** The Consultant have to record views from at least 5 points for each building, on weekly base, showing the progress on the site with dates and record them with acceptable format and submit to the Client as an attachment of Weekly Report

- **Weekly Progress Report:** The Consultant shall also prepare a report in table form showing summary of cumulative progress in main work activities on weekly basis. The report shall be submitted to the Client in an acceptable format by the Friday of each week via electronic mail. .This weekly report shall include 2 Weeks Look Ahead Schedule and Critical Activities for the related week with considering the approved Baseline Schedule. The report should be also sent by the Project Manager approved with key personnel list by the Client
- **Monthly Progress Report:** The report shall be prepared on the fifth day of each month until issuing taking-over certificate. Report will describe the physical and financial progress of the works and will address contractual and technical matters. Upon two weeks after the issuance of taking-over certificate this report shall be submitted for a last time as Final Completion Report. Sample report outline is given with the table below:

Table 10. Monthly Progress Report Content for Phase II

Report Section	**Required Content**
Introduction	• A concise outline in simple language, describing the project in general • Also include major milestones, obstacles, achievements, constraints on progress, problems encountered, appropriate identified solutions and remarks on procedural issues.
Description of Physical Progress	• Include progress charts and dated photographs in color giving all information regarding the progress of the Works • Give explanations for differences between actual and forecast progress
Description of Financial Progress	• a summary financial report containing cash-flow forecasts and budget expenditure • status of payments and requests for payment • explanations for differences between actual and forecast cash-flow on summary of claims and disputes
Projections	• variations and proposals for future variations to the timing and budgets of individual activities • a projection of activities for the forthcoming month • recommendation for further actions and improvements, both short- and long-term
Summary of Records	• Records of variation/change orders, design changes and shop drawings issued. • records of human resources, mechanical equipment and materials, testing and quality control, with copies of the test results and, statistical evaluation of the test results in table or graphical form. Action taken with regard to poor results shall be stated; • local issues/stakeholder issues (including any grievances received by nearby communities and/or workers); • a summary of site-specific environmental, social and OHS issues (i.e. update on the status of implementation of the sub-project specific ESMPs – including implementation actions taken/to be taken within the scope of the sub-project, OHS and E&S requirements, grievance mechanism, mitigation measures, etc.,
Review of Previous Meeting Minutes	• Summarizing previous meeting minutes • Identify each open item from the minutes remaining from previous meeting • Keep the open items for the next meeting minutes
Critical Path Items	• Show all Critical Path Items extracted from the planning software with considering baseline schedule
2 Weeks Look Ahead	• Present all activities which will be planned to be executed on site next 2 weeks per the updated schedule
Actual % Complete / Schedule % Complete	• Show the Actual Complete and Schedule Complete ratio per the updated schedule
Weather Mods	• Show all schedule impact due to the weather condition on site for each week
Occupational Health and Safety (OHSE) Issues	• Site Safety Supervisor should prepare Weekly Safety Report regarding weekly activities on site. • Go over all Occupational Health and Safety issues for that week •

Environmental and Social Issues	• Go over all Environmental and Social Issues.
Additional Comments	• Bring all issues regarding construction process or administration process which causing delay for the project •
Appendices	• Include relevant background documents, such as correspondences, photographs, revised drawings, change orders, as-builts (with Final Completion Report), etc. • PowerPoint presentation (based on above information)

- **Final Inspection Report:** The report shall be prepared and shall address the status of the work items at the time of Taking-over by the Consultant. The minor outstanding works, defects, failures, shortcomings are to be listed and compiled. Possible remedial actions by the Contractor as needed, are to be listed and noted, including the given period of time the Contractor is to rectify. The material handed over by the Contractor to the Client will be checked and listed for status and completeness.
- **Other reports upon request:** The Client may request the Consultant to submit specific reports on the issues related to the execution of the works. The Consultant will make the requested report in such manner within a reasonable time. The Consultant is obliged to provide all assistance to the Client, upon request, in drawing up reports to the bodies that comprise the institutional framework for project implementation described in the introduction to this project task, relating to project implementation reports, financial reports and etc.

6.2. Project Progress Reporting Requirements for Task 2:

The Reports should cover, but not necessarily be limited to, the information as follows:

- **Final Completion Report**, to be delivered in 2 months' time after the issuance of each Certificate of Completion of the Works.

