# OF 10 KLD TO 2000 KLD STP BASED ON

TIGER BIO FILTER TECHNOLOGY

# 10 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 10 KLD CAPACITY

	Design flow	=	<b>10.00</b> 0.010	KLD MLD
	Peak flow factor	=	3.00	
1	SCREEN CHANNELS: MANUAL			
	No. of Manual Screen	=	1	No.
	Average Flow	=	0.01	MLD
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
		=	0.03	MLD
		=	1.25	m³/hr
		=	0.000	m <sup>3</sup> /sec
	Average Flow	=	0.01	MLD
		=	0.417	m³/hr
		=	0.000	m <sup>3</sup> /sec
	Design Flow in each Screen	=	0.000 1	m³/sec No.
		=	0.000	m³/sec
	Average Flow in each Screen	=	0.000 1	m³/sec No.
		=	0.000	m³/sec
	Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	Clear Area of Opening through Screen for	=	0.000	m³/sec
	Peak Flow		1.2	m/sec
			1.2	111/560
		=	0.000000	m <sup>2</sup>
	Clear Area of Opening through Screen for	=	0.000	m³/sec
	Average Flow		0.6	m/sec
			3.0	,, 555
		=	0.000	m <sup>2</sup>
	Considering maximum Area of Opening through Screen	=	0.000	m²

Clear Spacing of Bars	=	10	mm	
Thickness of Bars	=	5	mm	
THIORIEGO OF BUILD	_	· ·		
O A		0/405\/40		
Gross Area of Screen	=	0x(10+5)/10		
	=	0.000	$m^2$	
Assuming Depth of Screen Channel	=	100.00	mm	
Gross Width of Screen	=	0/0.1		
	=	0.000	m	
	_	(Gross Width of Sci		Center Spacing
No. of Bars	=	of Bars) - 1	reen / Center to	Ceriter Spacing
	_	0/((10+5)/1000)-1		
	=		NI	
_	=	-1.0	Nos.	
Say	=	-1	Nos.	
Width of Screen provided	=	(Number of Bars+1)		g + (Number of
Width of Colocil provided	_	Bars x Bar Thickne	ss)	
	=	(-1+1)x10+(-1x5)		
	=	-5	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel provided	=	0.30	m	
L:B		3.00	***	
	=			
Length of Screen Channel provided	=	1.50	m	
				Invert Depth
Freeboard provided	=	0.70	m	of incoming
T				sewer
Total Depth of Screen Chamber	=	1.00	m	
Velocity in Channel at Average Flow	_	Average Flow / Cro	ss Sectional Are	ea of Screen
Velocity in Channel at Average Flow	=	Average Flow / Cro Channel	ss Sectional Are	ea of Screen
Velocity in Channel at Average Flow	=			ea of Screen
Velocity in Channel at Average Flow		Channel		ea of Screen
Velocity in Channel at Average Flow	=	Channel 0/((0.5x0.3)/1000x1 0.000	000) m/sec	ea of Screen
Velocity in Channel at Average Flow	=	Channel 0/((0.5x0.3)/1000x1	000)	ea of Screen
Velocity in Channel at Average Flow	=	Channel 0/((0.5x0.3)/1000x1 0.000	000) m/sec	ea of Screen
	= = >	Channel 0/((0.5x0.3)/1000x1 0.000	000) m/sec	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN	= = >	Channel 0/((0.5x0.3)/1000x1 0.000 0.300	000) m/sec	ea of Screen
	= = >	Channel 0/((0.5x0.3)/1000x1 0.000	000) m/sec	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN	= = > UAL	Channel 0/((0.5x0.3)/1000x1 0.000 0.300	000) m/sec	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber	= = > UAL =	Channel 0/((0.5x0.3)/1000x1 0.000 0.300	000) m/sec m/sec	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300	000) m/sec m/sec	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300  1 0.01 3.00 Peak Flow	000) m/sec m/sec	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300  1 0.01 3.00 Peak Flow 0.03	000) m/sec m/sec MLD	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300  1 0.01 3.00 Peak Flow	m/sec m/sec m/sec MLD MLD m³/day	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300  1 0.01 3.00 Peak Flow 0.03	000) m/sec m/sec MLD	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300  1 0.01 3.00 Peak Flow 0.03 30 1	m/sec m/sec MLD MLD m³/day m³/hr	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300  1 0.01 3.00 Peak Flow 0.03 30	m/sec m/sec m/sec MLD MLD m³/day	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow Peak Flow	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300  1 0.01 3.00 Peak Flow 0.03 30 1 0.000	m/sec m/sec MLD MLD m³/day m³/hr	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300  1 0.01 3.00 Peak Flow 0.03 30 1 0.000 30/1	m/sec m/sec m/sec MLD MLD m³/day m³/hr m³/sec	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow Peak Flow	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300  1 0.01 3.00 Peak Flow 0.03 30 1 0.000	m/sec m/sec m/sec  MLD  MLD  m³/day  m³/hr  m³/sec  m³/day	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow Peak Flow	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300  1 0.01 3.00 Peak Flow 0.03 30 1 0.000 30/1	m/sec m/sec m/sec MLD MLD m³/day m³/hr m³/sec	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow Peak Flow	=  - 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300   1 0.01 3.00 Peak Flow 0.03 30 1 0.000 30/1 30 1	m/sec m/sec m/sec  MLD  MLD  m³/day  m³/hr  m³/day  m³/hr	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow Peak Flow	= 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300  1 0.01 3.00 Peak Flow 0.03 30 1 0.000 30/1 30 1 30	m/sec m/sec m/sec  MLD  MLD  m³/day  m³/hr  m³/sec  m³/day	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow Peak Flow  Design Flow Design Flow Design Flow to each Grit Chamber	= 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300   1 0.01 3.00 Peak Flow 0.03 30 1 0.000 30/1 30 1	m/sec m/sec m/sec  MLD  MLD  m³/day  m³/hr  m³/day  m³/hr	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow Peak Flow  Design Flow According to CPHEEO Manual	= 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300   1 0.01 3.00 Peak Flow 0.03 30 1 0.000  30/1 30 1 0.000	m/sec m/sec MLD MLD m³/day m³/hr m³/sec m³/day m³/hr	ea of Screen
CONVENTIONAL GRIT CHAMBER: MAN No. of Grit Chamber Average Flow Peak Flow Factor Design Flow Peak Flow  Design Flow Design Flow Design Flow to each Grit Chamber	= 	Channel 0/((0.5x0.3)/1000x1 0.000 0.300   1 0.01 3.00 Peak Flow 0.03 30 1 0.000 30/1 30 1	m/sec m/sec m/sec  MLD  MLD  m³/day  m³/hr  m³/day  m³/hr	ea of Screen

Specific Gravity	<i>'</i>	2.65

Surface Overflow Rate for 100% removal efficiency in an ideal Grit Chamber	=	Settling Velocity	of the minimum size of Particles to be removed	1
	=	1.5	m/s	
	=	1296	m³/m²/day	
Considering Efficiency of removal of	_		III /III /ddy	
desired Particles, η = 75%	=	75%		
and Measure of Settling Basin				
Performance,	=	0.125		
n = 1/8 for very good performance		0.120		
Design Overflow Rate	=	857	m³/m²/day	
Boolgii Overnow itato		001	III /III /ddy	
Overface Overflow Data for 0.45 man dia				
Surface Overflow Rate for 0.15 mm dia.	_	1555	m <sup>3</sup> /m <sup>2</sup> /day	
Particle Size with Specific Gravity S <sub>s</sub> > 2.65 Table 5.6	=	1000	III /III /day	
			3, 2,,	
Considering Design Overflow Rate	=	960	m³/m²/day	
Area of Grit Chamber required	=	30	m³/day	
		960	m³/m²/day	
	=	0.03	$m^2$	
L:B ratio	=	2		
Length of Chamber provided	=	1.50	m	
Width of Chamber provided	=	0.50	m	
·				
Hydraulic Retention Time (HRT) in Grit		60		
Chamber at Peak Flow	=	60	sec	
Volume of Grit Chamber required	=	0x60		
	=	0	$m^3$	
Depth required in Grit Chamber	=	0 / (1.5x0.5)		
	=	0	m	
Say	=	0.30	m	
Grit Storage Depth	=	0.20	m	
Total Liquid Depth required	=	0.50	m	
Length of Grit Pit	=	0.50	m	
Width of Grit Pit	=	0.50	m	
Depth of Grit Pit	=	0.30	m	
Free Board	=	1.00	m	
RAW SEWAGE SUMP (WET WELL)				
No. of Units	=	1	No.	
Average Flow	=	0.01	MLD	
-	=	0.417	m³/hr	
	=	0.0001	m3/sec	
		- -		
Peak Flow Factor	=	3.00		

Design Flow	=	Peak Flow	
	=	0.03	MLD
	=	1	m³/hr
	=	0.0	m³/sec
	_	0.0	111 7000
Hydraulic Retention Time (HRT) at			_
Average Flow	=	180	min
Volume required	=	0.0001 x 180 x 60	
	=	1.08	$m^3$
Total Volume of Wet Well	=	1.08	$m^3$
Side Water Depth (SWD) provided	=	1.00	m
Plan Area of Wet Well	=	1.08	$m^2$
Length/width of Sump required	=	1.04	m
Length/width of Sump provided	=	1.0	m
Volume of Sump provided	=	1.08	$m^3$
Length of Pump Pit	=	1.00	m
Width of Pump Pit	=	0.50	m
Depth of Pump Pit	=	0.25	m
Free Board		1.00	m
DESIGN STATEMENT-RSS E&M			
Desire Constitution			
Design Considerations		0.04	NAL D
Design flow	=	0.01	MLD
	=	10.00 3.00	Cum/Day
Peak flow factor	=	3.00	
Pumping machinery			
Friction factor for Fittings in Pressure			
Mains			
Elbow 90 degrees	=	8	
Friction Factor for each	=	1	
Friction factor for all	=	8	
Elbow 45 degrees	=	0	
Friction Factor for each	=	0.75	
Friction factor for all	=	0	
Elbow 22 degrees	=	0	
Friction Factor for each	=	0.5	
Friction factor for all	=	0	
Tee 90 degrees	=	0	
Friction Factor for each	=	1.5	
Friction factor for all	=	0	
Tee in straight pipe	=	6	
Friction Factor for each	=	0.3	
Friction factor for all	=	1.8	
Gate valve open	=	1	
Friction Factor for each	=	0.4	

3.1

Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	12.7		
Stage		low	ave	peak
Average flow, cum / day	=		10.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	6	10	20
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0002	0.0002	0.0002
Dia needed, m	=	0.015	0.015	0.017
Dia needed, mm	=	15	15	17
Dia provided, mm (User)	=	63	63	63
Radius, m	=	0.032	0.032	0.032
Radius power 0.63	=	0.113	0.113	0.113
S power 0.54	=	0.045	0.074	0.112
S	=	0.003	0.008	0.017
Slope 1 in	=	316.6	123.0	58.0
length, m	=	15	15	15
Friction in pipeline, m	=	0.0	0.1	0.3
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	12.7	12.7	12.7
Friction in fittings, m	=	0.2	0.6	1.5
Static lift, m	=	3.0	3.0	3.0
Total head, m	=	3.2	3.6	4.5
Efficiency of pumpset	=	0.8	0.8	0.8
Discharge, lps	=	0.1	0.2	0.3
Discharge, Cum/Hr	=	0.4	0.6	1.3
Kw required	=	0.017	0.026	0.056
HP required	=	0.5	0.5	0.5
Number of Pumps	=	2	2	2
TIGER BIO FILTER				
DESIGN STATEMENT-TBF1- 10 KLD				
Number of pumping hours	=	16	Hrs	
Number of BMF tanks provided	=	1	Nos	
Design flow to each tank	=	10.00	Cum/day	

Number of pumping hours	=	16	Hrs	
Number of BMF tanks provided	=	1	Nos	
Design flow to each tank	=	10.00	Cum/day	
	=	0.63	Cum/ Hr for 16	6 Hr
	=	0.17	lps	
Inlet BOD	=	250.00	mg/l	
Inlet TSS	=	400.00	mg/l	
BOD load applied	=	2.5	kg/day	
BOD uptake rate	=	0.1	Kg of BOD /	(0.5 - 1.0)
			Kg of worms	
Worms required	=	25	Kg worms	

	Sewage application rate	=	1.85	Cum/Sqm/day	(1 - 2 Cum/Sqm/day)
	Area required	=	5.41	Sqm	
	Area Provided	=	6	Sqm	
	Area of each crate	=	0.4	Sqm	
	Number of crates	=	15	Nos	
	say	=	16	Nos	
	Crate in longitudinal direction	=	4	Nos	
	Crate in travers direction	=	4	Nos	
	crates provided	=	16	Nos	OK
	Width provided	=	4.00	m	
	Length required	=	3.00	m	
	Depth provided	=	1.2	m	
5	TERTIARY TREATMENT UNIT				
	Design Considerations		0.04	MID	
	Design flow	=	0.01	MLD	
		=	10.00	Cum/Day	
	Peak flow factor	=	3.00		
5.1	FILTER FEED TANK				
	Number of FFT provided	=	1	Nos	
	Number of operating hours	=	16	Hrs	
	Design flow	=	10.00	Cum/Day	
		=	0.63	Cum/Hr	
		=	0.00017	Cum/Sec	
	Hydraulic Retention time	=	60	min	
	Volume required	=	0.63	Cum	
	Depth	=	1.00	m	
	Civil Tanks				
	Area	=	0.63	Sqm	
	Length/Width required	=	0.79	m	
	Length/Width provided	=	1.00	m	
	Freeboard provided	=	0.50	m	
	Volume Provided		1.00	Cum	
	DESIGN STATEMENT-TTU E&M				
	Design Considerations				
	Design flow	=	0.01	MLD	
		=	10.00	Cum/Day	
	Peak flow factor	=	3.00		
	Pumping machinery Friction factor for Fittings in Pressure Mains				
	Elbow 90 degrees	=	5		
	Friction Factor for each	=	1		
	Friction factor for all	=	5		

Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	5		
Friction Factor for each	=	0.3		
Friction factor for all	=	1.5		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	9.4		
Stage		low	ave	peak
Average flow, cum / day	=		10.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	6	10	20
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	8.0	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0001	0.0002	0.0002
Dia needed, m	=	0.013	0.015	0.017
Dia needed, mm	=	13	15	17
Dia provided, mm (User)	=	63	63	63
Radius, m	=	0.032	0.032	0.032
Radius power 0.63	=	0.113	0.113	0.113
S power 0.54	=	0.060	0.074	0.112
S	=	0.005	0.008	0.017
Slope 1 in	=	185.9	123.0	58.0
length, m	=	20	20	20
Friction in pipeline, m	=	0.1	0.2	0.3
Velocity head, m	=	0.033	0.051	0.115
Frction factor in fittings	=	9.4	9.4	9.4
Friction in fittings, m	=	0.3	0.5	1.1
Static lift, m	=	8.0	8.0	8.0
Total head, m	=	8.3	8.5	9.1
Efficiency of pumpset	=	8.0	0.8	8.0
Discharge, lps	=	0.1	0.2	0.3
Discharge, Cum/Hr	=	0.4	0.6	1.3
Kw required	=	0.029	0.044	0.096
HP provided	=	0.5	0.5	0.5
Number of Pumps	=	2	2	2

5.2	PRESSURE SAND FILTER			
	Number of unit provided	=	1	Nos.
	Designed @ 16 hrs working for flow of	=	0.63	m3/h
	Loading rate	=	12.00	m3/m2/h
	Area of DMF	=	0.05	m2
	Dia of DMF	=	0.26	m
	Provided	=	0.300	m
	Backwash water			
	Backwash velocity	=	15.00	m/hr
	backwash flowrate	=	0.91	m3/h
	Backwash volume for 20 mins	=	0.30	m3
5.3	ACTIVATED CARBON FILTER			
	Number of unit provided	=	1	Nos.
	Designed @ 16 hrs working for flow of	=	0.63	m3/h
	Loading rate	=	12.00	m3/m2/h
	Area of ACF	=	0.05	m2
	Dia of ACF	=	0.26	m
	Provided	=	0.300	m
	Backwash water			
	Backwash velocity	=	15.00	m/hr
	backwash flowrate	=	0.91	m3/h
	Backwash volume for 20 mins	=	0.30	m3
5.4	CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM Average Flow	=	0.63	m3/hr
	Design Chlorine Dosage (Max)	_	3	mg/l
	Concentration of Chlorine in commercially available NaOCI	=	10%	
	Design NaOCI Dosage		30	mg/l
	Operating hours	=	16.0	hr
	operating neare	=	10.0	
	Quantity of NaOCI required	=	0.625 X 30	X 16 / 1000
		=	0.30	Kg/day
	Design Strength of NaOCI Solution	=	100%	
	Volume of NaOCI Solution	_	0.3 / (1 )	K 1000)
		=	0.010	m3
	No. of Dosing Tanks provided	=	1	Nos.
	Volume of each Dosing Tank	=	0.01 / 1	
	Totalio of Gaon Booling Talik	=	0.0171	

		0.01	m3
	=	100	Litres
	=		
No. of Working NaOCI Dosing Pump provided	=	1	No.
Capacity of each NaOCI Dosing Pump required	=	Total Volume of (No. of Dos	NaOCl Solution / sing pumps)
		0.01 / ( 1 X 16 )	
	=	0.001	m3/hr
		1.00	LPH
Capacity of each NaOCI Dosing Pump provided	=	1.00	LPH
No. of Standby NaOCI Dosing Pump provided	=	1	No.

# SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 10 KLD CAPACITY

S I.	Unit name	N o	Leng Widt			Height		So	oling	P¢	cc	Ra	ıft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	CITIC	wall		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	1.5	0.5	0.3	0.7	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1			80
2	Grit Chamber	1	1.5	0.5	0.5	1.0	1.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1			80
3	Raw Sewage Sump	1	1.0	1.0	1.0	1.0	2.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1		0.1	100
4	TBF Bed 50 KLD	1	3.0	4.0			1.2	0.1	0.1	0.1	0.1	0.1	0.1		0.2		60
5	Filter Feed tank	1	1.0	1.0	1.0	0.5	1.5	0.1	0.1	0.1	0.1	0.1	0.2	0.1		0.1	100
6	Filter Platform	1	1.4	1.7				0.1	0.1	0.1	0.1	0.1	0.1				60

### **Assumptions**

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound		soil	Muru	Soft roc	har d	Tota
0.0 to 1.5 m	Ш	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

## TIGER BIO FILTER OF 10 KLD CAPACITY BILL OF QUANTITIES

Sr.	Item Description	Qty	Unit	Rate	Amount (Rs.)
<b>No.</b>	Excavation for foundation / pipe trenches				
'	in earth, soils of all types, sand, gravel				
	and soft murum, including removing the				
	excavated material upto a distance of 50				
	metres and lifts as below, stacking and				
	spreading as directed, normal dewatering,				
	preparing the bed for foundation and				
	excluding backfilling, etc.				
	0.0 to 1.5 m	20.40	Cum	150.00	3,060.00
	1.5 to 3.0 m	5.57	Cum	164.00	913.50
	3.0 to 4.5 m	0.00	Cum	178.00	0.00
	4.5 to 6.0 m	0.00	Cum	192.00	0.00
	MJP/ SSR/ 2021-22 / Section E /				
	Excavation Item No.1/ Page no. 42				
	Everyation for foundation / nine transless in		-		
2	Excavation for foundation / pipe trenches in				
	hard murum and boulders, W.B.M. road				
	including removing the excavated material				
	upto a distance of 50 M beyond the area				
	and lifts as below, stacking and spreading				
	as directed by Engineer- in-charge, normal				
	dewatering, preparing the bed for				
	foundation and excluding backfilling, etc.			8.00	
	0.0 to 1.5 m	20.40	Cum	192.00	3,916.80
	1.5 to 3.0 m	5.57	Cum	206.00	1,147.50
	3.0 to 4.5 m	0.00	Cum	220.00	0.00
	4.5 to 6.0 m	0.00	Cum	234.00	0.00
	MJP/ SSR/ 2021-22/ Section E/ Excavation				
	Item No.3, Page no. 42				
3	Everystics for foundation / sing transher is				
3	Excavation for foundation / pipe trenches in soft rock and old cement and lime				
	masonry foundation asphalt road including				
	removing the excavated material upto a				
	distance of 50 M beyond the area and lifts				
	as below, stacking as directed by				
	Engineer-in-charge, normal dewatering,				
	preparing the bed for foundation and				
	excluding backfilling, etc. complete. (Bd-A-				
	4/259)				
	0.0 to 1.5 m	20.40	Cum	572.00	11,668.80
	1.5 to 3.0 m	5.57		597.00	3,325.30
	3.0 to 4.5 m	0.00	Cum	622.00	0.00
	4.5 to 6.0 m	0.00	Cum	647.00	0.00
	MJP/ SSR/ 2021-22 / Section E/				
	Excavation Item No.5, Page no. 42				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, excluding backfilling, etc. complete by all means. (Bd-A-6/259)	20.40	Cum	1,017.00	20,746.80
	1.5 to 3.0 m	5.57	Cum	1,042.00	5,804.00
	3.0 to 4.5 m	0.00	Cum	1,067.00	0.00
	4.5 to 6.0 m  MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43	0.00	Cum	1,092.00	0.00
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)  MJP/ SSR/ 2021-22 / Section E/Excavation Item No.18, Page no. 46	5.43	Cum	1,175.00	6,380.30
6	Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7. Page No. 38 MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY	3.21	Cum	5,640.00	18,104.40
7	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	3.48	Cum	7,448.00	25,919.10

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / SECTION - G :				
	PLAIN REINFORCED CEMENT				
	CONCRETE, READY				
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only.				
	Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor	0.00	Cum	8,624.00	0.00
	For Beams / Braces / Lintels In RCC M-300				
	MJP/ SSR/ 2021-22 / SECTION - G:				
	PLAIN REINFORCED CEMENT				
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold,				
	Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	0.27	Cum	9,247.00	2,496.70
	Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300				
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT				
	CONCRETE, READY				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-incharge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor				IKE )
	reinforcement) Chajjas / Parapets / Curtain Walls /Partition Walls / Pardies In RCC M-300	3.51	Cum	9,218.00	32,355.20
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY				
	MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)				
	c) Corrosion Resistant Steel (Fe 500)	0.64	MT	70,658.00	45,221.20
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.8 / Page no. 52				
12	Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U-1/537)  MJP/ SSR/ 2021-22 / SECTION - F: IRON AND STRUCTURAL STEEL WORK Item No.1 / Page	3.89	Sqm	1,895.00	7,371.60
-	no. 47				

