

ECP Canaan Center Water System

Annex A. Statement of Work for Engineering Services

1. Introduction

This scope of work covers the minimum requirements for the design and construction quality control and quality assurance of the Canaan Center Water Supply System.

The following roles and terms are adopted in this document: Global Communities (working in conjunction with DINEPA and the American Red Cross) is referred to as the Client. The entity responsible for designing the Canaan Center Water Supply System and providing the construction quality assurance/quality control (QA/QC) is referred to as the Engineer. The entity responsible for constructing the Canaan Center Water Supply System is referred to as the Contractor.

All work shall be conducted with focus on safety.

In addition, the Engineer shall ensure that all work is carried out in compliance with, but not limited to, the relevant codes (i.e. seismic, building, etc...) and regulations of Haiti.

2. Work Included

The scope of work includes, but is not necessarily limited to the following activities:

- a. Conduct desk study to confirm water demand for the Canaan Water Supply System.
- b. Conduct a water well survey to assess feasibility of existing wells and site possible new borehole locations. Well-development and pumping tests, down-hole inspection, and water quality testing are to be done for up to 6 short-listed wells. Other factors include security, access, and proximity to Canaan Center.
- c. Conduct drilling and well installation program, if existing wells are not sufficient to meet the water demand.
- d. Conduct field survey to find suitable private-business kiosks that could be used as water distribution points. Factors to consider include quality of existing business, condition of infrastructure, access, security and proximity to target distribution areas.
- e. Conduct field assessment of potential access points to the city electrical network as it relates to possible pump and feeder reservoir sites.
- f. Conduct detailed site survey of entire water system layout.
- g. Conduct alternatives study for optimal design and layout for water system Client approval of recommended design is needed before proceeding to detailed design.
- h. Complete detailed design of the water supply system, including water wells, pumping station, water treatment system, reservoirs, distribution points, water pipeline network.
- i. Develop construction drawings detailing civil, electrical, and mechanical works.
- j. Develop construction specifications.
- k. Develop schedule of approximate quantities in order to tender the work.

- l. Assist in the permitting process; the Engineer shall provide the appropriate documents to the Client to obtain the required permits
- m. Develop Construction Quality Assurance/Quality Control (QA/QC) Manual.
- n. Conduct construction supervision according to the description in Section 4.
- o. Develop Operations, Maintenance, and Surveillance Manual for the Water System.
- p. Participate in meetings by request, with Global Communities, the American Red Cross and other partners for work updates.
- q. Provide project management reports on a regular basis.

All designs and drawings shall use UTM Projection Zone 18Q (WGS84 datum), and be in metric.

3. Deliverables

a) Detailed Work Schedule

The detailed work schedule shall include all activities specified in Section 2 and all deliverables specified Section 3. This should be submitted as a Gantt chart by one week after Award to Engineer. The schedule of work shall include the following target dates:

- Bid Close – **12:00 PM (EST), April 28, 2017.**
- Award to Engineer – **June 1, 2017.**
- Kick Off Meeting (Chaired by the Client) & Detailed Work Schedule – **June 8, 2017.**
- Presentation: Preliminary well locations – **June 20, 2017.**
- Presentation: Cost (capital and operation), Risk, and Execution Timeline Comparison of Alternatives for the Water Supply System – **July 11, 2017.**
- Alternatives and Detailed Design Report Submission (Draft) – **August 1, 2017.**
- Final Detailed Designs and Drawings – **August 22, 2017.**
- Issue for Tender to Construction Contractor – **August 29, 2017.**
- Construction Start – **October 6, 2017.**

Note that the “Presentations” stated above are interim milestones. These allow the Engineer to release information and recommendations at earlier dates, so that the Client can provide input as the alternative study is being conducted.

b) Alternatives and Detailed Design Report

- Present data collected and findings from the field investigations.
- Present an alternatives assessment of at least two feasible layouts. Show cost (capital and operating), risks (i.e. landslide hazards), and execution timeline comparison.
- Present the detailed design of selected the water supply system.
- Provide two hard copies of both the plans/drawings and the text (writings)
- Provide in electronic form, plans/drawings in AUTOCAD (version to be agreed – format DWG for Global Communities and DWF for the Contractor), system layout as a georeferenced shapefile, and text (writings) in Microsoft Office - Word (version to be agreed) document on a USB drive. Tables and lists in Microsoft Office Excel.
- Provide the full report in PDF format.
- Draft and final reports to be both in French and English.

c) Construction Drawings

The plans shall be prepared to include but not limited to the following items:

- General Arrangement and Location Plan
- Pumping Station – Civil, Mechanical, Electrical
- Water Treatment System – Civil, Mechanical, Electrical
- Piping Network – Civil, Mechanical
- Reservoirs at locations 10 and 11 – Civil, Mechanical, Electrical
- Water Kiosk Connections - Connection details, flow metering, electrical

Provide:

- Two hard copies (in both French and English).
- In electronic form, as AUTOCAD (version to be agreed – format DWG for Global Communities and DWF for the Contractor), the system layout as a georeferenced shapefile, and as PDF.

d) Construction Specifications

Construction specifications shall include, but not limited to:

- All material and product descriptions and properties
- Construction execution sequence and identification of implementation efficiencies
- Technical Specifications
- Quality Control and Assurance Manual

All documents shall be submitted in Word and PDF format.

e) Schedule of Approximate Quantities

The design submittal shall include a detailed list of quantities and cost estimation based on costs in country.

f) Quality Control and Quality Assurance Report

Upon completion of construction, the Engineer shall provide his/her assurance, in writing, that the construction of the Canaan Center Water Supply System substantially comply with the design drawings and specifications and supporting documents prepared by the registered professional of record.

g) Operations, Maintenance and Surveillance Manual

This manual will be aligned with DINEPA directives and include, but is not limited to:

- Key stakeholders and their roles and responsibilities
- Facility description
- Maintenance
- Facility Monitoring Program
- Instrumentation Plan Overview
- Water Safety Plan
- Site Security
- Training of Personnel
- Overview of Water Supply System Emergency Plan

h) Construction Supervision Reporting
Frequency and content of reports

- Initial Report: one (1) month after award of the construction Tender, the Office of Supervision in the framework of its activities will submit this report containing: the results of its activities in the first 15 days where the firm will have to study all the documents related to the process: request for offers (Technical and Financial Offers, the Contractor Agreement), inventories (status of sections, soils, lending banks, drainage, walls and floor structures of the pavement, etc.)
- Weekly Summary Report: format to coordinate with the Client representative. Provide on the first day of each week with the status of construction, equipment, materials, personnel, economic situation, problems and solutions, action and execution plans for each week and action plans for the upcoming week.
- Monthly Report: the monthly report will contain information on: expenses incurred, estimated cost of the revised draft to the date of the report, information on availability of funds, the status of progress, programming and implementation of activities, environment, administration, problems and solutions.
- Final report: the final report shows, among other things, monthly invoices settled during the construction, the level of achievement of the Construction Agreement, the summary of costs incurred, the comments and recommendations for the maintenance of the road. This report will also show the experience gained in view of possible applications to other programs, and photographs of the project, including the final construction plans in easy formats to archive and all information requested by the delegated project manager. This report must be submitted within a period not exceeding one (1) month after the provisional acceptance of work.

The publishing and reproduction costs of all documents are the responsibility of the Engineer.

4. Description of Construction Supervision

The responsibilities of the supervision team include, but are not limited to the items listed below. *However, any actions that will impact or modify the cost, timeline or technical specifications requires Client's written prior approval.*

1. Conduct supervision of construction consistent with the best technical and administrative practices
2. Review and update (if necessary) all documents, specifications, implementation timelines, and any other documents of the work agreement as necessary.
3. Review the contract documents and technical specifications for the work as well as the inventory that were the basis for the preparation of the bid submitted by the implementation Contractor.
4. Provide information on measures and signs (topographic markers) that are necessary to ensure the project runs according to the alignment, elevations and projected cross sections, site safety requirements and environmental mitigation measures. This will include the pegs on the axis of the road and those limiting the road and slopes.