  The report shall contain at least:

  (i) Copies of Certificate of Completion of the Works including Contractor's request letters

  (ii) Approved As-Built Drawings showing all the modifications in relation to the main design elements or surveyor of performed works

  (iii) Any certification / permit / consent / declaration, lists of installed equipment, and photos

  (iv) Final account of "Work Contract Package"

  (v) Quality assessment of materials and workmanship;

  (vi) Data on the technical difficulties encountered and how they were solved;

  (vii) Comment on the As-Built Design,

  (viii) List of Instructions for Use and Maintenance,

  (ix) Energy Performance Certificate (EKB) should be prepared for each building after completion of the renovation works.

  (x) Final Report on Contractor's ESHS performance (Code of Conduct, compliance with ESMP, consent/permits and other relevant project requirements.

  The report shall be delivered to the Client upon completion of the works all job records, reproducible "as-built" drawings including (but not limited to) calculations, drawings, specifications, test reports and final accounts and the instruction necessary for the satisfactory operation and maintenance of the works. As-Built drawings shall be provided in AutoCAD 2006 (or newer) compatible files and PDF files that shall be signed by the project managers of both parties (Contractor and Consultant).

- **DNP quarterly Report:** A report of the DNP inspections shall be submitted to the Client, which shall include all details of any defects, faults, accidents or breakdowns, which have occurred together with the estimated costs of repair and the time scales within which they will be completed. The reports shall be prepared on a quarterly basis.

- **DNP Final Report:** The report shall be submitted by the time of the expiration of the DNP giving full details of all works carried out during the period. This report shall be submitted by the Consultant to the Client at least 30 days prior to issuing the Defects Notification Certificate for the completed Works.

VII. FACILITIES PROVIDED BY THE CONSULTANT

Supervision of the works and engineering services both during the construction and defects notification period including M&V works and ensure that the works are executed in accordance with recent regulations and rules. All costs for equipment and administrative and logistic support must be covered by the Consultant and included in the bid price, including:

- All costs arising from the activities of its staff during the contract period, including accommodation, allowances, transportation, insurance, etc.
- Automotive, equipment, equipment for field and lab tests, office supplies, hardware and software (software for modeling and static/dynamic analysis of critical structures), etc.
- All communication costs, including fax, email, telephone, etc.
- All the equipment, instruments, services and logistical support required for the implementation of the contract, and any costs incurred during its preparation of documents and drafts, copying, printing, qualified translation, interpretation etc etc.
- Technical equipment at the monitoring site;

VIII. SUPPORT TO BE PROVIDED BY THE CLIENT TO THE CONSULTANTS

- The client will sign letters with the beneficiary buildings that describe the responsibilities of the beneficiary, including appointing a contact/facility coordinator for all project phases, facilitating access to buildings or facilities, providing existing documentation, etc. Client shall, where possible, assist the Consultants in obtaining approvals, permissions from the Municipalities and other State Authorities in respect of the Services to be performed.
- The inputs (contract drawings, Bill of Quantities, tender documents, etc.) shall be provided free of charge by the Client to the Consultants. Consultant shall return all such drawings and documents received to the Client upon the completion of services.
- The Works Contractors' bidding documents are already arranged to incorporate clauses to provide temporary office facilities to the Consultants depending on the size and location of the construction sites, the size and number of rooms (generally the site office has approximately 80 m2 area and includes 1 meeting room, 3 room, 1 WC and 1 Kitchen) shall be jointly determined by the Client and the Consultant considering the needs of the Client as well. However, these will be constructed by the Contractors and will take some time.
- The Consultants will be fully responsible for providing their central site office until the contractors are in place to make site offices available. The central office shall be furnished and equipped by the Consultants, whereas the site offices shall be furnished by the Contractor. All sort of running expenses for the site offices except water and electricity (to be provided by the Contractor) shall be under the Consultant's responsibility.
- The Consultant shall not be required to deliver any equipment and materials provided by the reimbursable expenses and which have been used for the Services to the Client.

