



## APPENDIX IX:

# Scope of work/Technical Specifications, Schools& Clinics Rehabilitation in East of Libya

## 1. INTRODUCTION

UNICEF-LIBYA intends to rehabilitate a number of Clinics and Schools in East of – Libya. The rehabilitations comprise all Essential Facilities such as WASH facilities, doors, windows, roof insulations, plastering, etc. These rehabilitations will enable beneficiaries to have better services .

## 2. SCOPE OF WORK

The Scope of Work shall include but not limited to the below items. The BoQ's are part of the scope and complement to each other:

- Clearing off the site
- Supplying, placing and compaction of Backfilling material
- Pouring Lean Concrete
- Installation of Waterproofing membrane
- Pouring Reinforced Concrete slab
- Ground Work Excavation
- Pouring Lean concrete
- Pouring Reinforced concrete
- Block Work
- Plastering Work
- Tiling Work
- Marble Work
- Sanitary, Sewerage and Water Supply Work
- Painting Work
- Aluminium Work
- Electrical Work
- Removal of Existing Damaged Objects.
- Quality Control shall be implemented
- Manufacturing and Installation of Visibility (Signs)

### 2.1 Clearing off the site

- During construction operations at frequent intervals or as directed by the Engineer, CONTRACTOR shall remove accumulations of debris and rubbish from the construction area.
- - Upon completion of all exterior work, all areas disturbed by construction operations including those areas used for material storage construction sheds and offices, and construction toilets shall be cleared of all equipment, tools, scrap, debris and rubbish and CONTRACTOR shall leave the site in a clean, orderly condition.
- - Upon completion of all Clinics&Schools Rehabilitation, CONTRACTOR shall remove all of his equipment, all surplus materials and all rubbish and debris and leave the premises in a clean.

- Immediately before turning over to the Engineer, CONTRACTOR shall carefully inspect the entire Project to assure himself that the following specific cleaning work has been performed:
- Removing all paint, oil, grease and any other spots or strains from window frames and cleaning and polishing all glass.
- Removing all paint spots and smears from all non-paint finished surfaces.
- Removing all marks, stains, fingerprints and dirt from all painted surfaces.
- Cleaning and polishing all door hardware including the removal of all stains, dust, dirt and paint.
- Cleaning and dusting the interior of building.

## – 2.2. Supplying, placing and compaction of Backfilling material:

### – Supplying

Aggregate base course used as a foundation for pavements shall be placed on the subgrade within two percent (2%) of optimum moisture and compacted to a minimum of one hundred percent (100%) of the Maximum Modified Proctor

Density (ASTM D1557). The top six (6) inches of topsoil shall be stripped within the area to be aggregate surfaced. Following stripping of the topsoil,

24 cm of the subgrade shall be scarified and compacted to a minimum of ninety five Percent (95%) of the Maximum Standard Proctor Density (ASTM D698). Onsite Material may be used, as accepted by UNICEF ENGINEER, for compacted fill for the Aggregate base course. Fill shall be placed within two percent (2%) of optimum Moisture content and compacted to a minimum of ninety five percent (95%) of the Maximum Standard Proctor Density (ASTM D698). Deviations in aggregate base course under pavements of more than one-quarter (1/4) inch in ten (10) feet measured with a ten-foot (10') straight edge

### – PLACEMENT

The aggregate base course shall be constructed to the width and section shown in the DRAWINGS. If the required compacted depth of base course exceeds six (6) inches, the base shall be constructed in two (2) or more layers of approximate equal thickness. The maximum compacted thickness of any one (1) layer shall not exceed six (6) inches.

- Each layer shall be constructed as far in advance of the succeeding layer as UNICEF ENGINEER may direct.

