

## 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 **Vungdoy and Pjajen villages, Boun Neua 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

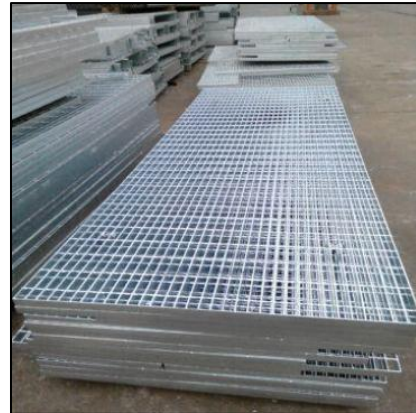
- **Delivery:** All materials must be delivered to the specified village locations:
  - **Ban Vungdoy (21.45136, 101.8692), Boun Neua District.**
  - **Ban Pjajen (21.47085, 101.81600), Boun Neua District.**
- **Packaging:** Materials must be packaged to prevent damage during transport and on-site storage. 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/m<sup>3</sup>.
- **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.
- **Hot-dip Galvanized Steel Grating:**
  - Dimensions: 205 cm x 110 cm x 5 cm thick.
  - Mesh: Maximum Ø 2 cm.
  - Frame: Each panel must be framed and reinforced by a peripheral frame welded from 40x4 mm flat iron.
  - **Sourcing:** This custom element **must be ordered and fabricated on size** prior to delivery.



### 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 **200 - 300 g/m<sup>2</sup>** 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**.

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



- **Polyurethane Sealant:** For waterproofing around technical ducts penetrating concrete.



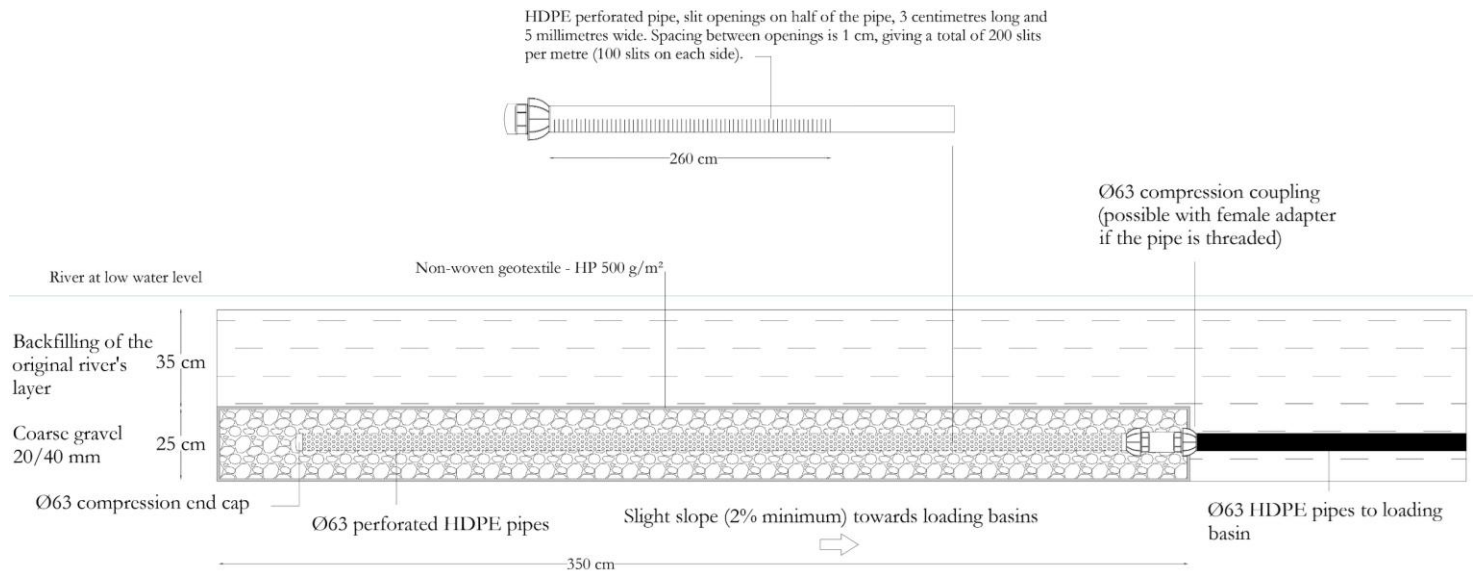
- **Teflon Tape:** Standard roll, for sealing threaded connections between HDPE and PVC fittings.

### 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 (3 cm long, 5 mm wide, 1 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.

### 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:** Concrete box with cover, "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:**