IX. TEAM COMPOSITION & QUALIFICATION REQUIREMENTS FOR THE KEY STAFF

The Consultant shall provide an experienced construction supervision and contract administration team with proven technical and managerial competence and experience in the supervision of construction works under Fédération Internationale des Ingénieurs Conseils (FIDIC) Conditions of Contract or other internationally recognized contract conditions used by IFI's. The Consultant shall separately indicate the task assignments for each staff.

i) Consultant Profile:

The Consultants should be in consulting business, have structural and energy retrofit experience within the scope of services, demonstrate sound administrative and financial capacity and availability of the key experts for the performance of the services described in this TOR.

The attention of interested Consultants is drawn to Section III, paragraphs, 3.14, 3.16, and 3.17 of the World Bank's "Procurement Regulations for IPF Borrowers" November 2020 and The Bank's 'Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants,' (revised as of July 01, 2016) ('Anticorruption Guidelines').

Consultants may associate with other firms to enhance their qualifications, but should indicate clearly whether the association is in the form of a joint venture and/or a sub-consultancy. In the case of a joint venture, all the partners in the joint venture shall be jointly and severally liable for the entire contract, if selected.

ii) Team Composition:

The working language of the project is English. All the team members assigned by the Consultant must possess proficiency in English language. Day-to-day communication language will be Turkish or English at the field level to ensure smooth communication among all participants, direct and indirect of the Project.

All key staff and support staff shall be mobilised immediately after the first Construction Contract signature in way to evaluate the design and make the necessary adjustment before the works commence. At least one Technician/Junior Engineer shall be assigned to every campus. To ensure the occupational health and safety measures of the construction sites at least one OHS Specialist (having at least Class C or equivalent internationally recognized OHS certificate) shall be assigned.. Technicians/Junior Engineers and OHS Specialists should have at least three (3) year experience. In addition, support staff for the administrative services shall be proposed additionally as required (surveyors, clerks, drivers, secretary etc.)

The Project Manager together with the respective Cost & Planning, Civil, Electrical and Mechanical Engineers will be required for reporting and inspections during the twelve (12) months Defects Notification Period. The Supervision Team and the Project Manager will be entitled to follow, supervise and certify the implementation of the health and safety measures as per the Law 6331.

All expatriate staff who will work in Türkiye should obtain a work permit and all who are resident for more than 90 days should obtain a non-resident visa. The consultant will obtain all required permits, visas for all expatriate staff at his own cost. Furthermore, the Consultant will be responsible to ensure that all proposed personnel are eligible to obtain such permits and visas. The information related to visas can be obtained from the embassies and consulates of Türkiye. The Client will assist the consultant for the issue of work permits. The Consultant is required to obtain all the necessary permits, approvals, payment of all fees and contributions, as well as all the other elements necessary for the work of his professional staff who is engaged at his own expense for the performance of this Contract.

All key staff shall be in project efficiently and updated on every related subject regarding the project.

All submitted and approved key personnel shall attend the Weekly Meetings and other unplanned meetings conducted by the Client.

Submit for approval the name of the alternate key personnel in case of changing key stuff submitted and approved by Client.

Key and support staff qualifications shall include but not limited to the following table.

Table 11. Staff Qualification Requirements for Phase II [Duration: 6 months (Supervision) + 12 months (DNP)]

Tasks	Position (Min. Number of Staff Required)	Total Est. Staff Months (Supervision + DNP)	Required Experience
All	[K-1] - Project Manager (1):	6+6	Civil Engineer with minimum fifteen (15) year professional experience includes at least ten (10) years' experiences in structural retrofitting supervision in construction projects of similar buildings and five (5) years working experience in manager position.
1-2-3	[K-2] - Site Manager (1):	6+0	Architect or Civil Engineer with minimum fifteen (15) years of professional experience, including at least ten (10) year experience of construction supervision in similar buildings and three (3) year working experience in management position on Retrofitting Works.
1-3	[K-3] - Site Engineer (1)	6+2	Civil Engineer with minimum five (5) years of professional experience including at least 3 years of supervision experience and Retrofitting Works
2-3	[K-4] - Architect (1):	2+0	Architect with minimum ten (10) years of professional experience including at least five (5) year experience in construction supervision of energy efficiency renovation works in similar buildings
	[K-5] - Mechanical Engineer (1):	4+1	Mechanical Engineer having ten (10) years of professional experience including five (5) years of energy efficiency related works experience in construction projects of similar buildings
1	[K-6] - Electrical Engineer (1):	3+1	Electrical Engineer having ten (10) years of professional experience including five (5) years of energy efficiency related works experience in construction projects of similar buildings
6	[K-7] - Cost and Planning Engineer (1):	6+1	University degree in engineering with minimum five (5) years of professional experience, includes at least two (2) year experience in preparation of progress payments, claim management, time schedules and reporting of construction projects that include similar buildings. Having experience on Primavera P6 or Ms Project program would be an asset
4	[K-8] - Environmental Specialist (1):	4+1	Environmental Engineer with minimum seven (7) years of professional experience including at least five (5) year experience in the national environmental legal framework, environmental impact/risk assessment, preparation and/or implementation of environmental assessment tools (ESMF/ESMP, etc.).
5	[K-9] - Social Specialist (1):	4+1	Graduate in relevant social sciences (sociology, etc.) with minimum five (5) years of professional experience including at least three (3) year experience in social impact/risk assessment, preparation and /or implementation of social assessment tools (ESMF, ESMP, SEP), experience in survey preparation, implementation and reporting, ability to use quantitative data analysis programs.