The material shall be deposited on the soil foundation, or previously placed layer, in manner to minimize segregation and to facilitate spreading to a uniform layer of the required section. In the event that blending of materials is necessary to provide required gradation and properties of the material, and is done in the roadway, the same shall be accomplished by mixing the aggregate and blending material by means of blade graders, discs, harrows, or other equipment to effect a uniform

distribution and gradation throughout the finished mixture. Excessive mixing and grading that will cause segregation between the coarse and fine materials is prohibited.

## – COMPACTION

- After a layer or course has been placed and spread to the required thickness, width and contour, it shall be compacted. If the material is too dry to readily attain the required density, it shall be uniformly moistened to the degree necessary during compaction operations for proper compaction.
- Compaction of each layer shall continue until the required density specified in Article Preparation of Foundation is reached.
- All areas where proper compaction is not obtainable due to segregation of materials, excess fines, or other deficiencies in the aggregate shall be reworked as necessary the material removed and replaced with aggregates that will meet this

## – 2.3 Waterproofing membrane

- CONTRACTOR shall install all waterproofing materials required to provide a completely waterproof installation on all Lean Concrete surfaces as described in these specifications OR as instructed by the Engineer. It shall also include, where required, Emulsion of Bitumen Coating shall be applied while the lean concrete set and hardened  
CONTRACTOR shall inspect all roof areas, and any defects observed which would have an adverse effect on the completed roof shall be repaired to the satisfaction of the UNICEF Engineer.

- Immediately before lean concrete emulsions placement, the Lean Concrete areas shall be thoroughly cleaned of all loose materials and shall be swept to obtain a dust-free surface.
- Flaming the Bitumen while is fresh and rolling out the membrane maintaining 10cm overlap
- Waterproofing installation shall be tested to the satisfaction of the UNICEF Engineer.
- In case of damage occurs, CONTRACTOR shall repair or clean at his expense to the satisfaction of the UNICEF Engineer
- The material sample shall be approved by the UNICEF Engineer prior installation .
- CONTRACTOR shall furnish a written, signed Five Year Roof Waterproofing Warranty Certificate guaranteeing the installation to be free of any defect from material or workmanship for a period of five years from date of the Engineer endorsement

## 2.4 Pouring Lean Concrete

## 2.5 Pouring Reinforced Concrete slab

## Mixing Concrete

### .1 General

Ready-mix concrete shall be mixed and delivered by one of the following operations:

- .1 Mixed completely in a stationary mixer and the mixed concrete transported to the point of delivery in a truck agitator or in a truck mixer operating at agitating speed, or
- .2 Mixed completely in a truck mixer.

C20 Compressive Strength shall be poured as Lean Concrete and C25 for reinforced Concrete. All concrete shall be poured into the formwork placing and troweled by using the vibrators and trowels. Concrete pump shall be used .however using Site concrete mix could be used in certain condition after the approval made by the UNICEF Engineer. Concrete curing shall be applied for 5-7 days . The Contractor shall also submit test data showing that the concrete supplied will meet the Performance criteria stated in this Specification for each concrete type

Reinforcement details shall comply with the ACI .Steel reinforcements must be Grade 60 (ASTM A615 Concrete minimum cover shall be:

4cm Footing

3cm Columns

2.5cm slabs and beams

Removing of Formwork: The form work shall be removed after the Concrete has reached 70% strength of the designed value, Concrete Compressive strength tests shall be performed on regular basis.

## 2.6 Block Work

CONTRACTOR shall demolish and execute all damaged masonry walls & plastering work as required and as per the Engineer instructions. Refer to relevant BoQ.

## 2.7 Plastering Work:

- All of the following materials used for plaster work shall comply with the following specifications:

- Cement - shall conform to all requirements of the latest edition of ASTM C150 or equivalent.
- Sand - shall be clean, sharp sand meeting ASTM C144-52T or equivalent.
- Water - shall be clean and free from injurious amounts of oil, acid, alkali, salt, organic matter or other deleterious substances.