Sr.	Item Description				
No.		Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled				
	stanchions fixed with connecting plates or				
	angle cleats as in main and cross beams,				
	hip and jack rafters, purlins connecting to				
	truss members and like as per detailed				
	designs and drawings or as directed by				
	Engineer-in-charge including cutting,				
	fabricating, hoisting, erecting, fixing in				
	position, making riveted / bolted / welded				
	connections and one coat of anticorrosive	0.31	N A T	71 206 00	22 206 20
	paint and over it two coats of oil painting,	0.31	MT	71,286.00	22,286.20
	MJP/ SSR/ 2021-22 / SECTION - F ::				
	IRON AND STRUCTURAL STEEL WORK				
	Item No.3,				
14	Providing and fixing corrugated galvanised				
'-	iron sheets of 0.63 mm thick (24B .W .G.)				
	for roofing without wind tiles including				
	fastening with galvanised iron screws and				
	bolts , lead and bitumen washers as per	29.00	Cam	777.00	22,533.00
	drawing etc. complete.  PWD / SSR 2020-21 / Roofing and Ceiling	29.00	Sqm	777.00	22,333.00
	SSR Item No.38.04 Reference No. Bd.R.5,				
	Page No. 453 Item No.1133, Page no. 224				
15	Providing fly ash brick masonry with				
	conventional / I.S. type bricks in cement				
	mortar 1:6 in superstructure including striking joints, raking out joints, watering				
	and scaffolding etc. Complete	5.85	Cum	6,305.00	36,884.30
	PWD / SSR 2020-21 / Brick Masonry SSR	2.00		2,232.23	33,3330
	Item No.27.13 Reference No. As director by				
	engineer incharge and BDG- 2 and 5 Item				
	No.893, Page no. 190				
16	Providing internal cement plaster 12 mm				
	thick in single coat in cement mortar 1:5				
	without neeru finish to concrete or brick				
	surfaces, in all positions including	_			
	scaffolding and curing etc. complete.	29.25	Sqm	257.00	7,517.30
	PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference				
	No. Bd. L.2				
	Page No. 368 Item No.950, Page no. 201				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding and	23.50	Sqm	529.00	12,431.50
	PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8				
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and	23.50	Sgm	10.00	235.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411	20.00	Oqiii	10.00	235.00
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.  PWD / SSR 2020-21 / Colouring SSR	23.50	Sqm	8.00	188.00
20	Item No. 36.04 Reference No. Bd. P.2 Page No. 412  Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc.  MJP/ SSR/ 2021-22 / Section E/	8.00	HP/ Hr.	77.00	616.00
	Exca				
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/  Exca	83.49	Cum	84.00	7,013.20
22	Transportation as per STATEMENT VI Including loading, unloading and stacking Earth (4.8 Cum) lead 15 Km	28.32	Cum	604.45	17,118.10

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	Electromechnical Items				
23	Screen (Manual) of size 1.5 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	0.75	Sqm	20,000.00	15,000.00
	Straight and 30 mm of 30 degree bend.	0.73	Sqiii	20,000.00	13,000.00
24	Grit pump				
	Supplying Non-clog Submersible Pump suitable				
	for sewage/ Liquid waste application v				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION				
	Pumps, Page no. 6, 7of size 1.5 m length  1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00
	1 TIF (OP to 9000 EFTI)	1.00	INO	08,034.00	00,034.00
25	Raw Sewage Pumps				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste a standard MOC and given duty points as below				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION				
	1 HP (Up to 9000 LPH)	2.00	Nos	68,654.00	137,308.00
26	TTU Feed pumps				
20	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid v standard MOC and given duty points as below				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION				
	1 HP (Up to 9000 LPH)	2.00	Nos	68,654.00	137,308.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 0.3 m x 2 m minimum height	1.00	Nos	18,800.00	18,800.00

Sr.	Item Description	Qty	Unit	Rate	Amount (Rs.)
No.	A (; , , , , , , , , , , , , , , , , , ,	,			
28	Activated Carbon Filter of FRP / MSEP				
	vessel with suitable thickness to withstand				
	a water pressure including MPV or 5 Valve				
	system and PVC / UPVC / MSEP				
	interconnecting and underdrain piping				
	including fittings, with standard filter media				
	layer with minimum depth of Activated				
	Carbon 1.0 m supported by gravels. The				
	piping arrangement should provide				
	sufficient pressure for backwash operations				
	and avoid loss of Activated carbon during				
	backwash operation. Suitable openings to				
	be provided to				
	Dia 0.3 m x 2 m minimum height	1.00	Nos	18,800.00	18,800.00
	N. OOLOU				
29	NaOCI Chlorinator				
	Pump Diaphragm Type / peristaltic				
	type / Solenoid Max Flow Rate Upto				
	10LPH Power Source				
	Electric Phase Single				
	Material PP /				
	PTFE(Teflon) Voltage				
	230 Volt Frequency				
	Mixing Tank of 100 Ltrs capacity	100.00	Ltrs	8.00	800.00
	Dosing Pump	2.00	Nos	12,000.00	24,000.00
30	Control Panel				
	Designing, Supplying, Installing,				
	commissioning				
	& testing of PLC Panel. Including PLC with CPU				
	& Power supply unit, power supplyb				
	cables interfacing cards, interfacing cables,	1.00	No	32,272.00	32,272.00
	MJP/ MECH/ ELECT / SSR/	1.00	110	32,272.00	32,272.00
	2021-22/ SECTION 19 - SA [				
	SCADA & AUTOMATION ]				
31	Supplying and erecting Fully Automatic				
	Star Delta starter to operate squirrel cage				
	induction motor working on 380- 440 Volt, 3				
	phase, 50 Hz with no volt coil, over load				
	element, and ON - OFF push buttons, with				
	necessary material and connected to				
	supply, etc complete. Starter with				
	> 7.5 HP & Up to 12.5 HP	6.00	nos	7,150.00	42,900.00
	MJP /MECH/ ELECT/ SSR/ 2021-22	3.00		.,	12,000.00
	SECTION				
	10 - LG [L.T. SWITCHGEAR				
	AND PROTECTION] Item no. LG 3				
	Page no. 27				

Sr.	Item Description	Qty	Unit	Rate	Amount (Rs.)
No.					. ,
32	Main power supply cable				
	3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable Supplying and erecting, Flat flexible				
	submersible cable with, Copper				
	Conductor, PVC insulated, and PVC				
	3 core 16 sq mm	25.00	m	549.00	13,725.00
	3 core to sq min	25.00	111	349.00	13,723.00
33	Power cables				
	Aluminium conductor 4 Core, XLPE /				
	PVC insulated & armoured cable				
	Supplying and erecting, XLPE / PVC				
	insulated, armoured cable 1100 V grade				
	with ISI mark Four core, solid / stranded				
	aluminium conductor with 6 mm thick 25				
	mm width M.S. spacer with				
	G.I. Earth wire 6 sq mm, complete				
	erected on				
	4 Core 6 sq mm	30.00	m	137.00	4,110.00
	MJP MECH/ ELECT/ SSR/ 2021-22				
	SECTION				
	12 - CB [ L.T. CABLE ] Item no. CB 6				
0.4	Construct Code to				
34	Control Cables				
	Copper conductor PVC insulated, Unarmoured control cable				
	Supplying and erecting Un-armoured				
	control cable with ISI mark stranded / solid				
	copper conductor 1.1 kV grade complete				
	erected on wall / panel or in provided				
	trench in an approved manner.				
	4 core 2.5 sq mm	30.00	m	137.00	4,110.00
	MJP MECH/ ELECT/ SSR/				,
	2021-22/ SECTION 12 - CB [ L.T.				
	CABLE ] Item no. CB 8-				
	Plumbing Items				
35	Providing and supplying in standard				
	lengths ISI mark rigid unplasticised PVC				
	pipes suitable for potable water with				
	solvent cement joints including cost of				
	couplers, as per IS specification no. 4985 /				
	1988 excluding GST levied by GOI and				
	GOM in all respect, including transportation,				
	freight charges, inspection charges,				
	loading, unloading, conveyance to the				
	departmental stores and stacking the				
	same in closed shed duly protected from				
	sun rays and rains including cost of				
	jointing material i.e. solvent cement, etc.				
	Johnson Haterial I.E. Solvetti Cettletti, etc.				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	1) 10% of cost of pipes shall be				
	considered for cost of PVC specials for				
	estimate purpose only.				
	2) One coupler and required cement				
	solvent shall be provided with each full				
	MJP/ SSR/ 2021-22 / SECTION – I(II)				
	P.V.C.				
1	Raw Sewage pump to TBF Distribution				
а	Main header				
	63 mm.	10.00	m	149.00	1,490.00
	PVC Specials- 10%				149.00
b	Distribution				
	63 mm.	10.00	m	149.00	1,490.00
	PVC Specials- 10%	10100		1 10100	149.00
	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7				
2	TBF collection to FFT (gravity)				
а	Main header				
	63 mm.	15.00	m	149.00	2,235.00
	PVC Specials- 10%				223.50
b	collection tributory				
<u> </u>	63 mm.	5.00	m	149.00	745.00
	PVC Specials- 10%	0.00		140.00	74.50
3	TTU Plumbing				
	63 mm.	15.00	m	149.00	2,235.00
	PVC Specials- 10%				223.50
4	TBF distribution				
•	63 mm.	5.00	m	149.00	745.00
	PVC Specials- 10%				74.50
00	Laboration				
36	Labour Plumber	4.00	dovo	644.00	2.564.00
	Helper	4.00 4.00	days	641.00 579.00	2,564.00 2,316.00
	MJP/ SSR/ 2021-22 / SECTION - B	4.00	days	379.00	2,310.00
	LABOUR & MACHINERY , Page no. 14				
37	Providing double flange sluice valve				
0.	confirming for IS- 14846 including worn				
	gear arrangements as per test pressure,				
	stainless steel spindle, caps, including				
	inspection charges, transportation upto				
	departmental store, unloading, stacking				
	excluding GST levied by				
	Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump 65 mm.	2.00	Nos	4,966.00	9,932.00
	Filter Feed Pump	2.00	1105	4,900.00	9,932.00
		2.00	Nos	4.966.00	9,932.00
	MJP/ SSR/ 2021-22 / SECTION - I(XII):		1.00	.,000,00	3,332.00
	65 mm.	2.00	Nos	4,966.00	

Sr.	Item Description	Qty	Unit	Rate	Amount (Rs.)
No.	Droviding and cumplying ICL mark CL D/C				, - <i>I</i>
38	Providing and supplying ISI mark CI D/F				
	reflux valves (non-return valves ) of				
	following dia including railway freight,				
	inspection charges, unloading from railway				
	wagon, loading into truck, transportation				
	upto departmental stores, unloading,				
	stacking excluding GST levied by GOI &				
	GOM in all respect etc. complete. Reflux				
	Without by pass arrangement -PN -1				
	Raw Sewage pump				
	65 mm.	2.00	Nos	3,885.00	7,770.00
	Filter Feed Pump			,	,
	65 mm.	2.00	Nos	3,885.00	7,770.00
	MJP/ SSR/ 2021-22 / SECTION - I(XII):				
	PIPES APPURTENANCES , Page no. 131				
	Bio media Items				
39	Supplying of Specially designed container				
	for holding Filter media including				
	Lightweight Expanded Clay Aggregates size				
	( 8-30 mm) and Bio media including				
	mixture of woodchips Vermicompost,				
	cocopeat and bacterial culture with special				
	worms per designed quantity including	40.00	NI.	4.750.00	70,000,00
-	transportation & fixing in position as	16.00	Nos	4,750.00	76,000.00
-	Market rate				
40	Rapid sand Gravity filter sand At				
	Source (Godhara, Gokak, Kanhan, Yesagi	1.53	Cum	1,730.00	2,646.90
	MJP/ SSR/ 2021-22 / SECTION- A			1,1 00100	_,0.1010
	MATERIALS				
41	Trasnsportation Godhara to Pune				
	distance by Road 660 Km.	1.53	Cum	11,031.37	16,878.00
	MJP/ SSR/ 2021-22 / SECTION - C				
40	Ctone Aggregate 20	4.50	C: ::::	000.00	4 077 00
42	Stone Aggregate 20 mm	1.53	Cum	900.00	1,377.00
	MJP/ SSR/ 2021-22 / SECTION- A MATERIALS				
	Item No. 49,50,51 Page no. 13				
	10. 13			+	
43	Transportation as per STATEMENT VI				
	Including loading, unloading and stacking				
	Manure or sludge (5.52 Cum) lead 25 Km	5.88	Cum	747.48	4,395.20
	MJP/ SSR/ 2021-22 / SECTION - C	2.00	_ <del>_</del>		1,000.20
			NET :	ΓΟΤΑL Rs.	984,455.90

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				1.90		
Α	0.0 to 1.5 m	1	4.30	2.50	1.5	16.13	Cum
	soil					4.04	Cum
	Murum					4.04	Cum
	Soft rock					4.04	Cum
	hard rock					4.04	Cum
В	1.5 to 3.0 m	1	4.3	2.50	0.4	4.3	Cum
	soil					1.08	Cum
	Murum					1.08	Cum
	Soft rock					1.08	Cum
	hard rock					1.08	Cum
С	3.0 to 4.5 m	1	3.3	2.00	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	3.3	2.00	0	0	Cum
	soil				_	0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	Screen	1	2.30	1.00	0.15	0.35	Cum
	Grit	1	2.30	0.50	0.15	0.18	Cum
	extra for grit chamber	1	0.00	0.40	0.15		Cum
				Total for gri	t	0.18	Cum
3	PCC M20						
	Screen	1	2.10	0.90	0.10	0.19	Cum
	Grit	1	2.10	0.50	0.10	0.11	Cum
		1	0.00	0.30	0.10	0	Cum
	Internal slope	1	Area	0.06	0.50	0.03	Cum
	Internal slope	1	Area	0.03	0.50	0.02	Cum
				Total for gri	t	0.16	Cum
4	Raft M30						
	Screen	1	1.90	0.80	0.15	0.23	Cum
	Grit	1	1.90	0.50	0.15	0.15	Cum
		1	0.00	0.20	0.15	0	Cum
_				Total for gri	t	0.15	Cum
5	RCC Wall						
	Screen		4 = -	2 12	4.00	2.11	
	Long Wall	2	1.70	0.10	1.20	0.41	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Short Wall	2	0.70	0.10	1.20	0.17	Cum
				Total for so	creen	0.58	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	0.00	0.10	1.70	0	Cum
	Short Wall	2	0.50	0.10	1.70	0.17	Cum
				Total for gr	it	0.17	Cum
		1					
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	80	Cum	1.13	0.1	MT
7	Fabrication work in Frame and Grating for Access						
	Screen	1	1.70	0.70		1.19	Sqm
	Grit	1	1.70	0.60		1.02	Sqm
					Total	2.21	Sqm
8	Removing excess exacavated material out of site						
	Screen chamber	1	1.70	0.70	1.00	1.19	Cum
	Grit Chamber	1	1.70	0.50	1.50	1.28	Cum
	soling, PCC, Raft volume					1.21	Cum
	Total Volume					3.68	Cum
	bulkage @ 40%					5.16	Cum
9	Refilling and compaction						
	Total Excavation	1				20.43	Cum
	Deduction for tank volume,						
	soling, PCC, Raft Refilling and compaction volume	+				3.68 16.75	Cum Cum
	I isoming and compaction volume					10.75	Cuiii

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				2.45		
Α	0.0 to 1.5 m	1	4.7	4.74	1.5	33.7	Cum
	soil					8.43	Cum
	Murum					8.43	Cum
	Soft rock					8.43	Cum
	hard rock					8.43	Cum
В	1.5 to 3.0 m	1	3.74	3.74	0.95	13.29	Cum
	soil					3.33	Cum
	Murum					3.33	Cum
	Soft rock					3.33	Cum
	hard rock					3.33	Cum
С	3.0 to 4.5 m	1	3.74	3.74	0	0	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	2.74	2.74	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	RSS	1	1.94	1.94	0.15	0.57	Cum
3	PCC M20						
	RSS	1	1.74	1.74	0.10	0.31	Cum
4	Raft M30						
	RSS	1	1.54	1.54	0.20	0.48	Cum
	D00 W #						
5	RCC Wall		4.04	0.45	0.00	0.00	
	Long Wall	2	1.34	0.15	2.20	0.89	Cum
	Short Wall	2	1.04	0.15	2.20	0.69	Cum
					Total	1.58	Cum
6	Doomo						
0	Beams 1	0	1.04	0.2	0.3	0	Cum
	Beam 1 Beam 2	0	1.04	0.2	0.3	0	Cum
	Dealli 2	0	1.04	0.2	Total	0	Cum
					TOtal	0	Cuili
7	Slab	1	1.34	1.34	0.15	0.27	Cum
	Deduction for manhole	-1	1.20	0.70	0.15	-0.13	Cum
	Deduction for marmore	-	1.20	0.70	Total	0.14	Cum
					Total	0.14	Cum
	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
8	2.00	um	100	Cum	2.2	0.22	MT
		<u> </u>		<b>3</b> 4111		0.22	
	Fabrication work in Frame and	1					
9	Grating for Access						
	RSS	1	1.20	0.70		0.84	Sqm
40	Removing excess exacavated						
10	material out of site						
	RSS	1	1.34	1.34	2.00	3.59	Cum
	soling, PCC, Raft volume					1.36	Cum
	Total Volume					4.95	Cum
	bulkage @ 40%					6.93	Cum
11	Refilling and compaction						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					46.99	Cum
	Deduction for tank volume, soling, PCC, Raft					4.95	Cum
	Refilling and compaction volume					42.04	Cum
12	Dewatering						
	2 Days x 2 hours/day	days	2	hours / day	2	4	Hrs

### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.35		
Α	0.0 to 1.5 m	1	4.46	5.46	0.35	8.53	Cum
	soil					2.14	Cum
	Murum					2.14	Cum
	Soft rock					2.14	Cum
	hard rock					2.14	Cum
2	Soling						
	TBF	1	4.06	5.06	0.15	3.09	Cum
3	PCC M20						
	TBF	1	3.86	4.86	0.10	1.88	Cum
4	Raft M30						
7	TBF	1	3.66	4.66	0.10	1.71	Cum
	151	'	0.00	1.00	0.10	1.7 1	Odili
5	Brick Wall						
	TBF						
	Long Wall	2	3.46	0.23	1.20	1.91	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	3.00	0.23	0.50	1.73	Cum
					Total for	T 5.85	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	3.00		0.50	9	Sqm
	Wall top	5	3.00		0.23	3.45	Sqm
	Long Wall	2	3.00		1.20	7.2	Sqm
	Short Wall	2	4.00		1.20	9.6	Sqm
					Total	29.25	Sqm
	External						
	Long Wall	2	3.46		1.20	8.31	Sqm
	Short Wall	2	4.46		1.20	10.71	Sqm
	Wall Top	1	14.92	0.3		4.48	Sqm
					Total	23.50	Sqm
7	External-white-wash	1				23.50	Sqm
8	External-colour-wash	1				23.50	Sqm
9	0(1, 1100)4/2002 0 1/ /0	Kg/C		0	4	2.11	N 4
	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	1.71	0.11	MT
10	Removing excess exacavated						
10	material out of site						
	soling, PCC, Raft volume					6.68	Cum
	Total Volume					6.68	Cum
	bulkage @ 40%					9.36	Cum

### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					8.53	Cum
	Deduction for tank volume, soling, PCC, Raft					6.68	Cum
	Refilling and compaction volume					1.85	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-4 m X 5 m x 3 m		4.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	4	3.00	6.97	kg/m	83.64	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	2	5.00	3.71	kg/m	37.10	KG
	for principle rafter 50*50*3 Unit Weight	4	2.90	3.71	kg/m	43.04	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	4	0.20	3.71	kg/m	2.97	KG
	for central strut rafter 50*50*3 Unit Weight	2	0.30	3.71	kg/m	2.23	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	18.00	3.71	kg/m	66.78	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	5.00	2.51	kg/m	62.75	KG
	for Base Plate 150*150*10 mm	8	0.15	0.15	0.010	14.13	KG
					Total Wei	312.63	Kg
						0.31	MT
13	corrugated galvanised iron sheets	2	5.00	2.90		29	Sqm

### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				1.95		
Α	0.0 to 1.5 m	1	3.7	3.70	1.5	20.54	Cum
	soil					5.14	Cum
	Murum					5.14	Cum
	Soft rock					5.14	Cum
	hard rock					5.14	Cum
В	1.5 to 3.0 m	1	3.20	3.20	0.45	4.61	Cum
	soil					1.16	Cum
	Murum					1.16	Cum
	Soft rock					1.16	Cum
	hard rock					1.16	Cum
С	3.0 to 4.5 m	1	2.70	2.70	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	2.70	2.70	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	FFT	1	1.90	1.90	0.15	0.55	Cum
3	PCC M20						
	FFT	1	1.70	1.70	0.10	0.29	Cum
4	Raft M30						
	FFT	1	1.50	1.50	0.20	0.45	Cum
5	RCC Wall						
	Long Wall	2	1.30	0.15	1.70	0.67	Cum
	Short Wall	2	1.00	0.15	1.70	0.51	Cum
					Total	1.18	Cum
6	Beams						
	Beam 1	0	1.00	0.2	0.3	0	Cum
	Beam 2	0	1.00	0.2	0.3	0	Cum
					Total	0	Cum
7	Slab	1	1.30	1.30	0.15	0.26	Cum
	Deduction for manhole	-	1.20	0.70	0.15	-0.13	Cum
					Total	0.13	Cum

### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	1.76	0.18	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	1	1.20	0.70		0.84	Sqm
10	Removing excess exacavated material out of site						
	FFT	1	1.30	1.30	1.50	2.54	Cum
	soling, PCC, Raft volume					1.29	Cum
	Total Volume					3.83	Cum
	bulkage @ 40%					5.37	Cum
11	Refilling and compaction						
	Total Excavation					25.15	Cum
	Deduction for tank volume, soling, PCC, Raft					3.83	Cum
	Refilling and compaction volume					21.32	Cum
12	Dewatering	+ +					
	2 Days x 2 hours/day	days	2	hours/day	2	4	Hrs

### **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
-1101	FILTER PLATFORM						
1	Excavation				0.40		
Α	0.0 to 1.5 m	1	2.4	2.70	0.4	2.6	Cum
	soil					0.65	Cum
	Murum					0.65	Cum
	Soft rock					0.65	Cum
	hard rock					0.65	Cum
2	Soling						
	Filter Platform	1	2.00	2.30	0.15	0.69	Cum
3	PCC M20						
	Filter Platform	1	1.80	2.10	0.10	0.38	Cum
4	Raft M30	+					
	Filter Platform	1	1.60	1.90	0.15	0.46	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	60	Cum	0.46	0.03	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					1.07	Cum
	Total Volume					1.07	Cum
	bulkage @ 40%					1.5	Cum
7	Refilling and compaction						
	Total Excavation					2.6	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					1.07	Cum
	Refilling and compaction volume					1.53	Cum

### **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.	16				16	Nos
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	16	0.82	0.58	0.2	1.53	Cum
3	Trasnsportation Godhara to					1.53	Cum
4	Stone Aggregate 20 mm	16	0.82	0.58	0.2	1.53	Cum
5	Transportation as per STATEMENT VI Including loading,						
	Manure or sludge (5.52 Cum) lead	16	0.82	0.56	0.8	5.88	Cum

### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr.	Item Description	Nos.	Unit
<b>No.</b>	Screen (Manual) of size 1.5 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	1	No
2	Grit pump		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.5 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
	(6) 10 0000 2		
3	Raw Sewage Pumps		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	1 HP (Up to 9000 LPH)	2	Nos
	1111 (OP 10 0000 E1 11)		1403
4	TTU Feed pumps		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	1 HP (Up to 9000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 0.3 m x 2 m minimum height	1	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 0.3 m x 2 m minimum height	1	Nos
7	PurAll Tablet Chlorinator + cartridge	0	nos

### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr.	Item Description	Nos.	Unit
No.	•	. 100.	
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH		
	Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz	4	NI
a	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
	Control Donal		
8	Control Panel		
	Designing, Supplying, Installing, commissioning & testing of PLC Panel.		
	Including PLC with CPU & Power supply unit, power supplyb cables interfacing		
	cards, interfacing cables, wireless modules with 25% extra quantity of all		
	accessories.		N 1
	PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		
	AUTOMATION ] Item no. 1.4 Page no. 69		
	Compliant and exection Fully Automotic Ctan Dalta starter to account according		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel		
	cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil,		
	over load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	> 7.5 HP & Up to 12.5 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
	•		
10	Main power supply cable		
	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,		
	PVC insulated, and PVC sheathed.		
	3 core 16 sq mm	25	m
11	Power cables		
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade		
	with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick		
	25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on		
	wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	30	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		
	•		
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		
12	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		

### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

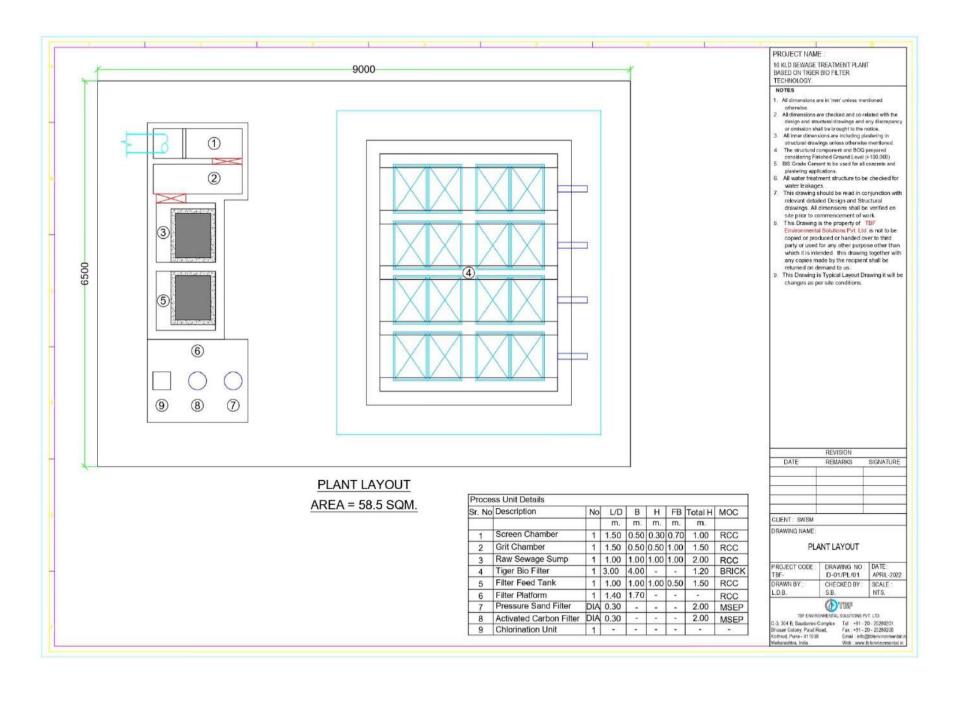
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	30	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

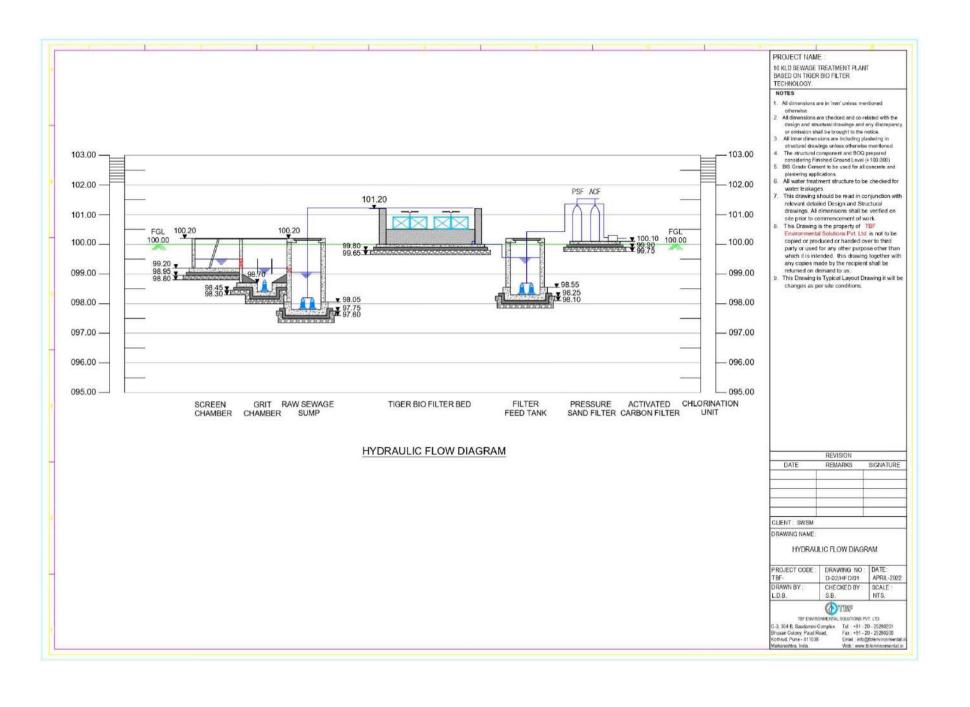
### **MEASUREMENT SHEET - PLUMBING**

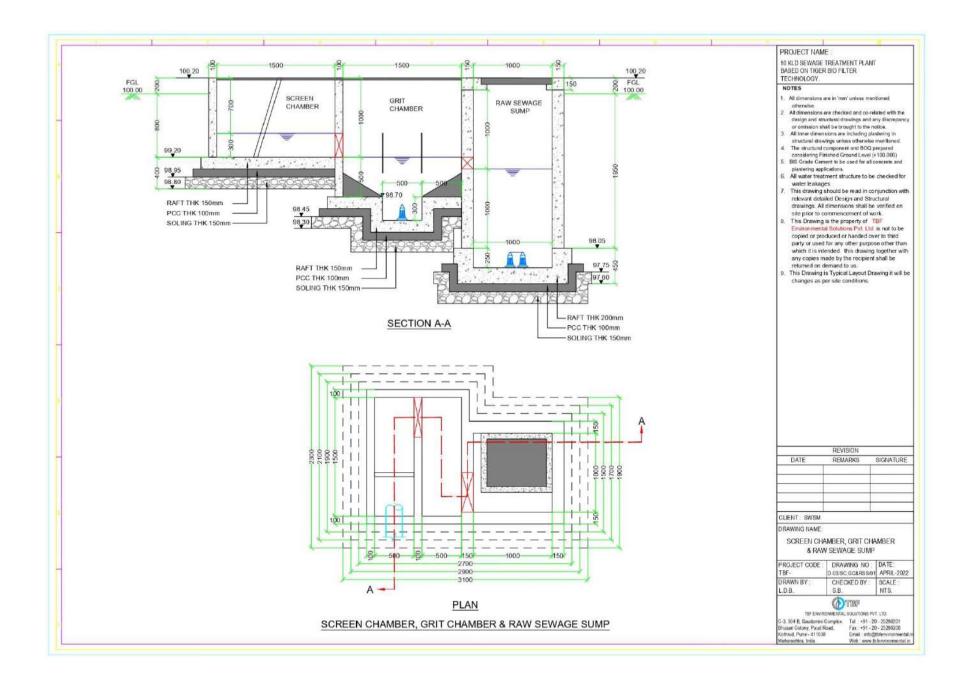
Sr.		l	l .	_		
No.	Item Description	Nos.	(m)	B (m)	Quantity	Unit
	Providing and supplying in standard lengths ISI mark					
	rigid unplasticised PVC pipes suitable for potable					
	water with solvent cement joints including cost of					
	couplers, as per IS specification no. 4985 / 1988					
	excluding GST levied by GOI and GOM in all respect,					
	including transportation, freight charges, inspection					
	charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed					
	shed duly protected from sun rays and rains including					
	cost of jointing material i.e. solvent cement, etc.					
	complete (selffit type to be jointed with cement					
	solvent).					
	1) 10% of cost of pipes shall be considered for cost					
	of PVC specials for estimate purpose only.					
	2) One coupler and required cement solvent shall					
	be provided with each full length pipe cost of					
	which is included in rates below.					
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES, Page no.77					
1	Raw Sewage pump to TBF Distribution					
a	Main header	Dia	63			
	63 mm.	1	10		10	m
	PVC Specials- 10%					
b	Distribution	4	40		40	
	63 mm. PVC Specials- 10%	1	10		10	m
	FVC Specials- 10%					
2	TBF collection to FFT (gravity)					
а	Main header					
	63 mm.	1	15		15	m
	PVC Specials- 10%					
b	collection tributory					
D	63 mm.	1	5		5	m
	PVC Specials- 10%					
	-1					
3	TTU Plumbing	Dia	63			
	63 mm.	1	15		15	m
	PVC Specials- 10%					
1	TDE distribution			No of hos	40	
4	TBF distribution 63 mm.	1	5	No. of bed	as 5	m
	PVC Specials- 10%	<u>'</u>	J	1	J	111
5	Labour	Nos	Days			
	Plumber	1	4		4	days
	Helper	1	4		4	days
	Chrise valves					
6	Sluice valves					

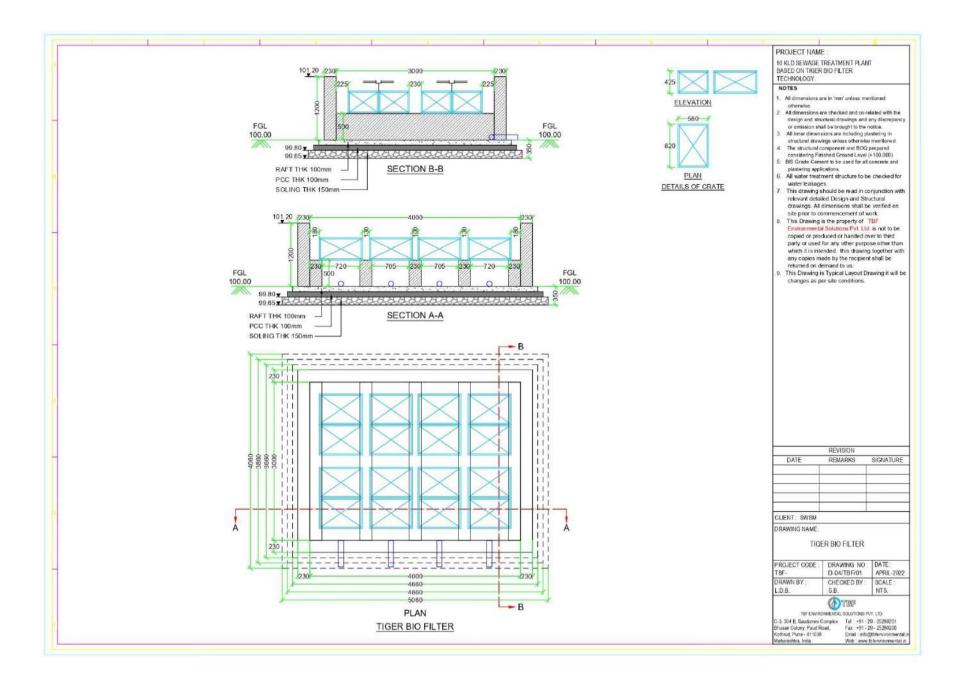
### **MEASUREMENT SHEET - PLUMBING**

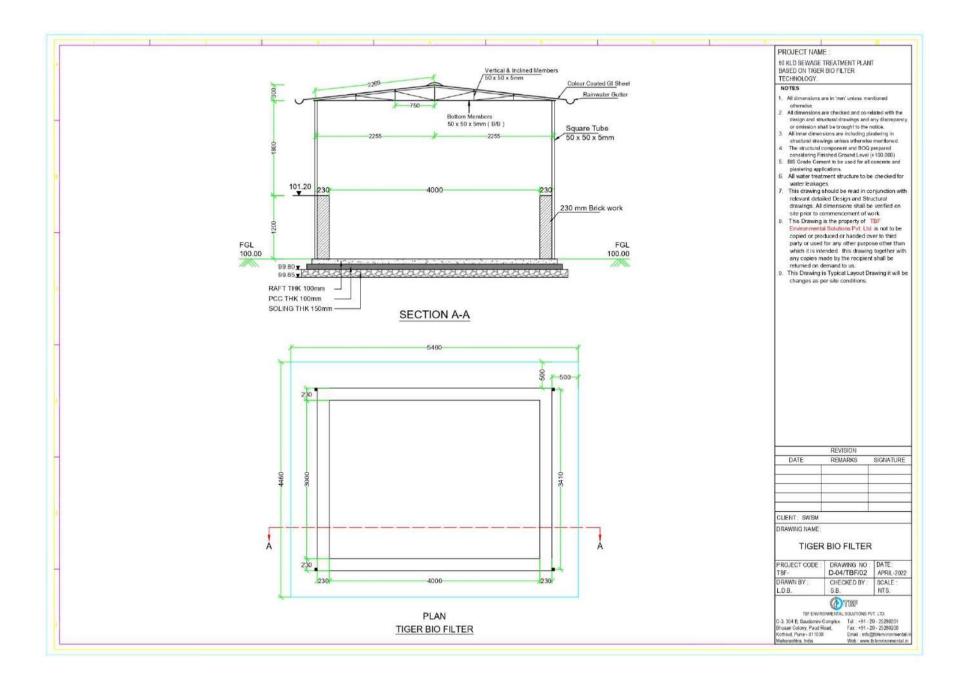
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming					
	for IS- 14846 including worn gear arrangements					
	as per test pressure, stainless steel spindle,					
	caps, including inspection charges,					
	transportation upto departmental store,					
	unloading, stacking excluding GST levied by					
	GOI & GOM in all respect etc. complete.					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES , Page no. 132 Raw Sewage pump					
	65 mm.	2			2	Nos
	05 11111.					1105
	Filter Feed Pump					
	65 mm.	2			2	Nos
	00 111111.					1400
7	Reflux valves (non-return valves )					
	Providing and supplying ISI mark CI D/F reflux					
	valves (non-return valves ) of following dia					
	including railway freight, inspection charges,					
	unloading from railway wagon, loading into					
	truck, transportation upto departmental stores,					
	unloading, stacking excluding GST levied by					
	GOI & GOM in all respect etc. complete. Reflux					
	valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES , Page no. 131					
	Raw Sewage pump					
	65 mm.	2			2	Nos
	Filton Food Division					
	Filter Feed Pump	2			2	No
	65 mm.	2			2	No

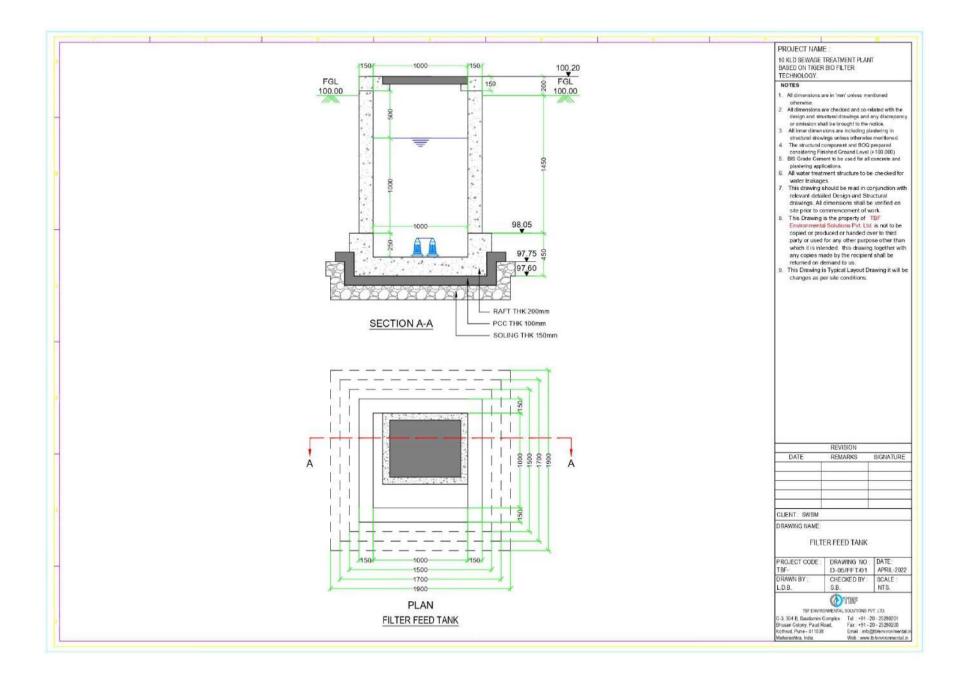


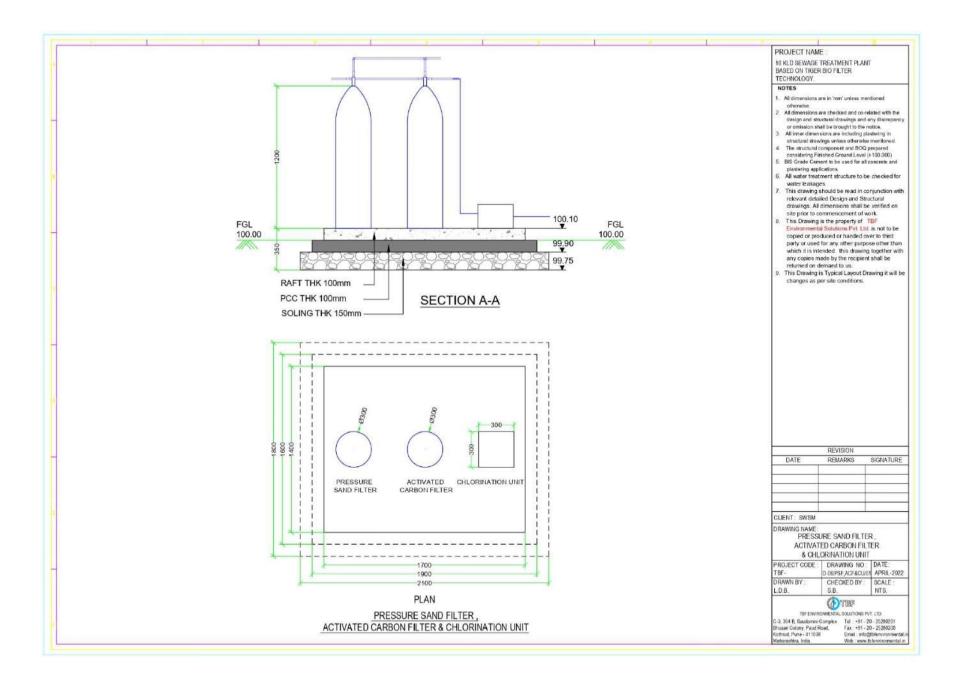












# 50 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 50 KLD CAPACITY

	Design flow	=	50.00	KLD
		=	0.050	MLD
	Peak flow factor	=	3.00	
1	SCREEN CHANNELS: MANUAL			
	No. of Manual Screen	=	1	No.
	Average Flow	=	0.05	MLD
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
		=	0.15	MLD
		=	6.25	m³/hr
		=	0.002	m³/sec
	Average Flow	=	0.05	MLD
		=	2.083	m³/hr
		=	0.001	m³/sec
	Design Flow in each Screen	=	0.002 1	m³/sec No.
		=	0.002	m³/sec
	Average Flow in each Screen	=	0.001 1	m³/sec No.
		=	0.001	m³/sec
	Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	Clear Area of Opening through Screen		0.000	3,
	for Peak Flow	=	0.002	m³/sec
			1.2	m/sec
		=	0.002	$m^2$
	Clear Area of Opening through Screen	=	0.001	m³/sec
	for Average Flow		2.2	,
			0.6	m/sec
		=	0.002	$m^2$
	Considering maximum Area of Opening through Screen	=	0.002	$m^2$

Clear Spacing of Bars Thickness of Bars	=	10 5	mm mm	
Gross Area of Screen	=	0.002x(10+5)/10		
	=	0.003	$m^2$	
Assuming Depth of Screen Channel	=	100.00	mm	
Gross Width of Screen	=	0.003/0.1		
No. of Bars	=	0.030 (Gross Width of Screen of Bars) - 1	m n / Center to C	Center Spacing
	=	0.03/((10+5)/1000)-		
		1		
	=	1.0	Nos.	
Say	=	1 (November of Deve (4) or (	Nos.	. /Niconale an af
Width of Screen provided	=	(Number of Bars+1) x (Bars x Bar Thickness)	Clear Spacing	+ (Number of
	=	(1+1)x10+(1x5)		
Mildu One	=	25	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel provided L:B	=	0.10	m	
	=	4.00	<b>m</b>	
Length of Screen Channel provided	=	2.00	m	Invert Depth
Freeboard provided	=	1.00	m	of incoming sewer
Total Depth of Screen Chamber	=	1.10	m	
Velocity in Channel at Average Flow	=	Average Flow / Cross S Channel	Sectional Area	of Screen
	=	0.001/((0.5x0.1)/1000x	1000)	
	=	0.020	m/sec	
	>	0.300	m/sec	
Head Loss across Screen				
Head Loss across Screen	=	$0.0728 (V^2 - v^2)$		
V = Velocity through Screen at Peak Flow	=	Peak Flow through So	reen Channel through Scre	
	=	1.000	m/sec	
v = Velocity in approach Channel at Peak Flow	=	Peak Flow through Sectional Are	n Screen Char a of Screen C	
	=	0.7	m/sec	
Head Loss across Screen at Peak Flow	=	0.040	m	
Head Loss across Screen at 50% Clogged Condition				
Velocity through Screen at 50% Clogged Condition at Peak Flow	=	2.000	m/sec	
Head Loss across screen at 50% Clogged Condition at Peak Flow	=	0.259	m	
	>	0.300	m/sec	OK

## 2 CONVENTIONAL GRIT CHAMBER: MANUAL

No. of Crit Charachar			
No. of Grit Chamber	=	1	N. 11 D
Average Flow	=	0.05	MLD
Peak Flow Factor	=	3.00	
Design Flow	=	Peak Flow	
Peak Flow	=	0.15	MLD
	=	150	m³/day
	=	6	m³/hr
	=	0.002	m³/sec
Design Flow to each Grit Chamber	=	150/1	
	=	150	m³/day
	=	6	m³/hr
	=	0.002	m³/sec
	_	0.002	111 / 300
According to CPHEEO Manual			
Particle Size	=	0.15	mm
Specific Gravity	=	2.65	
oposino Gravity		2.00	
Surface Overflow Rate for 100%		0 (11) 1 (1)	(4) (5)
removal efficiency in an ideal Grit	=	Settling Velocity of	of the minimum size of Particles to be removed
Chamber			
	=	1.5	m/s
	=	1296	m³/m²/day
Considering Efficiency of removal of	=	75%	
desired Particles, η = 75%	_	7370	
and Measure of Settling Basin			
Performance,	=	0.125	
n = 1/8 for very good performance			
Design Overflow Rate	=	857	m³/m²/day
Surface Overflow Rate for 0.15 mm			
dia. Particle Size with Specific Gravity	=	1555	m³/m²/day
S <sub>s</sub> > 2.65 Table 5.6			
Considering Design Overflow Rate	=	960	m³/m²/day
Area of Grit Chamber required	=	150	m³/day
		960	m <sup>3</sup> /m <sup>2</sup> /day
			,
	=	0.16	$m^2$
L:B ratio	=	2	
Length of Chamber provided	=	2.00	m
Width of Chamber provided	=	0.50	m
Width of Chamber provided		0.00	
Hydraulic Retention Time (HRT) in			
Grit Chamber at Peak Flow	=	60	sec
Volume of Grit Chamber required	=	0.002x60	
•	=	0.12	$m^3$