Tasks	Position (Min. Number of Staff Required)	Total Est. Staff Months (Supervision + DNP)	Required Experience
4	[K-10] - Occupational Health and Safety (OHSE) Expert (1)	6+1	Occupational Health and Safety Expert with minimum five (10) years of OHS professional experience, including at least five (5) year experience in OHS assessment and management in construction projects financed by international finance institutions or other international donors, preferably the World Bank and with a knowledge in environmental and social safeguard policies and ESSs of the World Bank's Environmental and Social Framework (ESF) or other international development institutions, having A Class Occupational Safety Expert certificate received from the Directorate General of Occupational Health and Safety or equivalent international certificate.
6	[K-11] - Measurement & Verification Expert (1)	0+2	Mechanical Engineer having ten (10) years of professional experience including two (2) year experience in measuring, collecting and analysing data for the purpose of verifying and reporting energy savings in EE renovations. Energy manager or audit-project certification given by Ministry of Energy and Natural Resources is also mandatory.
	[K-12] - Commissioning Specialist (1)	1+0	Engineer having ten (10) years of professional experience including three (3) years of test & commissioning works experience.
3	[K-13] - QA/QC Engineer	1+0	University degree in engineering with minimum five (5) years of professional experience including at least two (2) year quality assurance and control experience in retrofitting projects of similar buildings.
All	[N-…] - Technical Support Staff Requirement	12+4	Support staff for the technical services with minimum three (3) years of professional experience shall be proposed additionally as required (architects, surveyors, mechanical and electrical technicians/junior engineers, OHS personnel, etc.)
	[N-…] - Administrative Support Staff Requirement	12+4	Support staff for the administrative services shall be proposed additionally as required (surveyors, clerks, drivers, secretary etc.)
All Tasks	Total Man-Month	45+14	Key experts
		24+8	Non-key experts

