



**TECHNICAL SPECIFICATION FOR WATER SUPPLY NETWORK REHABILITATION  
Spen Jomat village, Khogyania District of Nangahar Province**

The document is intended to highlight the WASH interventions the International Medical Corps (IMC) is planning to implement through the funding of LDSCA. The project deliverables are to improve access to water and hygiene promotion in Spen Jomat village, Khogyanai District of Nangarhar Province.

The details are provided below:

<b>1.</b>	<b>DESCRIPTION</b>	<b>OF</b>	<b>THE</b>	<b>ACTIVITIES:</b>
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This is a brief description of the scope of work. The technical specifications required will be described below. The designs are in the Appendix.

- Rehabilitation- of solar power water supply network from well to Elevated tank and from El-Tank to public stand tap according to BOQs and all required activities.
- Construction of new 20 m3 RCC Elevated Tank.
- Rehabilitation- of the pipe network system according to BoQs and all required activities.
- Rehabilitation- of stand post according to BoQs and all required activities.
- Construction of New- Public Stand Posts
- Rehabilitation of Well protection Box.
- Construction of Flow meter and G.V boxes according to the BoQ and drawings.
- Supply and installation of the Solar system according to the Drawings and BoQ.
- Rehabilitation & extension of solar Frame.

<b>2.</b>	<b>LOCATION</b>	<b>AND</b>	<b>ACCESSIBILITY:</b>
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The rehabilitation of Solar power water supply network system site is located in Speen jumat Village, Khogyanai District of Nangarhar Province. The IMC team, in collaboration with the Darenoor district elders – Speen jumat Village Water Management Committee (WMC), will mark the exact locations of the water supply network system site. IMC will successfully hand over the site works to the contractor to initiate the agreed scope of works defined for rehabilitation through a joint IMC (program and support) team and community field visit.

#### **MOBILIZATION**

The work shall consist of mobilizing equipment, supplies, and securing bonds and permits necessary to do the work as stated in the contract and/or agreement and demobilizing excess materials and equipment from the work site.

### **3. SUPERVISION AND MONITORING**

IMC will designate one of its staff to coordinate with the contractor to regularly monitor the rehabilitation of Solar power Water Supply network, and installation of items. IMC will undertake on-the-spot checks and monitoring of the progress and quality of the work. The contractor must inform IMC of the project's milestones so that IMC monitors the above-mentioned activities together with the contractor.

### **5. PRE-AMBLE TO THE SPECIFICATION**

The contractor will always collaborate with the IMC field supervisor to be guided by the technical specification, and the scope of work to be carried out.

This specification covers the minimum standards of workmanship and materials required by the Contract. All works shall be carried out with the approval of the IMC WASH Engineer. Any civil works or materials that do not meet this specification's requirements shall be repaired or demolished and re-instated at the Contractor's expense. The Contractor shall be liable for any delays to the project caused by construction or demolishing defective work.

Any items of work not described in this specification but forming part of the works shall meet the minimum standards of workmanship and materials. The civil works or materials need to be approved by the IMC WASH Engineer. Where there is a conflict between local standards and this specification, this specification shall take precedence.

This document forms part of the Contract, and should be read in conjunction with the other Contract Documents:

- Contract Agreement
- Conditions of Contract
- Bid Form
- Contract Drawings
- Other documents referred to any of the contract documents.
- Work plan and construction tracker

### **6. MINIMUM STANDARDS FOR WORKMANSHIP AND MATERIALS**

#### **Quality of Materials**

The qualities of all construction materials are to be following the State Standards. The IMC WASH Engineer shall check the quality of all materials/items delivered to the site and put his finding in the Engineers' site Notebook once a week. Any materials/items, which do not meet the minimum standards, shall be rejected. Such materials shall be removed from the site and replaced at the Contractors' expense with materials of the required quality.

#### **Quantity of Materials**

The IMC WASH Engineer shall check that the required quantity of materials /items has been delivered to the site according to the BoQ put the inputs in the project site notebook and use them in the works. The IMC WASH Engineer will not certify payment for any materials/items, which have been specified in Contract but have not been used in the works for whatever reason.

**Quality of Workmanship**

The IMC WASH Engineer shall be responsible for checking that the quality of workmanship by the Contractor is of an acceptable standard according to this specification. The IMC WASH Engineer will reject any works, which have not been executed to the required standard. The Contractor shall redo any rejected works at his own expense and with no time delays to the overall scheme.

