Section 5a: Schedule of Requirements and Technical Specifications/Bill of Quantities (Lot 2)

	BOQ of Deep Well Rehabilitation Works in South Yap		
1	**Install new casings, drop pipes and pumps at Wells 1,2,3, 4 & 7 and construct 7 no 7' x 10' x 6" slab cover for 7 wells:**		
Five wells will be drilled under a separate contract. Allow for skilled workers with placement of new casings, screens and drop pipes for the wells and new submersible pump installation. Average depth of the well would be approximately 250'. The job consists of well construction (installation and backfilling), well development (removing fines, drilling fluid additives from the well and surrounding aquifer and settlement of gravel pack), and well testing and running . An electrician has been allowed for under S.No. 5. Materials and equipments mentioned from S.No 1.1 to 1.12 will be provided. The bidder shall work under the supervision of drilling bidder and presence of SYWA. Location of wells are given in Fig.14. The bidder shall construct 7 slabs (7'x10'x6") for protection of wells at well site which includes supplying both labor amd materials.			
1.1	Install PVC Sch 40 Well Casings 6" dia. x 10' pipe. Male x Female threads in each well.	**1,000.00**	**ft**
1.2	Fit PVC Schd 40 Screen pipe 6" x 10' x 0.010" slot size. Male x Female threads in each well.	**150.00**	**ft**
1.3	PVC Sch 80 Well pump delivery pipe 2" x 10' PVC pipe with male x female threads	**1,000.00**	**ft**
1.4	Well seal cap 8" dia. With 2" dia. threaded center outlet.	**7.00**	**No.**
1.5	Monitor well cap 2" dia.	**3.00**	**No.**
1.6	Pea metal for wells (25 kg bags) for packing around the well-screens.	**70.00**	**bags**
1.7	Installing and testing centriPro submersible pump motor 1.5-HP 3Wire 460V 60Hz 3-phase 4" motor, or similar in well No. 3,4,5,&6	**4.00**	**No.**
1.8	Installing and testing Centripro 4" dia. well pump for the above 1.5-HP motor in well No. 3,4,5,&6	**4.00**	**No.**
1.9	Installation of CentriPro 1.5-HP submersible pump control box, or similar in well no. 3,4,5,&6	**4.00**	**No.**
1.10	Installing and testing CentriPro submersible pump motor 2-HP 460V 60Hz single-phase 4" motor, or similar in wells 1, 2 & 7	**3.00**	**No.**
1.11	Installing and testing Centripro 4"dia. well pump for the above 2-HP motor in well no. 1, 2 & 7.	**3.00**	**No.**
1.12	Installing CentriPro 2-HP submersible pump control box, or similarin wells 1, 2 & 7.	**3.00**	**No.**
1.13	The bidder shall levell the ground by cutting and filling and compacting it using compaction vibrator to make a strong base for 7 well cover slabs.	**490.00**	**Sq ft**
1.14	Concrete work M20 for 7 slabs (size - 7' x 10' x 6") including proper mixing, pouring, finishing using vibrator as per instruction and curing.	**245.00**	**Cu ft**
1.15	Reinforcing bars (10 mm for the slab including cutting, bending, lapping and binding of bars as per drawings - prepared by the bidder and approved by UNDP after award of the contract.	**788.00**	**Kg**
2	**Well flushing (Wells 5 & 6)** -		