ANNEX I: SELECTED BUILDINGS

I. MAM Gıda Laboratuvarı

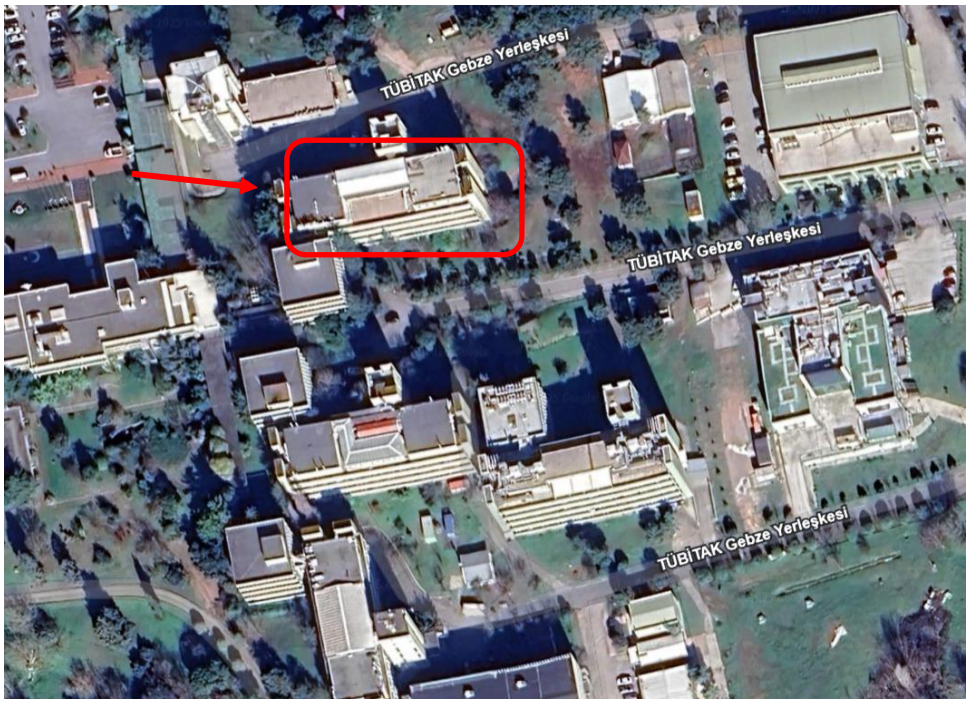

Figure 2. MAM Gıda Laboratuvarı Location (40.786111°, 29.450278°)

Figure 3. MAM Gıda Laboratuvarı Facade

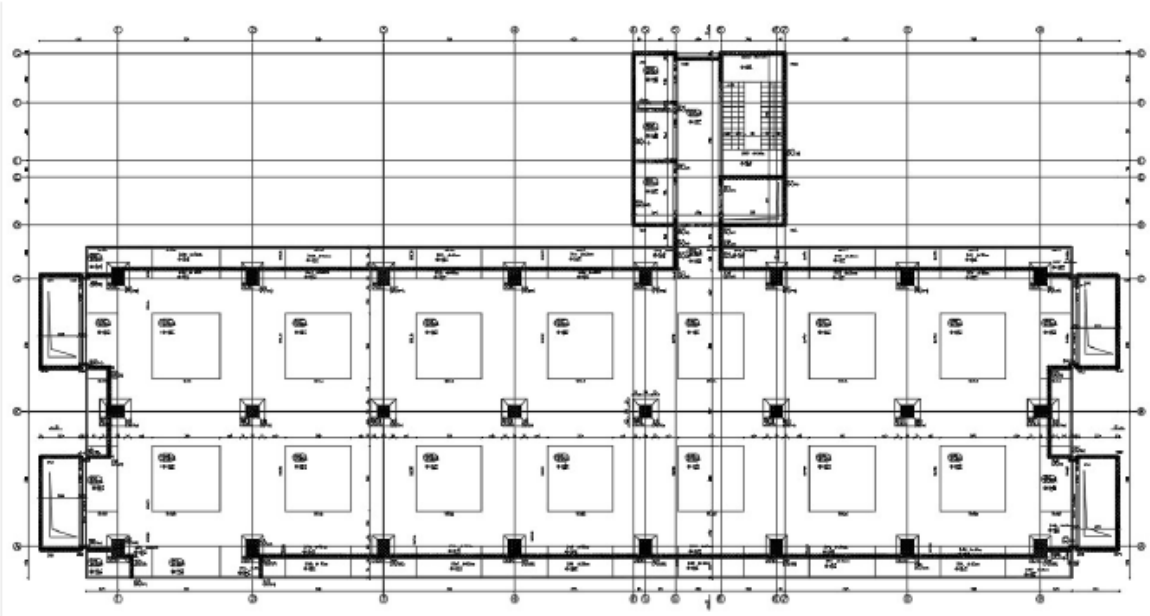

Figure 4. MAM Gıda Laboratuvarı Static Plan Drawing

Table 12. Building Information Data for MAM Gıda Laboratuvarı

Construction Year	1975
Number of Stories	B+Z+3
Total Construction Area	5000
Structural System	RC Frame
Concrete Strength	20.8 MPa

