

Tender for Water Supply Materials

Generating inclusive Resilience and Environment Enhancement
GREEN project – CCL

MATERIAL TECHNICAL SPECIFICATION & BILL OF QUANTITIES (BOQ)

1.0 Introduction

This document specifies the technical requirements, quality standards, and conditions for the supply of materials for a gravity-fed water supply system in **Yapoung village, Phongsaly district, Phongsaly province**. The tender covers the supply of all materials listed in the attached BoQs, delivered to the respective village sites.

Bidders must strictly adhere to these specifications. Any proposed deviations or equivalents must be clearly justified in their offer.

2.0 General Conditions

- **Delivery:** All materials must be delivered to the specified village locations:
 - **Ban Yapoung (21.6520002, 102.061233), Phongsaly District.**
- **Packaging:** Materials must be packaged to prevent damage during transport and on-site storage. All labels and manufacturing certifications must remain legible.
- **Certification:** For critical items (e.g., cement, HDPE/PVC pipes, steel bars), the supplier may be required to provide certificates of conformity or mill test reports upon request.
- **Village Contribution:** Items marked as "**VILLAGE CONTRIBUTION**" in the BoQ (e.g., formwork boards, wood beams) will be provided by the communities and are **excluded** from this supply contract **except for the water meters that will be paid by the project and reimbursed by the village authorities**. The supplier is only responsible for the items with a unit price in Lao Kip (₭).

3.0 Detailed Technical Specifications by Category

3.1 Concrete Infrastructures & Reinforcement

- **Portland Cement:** Standard 50 kg bags. Must be fresh, within shelf life, and stored off the ground. Dosage is specified at 350 kg/m³.
- **Concrete Steel Bar (Reinforcement):**
 - Grades: Must be compliant with common structural standards (e.g., ASTM A615/equivalent).

- Sizes: Ø 6 mm, 8 mm, 10 mm, 12 mm as per BoQ. Supplied in standard 10-meter lengths.
- **Stirrups Steel Wire:** Ø 1 mm, soft annealed binding wire.
- **Nails:** Common wire nails, 5 cm, 8 cm, and 10 cm lengths, galvanized preferred for corrosion resistance.
- **Sand and Gravel: In the event of different grain sizes, the supplier must specify this on the BoQ.**
 - Sand for concrete: **0/4 mm**, clean, sharp, and free from organic matter.
 - Gravel for concrete: **5/15 mm**, hard, durable, and well-graded.
- **Mass Water Repellent:** Integral concrete waterproofing admixture. Dosage: 2.5 liters per cubic meter of cement.

3.2 Formwork (Supplier Items Only)

- **Formwork Boards & Wood Beams: Noted as village contribution. The supplier is not responsible for these items.**

3.3 Filtration & Waterproofing

- **Non-Woven Filtration Geotextile:**
 - Material: **Non-woven**, made from long (continuous filament) polyester (PET) fibers.
 - **High Porosity & Permeability:** Excellent water flow characteristics (both in-plane and cross-plane) are crucial to handle the high flow rates from the spring without causing head loss or clogging.
 - **Robust Mechanical Properties**
 - **Puncture Resistance (CBR):** High resistance to puncture is essential to withstand the pressure from the sharp-edged 20/40 mm gravel during installation and under load.
 - **Tensile Strength:** Good multidirectional strength to resist stresses during installation and soil settlement - **ideally 20 kN/m**.
 - **Filtration/Pore Size (O90):** An appropriate apparent opening size (AOS/O90) to effectively retain the surrounding soil while allowing fine particles to pass through, minimizing the risk of blinding and clogging ("soil tightness").
 - Permeability: **High permeability** to allow the free passage of water.



- **UV Resistance:** Sufficient resistance to ultraviolet degradation for short-term exposure during installation.
- Mass per Unit Area: A suitable weight (e.g., between **300-350 g/m²** or as per your **technical recommendation** for this load class) to provide a durable and robust fabric.
- Properties: **High puncture resistance (> 2000 N)**. It must be suitable for separating layers of gravel/sand in a filtration system.
- **Filter Media: In the event of different grain sizes, the supplier must specify this on the BoQ.**
 - Coarse Gravel (Drainage Layer): **20/40 mm**.
 - Fine Gravel (Intermediate Layer): **5/15 mm**.
 - Coarse Sand (Final Filtration): **0/2 mm**.

In order to guarantee effective filtration and remove all impurities, we strictly require that you provide clean, high-quality materials (the origin may be requested), supplied in bags—the filtration materials must not be mixed with the materials used for cement!

- **Hydro-expansive Joint:** For structural breakaway joints to ensure watertightness between concrete pours.



- **Anchoring cartridge:** chemical anchoring for fixing iron bars inside existing concrete.