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5. Verify the placement of storage facilities or borrow pits so that the quality is in accordance with the relevant standards and specifications and ensure that environmental mitigation measures are implemented during their operation.
6. Verify that the key personnel engaged in the work is the same as the one appearing in the technical proposal provided by the engineering company and proceed to evaluate their ability and professional experience, to ensure the proper execution of the construction, and require the replacement of any member of the personnel that does not comply with the general regulations.
7. Verify the number, type, characteristics, and condition of construction equipment for the work and ensure that they are consistent with the plan in the technical proposal presented by the engineering company in its submission.
8. Verify and require that the required engineering company equipment are in good condition, and in an amount that is suitable to carry out the quality work.
9. Verify the quantities and if there is a significant difference between the inventoried amounts and the amounts stated by the Supervisory Board, the board must perform certain specific studies in accordance with the rules and regulations after approval from the delegated project manager
10. Verify the quality and condition of prefabricated components after delivery to the site of construction and after installation.
11. Review and approve the construction company schedules according to the current agreement, taking into account:
 - The execution of construction, the list of equipment and qualification of personnel;
 - The use of equipment and personnel;
 - The subcontractors use plan;
 - The construction and financial planning plan;
 - The methodology proposed for construction.
12. Devise any change that would be necessary for greater savings in the project, by the company's own initiative or at the request of the delegated project manager. Any changes proposed by the Oversight Mission will have to be approved by the delegated project manager prior to the execution. The delegated project manager shall have ten (10) working days to decide. Otherwise the Oversight Mission will execute the proposed change by assuming the corresponding technical and administrative responsibilities.
13. Conduct a complete and continuous inspection of all work performed by the construction company.
14. Inspect and perform tests on the materials used or to be used for construction through preparing related reports.
15. Perform tests required to approve the sites for materials supply.
16. Determine all quantities of work to make the corresponding monthly payments, which will be approved by the Client representative.
17. Perform monthly reviews of the remaining quantities for the work to be performed and update estimates that affect the total of the remaining work.

18. Certify jointly with the Client representative approval for payment to the Contractor, attaching work volumes, the report on the implementation of the construction and applying the relevant contractual terms.
19. Record daily construction activities. The proposed format must allow for the recording of the Contractor activities.
20. Review and make recommendations to the delegated project manager on possible claims from the construction firm for matters pertaining to the extension of time, the payment of additional work, application of the price revision clause if the contractual provisions allow, etc.
21. Submit reports to the Client representative.
22. Record weekly statistics referring to personnel, materials, equipment and other inputs used in construction, to facilitate the control of the costs of this work.
23. Maintain statistical records of working days, the equipment, and how they are used by the Company.
24. Supervise the preparation of as-built drawings that show all parts of the project as they were carried out within a maximum period of one (1) month after the provisional acceptance of the work, using a computer system for the full archive.
25. Prepare any report that the delegated project manager deems necessary under the terms of the Agreement.
26. Organize weekly meetings with the Client representative to assess progress in relation to the approved plan and prepare a report which will be read and approved during the next meeting by the participants or their representatives.
27. Ensure that maintenance work during construction and the warranty period will run properly in accordance with the standards and regulations of the Construction Agreement.

5. Work Excluded

Community mobilization activities will be done by Global Communities.

Business management/development training for the private-business kiosk owners will be done by another implementer.

6. Reference Documents

- An Evaluation (study) of the Plaine du Cul-de-Sac Aquifer and Its Potential to Serve Canaan – Northwater Consulting International, 2017
- Improving the Water Supply and Sanitation Situation of the Canaan Area, Haiti – UNHABITAT, 2017.
- Drone imagery and digital surface model to estimated 50cm accuracy – American Red Cross, 2016.
- Water distribution kiosks and household reservoirs in Canaan – American Red Cross, 2016.
- Two Maps and Google Earth KML file outlining the target area.

7. Design Criteria

A. Water Demand

Domestic Use: Estimated as 80 L (or as dictated by the Haitian water authority DINEPA) per person per day for approximately 30,000 people.

Commercial Use: To be determined.

Fire Suppression: To be determined.

Water Demand values for domestic, commercial and fire suppression use to be confirmed at the Kick-Off meeting.

B. Water Source

See the Northwater study for recommendations on existing water wells.

C. Water Quality

To meet Haiti standards for potable water.

D. Water Distribution Area

The water distribution area is defined as Canaan Center, as delineated in the attached maps.

E. Design Life

All components of the water system are to have a design life of at least 50 years. The Engineer may request a shorter design life on specific components, in accordance to industry standards.

F. Electrical Supply

The primary power source for the water system should be from the city electrical network. A back-up power source of diesel generators should be incorporated into the design.

G. Private-Business Kiosks

The criteria for selecting private-business kiosks will be decided at the Kick-Off meeting. See the American Red Cross report for the locations of existing kiosks.

H. Reservoirs

See the UN Habitat report for the recommended locations: Reservoirs 10 and 11.

Include both reinforced concrete and steel when considering the types of reservoirs. Factors influencing selection are to include overall cost (capital plus maintenance) and durability provided that the reservoirs meet the minimum design life and applicable seismic codes.

I. Building Codes

The water system should be designed according to applicable Haiti building codes accounting for seismicity, geo-hazards, wind and flooding.

J. Alternatives Evaluation

The alternatives evaluation must consider capital cost, operating cost, physical hazards, and construction timeline. Additional factors to include in the alternatives evaluation will be discussed and agreed at the Kick-Off Meeting.