	Depth required in Grit Chamber	=	0.12 / (2x0.5)	
		=	0.12	m
	Say	=	0.30	m
	Grit Storage Depth	=	0.25	m
	Total Liquid Depth required	=	0.55	m
	Length of Grit Pit	=	0.50	m
	Width of Grit Pit	=	0.50	m
	Depth of Grit Pit	=	0.30	m
	Free Board	=	1.10	m
3	RAW SEWAGE SUMP (WET WELL)			
	No. of Units	=	1	No.
	Average Flow	=	0.05	MLD
		=	2.083	m³/hr
		=	0.0006	m3/sec
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
		=	0.15	MLD
		=	6	m³/hr
		=	0.002	m <sup>3</sup> /sec
	Hydraulic Retention Time (HRT) at	=	120	min
	Average Flow	_		111111
	Volume required	=	0.0006 x 120 x 60	
		=	4	m <sup>3</sup>
	Hydraulic Retention Time (HRT) at		Making / Arrana na Flanc	
	Peak Flow	=	Volume / Average Flow	
		=	36	min
		<	30	min
	Total Volume of Wet Well	=	4	$m^3$
	Side Water Depth (SWD) provided	=	1.10	m
	Plan Area of Wet Well	=	3.93	$m^2$
	Length/width of Sump required	=	1.98	m
	Length/width of Sump provided	=	2.00	m
	Volume of Sump provided	=	4.40	$m^3$
	Length of Pump Pit	=	1.00	m
	Width of Pump Pit	=	0.50	m
	Depth of Pump Pit	=	0.25	m
	Free Board		1.10	m

## 3.1 DESIGN STATEMENT-RSS E&M

Design Considerations				
Design flow	=	0.05	MLD	
	=	50.00	Cum/Day	
Peak flow factor	=	3.00	,	
r san new raster				
Pumping machinery				
Friction factor for Fittings in Pressure Mains				
Elbow 90 degrees	=	8		
Friction Factor for each	=	1		
Friction factor for all	=	8		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	6		
Friction Factor for each	=	0.3		
Friction factor for all	=	1.8		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	12.7		
Stage		low	ave	peak
Average flow, cum / day	=		50.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	30	50	100
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0009	0.0009	0.0012
Dia needed, m	=	0.033	0.033	0.038
Dia needed, mm	=	33	33	38
Dia provided, mm (User)	=	63	63	63
Radius, m	=	0.032	0.032	0.032
Radius power 0.63	=	0.113	0.113	0.113
S power 0.54	=	0.045	0.074	0.112
S	=	0.003	800.0	0.017
Slope 1 in	=	316.6	123.0	58.0
length, m	=	15	15	15

Friction in pipeline, m	=	0.0	0.1	0.3
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	12.7	12.7	12.7
Friction in fittings, m	=	0.2	0.6	1.5
Static lift, m	=	3.0	3.0	3.0
Total head, m	=	3.2	3.6	4.5
Efficiency of pumpset	=	0.8	0.8	0.8
Discharge, lps	=	0.5	0.9	1.7
Discharge, Cum/Hr	=	1.9	3.1	6.3
Kw required	=	0.082	0.133	0.271
HP required	=	0.5	0.5	0.5
Number of Pumps	=	2	2	2
TIGER BIO FILTER				
DESIGN STATEMENT-TBF1- 50 KL	.D			
Number of pumping hours	=	16	Hrs	
Number of BMF tanks provided	=	1	Nos	
Design flow to each tank	=	50.00	Cum/day	
	=	3.13	Cum/ Hr for 16	Hr
	=	0.87	lps	
Inlet BOD	=	250.00	mg/l	
Inlet TSS	=	400.00	mg/l	
BOD load applied	=	12.5	kg/day	
BOD uptake rate	=	0.1	Kg of BOD / Kg of worms	(0.5 - 1.0)
Worms required	=	125	Kg worms	
Sewage application rate	=	1.85	Cum/Sqm/day	(1 - 2 Cum/Sqm/day)
Area required	=	27.03	Sqm	
Area Provided	=	28	Sqm	
Area of each crate	=	0.4	Sqm	
Number of crates	=	70	Nos	
say	=	72	Nos	
Crate in longitudinal direction	=	18	Nos	
Crate in travers direction	=	4	Nos	
crates provided	=	72	Nos	OK
Width provided	=	4.00	m	
Length required	=	11.00	m	
Depth provided	=	1.2	m	
TERTIARY TREATMENT UNIT				
Design Considerations				
Design flow	=	0.05	MLD	
	=	50.00	Cum/Day	
Peak flow factor	=	3.00		

5.1	FILTER FEED TANK				
J. 1	Number of FFT provided	=	1	Nos	
	Number of operating hours	=	16	Hrs	
	Design flow	=	50.00	Cum/Day	
	200igii ii0ii	=	3.13	Cum/Hr	
		=	0.00087	Cum/Sec	
	Hydraulic Retention time	=	60	min	
	Volume required	=	3.13	Cum	
	Depth	=	1.00	m	
	Civil Tanks				
	Area	=	3.13	Sqm	
	Length/Width required	=	1.77	m '	
	Length/Width provided	=	2.00	m	
	Freeboard provided	=	0.50	m	
	Volume Provided		4.00	Cum	
	DESIGN STATEMENT-TTU E&M				
	DESIGN STATEMENT-110 E&M				
	Design Considerations				
	Design flow	=	0.05	MLD	
		=	50.00	Cum/Day	
	Peak flow factor	=	3.00		
	Pumping machinery				
	Friction factor for Fittings in Pressure				
	Mains				
	Elbow 90 degrees	=	5		
	Friction Factor for each	=	1		
	Friction factor for all	=	5		
	Elbow 45 degrees	=	0		
	Friction Factor for each	=	0.75		
	Friction factor for all	=	0		
	Elbow 22 degrees	=	0		
	Friction Factor for each	=	0.5		
	Friction factor for all	=	0		
	Tee 90 degrees	=	0		
	Friction Factor for each Friction factor for all	=	1.5		
		=	0 5		
	Tee in straight pipe Friction Factor for each	=	0.3		
	Friction factor for all	=	0.5 1.5		
	Gate valve open	=	1.5		
	Friction Factor for each	=	0.4		
	Friction factor for all	=	0.4		
	Swing check	_	1		
	Friction Factor for each	_	2.5		
	Friction factor for all	_	2.5		
	Total friction factor	=	9.4		
	Stage		low	ave	
	•		-		

peak

	Average flow, cum / day	=		50.00	
	Proportion	=	0.6	1	2
	Design flow, cum / day	=	30	50	100
	Hazen Williams C	=	140	140	140
	Desired velocity, m/s	=	0.8	1.0	1.5
	Number of Pumping hours	=	16.0	16.0	16.0
	Area needed, sqm	=	0.0007	0.0009	0.0012
	Dia needed, m	=	0.029	0.033	0.038
	Dia needed, mm	=	29	33	38
	Dia provided, mm (User)	=	63	63	63
	Radius, m	=	0.032	0.032	0.032
	Radius power 0.63	=	0.113	0.113	0.113
	S power 0.54	=	0.060	0.074	0.112
	S	=	0.005	0.008	0.017
	Slope 1 in	=	185.9	123.0	58.0
	length, m	=	20	20	20
	Friction in pipeline, m	=	0.1	0.2	0.3
	Velocity head, m	=	0.033	0.051	0.115
	Frction factor in fittings	=	9.4	9.4	9.4
	Friction in fittings, m	=	0.3	0.5	1.1
	Static lift, m	=	8.0	8.0	8.0
	Total head, m	=	8.3	8.5	9.1
	Efficiency of pumpset	=	0.8	0.8	0.8
	Discharge, lps	=	0.5	0.9	1.7
	Discharge, Cum/Hr	=	1.9	3.1	6.3
	Kw required	=	0.140	0.229	0.464
	HP provided	=	0.5	0.5	1.0
	Number of Pumps	=	2	2	2
	rumber er rumpe		_	_	_
5.2	PRESSURE SAND FILTER				
	Number of unit provided	=	1	Nos.	
	Designed @ 16 hrs working for flow				
	of	=	3.13	m3/h	
	Loading rate	=	12.00	m3/m2/h	
	Area of DMF	=	0.26	m2	
	Dia of DMF	=	0.58	m	
	Provided	=	0.600	m	
	Backwash water				
	Backwash velocity	=	15.00	m/hr	
	backwash flowrate	=	4.07	m3/h	
	Backwash volume for 20 mins	=	1.36	m3	
5.3	ACTIVATED CARBON FILTER				
	Number of unit provided	=	1	Nos.	
	Designed @ 16 hrs working for flow		<del>-</del>	- <del></del>	
	of	=	3.13	m3/h	
	Loading rate	=	12.00	m3/m2/h	
	Area of ACF	=	0.26	m2	
	Dia of ACF	=	0.58	m	
	B 11 1		0.000		

0.600

m

Provided

	Backwash water			
	Backwash velocity	=	15.00	m/hr
	backwash flowrate	=	4.07	m3/h
	Backwash volume for 20 mins	=	1.36	m3
5.4	CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM			
	Average Flow	=	3.13	m3/hr
	Design Chlorine Dosage (Max)	=	3	mg/l
	Concentration of Chlorine in commercially available NaOCI	=	10%	
	Design NaOCI Dosage	=	30	mg/l
	Operating hours	=	16.0	hr
	Quantity of NaOCI required	=	3.125 X 30 X	16 / 1000
		=	1.50	Kg/day
	Design Strength of NaOCI Solution		100%	
	Volume of NaOCI Solution	=	1.5 / (1 X 1	1000)
		_	0.010	m3
	No. of Dosing Tanks provided	=	1	Nos.
	Volume of each Dosing Tank	=	0.01 / 1	
		=	0.01	m3
		=	100	Litres
	No. of Working NaOCI Dosing Pump provided	=	1	No.
	Capacity of each NaOCI Dosing Pump required	=	Total Volume of Na (No. of Dosing 0.01 / (1 X 16)	
		=	0.001	m3/hr
		=	1.00	LPH
	Capacity of each NaOCI Dosing Pump provided	_	1.00	LPH
	No. of Standby NaOCI Dosing Pump provided	=	1	No.

# SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 50 KLD CAPACITY

S I.	Unit name	N o	Leng Widt			Height		So	oling	P¢	cc	Ra	ıft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	CIIK	thi.		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	2.0	0.5	0.1	1.0	1.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	2.0	0.5	0.5	1.1	1.6	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
3	Raw Sewage Sump	1	2.0	2.0	1.1	1.1	2.2	0.2	0.3	0.1	0.1	0.2	0.2	0.1		0.1	100
4	TBF Bed 50 KLD	1	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	2.0	2.0	1.0	0.5	1.5	0.2	0.3	0.1	0.1	0.2	0.2	0.1		0.1	100
6	Filter Platform	1	1.7	2.3				0.2	0.3	0.1	0.1	0.2	0.1				60

### Assumptions

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound strata		soil	Muru	Soft roc	har d	Tota
0.0 to 1.5 m	=	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100
		%	%	%	%	%

# TIGER BIO FILTER OF 50 KLD CAPACITY BILL OF QUANTITIES

Sr.	Item Description	Qty	Unit	Rate	Amount (Rs.)
No.	item bescription	Qty	Oilit	Nate	Amount (NS.)
1					
	Excavation for foundation / pipe trenches in earth, soils of all types, sand, gravel and				
	soft murum, including removing the				
	excavated material upto a distance of 50				
	metres and lifts as below, stacking and				
	spreading as directed, normal dewatering,				
	preparing the bed for foundation and excluding backfilling, etc.				
	complete. (Bd-A-1/259)				
	0.0 to 1.5 m	37.70	Cum	150.00	5,655.00
	1.5 to 3.0 m	13.18	t	164.00	2,161.60
	3.0 to 4.5 m	0.00	t t	178.00	0.00
	4.5 to 6.0 m	0.00	t t	192.00	0.00
	MJP/ SSR/ 2021-22 / Section E /				
	Excavation Item No.1/ Page no. 42				
2					
	Excavation for foundation / pipe trenches in				
	hard murum and boulders, W.B.M. road				
	including removing the excavated material upto a distance of 50 M beyond the area				
	and lifts as below, stacking and spreading				
	as directed by Engineer-in-charge, normal				
	dewatering, preparing the bed for				
	foundation and excluding backfilling, etc.			8.00	
	complete. (Bd-A-3/259) 0.0 to 1.5 m	37.70	Cum	192.00	7,238.40
	1.5 to 3.0 m	13.18	+	206.00	2,715.10
	3.0 to 4.5 m	0.00	t t	220.00	0.00
	4.5 to 6.0 m		Cum	234.00	0.00
	MJP/ SSR/ 2021-22/ Section E/ Excavation	0.00	Juin	201.00	0.00
	Item No.3, Page no. 42				
	15.5, 15.5, 15.1				
3					
	Excavation for foundation / pipe trenches in				
	soft rock and old cement and lime masonry				
	foundation asphalt road including removing				
	the excavated material upto a distance of 50 M beyond the area and lifts as below,				
	stacking as directed by Engineer-in-charge,				
	normal dewatering, preparing the bed for				
	foundation and excluding backfilling, etc.				
	complete. (Bd-A-4/259)				<b>.</b>
	0.0 to 1.5 m	37.70	t t	572.00	21,564.40
	1.5 to 3.0 m	13.18	t t	597.00	7,868.50
	3.0 to 4.5 m	0.00	t t	622.00	0.00
	4.5 to 6.0 m	0.00	Cum	647.00	0.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.5, Page no. 42				
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below, stacking as directed by Engineer-incharge, normal dewatering, excluding backfilling, etc. complete by all means. (Bd-A-6/259)				
	0.0 to 1.5 m	37.70	Cum	1,017.00	38,340.90
	1.5 to 3.0 m	13.18	Cum	1,042.00	13,733.60
	3.0 to 4.5 m	0.00	Cum	1,067.00	0.00
	4.5 to 6.0 m	0.00	Cum	1,092.00	0.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43				
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)  MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.18, Page no. 46	31.27	Cum	1,175.00	36,742.30
6	Providing and laying in situ Cement Concrete M-15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38  MJP/ SSR/ 2021-22 / SECTION - G:	8.98	Cum	5,640.00	50,647.20
	PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.1, Page no.49				
Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
7	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	10.11	Cum	7,448.00	75,299.30
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE/ Item No.2, Page no. 49				
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in-charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)  For Beams / Braces / Lintels In RCC M-300	0.00	Cum	8,624.00	0.00
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in-charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	1.34	Cum	9,247.00	12,391.00
	Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300	-		2,	,
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in-charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)  Chajjas / Parapets / Curtain Walls /Partition Walls / Pardies In RCC M-300	6.26	Cum	9,218.00	57,704.70
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.6 / Page no. 51				

	Qty	Unit	Rate	Amount (Rs.)
Providing and fixing in position steel bar reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)  c) Corrosion Resistant Steel (Fe 500)	1.51	MT	70,658.00	1,06,693.60
PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.8 / Page no. 52				
Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U-1/537)  MJP/ SSR/ 2021-22 / SECTION - F: IRON AND STRUCTURAL STEEL WORK Item No 1 / Page no 47	4.54	Sqm	1,895.00	8,603.30
Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams,				
truss members and like as per detailed designs and drawings or as directed by Engineer-in-charge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C-3/275)	0.75	MT	71,286.00	53,253.50
MJP/ SSR/ 2021-22 / SECTION - F :: IRON AND STRUCTURAL STEEL WORK Item No.3, Page no. 47				
Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts, lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sg.m.).	75.40	Sam	777 00	58,585.80
	piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306) c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.8 / Page no. 52  Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U-1/537)  MJP/ SSR/ 2021-22 / SECTION - F: IRON AND STRUCTURAL STEEL WORK Item No.1 / Page no. 47  Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-in-charge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C-3/275)  MJP/ SSR/ 2021-22 / SECTION - F:: IRON AND STRUCTURAL STEEL WORK Item No.3, Page no. 47  Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per	piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)  c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.8 / Page no. 52  Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U-1/537)  MJP/ SSR/ 2021-22 / SECTION - F: IRON AND STRUCTURAL STEEL WORK Item No.1 / Page no. 47  Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-in-charge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C-3/275)  MJP/ SSR/ 2021-22 / SECTION - F:: IRON AND STRUCTURAL STEEL WORK Item No.3, Page no. 47  Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B. W. G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5)	piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)  c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.8 / Page no. 52  Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U-1/537)  MJP/ SSR/ 2021-22 / SECTION - F: IRON AND STRUCTURAL STEEL WORK Item No.1 / Page no. 47  Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-in-charge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C-3/275)  MJP/ SSR/ 2021-22 / SECTION - F:: IRON AND STRUCTURAL STEEL WORK Item No.3, Page no. 47  Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5	piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306) c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.8 / Page no. 52  Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U-1/537)  MJP/ SSR/ 2021-22 / SECTION - F : IRON AND STRUCTURAL STEEL WORK Item No.1 / Page no. 47  Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-in-charge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C-3/275)  MJP/ SSR/ 2021-22 / SECTION - F :: IRON AND STRUCTURAL STEEL WORK Item No.3, Page no. 47  Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224				
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete	14.87	Cum	6,305.00	93,755.40
	PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by engineer incharge and BDG- 2 and 5 Item No.893, Page no. 190				
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.	81.65	Sqm	257.00	20,984.10
	PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference No. Bd. L.2 Page No. 368 Item No.950, Page no. 201				
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding and fourteen days curing complete.	47.50	Sqm	529.00	25,127.50
	PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201				
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.	47.50	Sqm	10.00	475.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411 Item No.1091, Page no. 218				
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.	47.50	Sqm	8.00	380.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	PWD / SSR 2020-21 / Colouring SSR Item				
	No. 36.04 Reference No. Bd. P.2 Page No. 412 Item No.1092, Page no. 218				
20	Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)	40.00	HP/ Hr.	77.00	3,080.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.14, Page no.45				
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.	130.87	Cum	84.00	10,993.10
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.15, Page no. 45	100.07	Outil	04.00	10,000.10
22	Transportation as per STATEMENT VI Including loading, unloading and stacking	101.54	Cum	604.45	61,375.90
	Earth (4.8 Cum) lead 15 Km				
	Electromechanical Items				
23	Screen (Manual) of size 1.6 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	0.80	Sqm	35,000.00	28,000.00
24	Grit pump				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.6 m length x0.5 m width of SS304 MOC				
	1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
25	Raw Sewage Pumps				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7				
	1 HP (Up to 9000 LPH)	2.00	Nos	68,654.00	1,37,308.00
26	TTU Feed pumps				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7				
	1 HP (Up to 9000 LPH)	2.00	Nos	68,654.00	1,37,308.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.  Dia 0.6 m x 2 m minimum height	1.00	Nos	33,000.00	33,000.00
28	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.	1.00	Noc	22 000 00	22 000 00
	Dia 0.6 m x 2 m minimum height	1.00	Nos	33,000.00	33,000.00

Item Description	Qty	Unit	Rate	Amount (Rs.)
NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt				
	100.00	l tre	8.00	800.00
				30,000.00
Dosing Fump	2.00	1103	15,000.00	30,000.00
Control Panel				
Designing, Supplying, Installing, commissioning & testing of PLC Panel. Including PLC with CPU & Power supply unit, power supplyb cables interfacing cards, interfacing cables, wireless modules with 25% extra quantity of all accessories.	1.00	No	32,272.00	32,272.00
MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION] Item no. 1.4 Page no. 69				
Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.				
> 7.5 HP & Up to 12.5 HP	6.00	nos	7,150.00	42,900.00
MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR AND PROTECTION] Item no. LG 3 Page no. 27				
Main nawar aunnly anhla				
3 core PVC insulated, PVC sheathed copper conductor flat submersible cable				
Supplying and erecting, Flat flexible submersible cable with, Copper Conductor, PVC insulated, and PVC sheathed.				
3 core 16 sq mm	25.00	m	549.00	13,725.00
	Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency 50Hz Mixing Tank of 100 Ltrs capacity Dosing Pump  Control Panel  Designing, Supplying, Installing, commissioning & testing of PLC Panel. Including PLC with CPU & Power supply unit, power supplyb cables interfacing cards, interfacing cables, wireless modules with 25% extra quantity of all accessories.  MJP/ MECH/ ELECT / SSR/ 2021-22/SECTION 19 - SA [ SCADA & AUTOMATION] Item no. 1.4 Page no. 69  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.  > 7.5 HP & Up to 12.5 HP  MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR AND PROTECTION] Item no. LG 3 Page no. 27  Main power supply cable 3 core PVC insulated, PVC sheathed copper conductor flat submersible cable Supplying and erecting, Flat flexible submersible cable with, Copper Conductor, PVC insulated, and PVC sheathed.	Pump Diaphragm Type / peristaltic type / Solenoid  Max Flow Rate Upto 10LPH Power Source Electric Phase Single  Material PP / PTFE(Teflon) Voltage 230 Volt Frequency 50Hz  Mixing Tank of 100 Ltrs capacity  Dosing Pump  Control Panel  Designing, Supplying, Installing, commissioning & testing of PLC Panel. Including PLC with CPU & Power supply unit, power supplyby cables interfacing cards, interfacing cables, wireless modules with 25% extra quantity of all accessories.  MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION] Item no. 1.4 Page no. 69  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.  > 7.5 HP & Up to 12.5 HP  MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR AND PROTECTION] Item no. LG 3 Page no. 27  Main power supply cable 3 core PVC insulated, PVC sheathed copper conductor flat submersible cable Supplying and erecting, Flat flexible submersible cable with, Copper Conductor, PVC insulated, and PVC sheathed.	Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency 50Hz Mixing Tank of 100 Ltrs capacity Dosing Pump  Designing, Supplying, Installing, commissioning & testing of PLC Panel. Including PLC with CPU & Power supply unit, power supplyb cables interfacing cards, interfacing cards, interfacing cards, extra quantity of all accessories with 25% extra quantity of all accessories With 25% extra quantity of all accessories SECTION 19 - SA [ SCADA & AUTOMATION] Item no. 1.4 Page no. 69  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.  > 7.5 HP & Up to 12.5 HP  MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR AND PROTECTION] Item no. LG 3 Page no. 27  Main power supply cable 3 core PVC insulated, PVC sheathed copper conductor flat submersible cable Supplying and erecting, Flat flexible submersible cable with, Copper Conductor, PVC insulated, and PVC sheathed.	Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency 50Hz Mixing Tank of 100 Ltrs capacity 100.00 Ltrs 8.00 Dosing Pump 2.00 Nos 15,000.00 Control Panel Designing, Supplying, Installing, commissioning & testing of PLC Panel. Including PLC with CPU & Power supply unit, power supply cables interfacing cards, interfacing cards, interfacing cables, wireless modules with 25% extra quantity of all accessories. 1.00 No 32,272.00 MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION] Item no. 1.4 Page no. 69  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.  > 7.5 HP & Up to 12.5 HP 6.00 nos 7,150.00 MJP / MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR AND PROTECTION] Item no. LG 3 Page no. 27  Main power supply cable 3 core PVC insulated, PVC sheathed copper conductor flat submersible cable with, Copper Conductor, PVC insulated, and PVC sheathed.

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
33	Power cables				
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable				
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved manner.				
	4 Core 6 sq mm	50.00	m	137.00	6,850.00
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no. CB 6 Page no. 35				
34	Control Cables				
	Copper conductor PVC insulated, Unarmoured control cable				
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.				
	4 core 2.5 sq mm	50.00	m	137.00	6,850.00
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36				

	Item Description	Qty	11!1		
35		-4-9	Unit	Rate	Amount (Rs.)
	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges, inspection charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed shed duly protected from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit type to be jointed with cement solvent).				
	1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.  2) One coupler and required cement solvent shall be provided with each full length pipe cost of which is included in rates below.				
	MJP/ SSR/ 2021-22 / SECTION - I(II) P.V.C. PIPES, Page no.77				
1	Raw Sewage pump to TBF Distribution				
а	Main header				
	63 mm.	15.00	m	149.00	2,235.00
	PVC Specials- 10%				223.50
b	Distribution				
1	63 mm.	10.00	m	149.00	1,490.00
	PVC Specials- 10%				149.00
1	TBF collection to FFT (gravity) Main header				
	63 mm.	30.00	m	149.00	4,470.00
	PVC Specials- 10%	20.00			447.00
- la					
1	collection tributory	F 00		440.00	745.00
	63 mm.	5.00	m	149.00	745.00
	PVC Specials- 10%				74.50
3	TTU Plumbing				
1	63 mm.	20.00	m	149.00	2,980.00
	PVC Specials- 10%				298.00
	TBF distribution				
	63 mm.	5.00	m	149.00	745.00
	PVC Specials- 10%				74.50

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
36	Labour				
	Plumber	4.00	days	641.00	2,564.00
	Helper	4.00	days	579.00	2,316.00
	MJP/ SSR/ 2021-22 / SECTION - B LABOUR & MACHINERY , Page no. 14				
37					
	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.  Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump				
	65 mm.	2.00	Nos	4,966.00	9,932.00
	Filter Feed Pump		1100	1,000.00	0,002.00
	65 mm.	2.00	Nos	4,966.00	9,932.00
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132			1,000100	5,552.55
38					
	Providing and supplying ISI mark CI D/F reflux valves (non-return valves ) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)				
	Without by pass arrangement -PN -1				
	Raw Sewage pump				
	65 mm. Filter Feed Pump	2.00	Nos	3,885.00	7,770.00
	65 mm.	2.00	Nos	3,885.00	7,770.00
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 131				
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as				
	directed etc. complete.	72.00	Nos	4,750.00	3,42,000.00
	Market rate				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
40	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	6.85	Cum	1,730.00	11,850.50
	MJP/ SSR/ 2021-22 / SECTION- A MATERIALS Item No. 39 Page no. 13				
41	Trasnsportation Godhara to Pune distance by Road 660 Km.	6.85	Cum	11,031.37	75,564.90
	MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no. 23				
- 10					
42	Stone Aggregate 20 mm	6.85	Cum	900.00	6,165.00
	MJP/ SSR/ 2021-22 / SECTION- A MATERIALS Item No. 49,50,51 Page no. 13				
43	Transportation as per STATEMENT VI Including loading, unloading and stacking				
	Manure or sludge (5.52 Cum) lead 25 Km	26.45	Cum	747.48	19,770.90
	MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no. 23				
			NET	TOTAL Rs.	18,55,603.00

# MEASUREMENT SHEET - SCREEN CHAMBER, GRIT CHAMBER AND RAW SEWAGE SUMP

Sr.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
No.	Screen And Grit chamber		. ,	` ,	` '		
1	Excavation				2.20		
A	0.0 to 1.5 m	1	5.20	2.70	1.5	21.06	Cum
	soil	+ '+	5.20	2.70	1.0	5.27	Cum
	Murum	+				5.27	Cum
	Soft rock	+ +				5.27	Cum
	hard rock	+ +				5.27	Cum
	Hara rook	+				0.27	Cum
В	1.5 to 3.0 m	1	5.2	2.70	0.7	9.83	Cum
	soil	-			• • • • • • • • • • • • • • • • • • • •	2.46	Cum
	Murum					2.46	Cum
	Soft rock					2.46	Cum
	hard rock					2.46	Cum
С	3.0 to 4.5 m	1	4.2	2.20	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	4.2	2.20	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	Screen	1	3.20	1.20	0.30	1.16	Cum
	Grit	1	3.20	0.50	0.30	0.48	Cum
	extra for grit chamber	1	0.00	0.60	0.30		Cum
	orale for give oralines.		0.00	Total for gri		0.48	Cum
3	PCC M20		0.00	4.00	0.40		0
	Screen	1	2.80	1.00	0.10	0.28	Cum
	Grit	1	2.80	0.50	0.10	0.14	Cum
	latera el elege	1	0.00	0.40	0.20	0	Cum
	Internal slope	1	Area	0.09	0.50	0.05	Cum
	Internal slope	1	Area	0.05	0.50	0.03	Cum
				Total for gri	l	0.22	Cum
4	Raft M30						
	Screen	1	2.60	0.90	0.15	0.36	Cum
	Grit	1	2.60	0.50	0.15	0.2	Cum
		1	0.00	0.30	0.15	0	Cum
				Total for gri	t	0.2	Cum
5	RCC Wall						
	Screen						
	Long Wall	2	2.20	0.10	1.30	0.58	Cum

# MEASUREMENT SHEET - SCREEN CHAMBER, GRIT CHAMBER AND RAW SEWAGE SUMP

Sr.	Itom Deceription	Nes	1 (m)	D (m)	∐ /m\	Quantity	Unit
No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Short Wall	2	0.70	0.10	1.30	0.19	Cum
				Total for so	reen	0.77	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	0.00	0.10	1.85	0	Cum
	Short Wall	2	0.50	0.10	1.85	0.19	Cum
				Total for gr	it	0.19	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	80	Cum	1.52	0.13	MT
7	Fabrication work in Frame and Grating for Access						
-	Screen	1	2.20	0.70		1.54	Sqm
-	Grit	1 1	2.20	0.60		1.34	
	GIII	1	2.20	0.00	Total	2.86	Sqm Sqm
					Total	2.00	Sqiii
	Removing excess exacavated						
8	material out of site						
	Screen chamber	1	2.20	0.70	1.10	1.7	Cum
	Grit Chamber	1	2.20	0.50	1.65	1.82	Cum
	soling, PCC, Raft volume					2.62	Cum
	Total Volume					6.14	Cum
	bulkage @ 40%					8.6	Cum
9	Refilling and compaction						
	Total Excavation					30.89	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					6.14	Cum
	Refilling and compaction volume					24.75	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				2.80		
Α	0.0 to 1.5 m	1	5.9	5.90	1.5	52.22	Cum
	soil					13.06	Cum
	Murum					13.06	Cum
	Soft rock					13.06	Cum
	hard rock					13.06	Cum
В	1.5 to 3.0 m	1	4.90	4.90	1.3	31.22	Cum
	soil					7.81	Cum
	Murum					7.81	Cum
	Soft rock					7.81	Cum
	hard rock					7.81	Cum
С	3.0 to 4.5 m	1	4.90	4.90	0	0	Cum

# MEASUREMENT SHEET - SCREEN CHAMBER, GRIT CHAMBER AND RAW SEWAGE SUMP

Sr.							
No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	3.90	3.90	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling		0.00	0.00	0.00		
	RSS	1	3.30	3.30	0.30	3.27	Cum
3	PCC M20						
3	RSS	1	2.00	2.00	0.40	0.05	Cure
	KSS	1	2.90	2.90	0.10	0.85	Cum
4	Raft M30						
	RSS	1	2.70	2.70	0.20	1.46	Cum
	1.00	'	2.10	2.70	0.20	1.40	Cum
5	RCC Wall						
	Long Wall	2	2.30	0.15	2.40	1.66	Cum
	Short Wall	2	2.00	0.15	2.40	1.44	Cum
				3110	Total	3.1	Cum
6	Beams						
	Beam 1	0	2.00	0.2	0.3	0	Cum
	Beam 2	0	2.00	0.2	0.3	0	Cum
					Total	0	Cum
7	Slab	1	2.30	2.30	0.15	0.8	Cum
	Deduction for manhole	-1	1.20	0.70	0.15	-0.13	Cum
					Total	0.67	Cum
	0	1					
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C	400		<b>5</b> 00	0.50	
		um	100	Cum	5.23	0.53	MT
	Fabrication work in Frame and						
9	Grating for Access						
	RSS	1	1.20	0.70		0.84	Sqm
	1.00	1	1.20	0.70		0.04	Oqiii
	Removing excess exacavated						
10	material out of site						
	RSS	1	2.30	2.30	2.20	11.64	Cum
	soling, PCC, Raft volume			2.00	2.20	5.58	Cum
	Total Volume					17.22	Cum
	bulkage @ 40%					24.11	Cum
	5						
11	Refilling and compaction						

## MEASUREMENT SHEET - SCREEN CHAMBER, GRIT CHAMBER AND RAW SEWAGE SUMP

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					83.44	Cum
	Deduction for tank volume, soling, PCC, Raft					17.22	Cum
	Refilling and compaction volume					66.22	Cum
12	Dewatering						
	5 Days x 4 hours/day	days	5	hours / day	4	20	Hrs

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
2	Soling						
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
	TBF	1	12.06	5.06	0.10	6.11	Cum
A	Doff MOO						
4	Raft M30	4	44.00	4.00	0.10	r 77	Cura
	TBF	1	11.86	4.86	0.10	5.77	Cum
5	Brick Wall						
5	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
	Orace Support Wall		11.00	0.20	Total for	T 14.87	Cum
					1 otal 101	1 14.07	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	
	Short Wall	2	4.00		1.20	9.6	Sqm
					Total	81.65	Sqm
	External						
	Long Wall	2	11.46		1.20	27.51	Sqm
	Short Wall	2	4.46		1.20	10.71	Sqm
	Wall Top	1	30.92	0.3		9.28	Sqm
					Total	47.50	Sqm
	Fortonia I code!					47.50	
7	External-white-wash	1				47.50	Sqm
8	External colour wash	1				47 FO	Sam
0	External-colour-wash					47.50	Sqm
9	Stool HCDM / CDC @ V-/C	Kg/C	00	Cure	F 77	0.05	N 4∓
	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	5.77	0.35	MT
10	Removing excess exacavated						
-	material out of site					00.00	
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m x		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				2.10		
Α	0.0 to 1.5 m	1	4.9	4.90	1.5	36.02	Cum
	soil					9.01	Cum
	Murum					9.01	Cum
	Soft rock					9.01	Cum
	hard rock					9.01	Cum
В	1.5 to 3.0 m	1	4.40	4.40	0.6	11.62	Cum
	soil					2.91	Cum
	Murum					2.91	Cum
	Soft rock					2.91	Cum
	hard rock					2.91	Cum
С	3.0 to 4.5 m	1	3.90	3.90	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	3.90	3.90	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	FFT	1	3.30	3.30	0.30	3.27	Cum
3	PCC M20						
	FFT	1	2.90	2.90	0.10	0.85	Cum
4	Raft M30						
	FFT	1	2.70	2.70	0.20	1.46	Cum
_							
5	RCC Wall						
	Long Wall	2	2.30	0.15	1.70	1.18	Cum
	Short Wall	2	2.00	0.15	1.70	1.02	Cum
					Total	2.2	Cum
_	Dagge						
6	Beams		0.00	2.2	2.0	•	
	Beam 1	0	2.00	0.2	0.3	0	Cum
	Beam 2	0	2.00	0.2	0.3	0	Cum
					Total	0	Cum
-	Olak		2.22	2.22	0.45		
7	Slab	1	2.30	2.30	0.15	0.8	Cum
	Deduction for manhole	-	1.20	0.70	0.15	-0.13	Cum
					Total	0.67	Cum

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	4.33	0.44	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	1	1.20	0.70		0.84	Sqm
10	Removing excess exacavated material out of site						
	FFT	1	2.30	2.30	1.50	7.94	Cum
	soling, PCC, Raft volume					5.58	Cum
	Total Volume					13.52	Cum
	bulkage @ 40%					18.93	Cum
11	Refilling and compaction						
	Total Excavation					47.64	Cum
	Deduction for tank volume, soling, PCC, Raft					13.52	Cum
	Refilling and compaction volume					34.12	Cum
12	Dewatering						
	5 Days x 4 hours/day	days	5	hours/day	4	20	Hrs

#### **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	2.9	3.50	0.55	5.59	Cum
	soil					1.4	Cum
	Murum					1.4	Cum
	Soft rock					1.4	Cum
	hard rock					1.4	Cum
2	Soling						
	Filter Platform	1	2.70	3.30	0.30	2.68	Cum
3	PCC M20						
	Filter Platform	1	2.30	2.90	0.10	0.67	Cum
4	Raft M30						
	Filter Platform	1	2.10	2.70	0.15	0.86	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	60	Cum	0.86	0.06	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					3.35	Cum
	Total Volume					3.35	Cum
	bulkage @ 40%					4.69	Cum
7	Refilling and compaction	+					
	Total Excavation					5.59	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					3.35	Cum
	Refilling and compaction volume					2.24	Cum

#### **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.	72				72	Nos
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	72	0.82	0.58	0.2	6.85	Cum
3	Trasnsportation Godhara to					6.85	Cum
4	Stone Aggregate 20 mm	72	0.82	0.58	0.2	6.85	Cum
5	Transportation as per STATEMENT VI Including loading,						
	Manure or sludge (5.52 Cum) lead	72	0.82	0.56	0.8	26.45	Cum

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr. No.	Item Description	Nos.	Unit
1	Screen (Manual) of size 1.6 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.		
		1	No
2	Grit pump		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.6 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
3	Raw Sewage Pumps		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7	2	Nos
	1 HP (Up to 9000 LPH)		1105
4	TTU Feed pumps		
	Supplying Non-clog Submersible Pump suitable for sewsage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7 1 HP (Up to 9000 LPH)	2	Nos
	1111 (Op to 3000 E111)		1403
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 0.6 m x 2 m minimum height	1	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 0.6 m x 2 m minimum height	1	Nos
7	PurAll Tablet Chlorinator + cartridge	0	nos

#### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr. No.	Item Description	Nos.	Unit
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH		
	Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz		
а	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
8	Control Panel		
	Designing, Supplying, Installing, commissioning & testing of PLC Panel.		
	Including PLC with CPU & Power supply unit, power supplyb cables interfacing		
	cards, interfacing cables, wireless modules with 25% extra quantity of all		
	accessories.		
	PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		
	AUTOMATION ] Item no. 1.4 Page no. 69		
9	Supplying and areating Fully Automatic Star Dalta starter to apprate against again		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over		
	load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	officeted to supply, etc complete. Starter with original sheet steer encloser.		
	> 7.5 HP & Up to 12.5 HP	6	nos
	1 nos extra starter considered as spare.		1100
)	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
	,		
10	Main power supply cable		
	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	•••		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,		
	PVC insulated, and PVC sheathed.		
	3 core 16 sq mm	25	m
11	Power cables		
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade		
	with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25		
	mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall /		
	on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	50	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		
	CB 6 Page no. 35		
12	Control Cables		
	Copper conductor PVC insulated, Unarmoured control cable		

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

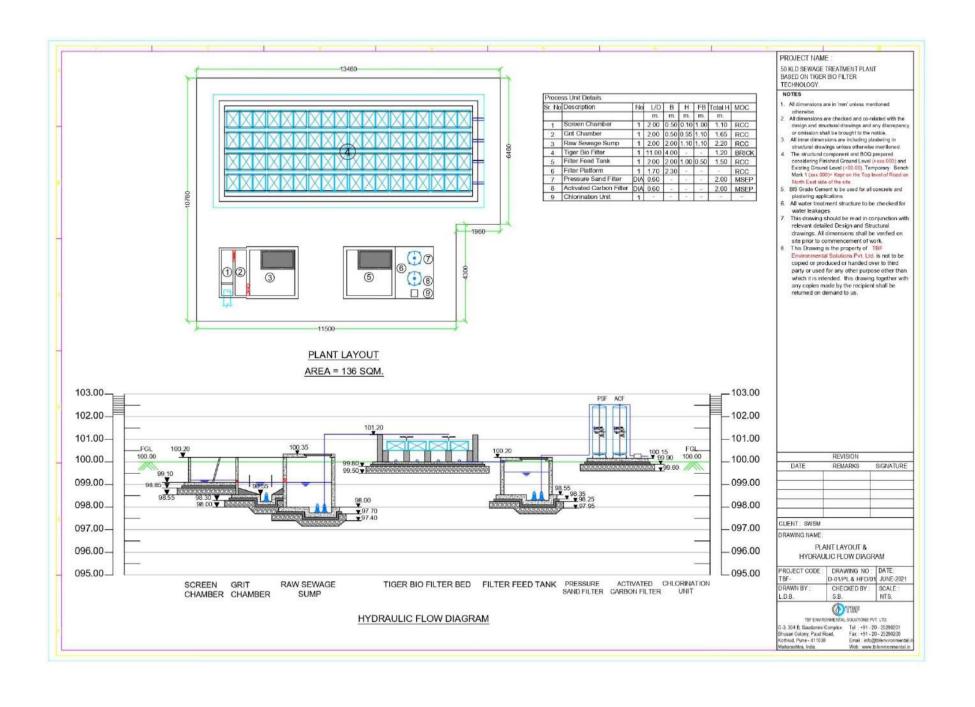
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	50	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

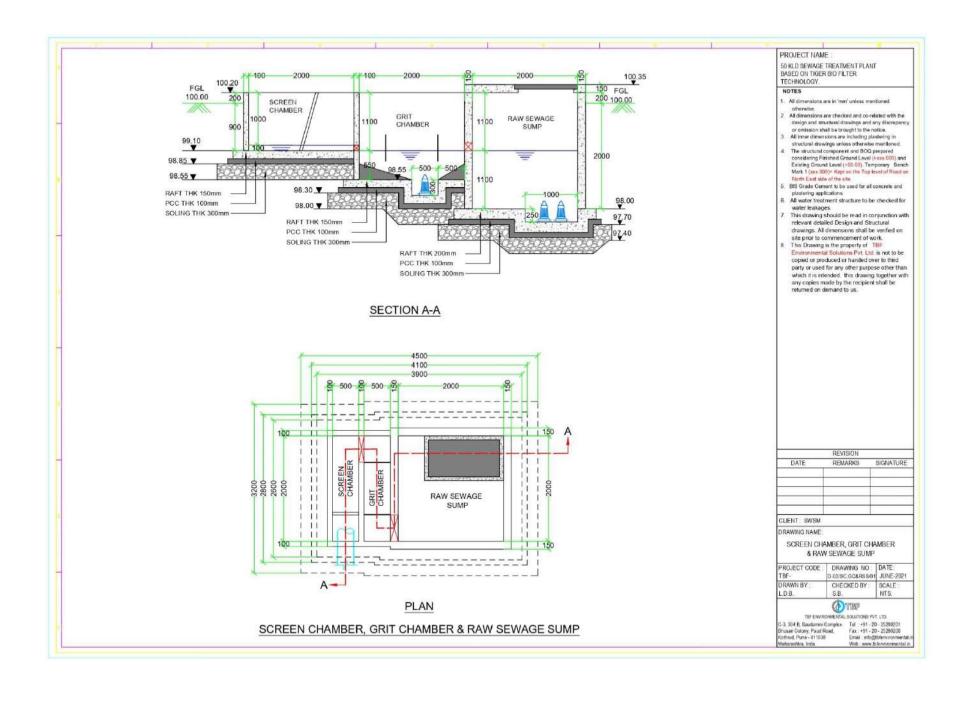
#### **MEASUREMENT SHEET - PLUMBING**

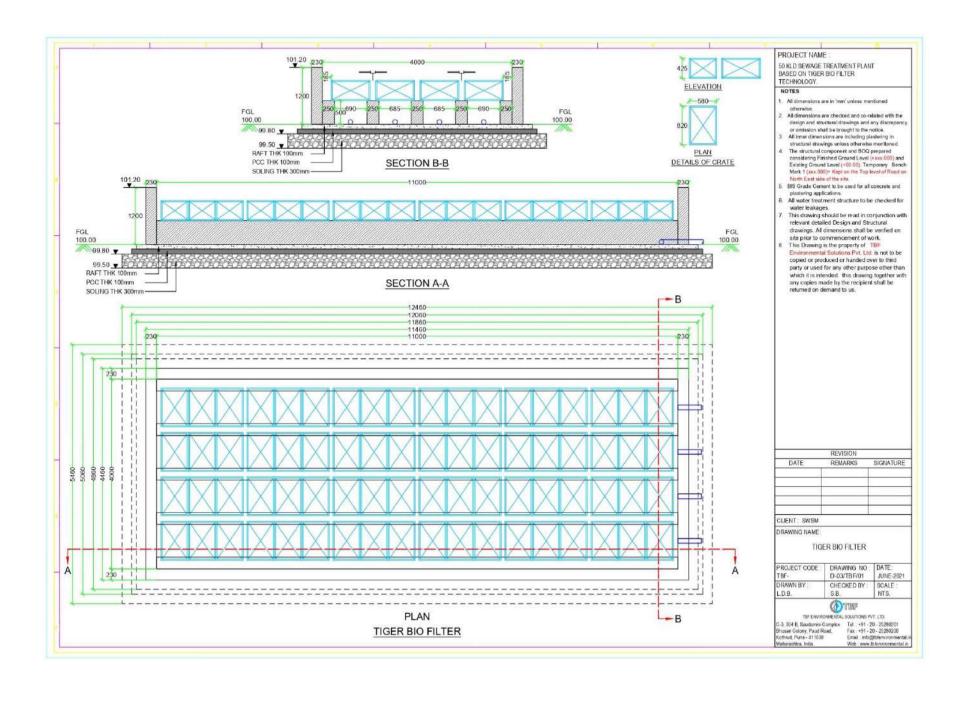
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing and supplying in standard lengths ISI mark		- 11111	- 7773		
	rigid unplasticised PVC pipes suitable for potable					
	water with solvent cement joints including cost of					
	couplers, as per IS specification no. 4985 / 1988					
	excluding GST levied by GOI and GOM in all respect,					
	including transportation, freight charges, inspection					
	charges, loading, unloading, conveyance to the					
	departmental stores and stacking the same in closed					
	shed duly protected from sun rays and rains including					
	cost of jointing material i.e. solvent cement, etc.					
	complete (selffit type to be jointed with cement					
	solvent).					
	1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.					
	<ul><li>2) One coupler and required cement solvent shall</li></ul>					
	be provided with each full length pipe cost of which					
	is included in rates below.					
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES,	<del> </del>				
	Page no.77					
1	Raw Sewage pump to TBF Distribution					
а	Main header	Dia	63			
	63 mm.	1	15		15	m
	PVC Specials- 10%					
b	Distribution					
	63 mm.	1	10		10	m
	PVC Specials- 10%					
2	TBF collection to FFT (gravity)					
a	Main header					
a	63 mm.	1	30		30	m
	PVC Specials- 10%	<u>'</u>	- 50			
	1.10 00001410 1070					
b	collection tributory					
	63 mm.	1	5		5	m
	PVC Specials- 10%					
3	TTU Plumbing	Dia	63			
	63 mm.	1	20		20	m
	PVC Specials- 10%					
	TDE PARK			N		
4	TBF distribution		_	No. of be		
	63 mm.	1	5	1	5	m
	PVC Specials- 10%					
5	Labour	Nos	Dave			
5	Plumber	1	Days 4		4	days
	Helper	1	4		4	days
	i loipol	<del>  '</del>	7			uays
6	Sluice valves	<del> </del>				
	Sidilo Tairoo	<u> </u>	I			

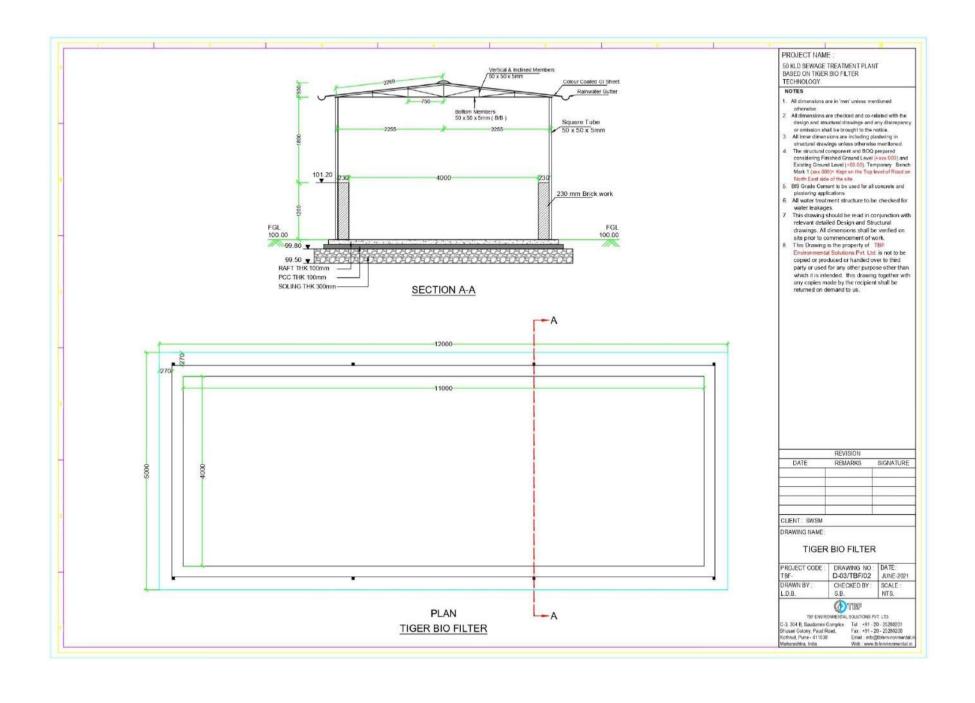
#### **MEASUREMENT SHEET - PLUMBING**

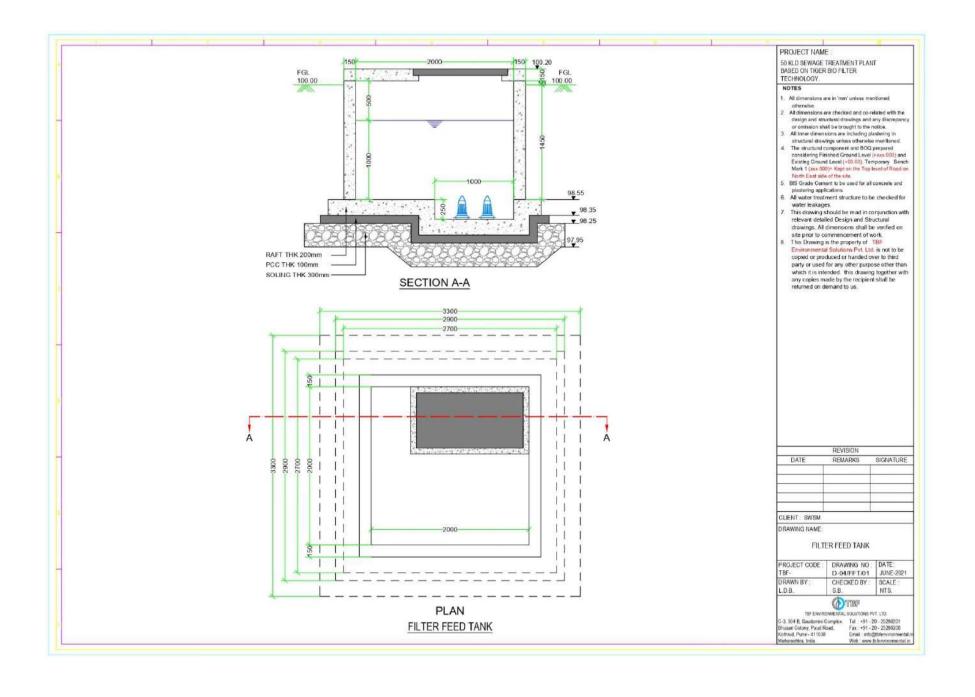
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming					
	for IS- 14846 including worn gear arrangements					
	as per test pressure, stainless steel spindle, caps,					
	including inspection charges, transportation upto					
	departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc.					
	complete.					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES , Page no. 132					
	Raw Sewage pump					
	65 mm.	2			2	Nos
	Filter Feed Pump					
	65 mm.	2			2	Nos
7	Reflux valves (non-return valves )					
	Providing and supplying ISI mark CI D/F reflux					
	valves (non-return valves ) of following dia including railway freight, inspection charges,					
	unloading fram railway wagon, loading into truck,					
	transportation upto departmental stores,					
	unloading, stacking excluding GST levied by GOI					
	& GOM in all respect etc. complete. Reflux					
	valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES , Page no. 131					
	Raw Sewage pump					
	65 mm.	2			2	Nos
	Filter Feed Pump					
	65 mm.	2		•	2	Nos

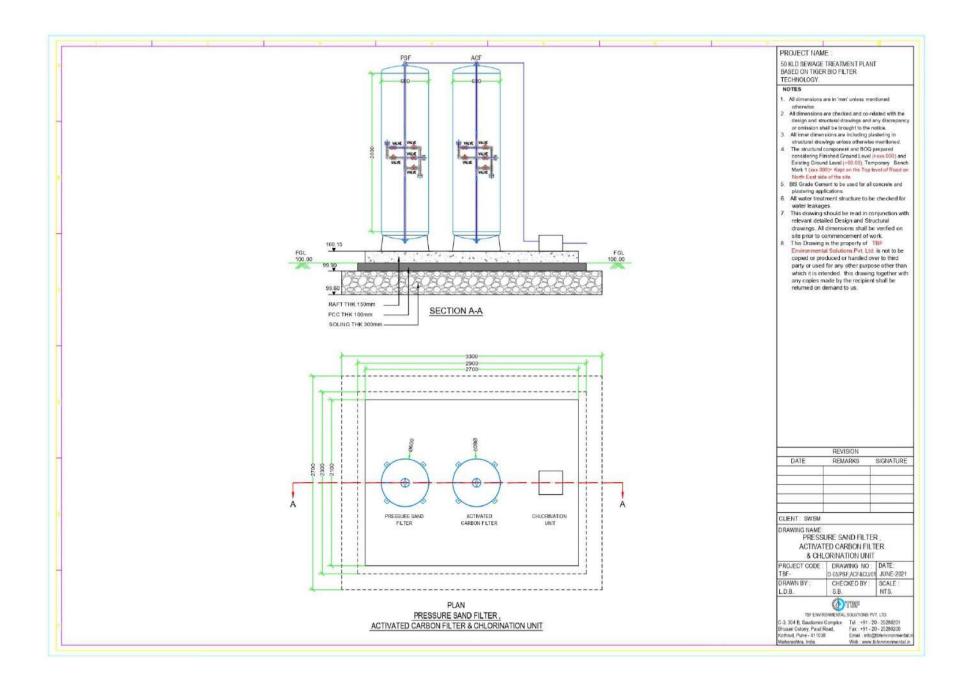












### 100 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 100 KLD CAPACITY

	Design flow	=	<b>100.00</b> 0.100	KLD MLD
	Peak flow factor	=	3.00	
1	SCREEN CHANNELS: MANUA	ΑL		
	No. of Manual Screen	=	1	No.
	Average Flow	=	0.10	MLD
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
	3	=	0.30	MLD
		=	12.50	m <sup>3</sup> /hr
			0.003	m³/sec
		=	0.003	111 / 500
	Average Flow	=	0.10	MLD
		=	4.167	m³/hr
		=	0.001	m³/sec
	Design Flow in each Screen	=	0.003	m³/sec
	Doolgin i lett in oden Geroen		1	No.
			ı	NO.
		=	0.003	m³/sec
	Average Flow in each Screen	=	0.001	m³/sec
			1	No.
				•
		=	0.001	m³/sec
	Maximum Velocity through		4.0	m/sec
	Screen at Peak Flow	=	1.2	m/sec
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	Ocident at Average Flow			
	Clear Area of Opening through Screen for Peak Flow	=	0.003	m³/sec
	through Screen for Peak Flow		1.2	m/sec
			·· <del>-</del>	
		=	0.003	m <sup>2</sup>
	Cloor Aron of Ononing			
	Clear Area of Opening through Screen for Average	=	0.001	m³/sec
	Flow	_	0.001	111 /300
			0.6	m/sec
		=	0.002	$m^2$
		-	3.33 <u>2</u>	•••

Considering maximum Area of Opening through Screen	=	0.003	$m^2$	
Clear Spacing of Bars	=	10	mm	
Thickness of Bars	=	5	mm	
Gross Area of Screen	=	0.003x(10+5)/10		
	=	0.005	$m^2$	
Assuming Depth of Screen Channel	=	150.00	mm	
Gross Width of Screen	=	0.005/0.15		
	=	0.033	m	
No. of Bars	=	(Gross Width of Screen / Center to 0.0333333333333333333((10+5)/1000		Bars) - 1
	=	1.2	Nos.	
Say	=	2	Nos.	
Width of Screen provided	=	(Number of Bars+1) x Clear Spacin Thickness)		s x Bar
	=	(2+1)x10+(2x5)		
	=	40	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel provided	=	0.15	m	
L:B	=	4.00		
Length of Screen Channel provided	=	2.00	m	
Freeboard provided	=	1.00	m	Invert Depo of incomin sewer
Total Depth of Screen Chamber	=	1.15	m	333.
Velocity in Channel at Average Flow	=	Average Flow / Cross Sectional Are	ea of Screen Channe	el
Average Flow	=	0.001/((0.5x0.15)/1000x1000)		
	=	0.013	m/sec	
	>	0.300	m/sec	
Head Loss across Screen		0.0700 (1/22)		
Head Loss across Screen V = Velocity through Screen at	=	0.0728 (V <sup>2</sup> - v <sup>2</sup> )  Peak Flow through Screen Channe	al / Clear Area of O	nenina throug
Peak Flow	=		een	periing triroug
	=	0.667	m/sec	
v = Velocity in approach Channel at Peak Flow	=	Peak Flow through Screen Channe Cha	el / Cross Sectional nnel	Area of Scre
	=	0.6	m/sec	
	=	0.006	m	
Head Loss across Screen at Peak Flow	_			
	_	1.333	m/sec	

	Head Loss across screen at			
	50% Clogged Condition at Peak Flow	=	0.103	m
		>	0.300	m/sec
2	CONVENTIONAL GRIT CHAM	BER: N	IANUAL	
	No. of Grit Chamber	=	1	
	Average Flow	=	0.10	MLD
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
	Peak Flow	=	0.30	MLD
		=	300	m³/day
		=	13	m³/hr
		=	0.003	m³/sec
	Design Flow to each Grit	=	300/1	
	Chamber	_		m <sup>3</sup> /do.,
		=	300	m³/day
		=	13	m³/hr
		=	0.003	m <sup>3</sup> /sec
	According to CPHEEO Manual			
	Particle Size	=	0.15	mm
	Specific Gravity	=	2.65	
	Surface Overflow Rate for 100% removal efficiency in an ideal Grit Chamber	=	Settling Velocity of the minim	um size of Particles to be removed
		=	1.5	m/s
		=	1296	m³/m²/day
	Considering Efficiency of removal of desired Particles, η = 75%	=	75%	
	and Measure of Settling Basin Performance,	=	0.125	
	n = 1/8 for very good performance			
	Design Overflow Rate	=	857	m³/m²/day
	Design Overflow Rate  Surface Overflow Rate for 0.15 mm dia. Particle Size	=	857 1555	m <sup>3</sup> /m <sup>2</sup> /day m <sup>3</sup> /m <sup>2</sup> /day
	Design Overflow Rate Surface Overflow Rate for			
	Design Overflow Rate  Surface Overflow Rate for 0.15 mm dia. Particle Size with Specific Gravity $S_s > 2.65$			
	Design Overflow Rate  Surface Overflow Rate for 0.15 mm dia. Particle Size with Specific Gravity S <sub>s</sub> > 2.65 Table 5.6 Considering Design Overflow Rate	=	1555 960	m <sup>3</sup> /m <sup>2</sup> /day m <sup>3</sup> /m <sup>2</sup> /day
	Design Overflow Rate  Surface Overflow Rate for 0.15 mm dia. Particle Size with Specific Gravity S <sub>s</sub> > 2.65 Table 5.6 Considering Design Overflow	=	1555 960 300	m <sup>3</sup> /m <sup>2</sup> /day m <sup>3</sup> /m <sup>2</sup> /day m <sup>3</sup> /day
	Design Overflow Rate  Surface Overflow Rate for 0.15 mm dia. Particle Size with Specific Gravity S <sub>s</sub> > 2.65 Table 5.6 Considering Design Overflow Rate	=	1555 960	m <sup>3</sup> /m <sup>2</sup> /day m <sup>3</sup> /m <sup>2</sup> /day
	Design Overflow Rate  Surface Overflow Rate for 0.15 mm dia. Particle Size with Specific Gravity S <sub>s</sub> > 2.65 Table 5.6 Considering Design Overflow Rate	=	1555 960 300	m <sup>3</sup> /m <sup>2</sup> /day m <sup>3</sup> /m <sup>2</sup> /day m <sup>3</sup> /day
	Design Overflow Rate  Surface Overflow Rate for 0.15 mm dia. Particle Size with Specific Gravity S <sub>s</sub> > 2.65 Table 5.6 Considering Design Overflow Rate	= =	1555 960 300 960	m <sup>3</sup> /m <sup>2</sup> /day m <sup>3</sup> /m <sup>2</sup> /day m <sup>3</sup> /day m <sup>3</sup> /m <sup>2</sup> /day

	Length of Chamber provided	=	2.00	m
	Width of Chamber provided	=	0.50	m
	Width of Ghamber provided	_	0.30	111
	Hydraulic Retention Time			
	(HRT) in Grit Chamber at	=	60	sec
	Peak Flow	_	90	300
	Volume of Grit Chamber		0.000.00	
	required	=	0.003x60	
	·	=	0.18	$m^3$
	Depth required in Grit			
	Chamber	=	0.18 / (2x0.5)	
		=	0.18	m
	Say	=	0.30	m
	Grit Storage Depth	=	0.25	m
	Total Liquid Depth required	=	0.55	m
	Length of Grit Pit	=	0.50	m
	Width of Grit Pit	=	0.50	m
	Depth of Grit Pit	_	0.30	m
	Free Board		1.15	
	Fiee Board	=	1.15	m
•				
3	RAW SEWAGE SUMP (WET		-	
	No. of Units	=	1	No.
	Average Flow	=	0.10	MLD
		=	4.167	m³/hr
		=	0.0012	m3/sec
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
		=	0.30	MLD
		=	13	m³/hr
		=	0.003	m³/sec
			0.000	,000
	Hydraulic Retention Time			
	(HRT) at Average Flow	=	120	min
	Volume required	=	0.0012 x 120 x 60	
	volamo rodanoa	=	9	$m^3$
		_	3	111
	Hudraulia Datantian Tima			
	Hydraulic Retention Time (HRT) at Peak Flow	=	Volume / Average Flow	
	(TITT) at I can I low	_	48	min
		=		
		<	30	min
	T . 137 1			3
	Total Volume of Wet Well	=	9	m <sup>3</sup>
	0:1 W / 5 / / 2::			
	Side Water Depth (SWD)	=	1.50	m
	provided			
	Plan Area of Wet Well	=	5.76	m <sup>2</sup>
	Length/width of Sump	=	2.40	m
	required			

Length/width of Sump provided Volume of Sump provided	= =	<b>2.40</b> 8.64	m m³
Length of Pump Pit	=	1.00	m
Width of Pump Pit	=	0.50	m
Depth of Pump Pit	=	0.30	m
Free Board		1.15	m
DESIGN STATEMENT-RSS	3 E&M		

#### 

DESIGN STATEMENT-RSS	E&M			
Design Considerations				
Design flow	=	0.10	MLD	
	=	100.00	Cum/Day	
Peak flow factor	=	3.00		
Pumping machinery				
Friction factor for Fittings in Pressure Mains				
Elbow 90 degrees	=	10		
Friction Factor for each	=	1		
Friction factor for all	=	10		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	6		
Friction Factor for each	=	0.3		
Friction factor for all	=	1.8		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	14.7		
Stage		low	ave	peak
Average flow, cum / day	=		100.00	-
Proportion	=	0.6	1	2
Design flow, cum / day	=	60	100	200
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0017	0.0017	0.0023
Dia needed, m	=	0.047	0.047	0.054
Dia needed, mm	=	47	47	54
•				

Dia provided, mm (User)	=	63	63	63
Radius, m	=	0.032	0.032	0.032
Radius power 0.63	=	0.113	0.113	0.113
S power 0.54	=	0.045	0.074	0.112
S	=	0.003	0.008	0.017
Slope 1 in	=	316.6	123.0	58.0
length, m	=	30	30	30
Friction in pipeline, m	=	0.1	0.2	0.5
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	14.7	14.7	14.7
Friction in fittings, m	=	0.3	0.7	1.7
Static lift, m	=	3.0	3.0	3.0
Total head, m	=	3.3	3.7	4.7
Efficiency of pumpset	=	0.8	0.8	0.8
Discharge, lps	=	1.0	1.7	3.5
Discharge, Cum/Hr	=	3.8	6.3	12.5
Kw required	=	0.163	0.271	0.538
HP required	=	0.5	0.5	1.0
Number of Pumps	=	2	2	2
TIOED DIO EIL TED				
TIGER BIO FILTER	50 KI D			
DESIGN STATEMENT-TBF1	- 30 KLD			
Number of pumping hours	=	16	Hrs	
Number of BMF tanks	=	2	Nos	
provided				
Design flow to each tank	=	50.00	Cum/day	
	=	3.13	Cum/ Hr for 16	Hr
	=	0.87	lps	
Inlet BOD		250.00	m a /l	
Inlet BOD	=	400.00	mg/l	
	=		mg/l	
BOD load applied	=	12.5	kg/day	(0.5, 4.0)
BOD uptake rate	=	0.1	Kg of BOD / Kg of worms	(0.5 - 1.0)
Worms required	=	125	Kg worms	
Sewage application rate	=	1.85	Cum/Sqm/day	(1 - 2 Cum/Sqm/da
Area required	=	27.03	Sqm	·
Area Provided	=	28	Sqm	
Area of each crate	=	0.4	Sqm	
Number of crates	=	70	Nos	
		-	-	

72

18

4

72

4.00

11.00

1.2

=

=

=

=

=

Nos

Nos

Nos

Nos

m

m

m

OK

4

say

Crate in longitudinal direction

Crate in travers direction

crates provided

Width provided

Length required

Depth provided

### 5 TERTIARY TREATMENT UNIT

	Design Considerations			
	Design flow	=	0.10	MLD
	_	=	100.00	Cum/Day
	Peak flow factor	=	3.00	·
5.1	FILTER FEED TANK		_	
	Number of FFT provided	=	1	Nos
	Number of operating hours	=	16	Hrs
	Design flow	=	100.00	Cum/Day
		=	6.25	Cum/Hr
		=	0.00174	Cum/Sec
	Hydraulic Retention time	=	60	min
	Volume required	=	6.25	Cum
	Depth	=	1.50	m
	Civil Tanks			
	Area	=	4.17	Sqm
	Length/Width required	=	2.04	m
	Length/Width provided	=	2.50	m
	Freeboard provided	=	0.50	m
	Volume Provided		9.38	Cum
	DESIGN STATEMENT-TTU I	E&M		
	Design Considerations			
	Design flow	=	0.10	MLD
		=	100.00	Cum/Day
	Peak flow factor	=	3.00	
	<b>B</b>			
	Pumping machinery			
	Friction factor for Fittings in Pressure Mains			
	Elbow 90 degrees	=	5	
	Friction Factor for each	=	1	
	Friction factor for all	=	5	
	Elbow 45 degrees	=	0	
	Friction Factor for each	=	0.75	
	Friction factor for all		0.73	
		=	0	
	Elbow 22 degrees Friction Factor for each	=	_	
	Friction factor for all	=	0.5 0	
		=		
	Tee 90 degrees	=	0	
	Friction Factor for each	=	1.5	
	Friction factor for all	=	0	
	Tee in straight pipe	=	5	
	Friction Factor for each	=	0.3	
	Friction factor for all	=	1.5	
	Gate valve open	=	1	
	Friction Factor for each	=	0.4	

	Friction factor for all	=	0.4		
	Swing check	=	1		
	Friction Factor for each	=	2.5		
	Friction factor for all	=	2.5		
	Total friction factor	=	9.4		
	Stage		low	ave	peak
	Average flow, cum / day	=		100.00	-
	Proportion	=	0.6	1	2
	Design flow, cum / day	=	60	100	200
	Hazen Williams C	=	140	140	140
	Desired velocity, m/s	=	0.8	1.0	1.5
	Number of Pumping hours	=	16.0	16.0	16.0
	Area needed, sqm	=	0.0013	0.0017	0.0023
	Dia needed, m	=	0.041	0.047	0.054
	Dia needed, mm	=	41	47	54
	Dia provided, mm (User)	=	63	63	63
	Radius, m	=	0.032	0.032	0.032
	Radius power 0.63	=	0.113	0.113	0.113
	S power 0.54	=	0.060	0.074	0.112
	S	=	0.005	800.0	0.017
	Slope 1 in	=	185.9	123.0	58.0
	length, m	=	20	20	20
	Friction in pipeline, m	=	0.1	0.2	0.3
	Velocity head, m	=	0.033	0.051	0.115
	Frction factor in fittings	=	9.4	9.4	9.4
	Friction in fittings, m	=	0.3	0.5	1.1
	Static lift, m	=	8.0	8.0	8.0
	Total head, m	=	8.3	8.5	9.1
	Efficiency of pumpset	=	0.8	0.8	0.8
	Discharge, lps	=	1.0	1.7	3.5
	Discharge, Cum/Hr	=	3.8	6.3	12.5
	Kw required	=	0.280	0.464	0.922
	HP provided	=	0.5	1.0	1.5
	Number of Pumps	=	2	2	2
	·				
	PRESSURE SAND FILTER				
	Number of unit provided	=	1	Nos.	
	Designed @ 16 hrs working				
	for flow of	=	6.25	m3/h	
	Loading rate	=	12.00	m3/m2/h	
	Area of DMF	=	0.52	m2	
	Dia of DMF	=	0.81	m	
	Provided	=	0.900	m	
	Backwash water				
	Backwash velocity	=	15.00	m/hr	
	backwash flowrate	=	8.63	m3/h	
	Backwash volume for 20 mins	=	2.88	m3	
•	ACTIVATED CARBON FILTER		_		
	Number of unit provided	=	1	Nos.	

5.2

5.3

	Designed @ 16 hrs working			
	Designed @ 16 hrs working for flow of	=	6.25	m3/h
	Loading rate	=	12.00	m3/m2/h
	Area of ACF	=	0.52	m2
	Dia of ACF	=	0.81	m
	Provided		0.900	
	Backwash water	=	0.900	m
			45.00	//
	Backwash velocity	=	15.00	m/hr
	backwash flowrate	=	8.63	m3/h
	Backwash volume for 20 mins	=	2.88	m3
5.4	CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM		0.05	0.4
	Average Flow	_	6.25	m3/hr
		=		
	Design Chlorine Dosage		3	mg/l
	(Max)	=	3	1119/1
	Concentration of Chlorine in		10%	
	commercially available NaOCI	=		
	Design NaOCI Dosage		30	mg/l
		=		
	Operating hours		16.0	hr
		=		
	Overtity of NaOCI required		C 25 V 20 V 46 / 4000	
	Quantity of NaOCI required	=	6.25 X 30 X 16 / 1000	
		_	3.00	Kg/day
		=	0.00	. tg/ day
	Design Strength of NaOCI		100%	
	Solution	=		
	Volume of NaOCI Solution		3 / (1 X 1000 )	
		=	0.010	m3
		=	0.010	1113
	No. of Dosing Tanks provided	_	1	Nos.
	3 2 1	=		
	Volume of each Dosing Tank		0.01 / 1	
		=	2.24	
			0.01	m3
		=	100	Litres
		=	100	Lilles
	No. of Working NaOCI Dosing		1	No.
	Pump provided	=		
	Capacity of each NaOCI		Total Volume of NaOCI Solution / (N	No. of Dosina
	Dosing Pump required	=	pumps)	
			0.01 / (1 X 16)	
		=		
			0.001	m3/hr
		=		
			1.00	LPH
		=		

Capacity of each NaOCI		1.00	LPH
Dosing Pump provided	=		
No. of Standby NaOCI Dosing		1	No.
Pump provided	=		

## SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 100 KLD CAPACITY

S I.	Unit name	N o	Leng th	Widt h		Height		Sc	oling	PO	сс	Ra	aft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk		thk		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	2.0	0.5	0.1	1.0	1.1	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	2.0	0.5	0.5	1.1	1.7	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
3	Raw Sewage Sump	1	2.4	2.4	1.5	1.1	2.6	0.2	0.3	0.1	0.1	0.2	0.2	0.1		0.1	100
4	TBF Bed 50 KLD	2	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	2.5	2.5	1.5	0.5	2.0	0.2	0.3	0.1	0.1	0.2	0.2	0.1		0.1	100
6	Filter Platform	1	2.0	2.9				0.2	0.3	0.1	0.1	0.2	0.1				60

#### **Assumptions**

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Underground strata		soil	Muru	Soft roc	har d	Tota
0.0 to 1.5 m	-	25	25	25	25	100
1.5 m to 3.0 m	II	25	25	25	25	100
3.0 to 4.5 m	II	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

## TIGER BIO FILTER OF 100 KLD CAPACITY BILL OF QUANTITIES

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
1	Excavation for foundation / pipe trenches in earth, soils of all types, sand, gravel and soft murum, including removing the excavated material upto a distance of 50 metres and lifts as below, stacking and spreading as directed, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-				
	0.0 to 1.5 m	50.83	Cum	150.00	7,624.50
	1.5 to 3.0 m	19.79	Cum	164.00	3,245.60
	3.0 to 4.5 m	1.76	Cum	178.00	313.30
	4.5 to 6.0 m	0.00	Cum	192.00	0.00
	MJP/ SSR/ 2021-22 / Section E / Excavation Item No.1/ Page no. 42				
2	Excavation for foundation / pipe trenches in hard murum and boulders, W.B.M. road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking and spreading as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-3/259)			8.00	
	0.0 to 1.5 m	50.83	Cum	192.00	9,759.40
	1.5 to 3.0 m	19.79	Cum	206.00	4,076.80
	3.0 to 4.5 m	1.76	Cum	220.00	387.20
	4.5 to 6.0 m	0.00	Cum	234.00	0.00
	MJP/ SSR/ 2021-22/ Section E/ Excavation Item No.3, Page no. 42				
3	Excavation for foundation / pipe trenches in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A- 4/259)				
	0.0 to 1.5 m	50.83	Cum	572.00	29,074.80
	1.5 to 3.0 m	19.79	Cum	597.00	11,814.70
	3.0 to 4.5 m	1.76	Cum	622.00	1,094.80
	4.5 to 6.0 m	0.00	Cum	647.00	0.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.5, Page no. 42				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below, stacking as directed by Engineer-incharge, normal dewatering, excluding backfilling, etc. complete by all means.				
	0.0 to 1.5 m	50.83	Cum	1,017.00	51,694.20
	1.5 to 3.0 m	19.79	Cum	1,042.00	20,621.20
	3.0 to 4.5 m	1.76	Cum	1,067.00	1,878.00
	4.5 to 6.0 m	0.00	Cum	1,092.00	0.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43				
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)  MJP/ SSR/ 2021-22 / Section E/	54.42	Cum	1,175.00	63,943.50
	Excavati				
6	Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE,	15.89	Cum	5,640.00	89,619.60
	READY				
7	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE/ Item No.2, Page no. 49				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor	0.30	Cum	8,624.00	2,587.20
	For Beams / Braces / Lintels In RCC M-300	0.30	Cum	0,024.00	2,007.20
	MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50				
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor	2.02	Cum	9,247.00	18,679.00
	Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300	2.02	- G	3,2	. 5,51 0.00
	MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				
		J			

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)				
	Chajjas / Parapets / Curtain Walls /Partition Walls / Pardies In RCC M-300	8.85	Cum	9,218.00	81,579.30
	MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)				
	c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.8 / Page no. 52	2.34	MT	70,658.00	165,339.80
12	Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U- 1/537)	4.54	Sqm	1,895.00	8,603.30
	MJP/ SSR/ 2021-22 / SECTION - F: IRON AND STRUCTURAL STEEL WORK Item No.1 / Page				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-in-charge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C- 3/275)  MJP/ SSR/ 2021-22 / SECTION - F: IRON	1.49	MT	71,286.00	106,507.00
	AND STRUCTURAL STEEL WORK Item No.3,				
14	Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24 B.W.G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts, lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sq.m.).  PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224	150.80	Sqm	777.00	117,171.60
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete  PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by engineer incharge and BDG- 2 and 5 Item No.893, Page no. 190	29.74	Cum	6,305.00	187,510.70
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference No. Bd. L.2 Page No. 368 Item No.950,	163.30	Sqm	257.00	41,968.10

Sr. No	Item Description	Qty	Unit	Rate	Amount (Rs.)
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding and fourteen days curing	95.	Sqm	529.	50,255.
	PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957,				
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.	95.	Sqm	10.00	950.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411 Item No.1091, Page no. 218				
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.	95.	Sqm	8.00	760.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No.				
20	Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc.  MJP/ SSR/ 2021-22 / Section E/		HP/		
	Excava				
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.	164.	Cum	84.00	13,808.
	MJP/ SSR/ 2021-22 / Section E/ Excava			-	,
22	Transportation as per STATEMENT VI Including loading, unloading and stacking Earth (4.8 Cum) lead 15 Km	174.	Cum	604.45	105,760.

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	Flooting a chaired Items				
23	Electromechnical Items  Screen (Manual) of size 1.65 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200				
	mm straight and 50 mm of 90 degree	0.83	Sqm	35,000.0	28,875.00
24	Grit pump				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.65 m				
	1 HP (Up to 9000 LPH)	1.00	No	68,654.0	68,654.00
25	Daw Causes Daws				
25	Raw Sewage Pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	1 HP (Up to 9000 LPH)	2.00	Nos	68,654.0	137,308.00
26	TTU Feed pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	1 HP (Up to 9000 LPH)	2.00	Nos	68,654.0	137,308.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and				
	Dia 0.9 m x 2 m minimum height	1.00	Nos	55,400.0	55,400.00
		1.55		,	22, 100.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
28	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease				
	Dia 0.9 m x 2 m minimum height	1.00	Nos	55,400.00	55,400.00
29	NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency				
	Mixing Tank of 100 Ltrs capacity	100.00	Ltrs	8.00	800.00
	Dosing Pump	2.00	Nos	15,000.00	30,000.00
	0 1 10 1				
30	Control Panel  Designing, Supplying, Installing, commissioning & testing of PLC Panel. Including PLC with CPU & Power supply unit, power supplyb cables interfacing cards, interfacing cables, wireless modules with 25% extra  MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION]	1.00	No	32,272.00	32,272.00
31	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.  > 7.5 HP & Up to 12.5 HP	6.00	nos	7,150.00	42,900.00
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR AND PROTECTION] Item no. LG 3 Page no. 27	0.00	1100	7,100.00	72,000.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
32	Main power supply cable				
	3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable				
	Supplying and erecting, Flat flexible				
	submersible cable with, Copper				
	Conductor, PVC insulated, and PVC				
	3 core 16 sq mm	25.00	m	549.00	13,725.
33	Power cables				
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable				
	Supplying and erecting, XLPE / PVC				
	insulated, armoured cable 1100 V grade				
	with ISI mark Four core, solid / stranded				
	aluminium conductor with 6 mm thick 25				
	mm width M.S. spacer with G.I. Earth				
	wire 6 sq mm, complete erected on wall				
	/ on pole with 25 X 3 mm M.S. clamps or				
	in provided trench in an approved				
	4 Core 6 sq mm	75.00	m	137.00	10,275.
	MJP MECH/ ELECT/ SSR/ 2021-22				
	SECTION				
	12 - CB [ L.T. CABLE ] Item no. CB 6				
34	Control Cables				
	Copper conductor PVC insulated,				
	Unarmoured control cable				
	Supplying and erecting Un-armoured				
	control cable with ISI mark stranded /				
	solid copper conductor 1.1 kV grade				
	complete erected on wall / panel or in				
	provided trench in an approved manner.				
	4 core 2.5 sq mm	75.00	m	137.00	10,275.
	MJP MECH/ ELECT/ SSR/ 2021-22/				
	SECTION 12 - CB [ L.T. CABLE] Item				
	no. CB 8-				
	Plumbing Items				
	Ŭ				
35	Providing and supplying in standard				
	lengths ISI mark rigid unplasticised PVC				
	pipes suitable for potable water with				
	solvent cement joints including cost of				
	couplers, as per IS specification no.				
	4985 / 1988 excluding GST levied by				
	GOI and GOM in all respect, including				
	transportation, freight charges,				
	inspection charges, loading, unloading,				
	conveyance to the departmental stores				
	and stacking the same in closed shed				
	duly protected from sun rays and rains				
	including cost of jointing material i.e.				
	solvent cement, etc. complete (selffit				
	Solvent Cement, etc. Complete (Seillit				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose				
	only.				
	One coupler and required cement solvent shall be provided with each full length pipe				
	cost of which is included in rates below.				
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C.				
	PIPES, Page no.77				
1	Raw Sewage pump to TBF Distribution				
а	Main header 63 mm.	30.00	m	149.00	4 470 00
	PVC Specials- 10%	30.00	m	149.00	4,470.00 447.00
	1 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				447.00
b	Distribution				
	63 mm.	15.00	m	149.00	2,235.00
	PVC Specials- 10%				223.50
2	TBF collection to FFT (gravity)				
a	Main header				
	75 mm.	45.00	m	211.00	9,495.00
	PVC Specials- 10%				949.50
b	collection tributory				
	63 mm.	10.00	m	149.00	1,490.00
	PVC Specials- 10%				149.00
3	TTU Plumbing				
	63 mm.	20.00	m	149.00	2,980.00
	PVC Specials- 10%				298.00
4	TBF distribution				
•	63 mm.	10.00	m	149.00	1,490.00
	PVC Specials- 10%				149.00
36	Labour	6.00	dovo	C44.00	2.046.00
	Plumber Helper	6.00 12.00	days days	641.00 579.00	3,846.00 6,948.00
	MJP/ SSR/ 2021-22 / SECTION - B	12.00	uays	379.00	0,940.00
	LABOUR & MACHINERY , Page no. 14				
1					
37	Providing double flange sluice valve confirming for IS- 14846 including worn				
	gear arrangements as per test pressure,				
	stainless steel spindle, caps, including				
	inspection charges, transportation upto				
	departmental store, unloading, stacking				
	excluding GST levied by GOI & GOM in all				
	respect etc. complete.				
	Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump 65 mm.	2.00	Nos	4,966.00	9,932.00
	Filter Feed Pump	2.00	1105	4,900.00	შ,შ32.00
	65 mm.	2.00	Nos	4,966.00	9,932.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132				
38	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)  Without by pass arrangement -PN -1				
	Raw Sewage pump 65 mm.	2.00	Nos	3,885.00	7,770.00
	Filter Feed Pump	2.00	1403	0,000.00	7,770.00
	65 mm.  MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 131	2.00	Nos	3,885.00	7,770.00
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including				
	transportation & fixing in position as  Market rate	144.00	Nos	4,750.00	684,000.00
40	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand) MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	13.70	Cum	1,730.00	23,701.00
41	Trasnsportation Godhara to Pune distance				
71	by Road 660 Km.  MJP/ SSR/ 2021-22 / SECTION - C :	13.70	Cum	11,031.37	151,129.80
	TRANSPORTATION Page no. 23	+	<del>                                     </del>		
42	Stone Aggregate 20 mm MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	13.70	Cum	900.00	12,330.00
43	Transportation as per STATEMENT VI Including loading, unloading and stacking				
	Manure or sludge (5.52 Cum) lead 25 Km MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no. 23	52.90	Cum	747.48	39,541.70
		1	NET T	OTAL Do	2 022 002 00
			NEII	OTAL Rs.	2,932,802.80

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				2.25		
Α	0.0 to 1.5 m	1	5.20	2.70	1.5	21.06	Cum
	soil					5.27	Cum
	Murum					5.27	Cum
	Soft rock					5.27	Cum
	hard rock					5.27	Cum
В	1.5 to 3.0 m	1	5.2	2.70	0.75	10.53	Cum
	soil					2.64	Cum
	Murum					2.64	Cum
	Soft rock					2.64	Cum
	hard rock					2.64	Cum
		1					
С	3.0 to 4.5 m	1	4.2	2.20	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock	+				0	Cum
	4.5 to 6.0 m	1	4.2	2.20	0	0	Cum
D	4.5 to 6.0 m soil	1	4.2	2.20	0	0	Cum
	Murum					0	Cum
	Soft rock						Cum
	hard rock					0	Cum Cum
	naru rock					0	Cum
2	Soling						
	Screen	1	3.20	1.20	0.30	1.16	Cum
	Grit	1	3.20	0.50	0.30	0.48	Cum
	extra for grit chamber	1	0.00	0.60	0.30	0.40	Cum
	oxid for girl criambor	•	0.00	Total for grit	0.00	0.48	Cum
				rotarior gin		0.10	Jann
3	PCC M20						
	Screen	1	2.80	1.00	0.10	0.28	Cum
	Grit	1	2.80	0.50	0.10	0.14	Cum
		1	0.00	0.40	0.20	0	Cum
	Internal slope	1	Area	0.09	0.50	0.05	Cum
	Internal slope	1	Area	0.05	0.50	0.03	Cum
				Total for grit		0.22	Cum
				Ĭ			
4	Raft M30						
	Screen	1	2.60	0.90	0.15	0.36	Cum
	Grit	1	2.60	0.50	0.15	0.2	Cum
		1	0.00	0.30	0.15	0	Cum
				Total for grit		0.2	Cum
5	RCC Wall						
	Screen	1					
	Long Wall	2	2.20	0.10	1.35	0.6	Cum

Sr.	Itam Dagawatian	Naa	1 ()	D (m)	11 (***)	0	l lesit
No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Short Wall	2	0.70	0.10	1.35	0.19	Cum
				Total for so	reen	0.79	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	0.00	0.10	1.90	0	Cum
	Short Wall	2	0.50	0.10	1.90	0.19	Cum
				Total for gr	it	0.19	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	80	Cum	1.54	0.13	MT
7	Fabrication work in Frame and						
	Grating for Access						
	Screen	1	2.20	0.70		1.54	Sqm
	Grit	1	2.20	0.60		1.32	Sqm
					Total	2.86	Sqm
8	Removing excess exacavated						
	material out of site						
	Screen chamber	1	2.20	0.70	1.15	1.78	Cum
	Grit Chamber	1	2.20	0.50	1.70	1.87	Cum
	soling, PCC, Raft volume					2.62	Cum
	Total Volume					6.27	Cum
	bulkage @ 40%					8.78	Cum
	D (III)						
9	Refilling and compaction					<u> </u>	
	Total Excavation					31.59	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					6.27	Cum
	Refilling and compaction volume					25.32	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				3.25		
Α	0.0 to 1.5 m	1	6.3	6.30	1.5	59.54	Cum
	soil					14.89	Cum
	Murum					14.89	Cum
	Soft rock					14.89	Cum
	hard rock					14.89	Cum
В	1.5 to 3.0 m	1	5.30	5.30	1.5	42.14	Cum
	soil					10.54	Cum
	Murum					10.54	Cum
	Soft rock					10.54	Cum
	hard rock					10.54	Cum
С	3.0 to 4.5 m	1	5.30	5.30	0.25	7.03	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					1.76	Cum
	Murum					1.76	Cum
	Soft rock					1.76	Cum
	hard rock					1.76	Cum
D	4.5 to 6.0 m	1	4.30	4.30	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	RSS	1	3.70	3.70	0.30	4.11	Cum
	1.00		0.10	0.70	0.00	7	Odili
3	PCC M20						
	RSS	1	3.30	3.30	0.10	1.09	Cum
4	Raft M30						
	RSS	1	3.10	3.10	0.20	1.93	Cum
5	RCC Wall				0.05		
	Long Wall	2	2.70	0.15	2.85	2.31	Cum
	Short Wall	2	2.40	0.15	2.85	2.06	Cum
					Total	4.37	Cum
6	Beams						
	Beam 1	1	2.40	0.2	0.3	0.15	Cum
	Beam 2	0	2.40	0.2	0.3	0.10	Cum
	Dodin 2		2.10	0.2	Total	0.15	Cum
						0110	
7	Slab	1	2.70	2.70	0.15	1.1	Cum
	Deduction for manhole	-1	1.20	0.70	0.15	-0.13	Cum
					Total	0.97	Cum
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	100	Cum	7.42	0.75	MT
	Fabrica Can words in France and						
9	Fabrication work in Frame and						
	Grating for Access RSS	1	1.20	0.70		0.84	Sqm
	100	1	1.20	0.70		0.04	Sqiii
10	Removing excess exacavated						
10	material out of site						
	RSS	1	2.70	2.70	2.65	19.32	Cum
	soling, PCC, Raft volume					7.13	Cum
	Total Volume					26.45	Cum
	bulkage @ 40%					37.03	Cum
11	Pofilling and compaction						
	Refilling and compaction						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					108.71	Cum
	Deduction for tank volume, soling, PCC, Raft					26.45	Cum
	Refilling and compaction volume					82.26	Cum
12	Dewatering						
	5 Days x 4 hours/day	days	5	hours / day	4	20	Hrs

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
	0.11						
2	Soling		40.40	5.40	0.00	00.44	0
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
	TBF	1	12.06	5.06	0.10	6.11	Cum
	IDF	' '	12.00	5.00	0.10	0.11	Culli
4	Raft M30						
	TBF	1	11.86	4.86	0.10	5.77	Cum
		<u>'</u>	11.00	1.00	0.10	0.77	Odili
5	Brick Wall						
	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
					Total for	T 14.87	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	Sqm
	Short Wall	2	4.00		1.20	9.6	Sqm
	Cutamal				Total	81.65	Sqm
	External	2	11 16		1.20	27 F1	Cam
	Long Wall Short Wall	2 2	11.46 4.46		1.20	27.51 10.71	Sqm
	Wall Top	1	30.92	0.3	1.20	9.28	Sqm Sqm
	vvali 10p	'	30.32	0.3	Total	47.50	Sqm
		+			ıotai	77.00	Oqiii
7	External-white-wash	1				47.50	Sqm
		'					9411
8	External-colour-wash	1				47.50	Sqm
						11.00	1
9	0/ 1 10001/1000 0 11 /0	Kg/C					
	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	5.77	0.35	MT
10	Removing excess exacavated						
	material out of site						
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				2.60		
Α	0.0 to 1.5 m	1	5.4	5.40	1.5	43.74	Cum
	soil					10.94	Cum
	Murum					10.94	Cum
	Soft rock					10.94	Cum
	hard rock					10.94	Cum
В	1.5 to 3.0 m	1	4.90	4.90	1.1	26.42	Cum
	soil					6.61	Cum
	Murum					6.61	Cum
	Soft rock					6.61	Cum
	hard rock					6.61	Cum
С	3.0 to 4.5 m	1	4.40	4.40	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	4.40	4.40	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	FFT	1	3.80	3.80	0.30	4.34	Cum
3	PCC M20						
	FFT	1	3.40	3.40	0.10	1.16	Cum
4	Raft M30						
	FFT	1	3.20	3.20	0.20	2.05	Cum
5	RCC Wall						
	Long Wall	2	2.80	0.15	2.20	1.85	Cum
	Short Wall	2	2.50	0.15	2.20	1.65	Cum
					Total	3.5	Cum
6	Beams						
	Beam 1	1	2.50	0.2	0.3	0.15	Cum
	Beam 2	0	2.50	0.2	0.3	0	Cum
					Total	0.15	Cum
7	Slab	1	2.80	2.80	0.15	1.18	Cum
	Deduction for manhole	-	1.20	0.70	0.15	-0.13	Cum
					Total	1.05	Cum

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	6.75	0.68	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	1	1.20	0.70		0.84	Sqm
10	Removing excess exacavated						
	material out of site						
	FFT	1	2.80	2.80	2.00	15.68	Cum
	soling, PCC, Raft volume					7.55	Cum
	Total Volume					23.23	Cum
	bulkage @ 40%					32.53	Cum
11	Refilling and compaction						
	Total Excavation					70.16	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					23.23	Cum
	Refilling and compaction volume		_		<u> </u>	46.93	Cum
12	Dewatering						
	5 Days x 4 hours/day	days	5	hours/day	4	20	Hrs

#### **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	3.2	4.10	0.55	7.22	Cum
	soil					1.81	Cum
	Murum					1.81	Cum
	Soft rock					1.81	Cum
	hard rock					1.81	Cum
2	Soling						
	Filter Platform	1	3.00	3.90	0.30	3.51	Cum
3	PCC M20						
	Filter Platform	1	2.60	3.50	0.10	0.92	Cum
4	Raft M30						
	Filter Platform	1	2.40	3.30	0.15	1.19	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	60	Cum	1.19	0.08	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					4.43	Cum
	Total Volume					4.43	Cum
	bulkage @ 40%					6.21	Cum
7	Refilling and compaction						
	Total Excavation					7.22	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					4.43	Cum
	Refilling and compaction volume					2.79	Cum

#### **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation &	144				144	Nos
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak,	144	0.82	0.58	0.2	13.7	Cum
3	Trasnsportation Godhara to					13.7	Cum
	_						_
4	Stone Aggregate 20 mm	144	0.82	0.58	0.2	13.7	Cum
5	Transportation as per STATEMENT VI Including						
	Manure or sludge (5.52 Cum) lead	144	0.82	0.56	0.8	52.9	Cum

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

No.	Item Description	Nos.	Unit
1	Screen (Manual) of size 1.65 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	1	No
2	Grit pump		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.65 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
	(op to coco 2)		110
3	Raw Sewage Pumps		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	1 HP (Up to 9000 LPH)	2	Nos
4	TTU Feed pumps		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	1 HP (Up to 9000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 0.9 m x 2 m minimum height	1	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 0.9 m x 2 m minimum height	1	Nos
7	PurAll Tablet Chlorinator + cartridge	0	nos