The Bidder shall allow for flushing two deep wells. The procedures and supervision will be provided. A compressor and hoses for flushing will be provided by SYWA. The bidder will need to provide the 140' x 1" dia. PVC pipes and fittings that connects to the compressor hose and into the bottom of the well. Flushing detergent will be provided by SYWA. The flushing procedure shall be undertaken once the other wells are running. In short, the well flushing is a two-day procedure (day one lifting pump and adding well detergent). and first flush then adding chlorine into well overnight; then day 2 final flush then installation of new submersible pump and test running. Map showing location of wells is attached herewith as Fig. 14.		**2.00**	**Wells**
3	**Install new headwork pipework's, valves, fittings & water meter at 7 x Deep Wells**		
The Bidder will provide for a plumber to install the 2" dia. pipes and valves, above ground level at seven wells. Pipes and fittings will be provided to the bidder together with installation drawings. 2" dia. 2" GI threaded pipe nipples and tees are used to connect 3 x valves, 1 x water meter, 1 x air valve, pressure gauge. All the materials from 3.1 to 3.17 will be provided to the bidder. Example of well headwork is shown in Fig. 2. The bidder will be required to provide telfon tape and any other miscellaneous items required for the plumbing. Please quote the rate of labor only.			
3.1	Zenner PMFP11 - 2" dia. multi-jet flow meter, or similar	**10.00**	**Nos**
3.2	2" brass flapper type check valve threaded socket	**7.00**	**Nos**
3.3	Bronze ball valve 2" dia. Threaded socket	**16.00**	**Nos**
3.4	Air valve. 1/2" pipe inlet. Valmatic 15A or similar	**7.00**	**Nos**
3.5	Pressure gauge. 2 1/2" Glycerine filled pressure gauge 0-100 PSI	**8.00**	**Nos**
3.6	2" dia. PVC tank connectors	**4.00**	**Nos**
3.7	GI 2" elbow 45 degree. Threaded female	**10.00**	**Nos**
3.8	GI 2" elbow 90 degree. Threaded female	**20.00**	**Nos**
3.9	GI 2" Nipples x close	**20.00**	**Nos**
3.10	GI 2" Tee	**20.00**	**Nos**
3.11	Cam connector. 2" dia. aluminum cam coupling male adaptor x NPT thread	**7.00**	**Nos**
3.12	2" dia. PVC discharge hose w/ M&F quick cam connections	**2.00**	**Nos**
3.13	GI 2" Nipples x 24"	**20.00**	**Nos**

3.14	GI 2" Nipples x 4"	**20.00**	**Nos**
3.15	GI 2" x 2" x 3/4" tee. Threaded female	**20.00**	**Nos**
3.16	GI 2" union. Threaded female	**20.00**	**Nos**
3.17	GI 2" socket. Threaded female	**20.00**	**Nos**
4	**Install new chlorine pump and tank at Well 1**		
The Bidder shall install a mounting bracket (provided) for the dosing pump, install a power point (provided), and place the 200 gallon tank (provided). The bidder shall procure 1" dia. PVC pipes and fittings for a line from the nearby water main to the tank and enable the water supply to fill the 200 gallon tank. For item no. 4.1 and 4.2, materials will be provided include only labor cost. But, for item no. 4.3, include the cost of both materials and labor.			
4.1	Install a power point and plastic wall mounting bracket for LMI dosing pump.	**1.00**	**No**
4.2	Install 100 or 200 gal (as supplied) LMI chemical tank with top pump mount.	**1.00**	**No**
4.3	Supply and fix 1" dia PVC pipe including assocceries/fittings from the main line to the the 200 gallon storage tank.	**20.00**	**ft**
5	**Electrical Installation works:**		
The Bidder shall allow for an electrician to install lights, light switches & power points (all provided) in WTP building, the chlorine shed at Well 1, and the kitset garage; for connection 7 x well pumps to new motor control panels (provided), pressure switches and motor saver relays for each of the wells will be provided and the bidder shall allow for the installation and setting of these units; for connection the WTP pumps to MCC panel; for connecting the quarry pump to the MCC panel at the WTP; and some other small works. The Bidder shall procure 3 x switchboards for the WTP building, the chlorine shed at Well 1, and the kitset garage. Bidder shall procure all wiring size. The bidder shall set the operation for the WTP raw water pump and the treated water pumps for manual operation from the WTP switchboard. Please see the flow diagram below in Fig. 10 and location of sites in Fig. 14. Electrical power cable for connecting 1 - phase pump at Quarry Pond to the switchboard at new WTP site (approx. 30m), 3-phase cable for the well sites and kitset garage, cable conduits & clamps, three switchboards, plus any other miscellaneous fittings required for attachment and connections works. Note: Single phase power will be provided to WTP site by SYWA. Switchboards shall be Schneider NF or similar rated for lighting and appliance application. For items 5.1 to 5.5, materials will be provided and the rate to include is only labor cost.			
5.1	Power points. Wall mounted, IP rated weather proof, double socket. Lithonia or similar	**10.00**	**No**
5.2	Light switches. IP Rated Weather proof. Wall mounted. BWF-TEDDICO TS-11V, or similar	**10.00**	**No**
5.3	LED lights. Ceiling mounted. 3' strip light. Lithonia CDS-L48-MVOLT, or similar	**10.00**	**No**
5.4	Wire splice packs. #SP8C-4. Four wire splice kit, wire size #8, W/ #12 ground	**20.00**	**Pack**

6.3 is replaced by4.3

5.5	Pressure control switch. Range 30-80 PSI. Contact rating 20A@120V	**8.00**	**No**
5.6	The Bidder shall procure 3 x switchboards for the WTP building, the chlorine shed at Well 1, and the kitset garage. Bidder shall procure all wiring. The bidder shall set the operation for the WTP raw water pump and the treated water pumps for manual operation from the WTP switchboard. The length of cable from the pond to WTP is 453 feet (1 - phase) and from the WTP to Tank is 517 feet (3 - phase). The cost includes both labor and material.	**1.00**	**job**
6.00	**Install pond pump and pontoon**		
A ponton/pump arrangement and anchoring wire-ropes and anchor plates. The Bidder shall allow for transport and placement of the pontoon, securing 3 x anchor plates at selected positions around the pond, and securing pontoon with wire-ropes to the anchors. Under item 5 the bidder shall ensure that this pump operates by manual control from the WTP switchboard. The bidder shall test run this pump in the presence of SYWA. Fig. 6 and 7 below is shown as an example of the pontoon. Materials will be provided. Only labor charge.			
6.1	Raw water pump pontoon. 4-drum pontoon for mounting item below (raw water pump). w/ 3 x 50' steel wire securing lines, attachment fittings to pontoon & anchor plates including 12 anchor bolts (see example below) and 20' boom arm designed to pump item Fig. 7 below. The bidder shall install the boom as per drawing and specification that includes 2(2'x2'x4') concrete foundation (including materials and labor) and supply and fix 2xapproxmitaly 8' supporting pole as per requirement.	**1.00**	**Set**
6.2	Raw water submersible pump (to be installed onto the pontoon). Rated at 55 gpm @ 180' TDH. Grundfos 5-HP 12 stage submersible pump end, or similar	**1.00**	**No**
6.3	Grundfos 5-HP 230V 1-PH Grundfos submersible motor, or similar	**1.00**	**No**
6.4	Grundfos 5-HP 230V deluxe control box, or similar	**1.00**	**No**
6.5	4" x 4' x 0.020 slot submersible pump screen	**1.00**	**No**
7	**WTP Pumps**		
The Bidder shall anchor two water pumps (provided) in the WTP building built under seperate contract. Under s.no. 5 the bidder shall ensure that these pumps operate by manual control from the WTP switchboard. The bidder shall test run these pumps in the presence of SYWA. The bidder shall provide the filter O&M manual – manual shall include raw water and treated water pump detail. Materials will be provided. Only labor cost			
7.1	Treated water submersible pump. Grundfos 3HP 7 stage submersible pump end, or similar	**1.00**	**No**
7.2	Grundfos 3HP 230V 1PH Grundfos submersible motor, or similar.	**1.00**	**Nos**
7.3	Grundfos 5HP 230V deluxe control box, or similar	**1.00**	**No**
7.4	4" x 4' x .020 slot submersible pump screen	**1.00**	**No**
8	**Install new chlorine pumps at WTP**		
The Bidder shall install a mounting bracket (provided) for a chlorine dosing pump, install a power point, place the 200 gallon tank. The bidder shall procure 1" dia. PVC pipes and fittings for a line from the nearby water main to the tank and enable the water supply to fill the 200 gallon tank.			
8.1	Chlorine pumps. LMI B9 series pump. 38.4 GPM. 150 PSI. B911-297, or similar. Labor cost only.	**2.00**	**Nos**

8.2	Plastic wall mounting brackets for LMI pumps. Labor cost only.	**2.00**	**Nos**
8.3	LMI chemical tank with top pump mount 100 gal. Labor cost only.	**2.00**	**Nos**
8.4	Procure and fit with necessary fittings 1" dia PVC pipe from the water main to the tank	**20.00**	**ft**
9	**Install 3" line from pond to WTP**		
The Bidder shall lay approximately 100' of 3''diameter HDPE pipe from the Quarry reservoir to the WTP. Where possible the pipeline will be buried 6" below the surface. The inlet of this pipe shall be connected to the pontoon pump (See Fig. 10 and 14). This pipeline shall be tested for leaks by the bidder after the rawwater pumps are commissioned.Materials will be provided. Rate is only for labor.			
9.1	HDPE Pipe 3" dia x 50 m rolls	**5.00**	**Rolls**
9.2	HDPE straight couplings 3" dia	**5.00**	**No**
9.3	HDPE female threaded couplings 3" x 2"dia. (3" compression coupling to HDPE with other end 2" female thread)	**2.00**	**No**
10	**Install 3'' line from WTP to Fedor tank**		
The Bidder shall lay approximately 300' of 3" diameter HDPE pipe from the WTP reservoir to the Fedor Tank. Where possible the pipeline will be buried 6" below the surface. The HDPE pipe shall be connected to the WTP pump outlet and the outlet into the Fedor tank, as per drawings that will be provided. This pipeline shall be tested for leaks by the bidder after the treated water pumps are commissioned. Materials will be provided. Rate is only for labor.			
10.1	HDPE Pipe 3" dia. x 50 metre rolls	**5.00**	**Rolls**
10.2	HDPE straight couplings 3" dia.	**5.00**	**Nos**
10.3	HDPE female threaded couplings 3" x 2"dia. (3" compression coupling to HDPE with other end 2" female thread)	**2.00**	**Nos**
11	**Install filters and pipework**		
Two sand filters plus filter sand will be provided. Filters will have interconnection pipework. Bidder shall provide a plumber to allow for additional 2" dia. PVC pipework's. PVC pipes and fittings for inlet and outlet connections, and installation details, will be provided. The bidder will commission these filters as per manufacturers instruction. Electrical connections are discussed in item 5. See below pictures of filters. Materials listed below will be provided. The rate to be quoted for fitting only. However, PVC Cement, telfon tape and any other miscellaneous items required for the plumbing to be supplyed by the bidder.			
11.1	Sand filter skid (See Fig. 4 as an example) 2 x 1m dia. FRP rapid sand filters rated at 4 bar. Suitable for flow of 300m3/day @ 3.5 bar W/ filter and backwash controls, and interconnecting 2" dia. pipework, backwash pump and associated pipework, and sand media. Materials will be provided. Only labour charge.	**1.00**	**Lot**
11.2	2" brass flapper type check valve threaded socket	**2.00**	**Nos**
11.3	Bronze ball valve 2" dia. Threaded socket	**4.00**	**Nos**

11.4	2" Sch 80 PVC female adaptor	**10.00**	**Nos**
11.5	2" Sch 80 PVC Tee	**10.00**	**Nos**
11.6	2" Sch 80 PVC Socket Union	**10.00**	**Nos**
11.7	2" Sch 80 PVC Elbow 45 degree	**10.00**	**Nos**
11.8	2" Sch 80 PVC Elbow 90 degree	**10.00**	**Nos**
11.9	2" Sch 80 PVC Coupler	**10.00**	**Nos**
11.10	2" Sch 80 PVC male Adaptor	**10.00**	**Nos**
11.11	2" Sch 80 PVC pipe x 10' lengths	**10.00**	**Nos**
12	**Install new chlorine pump and tank at SYWA office**		
Bidder shall install a mounting bracket (provided) for the dosing pump, install a power point, place the 200 gallon tank. The bidder shall procure 1" dia. PVC pipes and fittings for a line from the nearby water main to the tank and enable the water supply to fill the 200 gallon tank.			
12.1	Installation of a mounting bracket for the dosing pump (Labor cost only)	**1.00**	**No**
12.2	Installation of a 200 or 100 gal tank (Labor cost only)	**1.00**	**No**
12.3	Install LMI B9 series pump. 38.4 GPM. 150 PSI. B911-297, or similar (Labor cost onlly)	**2.00**	**Nos**
12.4	Supply and fix 1" dia PVC pipe from nearby water main to the tank . This includes both materials and labor cost.	**20.00**	**ft**
13	**Paint pipework at chlorine station at SYWA office.**		
Bidder shall wire brush and clean old paint, and paint pipework (prime and final coats). Paint and brushes shall be provided by bidder. Painter MUST be an experienced painter This includes both labor and material cost.			
13.1	Clean the old paint and apply two coats of acrylic based paint over one coat primer. The job includes both materials labor.	**50.00**	**sq ft**
14	**Repairs to Fedor tank**		

This tank has a number of hairline cracks that need to be repaired. Work includes 'grooving' the cracks and applying a crack sealing compound to the cracks. Crack compound and instruction on use will be provided. Bidder will need to allow for ladders or moving scaffold. Please see picture below of the Fedor tank in Figure 8.			
14.1	Grooving 2" wide around the cracks and brush it properly and inject crack sealing compound (Crack Bond Epoxy) on the grooved area as per instruction to seal the cracks developed in the tank. The sealing compound will be provided. The job includes scafolding and labor charge.	**80.00**	**Ft**
15	**Install level indicator on Fedor tank (Fig. 3)**		
A level indicator will be provided. This gauge strip is about 8" wide and extends from the base of the concrete tank some 20' to the top. The Bidder shall supply 12 concrete anchors and attach this to the tank. Allow also for a 1" dia. hole to be drilled into the top of the tank above the gauge.			
15.1	Drill an 1" hole on the top and install a water tank level indicator/gauge on for external mounting. The bidder shall supply and fix 12 concrete anchors including anchor bolts where necessary.	**1.00**	**job**
16	**Supply and install 3 x 2000 gal. tanks on concrete pad**		
Bidder shall purchase standard 3 x 2000 gallons closed top plastic tanks and transport to the Quarry WTP site. Bidder shall procure all materials for a reinforced concrete base for tank placement. For evaluation purpose allow for a reinforced concrete pad of dimension 25' x 10' x 6" deep (final dimension will be dependent on actual tank diameter. The bidder shall include for the fitting of 4 x 2" dia. tank connectors and PVC pipe to interconnect these tanks and allow for 2 x 3" connectors for the inlet from the filters and for the outlet to the treated water pump. 2 x PVC connectors will be provided.			
16.1	The bidder shall levell the ground by cutting and filling and compacting it using compaction vibrator to make a strong base for the base slab of the gallons.	**250.00**	**Sq ft**
16.2	Concrete work M20 for base slab (6") including proper mixing, pouring, finishing using vibrator as per instruction including curing.	**125.00**	**Cu ft**
16.3	Reinforcing bars (12 mm for base slab) including cutting, bending, lapping and binding of bars as per drawings - prepared by the bidder and approved by UNDP after award of the contract.	**382.00**	**Kg**
16.4	Procure and install 2000 gal. closed top water tank including assocceries connectors for inlet and outlet of the tank and labor all complete. A 2x3' dia PVC tank connector will be provided.	**3.00**	**No**
17	**Construct roof over 40' container**		
Bidder shall supply all materials and construct a corrugated iron roof over a 40' container. A timber support structure for the roof shall be constructed and secured to the container. The roof shall be 24 gauge or equivalent zinc-alume corrugated sheets including hooks, nuts and bolts or similar approved by SYWA. No gutter. The roof shall be 'A' shaped (two side slope) typhoon resistant. The bidder shall prepare drawings for the roof and get approval from SYWA. Payment shall made on the basis of measurement of actual work done.			
17.1	Install a one way 40' container. Final destination container. The container will be provided. Labor charge only.	**1.00**	**No**
17.2	Wood work for roof support structure (posts, rafters, battens etc..) including necessary nails, bolts and labour all complete.	**65.26**	**cu ft**

17.3	Supply and fix 24 gauge or equivalent zinc-alume corrugated sheet roof with proper overlap over the container including all materials (1/2"x3" bolts with washers and knuts, screw type roofing nails w/ rubber seals, common nails, typhoon clips, etc.) and labor. The roof shall be A shaped and the slope shall be as per instruction of the Engineer. The cost to included both labor and material.	**720.00**	**sq ft**
17.4	Supply and fix 24 gauge or equivalent zinc-alume roof cap including all materials.	**45.00**	**R ft**
17.5	Supply and fix 1/2" Treated ply wood for truss board connector.	**2.00**	**Pcs**
17.6	M20 Concrete work for the support of wooden posts. The 12"x12" post shall be built on 18"x18" base and the length of the post shall be 4' in which 2' shall be below the ground and 2' above. The cost includes both labor and material.	**41.00**	**cu ft**
17.7	Supply and fixing in position including bending and binding by tie wire # 4 Rebar for the base and support of wooden post.	**108.58**	**kg**
17.8	Supply and fixing flat-tin to cover the end of trusses on both end of the container.	**2.00**	**Pcs**
17.9	Supplying 8" Anchor plate including fixing and fitting in position as per instruction. The anchor plates will be used on top of every post to be welded to the container. The rest will be used to welded on top of the container to srew with bottom plate of all Trusses.	**32.00**	**pcs**
17.10	Supply and apply two coats oil base paint over two coat metal primer on both sides for container. The size of the container is 41'x8'x8' (Note: This item is optional. Depends on new or old Container.)	**2,880.00**	**sq ft**

Note: Payment shall be made based on actual measurement of completed work in accordance with payment schedule.