**Sand**

Sand shall be clean and free from contaminants such as oil, silt, soil, wood, metal, or vegetable. Very fine or smooth Sand shall not be used. Coarse Sand (used for concrete) shall have a maximum size of 5mm. Medium Sand (used for mortar) shall have a maximum size of 2mm. Fine Sand (used for plaster) shall have a maximum size of 1mm.

**Aggregate**

The coarse aggregate used for the concrete mix shall be angular crushed rock varying from 5mm to 20mm for Grade 1 Concrete. It shall be clean and free from contaminants such as oil, silt, soil, wood, metal, or vegetation. Suppose this type of aggregate is not available. In that case, the CONTRACTOR/SUPPLIER must seek the IMC WASH Engineer's approval in the Journal book on which other types to use.

**Cement**

Cement (Portland 400 or 500) shall be delivered to the site in prime powder form and sealed bags. It shall be kept clean and dry until usage. Partially used bags of cement shall be stored in a dry place until required. Any partially used bags, which have become damp, shall be rejected. The Contractor will store the empty bags for the IMC WASH Engineer's count and dispose of them the Contractor.

**Water**

Water used for concrete mix, mortar, plaster, and other construction materials shall be potable, clean, and free from organic material. If none is available on site, the Contractor shall transport suitable water to the site.

**Clay:**

The clay must be of industrial quality and delivered in small aggregates, if possible. If not available, the clay used to create the plug should come in chunks of small size (less than 5 cm) to avoid them being stuck in a higher position than supposed to.

**Concrete**

Except otherwise specified, all plain and reinforced concrete works and concrete in general (either hand or machine mix at site) will meet the applicable standards & specifications.

**Concrete design mix:**

The materials used in concrete shall be proportionate by weight following the standard cement/sand/aggregate mix ratios as follows:

- For reinforced concrete mix - 1:1:2 mix ratio only for footing and columns
- For reinforced concrete mix - 1:1.5:3 mix ratio for beams, slab, and peaks.
- For plain/mass concrete mix - 1:1.5:3 mix ratio
- For plastering mortar mix- 1: 3 Mix ratio

The mix, cement, and water content ratio shall be selected to obtain the best results for compressive strength, density, water tightness & durability, workability, and finish quality. The concrete mix must be such that the design is compatible with the minimum water content ratio to give each grade adequate concrete workability.

The grades of concrete for the various works shall be as noted on the drawings and as below:

C25: all reinforced concrete (foundations, slabs, etc.)

- Characteristics compressive strength at 28days: 250kg/cm

- Minimum cement content: 280 kg/m
- Max free water content ratio: 0.40
- Max nominal size of aggregates: 25mm

After placement, the concrete shall be vibrated by mechanical means. The vibration method is to be approved by the WASH Site Engineer/works personnel before the operation. The vibrated and consolidated concrete is finished by toweling or floating the surface to a smooth and flat finish.

Following placement, vibration, and finishing work to the concrete and after the initial set has occurred not to damage the surface of the concrete, appropriate measures, approved by the site Engineer/Works personnel are to be implemented to cure the concrete for a minimum period of 14 days.

Where concrete previously placed as part of the works is to be butted, jointed, or raised with the addition of further concrete, except in the case where the initial concrete is blinding concrete, the first concrete surface must be suitably prepared by the scrabbling, i.e., removing the laitance (fine concrete surfacing) before placement of the other concrete. The method is to be approved by the Site Engineer/Works personnel. After scrabbling, the concrete shall be a thoroughly wetted and thin layer of 1:2 cement: sand mortar applied before pouring the new concrete.

Steel reinforcement shall be positioned with a clearance of 40mm to the face of the concrete unless otherwise directed by the IMC WASH Engineer/Works personnel or shown in the Contract drawings. Formwork for the concrete shall be to the approval of the IMC Site Engineer and shall not allow grout loss from the concrete mix.

Prior to the concrete placement, the formwork is to be inspected and all harmful materials removed to the approval of the IMC WASH Engineer/Works personnel.

The Contractor must undertake no mixing or placement of concrete without prior permission by the IMC WASH Engineer.

## **Reinforcement**

Steel reinforcement shall be the correct diameter, as shown on the drawings. The bars shall be clean and free from rust. They shall be securely fixed with wire before placing the concrete. The minimum cover to reinforcement shall be 25mm.