- It is CONTRACTOR's responsibility to properly store and protect all sacks cement in a suitable weather-tight shed or under waterproof tarpaulins. All materials shall be stored off the ground and stacked closely together to minimize air circulation and in such a manner as to prevent warehouse set.

- CONTRACTOR shall use strict control in the mixing of the plaster, not only to ensure that the proportions are accurately measured and correct, but that the plaster has been thoroughly and completely mixed and that the grain, consistency, workmanship and appearance of the plaster is up to the best standards of workmanship.

- Immediately before applying plaster, surfaces shall be clean, free from dust and efflorescence, and shall be wetted down with clean, fresh water to prevent extraction of moisture from the plaster.
- CONTRACTOR shall use only good and clean equipment in the handling, mixing and placing of the plaster. Mixing tubs, mortar boards, trowels, points and all other tools and equipment shall be in good condition, kept clean, and shall be of the proper size and type for the work required.
- All work shall be performed by skilled and experienced workmen, thoroughly competent to execute the work according to the UNICEF Engineer instruction .

## 2.8 Tiling Work:

- CONTRACTOR shall replace all damaged ceramic floor & wall tiles on surfaces.
- CONTRACTOR shall install all glazed ceramic wall tile on wall surfaces described in these specifications and BoQ. Tiles shall be of best quality from an approved manufacturer. Tile to be installed shall include not only regular tile, but also all necessary trim pieces such as coved based, cap, internal corner, and external corner pieces. Only those tiles in first-class condition having no broken edges, corners or apparent surface imperfections shall be installed. Cutting, when required, shall be done with a masonry saw and all cuts shall be neat and square.
- CONTRACTOR shall replace at his expense all tiles which in the opinion of the Engineer do not present a suitable finished appearance.
- The installation of glazed ceramic wall tile shall be performed in accordance with the following:
  - Immediately before installing the scratch coat of mortar the rough wall surface shall be thoroughly moistened with clean, fresh water.
  - Grout shall be used after an interval of not less than 24 hours nor more than 72 hours after completion.
  - Immediately prior to setting tile, the leveling coat surface shall be properly moistened.
  - Wall tile shall then be set in stack bond by either toweling a skin coat of neat Portland cement onto the leveling coat or by applying a skin coat to the back of each tile unit and immediately floating the tile unit into place.
  - - All cut tiles required for make-up pieces shall be kept to a minimum and shall never be placed on top of tiled areas but only at bottom and corners. Each tile to be cut shall be carefully measured and cut to the proper size any tiles cracked or crazed during placing shall be removed immediately.
  - All tiles shall be properly fitted around plumbing lines and electrical outlet boxes so as to ensure that outlet plates, escutcheons or other coverings shall overlap the cut edges or tile.
  - Immediately after the grout has had its initial set, wall tile surfaces shall be thoroughly cleaned in an approved manner, removing all traces of cement and dust accumulation.
  - - CONTRACTOR shall employ only experienced workmen, thoroughly competent to execute the work in accordance with the best practices and methods common to the trade.

- - CONTRACTOR shall be responsible to suitably protect completed work from other construction activities and shall be responsible to replace any damaged or defective tiles at his own expense. All such replacement work must be performed to the satisfaction of the Engineer.

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## 2.9. Marble Work

Marble materials shall comply with the following:

- Sills - shall be cut to the proper size and shall have no broken or chipped edges and no apparent surface imperfections.
  - Any cutting required on sills and baseboards shall be done with a masonry saw and all cuts shall be square and clean.
  - Mortar used for embedding the sills and baseboards shall be of the type and consistency necessary for good, firm bond and support, and shall consist of one part Portland cement and four parts sand by volume with only enough water added to make the mix plastic but still enough for the intended purpose.
  - The finished work shall be in a true straight line.
  - After the installation of sills and baseboards and as soon as the mortar setting bed has sufficiently hardened, the sill or baseboard shall be well washed with clean water to ensure that no mortar remains on the surface and the joints shall be pointed. Any damage which occurs shall be repaired by CONTRACTOR to the satisfaction of the Engineer.
- CONTRACTOR shall employ only experienced workmen thorough competent to execute the work in accordance with the best practices and methods common to the trade.