II. MAM Gıda Laboratuvarı İdari Bina

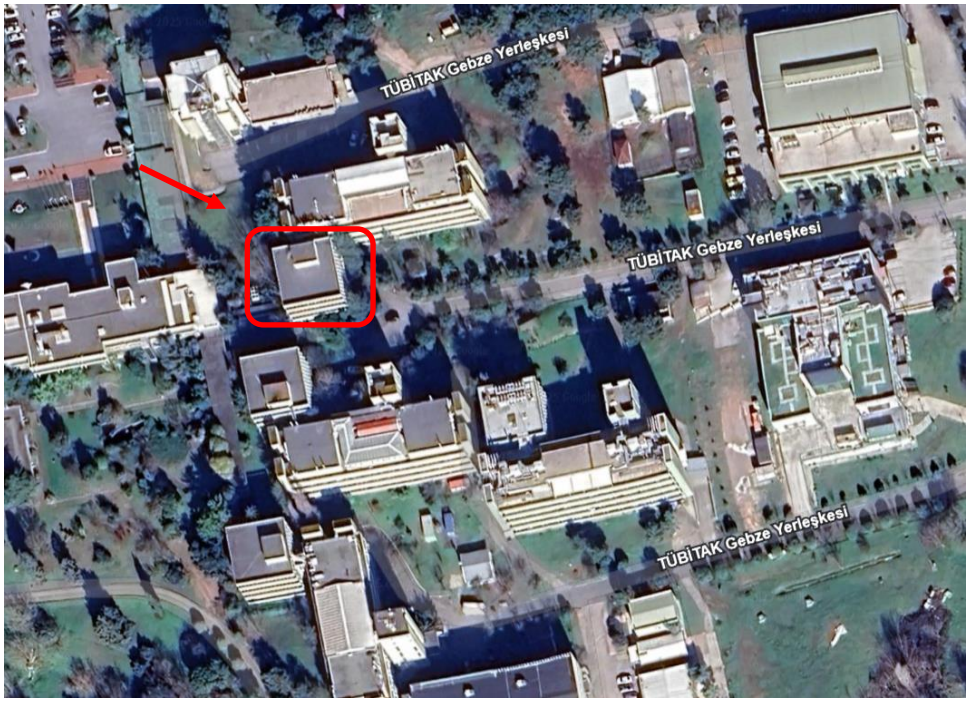

Figure 5. MAM Gıda Laboratuvarı İdari Bina Location (40.785833°,29.450278°)