- **Teflon Tape:** Standard roll, for sealing threaded connections between HDPE and PVC fittings.

3.4 Pipes

All pipes supplied under this contract must be **new, unused, and of first quality**, free from defects, and manufactured from virgin raw materials. **Recycled or regrind material is not permitted** for pressure pipes. The following international standards shall apply:

- **HDPE (High-Density Polyethylene) Pipes:**
 - **Material:** Must be made from virgin PE 100 RC (Resistance to Crack) resin or equivalent, ensuring high resistance to stress cracking and long-term durability.
 - **Standard:** Must comply with **ISO 4427** for polyethylene pipes for water supply, or an equivalent international standard (e.g., **ASTM D3035**).

- **Pressure Rating (PN):** The Pressure Nominal (PN) rating must be clearly marked along the pipe's length. The PN value must be guaranteed by the manufacturer to withstand the continuous pressure for a 50-year design life at 20°C.
- **Color & Marking:** Pipes must be black with blue stripes for potable water use. Full manufacturer's marking, including standard, material type (PE 100), SDR/PN, diameter, and production batch, must be legible.
- **HDPE Perforated Drain Pipe (Ø63 mm):** Must meet the same base material standards as solid HDPE pipes.
- The perforations (slots) must be **precision-cut to the specified dimensions : 2 pipes of 3 meters long, perforated on 2 meters only. Opening sizes : 10 cm long , silt opening : 5mm, 1.5 cm spacing, see illustration below**). The pipe must be delivered with a protective end cap to prevent soil ingress during transport and storage.



- **PVC (Polyvinyl Chloride) Pipes:**

- **Material:** Must be made from PVC compound, suitable for potable water.
- **Standard:** Must comply with ISO 1452 for plastic piping systems for water supply, or an equivalent international standard (e.g., ASTM D1785).
- **Pressure Rating (PN):** Must be of PN 13.5 (Pressure Rated) as per the BoQ. The pipes must be clearly marked with the standard and pressure rating.
- **Color & Fittings:** Pipes are typically blue. All PVC fittings and solvent cement must be from the same manufacturer as the pipes or be a certified compatible system to ensure joint integrity.

- **GSP (Galvanized Steel Pipes):**

- **Standard:** Must be heavy-grade, hot-dip galvanized steel pipes, compliant with ISO 65 / EN 10255 or equivalent ASTM A53.
- **Galvanization:** The galvanized coating must be continuous, uniform, and free from defects (bare spots, flux residues) that would lead to premature corrosion. The coating must withstand a standard salt spray test.
- **Threading: All threads must be clean, sharp, and cut to standard taper (NPT) specifications.** They must be protected with plastic caps during transport to prevent damage. **We reserve the right to refuse fittings if there are signs of rust.**

3.5 Hydraulic Accessories & Fittings

All fittings must be from reputable manufacturers and be compatible with the specified pipe materials and pressure ratings.

- **GSP Fittings (Elbows, Tees, Nipples, Unions, Sockets, Valves):**
 - All fittings must be from reputable manufacturers and be compatible with the specified pipe materials and pressure ratings.
 - Preferred material is brass. Galvanized Steel (GSP) is acceptable, but bidders must indicate if they are offering brass alternatives.
- **HDPE Fittings (Elbows, Male/Female Adapters, Compression Couplings, Tees, Saddles, End Caps):**
 - All fittings must be from reputable manufacturers and be compatible with the specified pipe materials and pressure ratings.
 - Must be of the same quality and pressure rating as the HDPE pipes.
- **PVC Fittings (Elbows, Adapters):**
 - Must be schedule/pressure rated to match **PVC pipes (PN 13.5)**.
- **Water Meters:**
 - Standard: Class B, cast iron body.
 - Connection: Threaded male, 1/2" - Ø 15/21 mm.
 - **Note:** The quantities for village households are a **village contribution** and has to be supplied under this contract.
- **Safety Box for Water Meters: Steel boxes with cover are preferred** to avoid any damage during transportation, "Nampapa" style or equivalent.

3.6 Tools

- All tools listed (Wood Saw, Measuring Tapes, Trowels, Pipe Wrenches, Cutters, etc.) must be new, of good quality, and suitable for professional use in a construction environment.

Clause on Confidential Designs

4.1 Technical Drawings and Designs

The detailed technical drawings for the spring catchment, water tank, filter basin, and network layout are considered confidential. For a comprehensive understanding of the project's scope, these designs are available to serious bidders upon formal and justified requests.

To obtain the designs, bidders must submit a written request to **CCL** at least before the tender submission deadline. The request must be made on company letterhead. Access to the designs implies a commitment to use them solely for the purpose of preparing a tender for this specific project.

On at,

Name and signature of supplier with the mention read and approved:

