

## SCHEDULE OF QUANTITY

Name of Work:-*Providing LWSS to PC Habitation of CV Kando GP Dugana in Tehsil Paonta Sahib, Distict Sirmour (HP) (SH:-Providing and Installation of Pumping Machinery with allied accessories) 1st Stage.*

Estimated Cost Rs.-6,07,500/-  
Earnest Money Rs.-12,150/-  
Time:- Three Months

Sl. No.	Item Description	Quantity	Units	Rate		Gross Amount
				In Fig	In Words	
1	2	3	4	5	6	
1	<p>Supply, erection, testing &amp; commissioning of horizontal spindle, horizontal split casing, radial split Single,/Multistages centrifugal/ reciprocating pumps of standarad make such as KSB/ Mather &amp; Platt/ Jyoti /Kirloskar/ Beaconweir /BS &amp; BE conforming to BIS 1520-1980 with upto date ammendments read with BIS 9137-1978 or latest edition to handle clear water having characterstics as mentioned in item 1 (a) as under, with impellers, casing ring, priming funnels &amp; shaft sleeves of bronze, shaft of steel with cast iron casing of suitable capacity coupled directly through a flexible coupling on a common base plate of cast steel /Mild steel to BHEL /Kirlokar/ NGEF/ Crompton / Siemen/Jyoti /GEC make slip ring /squirrel cage screen protected drip proof induction electric motor suitable for operation on the data given below.</p> <p>(a) Total Head <span style="float: right;">514.00 Mtr.</span></p> <p>(b) Capacity of each pump set <span style="float: right;">3.45 LPS</span></p> <p>(c) Dia of R/Main (in mm) <span style="float: right;">80mm</span></p>	2	Per Set			
1.1	<p><b>(A) SITE CONDITIONS:-</b></p> <p>i) Location of site:- <span style="float: right;">To be filled in by Engineer-incharge</span></p> <p>ii) The altitude of place in which the motor is intended to work:- <span style="float: right;">To be filled in by Engineer-incharge</span></p> <p>iii) Humidity:- <span style="float: right;">Whether Generally remains humid during monsoon season</span></p> <p>iv) Nature of Atmosphere:- <span style="float: right;">As normally encountered in Shivalik Ranges</span></p> <p>v) Detail of quality of water:- <span style="float: right;">To be filled in by Engineer-incharge</span></p> <p>vi) Water free from sand or not:- <span style="float: right;">To be filled in by Engineer-incharge</span></p> <p>vii)Water corosive or not:- <span style="float: right;">To be filled in by Engineer-incharge</span></p> <p>viii)Turbity:- <span style="float: right;">To be filled in by Engineer-incharge</span></p> <p>ix) NPSH available:- <span style="float: right;">Positive Suction.</span></p> <p>x) Any other information or requirement: -</p>					
1.2	<p><b>(B)OPERATING CONDITIONS:-</b></p> <p>i) Type of current:- <span style="float: right;">AC three/single phase</span></p> <p>ii) Operating frequency:- <span style="float: right;">50 HZ</span></p> <p>iii) Rated voltage <span style="float: right;">400 (+/-) 10% volts</span></p> <p>iv) System of earthing if any to be adopted:- <span style="float: right;">Double loop earthing as per BIS 3043-1987 latest with upto date ammendments</span></p> <p>v) No. of working hours per day: - <span style="float: right;">8 Hours.</span></p> <p>vi) Speed of revolution:- <span style="float: right;">To be quoted by tenderer</span></p> <p>vii) Direction of rotation:- <span style="float: right;">To be quoted by tenderer</span></p> <p>viii)The max. Temp. of cooling air &amp; water in the place in which the pump set is intended to work in ordinary service:- <span style="float: right;">35 deg. centig.</span></p>					

1.3	<p><b>(C) MOTOR</b></p> <p>i) Ref to BIS code:- BIS 325-1978 read with BIS 900-1992(latest)with upto date ammendments</p> <p>ii) Type of enclosure of motor:- SPDP (as per BIS 4691-1985 (latest)</p> <p>iii) Type of duty:- Continuous as per IS-12824-1989 or latest withy up to date ammendments.</p> <p>iv) Mechanical out put in KW:- <b>Suitable for driving submersible pumps required for duties specified against pumps. To avoid overloading of motor a margin of about 15-20% may be kept in the rated out put of prime mover.</b></p> <p>v) Class of Insulation:- Class ~B~</p> <p>vi) Max.permmissible temp. rise of motor reqd. if different from that given in B (viii) above:- <b>To be filled in by Engineer-incharge</b></p> <p>vii) Particulars of test reqd. &amp; where they are to be conducted:- <b>As per terms &amp; conditions attached</b></p> <p>viii) Particulars as to whether voltage limiting device will be employed:- <b>ATS/Star Delta starter, oil immersed,fully automatic to be installed between bus bar &amp; motor. Shunt capacitor is also proposed to be installed for improving the power factor at site.</b>  <b>(NOTE:- Star delta starter upto 37.5 KW &amp; ATS for 37.5 KW, ATS between 37.5 KW to 50 KW)</b></p> <p>ix) Motor whether squirrel cage or slipring: - Squirrel cage/slip-ring. (Squirrel cage upto 40HP and slipring above 40HP)</p> <p>x) Details of shaft extension reqd.:- Just sufficient toprovide direct drive by flexible coupling to pump</p> <p>xi) Type of slip-ring gear whether continously rated or for starting purposes only &amp; whether to be fitted with brush lifting or short circuit arrangements or both if interlocks are rquired.:- <b>Continously rated for Squirrel cage/ Slipring motor</b></p> <p>xii) Breakway torque in terms of rated load torque &amp; the corresponding breakway starting current which may be taken from the supply with the starting apparatus in circuit.:- <b>Breakway torque to be given by the tenderer but the starting current should not exceed 2.5 times of the full load current.</b></p> <p>xiii) Nature of load &amp; any information regarding the driven machine which has a bearing upon the torque reqd. during the accelerated period, the kinetic energy of the moving parts to be accelrated &amp; No.of starts during a specified period.:- <b>Sufficient to work the pump offered</b></p> <p>xiv) Where possible fault capacity of the system to which the motor is connected.:- <b>The motor should be able to withstand initial current of 2.5 times the rated current for two minutes without suffering damages or permanent deformations.</b></p>				
1.4	<p><b>(D) PUMPS</b> <b>BIS 1520-1980 read with BIS 9137-1978 both with upto date ammendments.</b></p> <p>(a) Nos of pumps reqd.:- 2 Pumps out of which one will acts as a stand bye</p> <p>(b)Spare parts required:- For two years normal maintenance as recommended by manufacturer.</p> <p>(c)Type of Drive Electric Induction Motor.</p>				
1.5	<p><b>(E ) PUMP OPERATING CONDITIONS:-</b></p> <p>i) Capacity in LPS 3.45 LPS</p> <p>ii) Total head (in mtrs) 514.00 mtrs</p> <p><b>(If total hed is not known then followin detail be provided)</b></p> <p>i) Static head (in mtrs) 480 mtrs.</p> <p>ii) Minimum depth of water (in mtrs)</p> <p>iii) Variation in water level (in mtrs)</p> <p>iv) Ground level to max. water level (in mtrs.)</p> <p>v) Ground level to delivery point (in Kg/cm<sup>2</sup>)</p> <p>vi) Pressure in the suction tank (in Kg/cm<sup>2</sup>)</p> <p>iii) Length of R/Main (in mtrs):- 1840 Mtrs.</p> <p>iv) Dia of R/Main (in mm):- 80 mm</p> <p>v) Drive arrangement:- Direct through flexible coupling on a common base plate.</p> <p>vi) Drive type:- Electric driven</p> <p>vii) NPSH reqd:- To be quoted by the tenderer</p> <p>vii) Limits of total head in which the pump is reqd. to operate: - (-)15% to (+)10% of total head</p> <p>ix) Suction/delivery size of pump:- To be specified by the tenderer</p> <p>x) Efficiency of pump at:- To be specified by the tenderer</p> <p>a) duty head (As mentioned in item 1 (a) --</p> <p>b) (+)10% of head (As mentioned in item 1 (a) --</p> <p>c) (-)15% of head (As mentioned in item 1 (a) --</p> <p>xi) Material of construction:- <b>To be specified by the tenderer(manufacturers certificate to be appended)</b></p>				

2	Supply/fiing at site of suitable direct on line/oil immersed star delta /ATS/stator rotor starter of standard make such as MEI/Kilburn/Jyoti/Siemens/Larson & Tubro conforming to BIS-8544-1979 latest with up to date ammendments for squirrel cage/slip-ring motor (make to be specified by the tenderers) mounted on panel board with magnetic type over load release & dashpot,time lag,under voltage release with initial oil filling . <b>Note:- Star-delta-starter upto 37.5 KW, ATS between 37.5 KW to 50 KW</b>	2	Nos			
3	Providing & fixing M.S. sheet 16 SWG steel fabricated floor mounted closed almirah type switch board including angle iron post of suitable height and size ISA 40x40x6mm duly painted comprising and capable of mounting the following accessories including the cost of P/F of thesae accessories with all internal electric connections. The drawing of panel board shall be subject to approval of Engineer in charge.	1	Nos			
a)	Ammeter AC supply,100 mm dia circular dial Auto electric/AE/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS 1248-(P-II)1983 latest with up to date ammendments.	2	Nos			
b)	Voltmeter AC supply,100 mm dia circular dial Auto electric/AE/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS 4064-1978 with up to date ammendments.	1	Nos			
c)	ICTP switches with HRC fuses of Kilburn/Larsen & Tubro/Standard/Siemen/Havells make and having capacity 30% extra of the operational rating of motor as per BIS 4064-1978 with upto date ammendments immediatly after the power meter of HPSEB.	2	Per Set			
d)	Busbar chamber having three copper bars of suitable rating for full length equal to width of board of three live phases and one copper bar of half rating of full length for neutral conforming to BIS 8084-1976 and 11353-1985 read with 5578-1985 all latest with upto date ammendments.	1	Nos			
e)	ACB/MCB/Oil circuit breaker of suitable capacity of Kilburn/L & T/MEI/GEC/Standard make on incomming feeder for motors offered by the tenderer conforming to BIS 2516-1985 latest with upto date ammendments with initial oil filling whenever required & neutral linked under voltage release.	1	Nos			
f)	Three phase indicating lamps complete with toggle switches for individual motors conforming to BIS 3452 part I & II latest with up to date ammendments.	2	Per Set			
g)	Earth leakage circuit breaker/relay of recommended make such as Kilburn/L&T/MET/GEC conforming to BIS-2516-1977 with upto date ammendments and of suitable range which should have control box, oprating handel and trip/reset push button, on/ off indicators, re-indicating off spring condition of the circut breaker for over current protection. The circuit should be equipped with magnet thermal release with metallic tap CTS. It should also be fitted earth fault for tripping of breaker on occurance of earth fault on/ of breaker load side.	1	Nos			
h)	Hour run meter of reputed make of four digit capacity conforming to BIS-722 (latest edition)/ recommendations.	2	Nos			
i)	Suitable three phase voltage monitor relay with all protections & usual indicators with electric sirens against single phasing, No/low voltage, high voltage & overloading & phase voltage difference as per IS-3842 with up to date ammendments.	1	Nos			
j)	Change over Switch of reputed make & suitable capacity	1	Nos			
k)	Single phase preventor of reputed make & suitable capacity conforming to IS:1248 (P-V)-1983 with up to date ammendments	1	Nos			

4(a)	Supply and fixing at site of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/KSB make of cast iron/cast steel double flanged sluice valve having size one size higher than the nominal delivery size of pump and capable of withstanding nominal seat pressure as mentioned in item No. 1(a) + single pressure & conforming to API-standards with up to date amendments <b>for delivery line of pump and of class ASA-600</b>	2	Nos			
b)	Supply/fixing at site of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/KSB make of suitable size cast iron double flanged swing check type reflux valve for delivery line of pump having bye pass arrangement & size one size higher than the nominal delivery size of pump and capable of withstanding nominal seat pressure as mentioned in item No. 1(a) + gauge pressure & conforming to API-standards with up to date amendments for delivery line of pump <b>Class of valve shall be ASA-600</b>	2	Nos			
c)	Supply/fixing at site of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/KSB make of suitable size Cast Steel double flanged swing check type reflux valve conforming to API Standard with up to date amendments for R/main as mentioned in item No.1(c) for withstanding nominal seat pressure as indicated in item 1(a) + gauge pressure. The size of reflux valve shall be equal to size for Rising main of the same shall be provided with suitable bye pass arrangements. <b>The class of valve shall be ASA-600 and of 80mm dia.</b>	1	Nos			
d)	Supply/fixing at site of Kirloskar//Kilburn/IVC/Fouress/Gled/BHEL/Leader make cast iron double flanged sluice valve (In case Suction is positive) for <b>suction pipe</b> having size one or two size larger than suction size of pump such that velocity of flow in suction pipe is not more than 3.00 mtr/sec <b>confirming to BIS standard with up to date amendments class P.N. 1.6</b>	2	Nos			
5(a)	P/L at site suitable size copper PVC insulated armoured power three & half core cable conforming to BIS 1554 (Part I) -1988 or latest with up to date amendments of Siemen/Gloster/ICC/EICO/National /IEC make from meter of HPSEB to circuit breaker & from circuit breaker to bus bar switch & starter (one cable carrying all three phases) including all other electrical equipment/accessories such as thimbles,flexible pipe,solder,nuts & bolts,cable glands etc. laid in pipes or trenches under floor The type,size & make will be subject to approval of HPSEB authorities. In case of non acceptance by HPSEB authorities it shall have to be replaced by the tenderer free of cost.	1	Per Job			
b)	P/L suitable size copper PVC insulated armoured power three core cable conforming to BIS 1554 (part 1)-1988 or latest with up to date amendments of Siemen/Gloster/ICC/EICO/National/IEC make from switch to starter & starter to motor (one cable carrying all three phases) including all other electrical equipment/accessories such as thimbles, flexible pipes, solder, nuts & bolts, cable glands etc. laid in pipes or trenches under floor. The type size & make will be subject to approval of HPSEB authorities. In case of non acceptance by HPSEB authorities it shall have to be replaced by the tenderer free of cost.	1	Per Job			
c)	P/L double loop earthing with copper plate 600x600x3mm thick electrode complete with material such as charcoal, common salt ,GI pipes,thimbles,nuts & bolts,digging of pits,GI wiring & 25x5mm copper strips of required capacity conforming to BIS 3043-1987 latest with up to date amendments suitable for above motors & other electrical equipments.	1	Per Job			
d)	Supply & erection of floor/wall mounted power factor shunt capacitor of suitable KVAR conforming to BIS 2834-1986 or latest with up to date amendments of BHEL/GEC/Machneil/ Mager/Bajaj/L&T make to raise the prevailing power factor at site to 0.95 for direct connection to induction motor individually,of required KVAR according to HP of motor offered including cable Siemens/Gloster/ICC make from busbar chamber to capacitor & also including L&T//Kilburn/Standard/Siemen/Havells make ICTP switches conforming to BIS 4064-1978 or latest with HRC fuses (Range to be specified by the tenderer).	2	Nos			
6	Supply of 100mm dia circular dial pressure gauge of suitable range & standard make such as Fiebeg/Bourden/ Precision/PREGA with all accessories such as stop cock,copper tubing etc.conforming to BIS 3624-1987 or latest with up to date amendments.	2	Nos			

7	<p>Providing/fixing at site double flanged suction delivery pipe &amp; common header considering site requirements,NPSH required &amp; available &amp; common header having area equal to two times the area of delivery branch of pump including tapers flanges rubber gaskets 3mm thick as per BIS 2712-1978 nuts &amp; bolts as per 1364-1983 &amp; special upto 5 mtrs. away from the outer wall of pump house as per layout drawings approved by Engineer-in-charge .The pipes shall be capable of withstanding 1.5 times the total pressure indicated in item No. 1(E)(ii) or total dynamic pressure plus gauge pressure which is more.The size of suction pipe shall be one or two size larger than the suction size of pump such that velocity of flow in suction pipe is not more than 3.00 mtr. / sec. &amp; size of delivery pipe shall be one size larger than nominal size of pump. The delivery pipe and common header shall be of specification <b>MSERW pipe grade-A, 5.50mm thick with FT-34 and suction pipe shall be GMS (MG) pipe joint with FT-5 .</b></p> <p><b>NOTE:- Actual laying to be done as per final drawings to be approved by the Engineer in charge.</b></p>	1	Per Job			
	<b>Grand Total-</b>					

Executive Engineer,  
I & P.H. Division,  
Paonta Sahib.