### **Framework:**

The exact dimensions and positions shall be as per the issued execution drawing. All formworks shall be designed and built to maintain rigidity throughout the concrete placement, ramming, vibration, and setting to the required shape, position, level, and specified class of finish. All joints shall be sufficiently tight to prevent leakage of concrete.

Before concreting commences, the formwork shall be thoroughly cleaned and freed from all sawdust, tie wire, shavings, earth, dirt, and other debris. Release agents should be applied and compatible with the finishing class; care must be taken.

Striking of formwork shall be done without damage to the concrete, including removal without shock to prevent impact load on the partially hardened concrete.

## **Placing Concrete**

Once mixed, concrete shall be used immediately. Any concrete, which had been allowed to achieve its initial set, shall not be placed. Concrete shall be placed in layers with a maximum thickness of 250mm. Each layer shall be thoroughly compacted with a wooden (or any other) rammer. When placing on old or set concrete, the surface of the old concrete shall be thoroughly cleaned and wetted with water. The surface must be chipped to form a suitable key if the surface is smooth. Old concrete shall be painted with liquid cement prior to placing new concrete.

## **Curing Concrete**

Sufficient water is required for concrete to harden through hydration. The concrete must be kept moist or "cured" to ensure it does not dry out. Poorly cured concrete will shrink or crack, and not achieve its full strength. Concrete shall be cured by covering it in plastic sheets.

Spraying with water, covering with wet Sand, or other methods proposed by the Contractor and approved by the Engineer. The Contractor shall ensure that all concrete is adequately cured. Curing shall start as soon as the concrete has been poured and shall continue until curing is complete after 28 days.

### **Concrete Finishing**

Concrete shall be finished to a smooth uniform surface and finished using a metal or wooden float. The surface texture shall be flat and smooth with no irregularities or air bubbles. When formwork is removed, the face of the concrete shall be flat and smooth. If there are signs of voids, air bubbles, or inadequate compaction, the concrete shall be removed, disposed of, and re-laid with a fresh mix.

### **Plaster and Pointing**

Plaster apron shall be mixed in the proportion of 1 cement: 4 for plaster Fine Sand by volume. Sufficient water shall be added to achieve the desired workability.

The apron shall be wetted before applying the plaster. The plaster shall be 10mm to 20mm thick and It shall have a uniform flat finish free of irregularities and blemishes. The finish shall be clean and precise at corners Untidy or poorly finished plaster shall be rejected.

When the plaster is still damp, the apron shall be floated to a smooth finish with a wet steel float.

### **Drainage System**

Used and surface rain runoff water: All water from the Facility must be collected and channeled through the drainage channel into soakaway pits. The water drained from the high-risk shall be channeled to the

high-risk soakaway pit, while the water drained from the low-risk shall be channeled to the low-risk  
**Submittals.**

The construction contractor shall provide IMC with submittals of required material/activities; submittals can be shop drawings, material data, samples, and product data before use in construction projects. Submittals are required at the inception phase of construction activities to verify that the correct product/ material will install on the project. IMC WASH Engineer will reject all the work carried out without providing IMC with submittals.

### **Solar System:**

Solar panels, Submersible & inverter should be new, best quality and meet MRRD Specification. Cable of solar power system must be made of cooper.

### **Site Cleaning:**

After completing the work, the contractor must remove all remaining sand, gravel, and cuttings from the site. They must also remove all rubbish left over from the workers.

### **Safety:**

The contractor should provide sufficient safety measures for skilled and unskilled laborers and other hired workers on the Project site, the contractor should provide workers and laborers with all required PPEs (personal protection equipment).

### **Project Handover:**

Before the handover of the project, it is the responsibility of the contractor to provide (IMC) with all necessary documentation showing approval of the materials, tools, and spare parts utilized in the project. This approval must be obtained from the pertinent stakeholders, namely the Ministry of Rural Rehabilitation and Development (MRRD) or Local PRRDS. Failure to secure Final approval from the MRRD or PRRDs for the mentioned project both in terms of quality and quantity as per the contracted BOQ will result in the project not being deemed complete and the final install payment will remain pending.

Also, the contractor should provide IMC with all the warranty letters of used materials in the project ensuring they meet the standards mentioned in the contracted BOQ.