Figure 6. MAM Gıda Laboratuvarı İdari Bina Facade

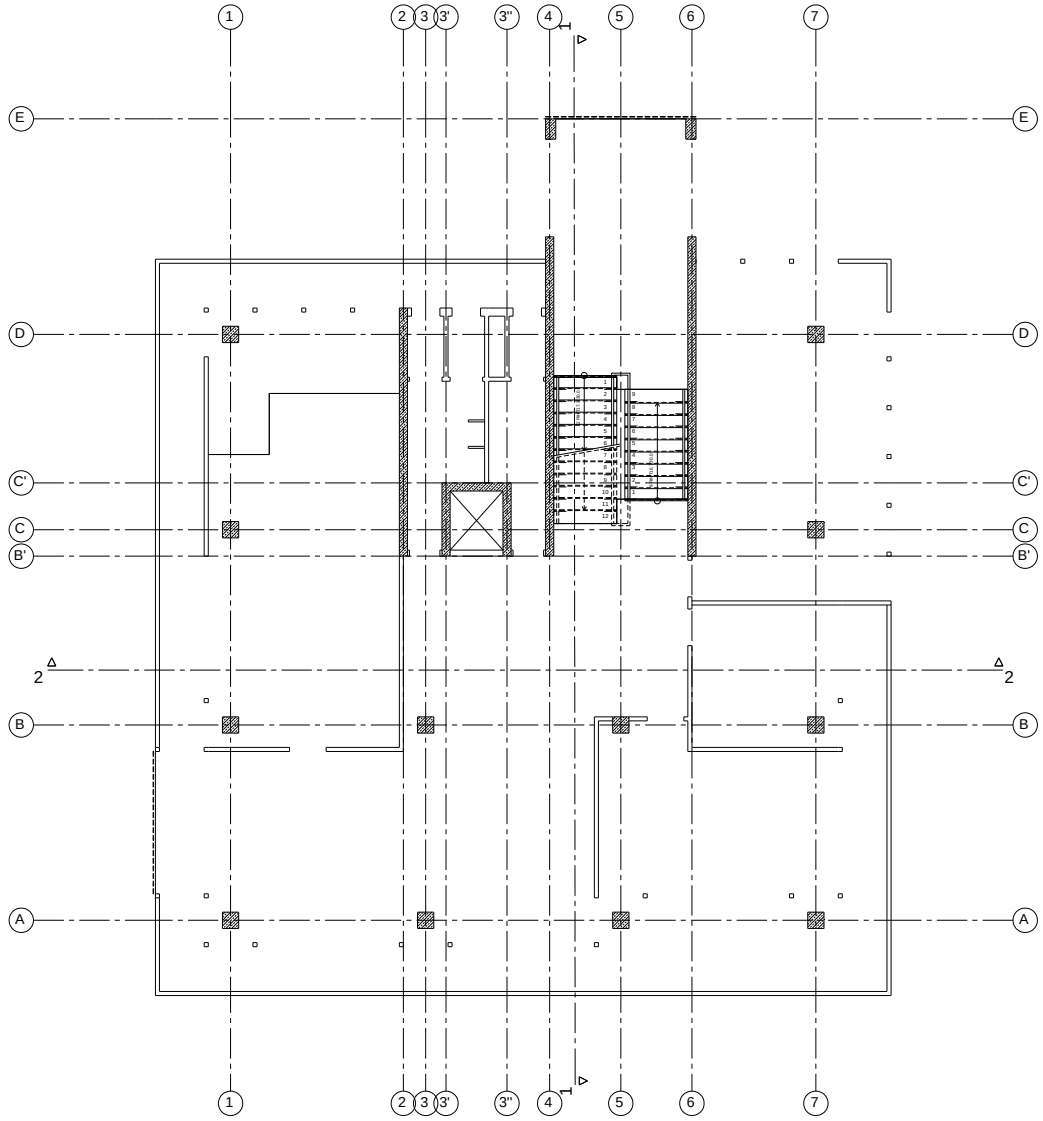

Figure 7. MAM Gıda Laboratuvarı İdari Bina Static Plan Drawing

Table 13. Building Information Data for MAM Gıda Laboratuvarı İdari Bina

Construction Year	1975
Number of Stories	2B+5
Total Construction Area	1787
Structural System	RC Frame
Concrete Strength	24 MPa

III. MAM İdari Bina

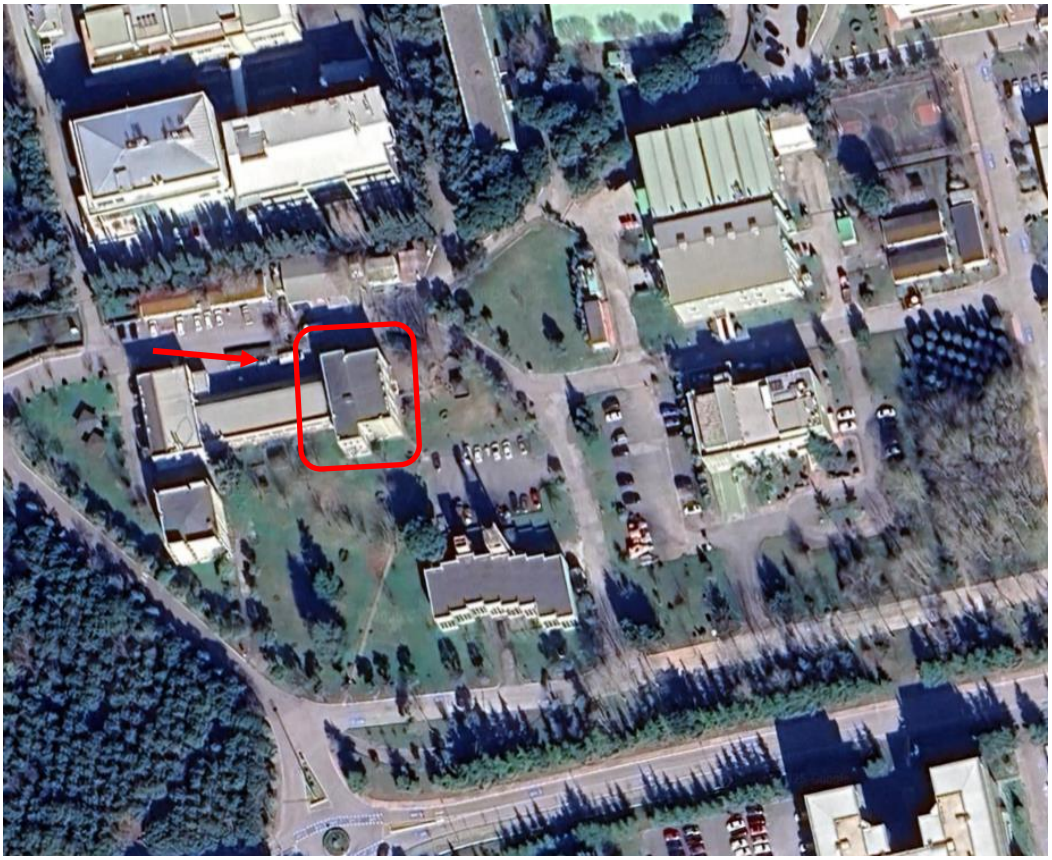

Figure 8. MAM İdari Bina Location (40.788523° , 29.451334°)