## 2.10 Sanitary Sewerage and Water Supply work

- CONTRACTOR shall perform all plumbing work required for a complete workable plumbing system as described in these specifications and BoQ including the temporary connection of water and sewer lines into the existing nearby utility distribution systems.
- The piping materials for plumbing work shall consist of one or more of the following for each of the several types of installation:
  - Water Piping Installation - Outside buildings all piping shall be PVC pipe with screwed or cemented joints. Inside buildings piping shall also be PVC but it shall be capable to the pressure.
  - Sewer Piping Installation - materials shall be PVC both outside and within buildings.
  - Vent Piping Installation - material shall be PVC pipe with joints according to manufacturer's details.
  - Plumbing Fixture Installation - materials shall be chrome plated brass piping and tubing with screwed or slip joints.

- Tubing shall be installed by utilizing only straight tubing free of dents, cuts, or other handling defects.
- Only standard and heavy duty fittings will be accepted by the UNICEF Engineer.
- All sanitary appliances shall be firmly secured to the wall or floor by approved means.
- Wash basins should be provided with pedestal for support. European W.C.s shall be provided with low level and a suitable capacity. The seat and cover may be in heavy duty plastic color matched to the toilet finish.
- - - All toilets shall include a 0.5" flexible steel hose of length 1 m located close to the W.C. This shall be connected to the cold water supply through a 0.5" bib tap mounted 30 cm above finished floor level and it shall be fitted with a nozzle to deliver a fine spray.
- - All taps should be easy to operate and they shall allow precise control of water flow to minimize splashing.
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## 2.11. Painting

- CONTRACTOR shall perform all painting work if applicable and when needed as per the BoQ's.
- All paint, primers, thinners, varnish, filling putty, etc. shall be the standard, first-quality trademark product of Jotun or the Engineer approved equal substitute.
- Before application of any paint, CONTRACTOR shall inspect all surfaces scheduled to receive paint in accordance with the following:
  - Plaster Surfaces - all nail holes, checks, hairline cracks or other imperfections shall be filled with a putty colored to match the finished work. Any large cracks shall be cut out to provide good anchorage and the cracks filled with such material and in such a manner as is acceptable to the UNICEF Engineer.
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- CONTRACTOR shall not mix paints of different brands before or during application. All paint and the like shall be brought on to the works in sealed tins and no paint shall be taken from one job to another. A suitable store shall be provided by CONTRACTOR in a location approved by the Engineer.
- All coats shall be thoroughly dry and hard before the next coat is applied.
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- CONTRACTOR shall provide and use sufficient clean drop cloths to protect all work and material including floors from injury or stains during the progress of the work and shall make every reasonable effort to ensure that drips, splashes and spills are kept to an absolute minimum.
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- CONTRACTOR shall, upon completion of painting, remove all paint where it has been spilled, splashed or splattered on surfaces, including fixtures and glass, and leave the entire job in a neat, clean and orderly condition satisfactory to the Engineer.

## 2.12 Aluminum Work

- CONTRACTOR shall supply and install all doors and windows as per the existing and as per the BoQ. All doors and windows shall be provided of the approved type, make and quality, and as per the BoQ.
- Doors and windows shall be made up of either aluminium, or PVC as per the existing material and the Engineer instructions. The doors and windows shall be complete with all doors and windows furnishing and hardware including handles, knobs, door closers, etc. All doors shall essentially be sourced from the approved list of supplies.
- Similar sizes of doors and windows shall be provided as per the existing, specifications and applicable codes.
  