Figure 9. MAM İdari Bina Facade

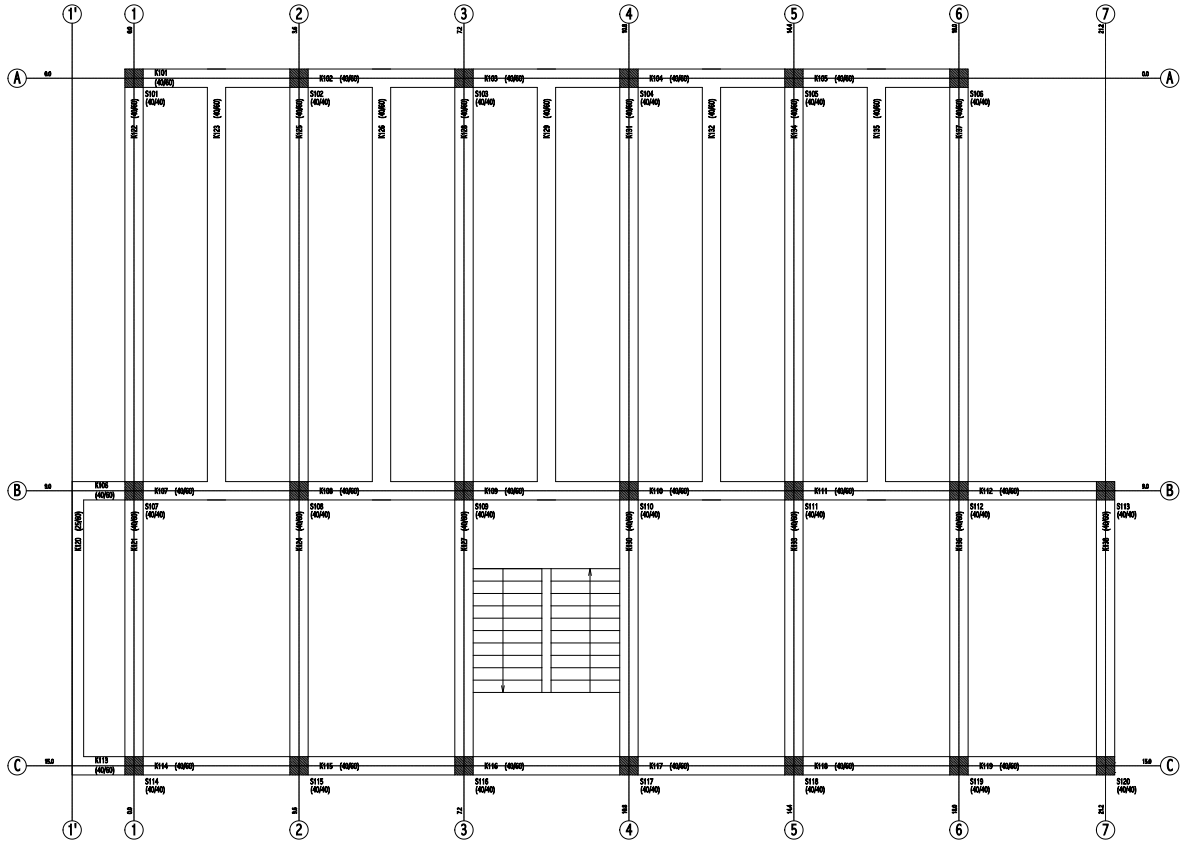

Figure 10. MAM İdari Bina Static Plan Drawing

Table 14. Building Information Data for MAM İdari Bina

Construction Year	1975
Number of Stories	Z+2
Total Construction Area	1305
Structural System	RC Frame
Concrete Strength	24 MPa