- - Windows shall be installed with strict attention to detail and dimension, and shall be set plumb and true in the openings, securely anchored and held in alignment. An allowance for expansion shall be made for windows that are to be installed side by side, and each window shall be in alignment with the others.
- Caulking shall be installed with a proper caulking tool, in the void between window frames and masonry openings, and shall be of sufficient quantity to ensure watertight sealing without voids or pockets. Caulking shall be well smoothed out to present a neat, workmanlike appearance, and so contoured to allow good drainage of rain water.
- CONTRACTOR shall be responsible for the suitable protection of the installed windows from damage due to other construction activities.
  
- -CONTRACTOR shall install all windows glass as described in these specifications.
- Glass shall be 4 mm and 6 mm thick as described in the BoQ's and shall be of a quality approved by the UNICEF Engineer.
- Glazing shall be of a type approved by the UNICEF Engineer which adheres firmly to both the glass and the metal frame.
- CONTRACTOR is responsible for proper storage and handling of glass to avoid scratches, chips and breaks. Edges of glass shall be protected when glass is stored vertically, and CONTRACTOR shall avoid storing glass in any manner that could cause cracking or chipping, including excessive weight on horizontal stacks.
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## 2.13 Electrical Work

- CONTRACTOR shall perform all electrical works required for a complete workable electrical as described in the BoQ's.
- All electrical installations, materials and equipment shall be in strict compliance with the following codes and standards:
  - NEC National Electrical Code
  - IEEE Institute of Electrical Electronics Engineers
  - NEMA National Electrical Manufacturer's Association
  - ANSI American National Standard Institute Incorporation

NFPA National Fire Protection Association

VDE German Standards

- All work shall be executed in a workmanlike manner, presenting a neat appearance upon completion, and shall be tested for the Engineer approval.
- Accurately locate conduits in walls and partitions so as to be completely concealed and as nearly vertical as possible with no exposed conduit bends at ceiling. Conduits shall never be installed diagonally in walls and horizontally only where unavoidable. Locate conduits at least 15 cm from hot water piping or other hot surfaces.
- Make wire joints and splices only at junction or outlet boxes, never inside conduits. All joints shall be firmly made with wire nuts in a manner approved by the Engineer.
- Electrical Devices - such as switches and receptacles shall be securely installed in the outlet boxes and shall be plumb square and level. All electrical device wiring connecting screws shall be

## 2.14. Installation of Air conditioning, And commissioning

Please see the instruction manual

## 2.15 Removal of Existing Damaged Objects:

CONTRACTOR shall perform all demolition and removal work required to complete all of the work. In general, the required demolition work and removal work is indicated on the BoQ for each school/clinic. Even though not specifically indicated or described, CONTRACTOR nevertheless shall still be responsible to perform the demolition and removal of all items, which do not become part of the completed work unless specifically accepted by the UNICEF Engineer.

- Demolition work shall include but not necessarily be limited to the following:
  - Damaged electrical conduits and accessories.
  - All damaged existing partition walls, windows and doors.
  - All damaged existing floor finishes that shall be carefully cleared prior to the laying of the new floor finishes.
  - All damaged toilets and existing plumbing piping except for under floor piping which shall be cut off and plugged below finish floor line.
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  - Removing all paint spots and smears from all non-paint finished surfaces.
  - Removing all marks, stains, fingerprints and dirt from all painted surfaces.
  - Cleaning and polishing all door hardware including the removal of all stains, dust, dirt and paint.
  - Cleaning and dusting the interior of building.

## 2.16 Manufacturing and Installation of Visibility (Signs ):

Production and Installation of two visibility (Signs) for every school/clinic, which made from FLEX and waterproof and the followings shall be considered:

- The size shall be 2 m@1.5 m
- Self-standing signs
- Metal Pole

The layout and the design shall be handed over to the Contractor during the Project Construction and the Contractor not allowed to install the Visibility unless prior approval from the UNICEF Construction Engineer.

The cost of production and installation of visibility (Signs) should be borne by the contractor.

## 2 CONTRACTOR RESPONSIBILITIES/ QUALITY CONTROL:

- CONTRACTOR is to supply all material, manpower, equipment and tools for the works, transportation and all required consumable material like sand, cement, aggregates, and similar required completing the works in all respects and according to this scope of work and standards.
- CONTRACTOR shall supply and use best substantially same as existing or higher quality materials. All material to be used in the works shall be approved by the UNICEF Engineer.
- CONTRACTOR shall carry out construction works in close co-ordination with UNICEF Engineer and according to UNICEF standard and agreed procedure.
- CONTRACTOR shall, during the progress of work, keep the complete area in a very clean condition.
- All required works should be complying with scope of work and specifications.
- CONTRACTOR shall be responsible to suitably protect completed work from other construction activities and shall be responsible to replace any damaged or defective tiles at his own expense. All such replacement work must be performed to the satisfaction of the UNICEF Engineer.
- The Contractor shall test the completed and newly installed wiring system for faults and shall remove any defects prior to final inspection.
- All electrical equipment, fixtures, fittings, devices, etc., shall be tested prior to installation and they must be manufactured by reputable companies with worldwide presence.
- All work deficiencies shall be quickly identified and corrected. All works shall be done in accordance with the strict International Quality Standards.

## 3 TEMPORARY FIRE PROTECTION

- The Contractor shall provide and maintain adequate fire protection in the form of barrels of water with buckets, fire bucket tanks, fire extinguishers, or other effective means of extinguishing fire, ready for instant use during construction of the works.
- Gasoline and other flammable liquids shall be stored in and dispensed from safety containers approved by the Engineer.

#### **4 FIRST AID FACILITIES**

The Contractor shall provide adequate first aid facilities for the use of his staff and of his subcontractors and for the UNICEF Engineer and his personnel. They shall be made available at no extra cost.

#### **5 TEMPORARY SAFETY MEASURES HSE/ SITE ACCESS**

- The Contractor shall provide and maintain during the entire Contract period all temporary safety measures necessary for the protection of people, structures, fences and the like on the site or adjacent properties, and he shall be solely responsible for any damage to life and property caused as a result of not having taken adequate precautions against such damage.

The Contractor shall be responsible for making arrangements with and obtaining necessary permits from relevant authorities to ensure access to Site for construction personnel, delivery of products and construction equipment, and performance of work.

- Maintain clear access for roads and sidewalks on the Employer's and public property.

#### **6 Construction Progress Schedule**

- The contractor shall submit initial schedule, product data, samples and required test results within 5 days unless otherwise indicated after date established in Notice to Proceed. Revise and resubmit as required.

- Submit bar chart and/or time related line diagram as appropriate with separate line for each major portion of Work or operation. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

#### **7 Progress Reports**

- Five copies of the progress report shall be furnished to the Engineer with each application for progress payment. If the Works fall behind schedule, the Contractor shall submit additional progress reports at such intervals, as the Engineer shall request.

- Each progress report shall include sufficient narrative to describe current and anticipated delaying factors, their effect on the construction schedule, and proposed remedial and corrective actions. Any work reported complete, but which is not readily apparent to the Engineer, shall be substantiated with satisfactory evidence.

- Each progress report shall include a copy of the construction schedule progress report.

#### **8 Inspection System**

- The Contractor shall maintain an adequate inspection system and perform such inspections to ensure that the Works carried out conform with the Contract requirements. The Contractor shall maintain complete inspection records and make them available to the UNICEF Engineer

- - If the Contractor does not promptly replace or correct rejected work, the UNICEF may (a) by Contract or otherwise, replace or correct the work and charge the cost to the Contractor or (b) terminate for default Contractor's right to proceed.

## **9 Unknown Services**

The Contractor shall notify the Engineer immediately should he come into contact with any unknown services such as cables, pipes, boreholes and the like and all work in the vicinity of such services shall cease forthwith until authority to proceed is obtained from the Engineer.