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr.	Item Description	Nos.	Unit
<b>No.</b> 7	NaOCI Chlorinator		
,	Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH		
	Power Source Electric Phase Single		
	Material PP / PTFE(Teflon) Voltage 230 Volt Frequency 50Hz		
а	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
8	Control Panel		
	Designing, Supplying, Installing, commissioning & testing of PLC Panel. Including PLC with CPU & Power supply unit, power supplyb cables interfacing cards, interfacing cables, wireless modules with 25% extra quantity of all accessories.		
	PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		
	AUTOMATION ] Item no. 1.4 Page no. 69		
	Cumplying and areating Fully Automotic Ctay Delta starter to an area and area		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	> 7.5 HP & Up to 12.5 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
10	Main power supply cable		
10	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	o dore i ve induiated, i ve driedtried depper deriddeter nat dubineralisie dubie		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor, PVC insulated, and PVC sheathed.		
	3 core 16 sq mm	25	m
11	Power cables		
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick		
	25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on		
	wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	75	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE] Item no. CB 6 Page no. 35		
12	Control Cables		
	Copper conductor PVC insulated, Unarmoured control cable		

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

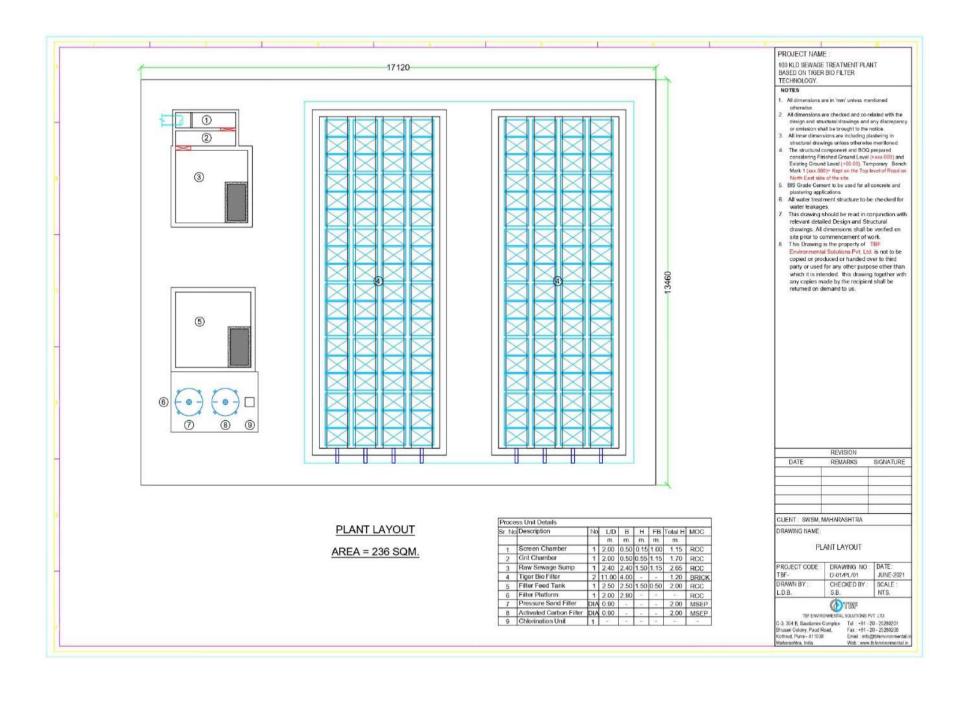
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	75	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

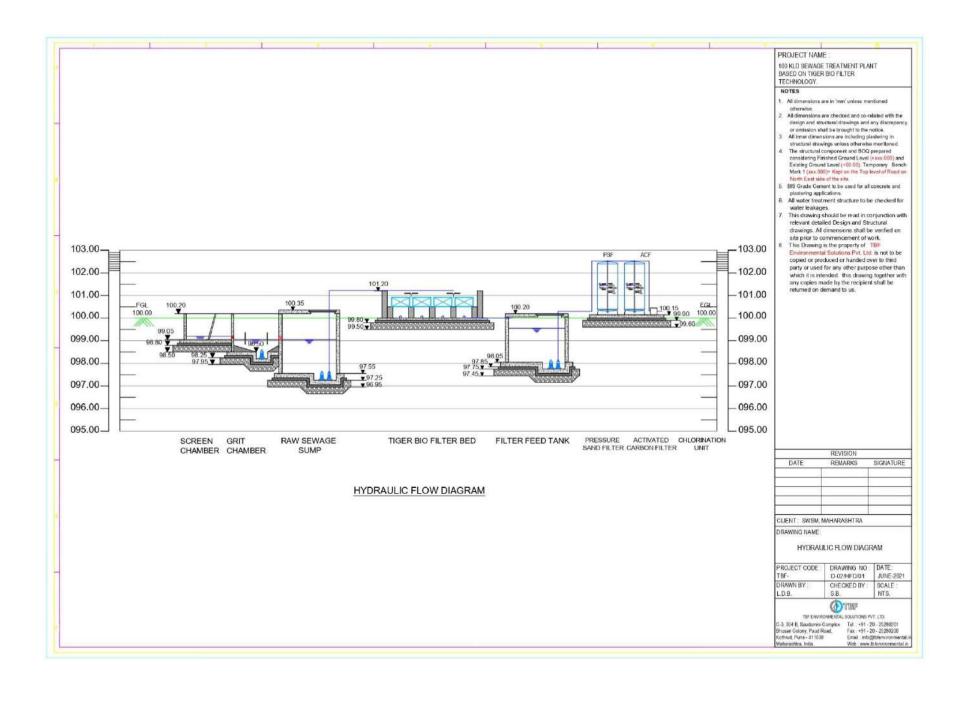
#### **MEASUREMENT SHEET - PLUMBING**

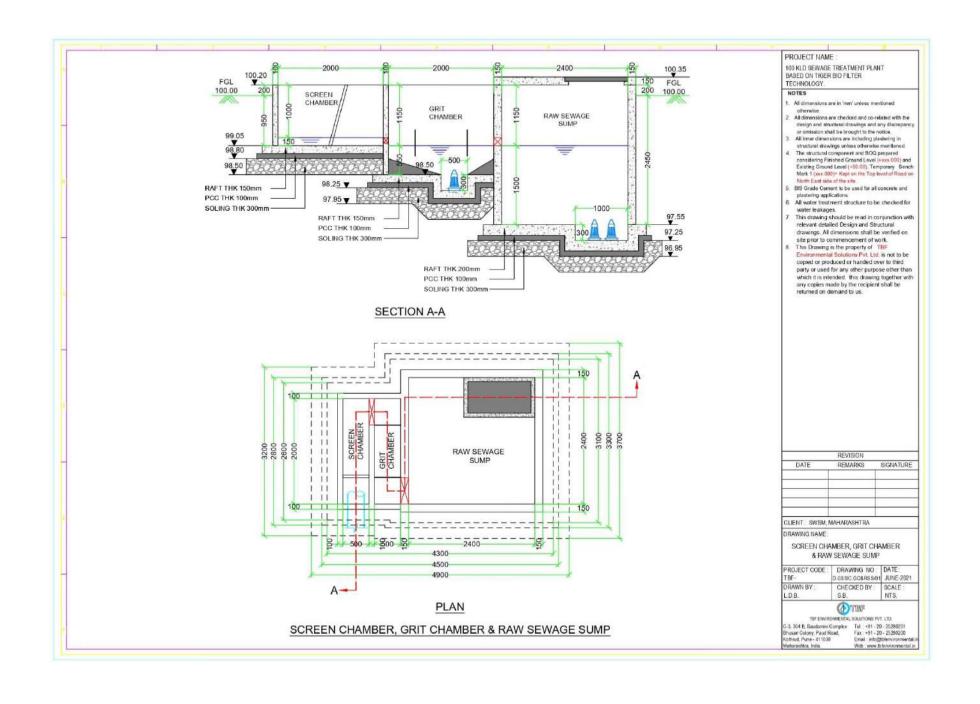
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing and supplying in standard lengths ISI					
	mark rigid unplasticised PVC pipes suitable for					
	potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 /					
	1988 excluding GST levied by GOI and GOM in all					
	respect, including transportation, freight charges,					
	inspection charges, loading, unloading, conveyance					
	to the departmental stores and stacking the same in					
	closed shed duly protected from sun rays and rains					
	including cost of jointing material i.e. solvent					
	cement, etc. complete (selffit type to be jointed with cement solvent).					
	·					
	1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.					
	<ul><li>2) One coupler and required cement solvent shall</li></ul>					
	be provided with each full length pipe cost of which					
	is included in rates below.					
	MJP/ SSR/ 2021-22 / SECTION - I(II) P.V.C.					
	PIPES,					
1	Raw Sewage pump to TBF Distribution  Main header	Dia	62			
а	63 mm.	1 Dia	63 30		30	m
	PVC Specials- 10%	<u>'</u>	30			
	100000000000000000000000000000000000000					
b	Distribution					
	63 mm.	1	15		15	m
	PVC Specials- 10%					
2	TBF collection to FFT (gravity)					
a	Main header					
	75 mm.	1	45		45	m
	PVC Specials- 10%					
	-					
b	collection tributory	ļ .				
	63 mm.	1	10		10	m
	PVC Specials- 10%	1				
3	TTU Plumbing	Dia	63			
	63 mm.	1	20		20	m
	PVC Specials- 10%	<u>L</u>				
4	TBF distribution		_	No. of be		
	63 mm.	1	5	2	10	m
	PVC Specials- 10%					
5	Labour	Nos	Days			
	Plumber	1	6		6	days
	Helper	2	6		12	days
6	Sluice valves					

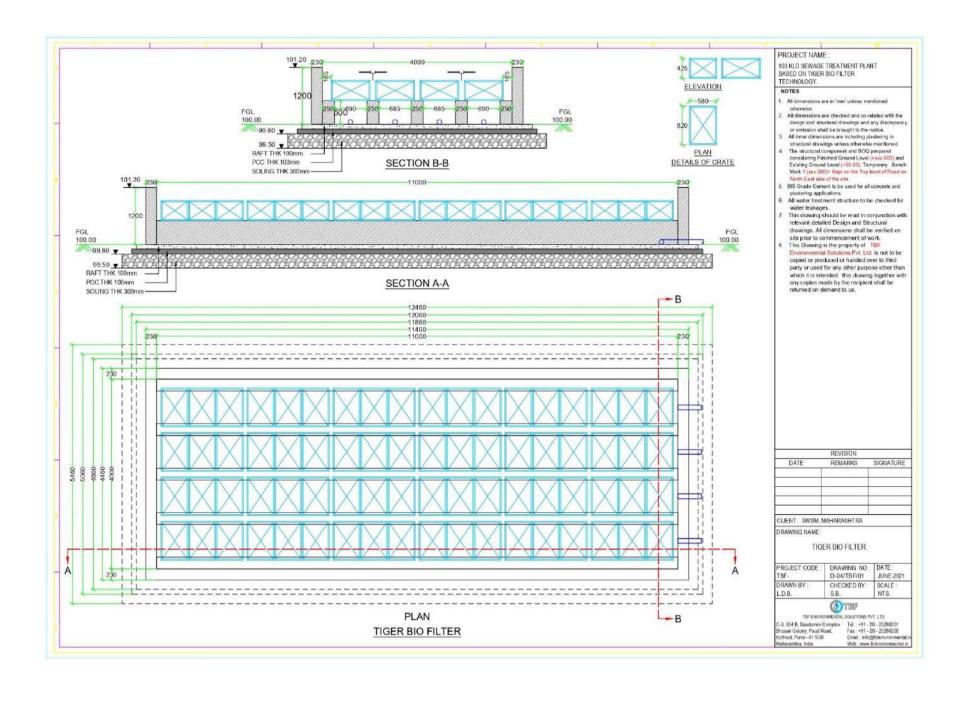
#### **MEASUREMENT SHEET - PLUMBING**

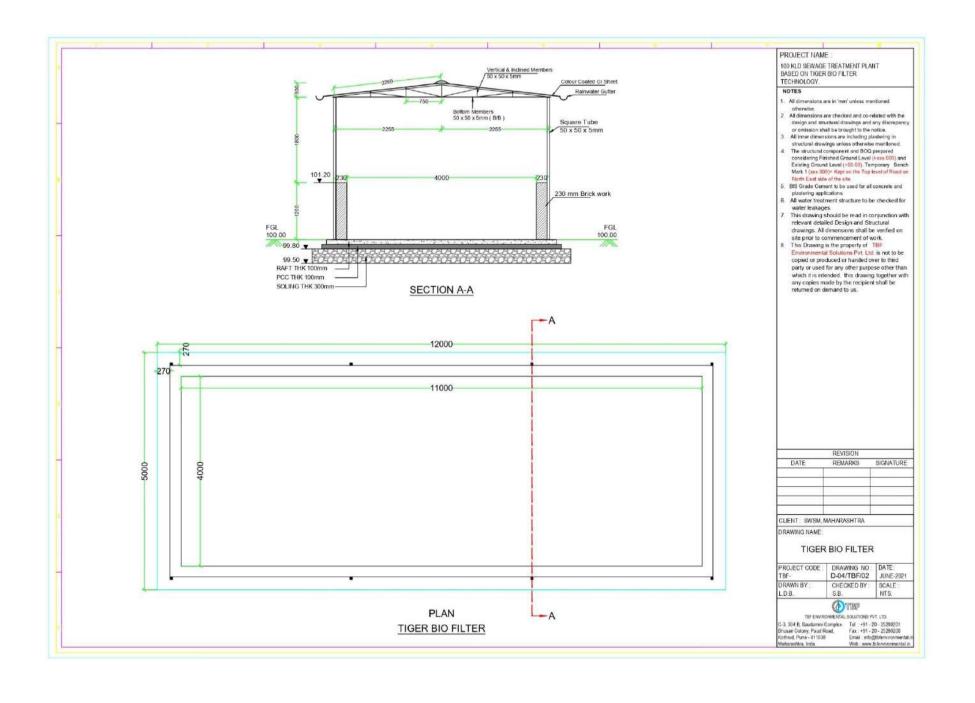
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132					
	Raw Sewage pump					
	65 mm.	2			2	Nos
	Filter Feed Pump					
	65 mm.	2			2	Nos
7	Reflux valves (non-return valves)  Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 131					
	Raw Sewage pump					
	65 mm.	2			2	Nos
	Filter Feed Pump					
	65 mm.	2			2	Nos

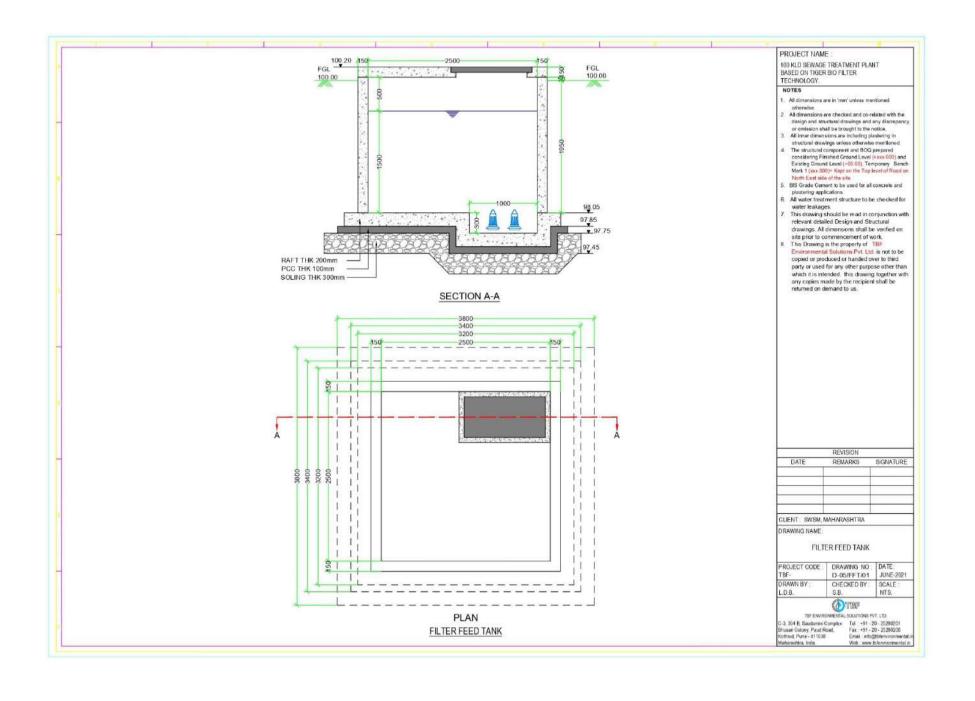


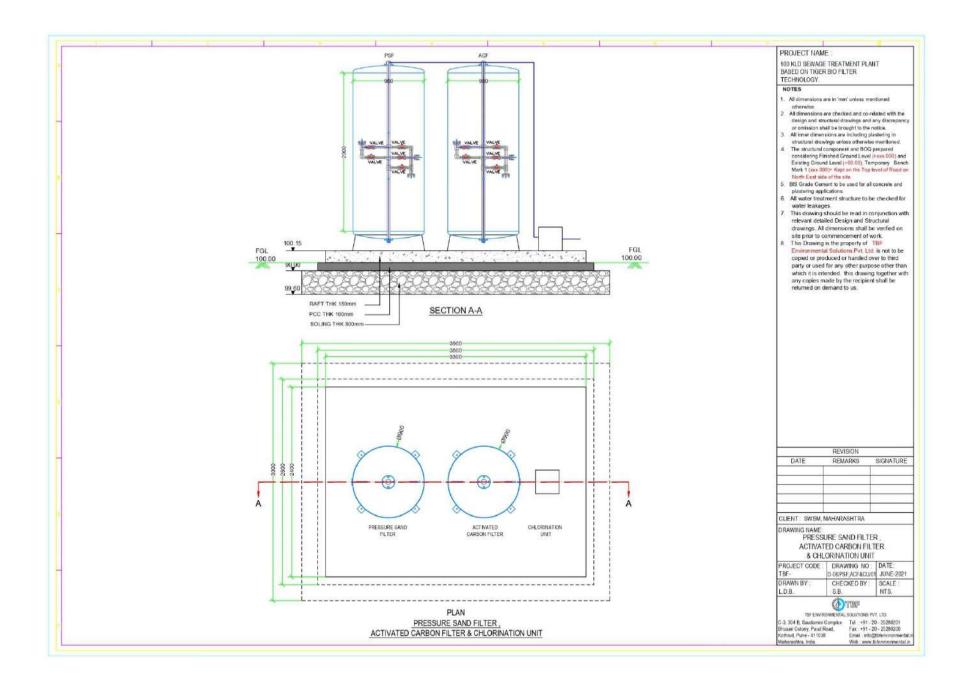












# 200 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 200 KLD CAPACITY

	Design flow	=	<b>200.00</b> 0.200	KLD MLD
	Dook flow footon	=	3.00	IVILD
	Peak flow factor	_	3.00	
1	SCREEN CHANNELS: MANUAL			
	No. of Manual Screen	=	1	No.
	Average Flow	=	0.20	MLD
	Peak Flow Factor		3.00	
	Design Flow	=	Peak Flow	
		=	0.60	MLD
		=	25.00	m³/hr
		=	0.007	m <sup>3</sup> /sec
	Average Flow	=	0.20	MLD
		=	8.333	m <sup>3</sup> /hr
		=	0.002	m³/sec
	Design Flow in each Screen	=	0.007	m³/sec
			1	No.
				•
		=	0.007	m³/sec
	Average Flow in each Screen	_	0.002	m³/sec
	Average Flow in each Screen	_	0.002	No.
			,	110.
		=	0.002	m³/sec
	Maximum Velocity through	=	1.2	m/sec
	Screen at Peak Flow			
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	gereen aan merage men			
	Clear Area of Opening through	_	0.007	m³/sec
	Screen for Peak Flow	_		
			1.2	m/sec
		=	0.006	$m^2$
		_	0.000	•••
	Clear Area of Opening through	_	0.002	m³/sec
	Screen for Average Flow	_		
			0.6	m/sec
			0.003	$m^2$
		=	0.003	111
	Considering maximum Area of		0.000	. 2
	Opening through Screen	=	0.006	m <sup>2</sup>
	Clear Spacing of Bars	=	10	mm

Thickness of Bars	=	5	mm	
Gross Area of Screen	=	0.006x(10+5)/10 0.009	$m^2$	
Assuming Depth of Screen Channel	=	200.00	mm	
Gross Width of Screen	=	0.009/0.2 0.045	m	
No. of Bars	=	(Gross Width of Scree Bars) - 1 0.045/((10+5)/1000)	en / Center to Co	enter Spacing of
	=	-1 2.0	Nos.	
Say	=	2	Nos.	
Width of Screen provided	=	(Number of Bars+1) x Bars x Bar Thickness (2+1)x10+(2x5)		+ (Number of
	=	40	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel provided	=	0.20	m	
L:B	=	4.00		
Length of Screen Channel provided	=	2.00	m	
Freeboard provided	=	1.00	m	Invert Depth of incoming sewer
Total Depth of Screen Chamber	=	1.20	m	<b>CO</b> C.
Velocity in Channel at Average Flow	= = = >	Average Flow / Cross Channel 0.002/((0.5x0.2)/1000 0.020 0.300		of Screen
Head Loss across Screen				
Head Loss across Screen	=	$0.0728 (V^2 - v^2)$		
V = Velocity through Screen at Peak Flow	=	Peak Flow through S Openin	Screen Channel og through Scree	
	=	1.167	m/sec	
v = Velocity in approach Channel at Peak Flow	=	Peak Flow throuç Sectional A	gh Screen Chan rea of Screen C	
	=	0.8	m/sec	
Head Loss across Screen at Peak Flow	=	0.055	m	
Head Loss across Screen at 50% Clogged Condition				
Velocity through Screen at 50% Clogged Condition at Peak Flow	=	2.333	m/sec	
Head Loss across screen at 50% Clogged Condition at Peak Flow	=	0.352	m	
1 IOW	>	0.300	m/sec	

#### 2 CONVENTIONAL GRIT CHAMBER: MANUAL

CONVENTIONAL GRIT CHAMB	ER: I		
No. of Grit Chamber	=	1	
Average Flow	=	0.20	MLD
Peak Flow Factor	=	3.00	
Design Flow	=	Peak Flow	
Peak Flow	=	0.60	MLD
	=	600	m³/day
	=	25	m³/hr
	=	0.007	m³/sec
Design Flow to each Grit		000/4	
Chamber	=	600/1	
	=	600	m³/day
	=	25	m³/hr
	=	0.007	m³/sec
According to CPHEEO Manual			
Particle Size	=	0.15	mm
Specific Gravity	=	2.65	
Surface Overflow Rate for 100%		Cattling Valacity of	the mainimum aims of Dentieles to
removal efficiency in an ideal	=		the minimum size of Particles to be removed
Grit Chamber			
	=	1.5	m/s
	=	1296	m³/m²/day
Considering Efficiency of		750/	
removal of desired Particles, $\eta = 75\%$	=	75%	
and Measure of Settling Basin			
Performance,		0.405	
n = 1/8 for very good	=	0.125	
performance			
Design Overflow Rate	=	857	m³/m²/day
Surface Overflow Rate for 0.15			
mm dia. Particle Size with	=	1555	m³/m²/day
Specific Gravity S <sub>s</sub> > 2.65 Table 5.6			·
Considering Design Overflow		000	31-21
Rate	=	960	m <sup>3</sup> /m <sup>2</sup> /day
Area of Grit Chamber required	=	600	m³/day
		960	m³/m²/day
			•
	=	0.63	$m^2$
L:B ratio	=	2	
Length of Chamber provided	=	2.50	m
Width of Chamber provided	=	0.60	m
The contract provided		<b>5.00</b>	•••
Hydraulic Retention Time (HRT)			
in Grit Chamber at Peak Flow	=	60	sec
Volume of Grit Chamber	_	0.007v60	
required	=	0.007x60	

		=	0.42	$m^3$
	Depth required in Grit Chamber	=	0.42 / (2.5x0.6)	
		=	0.28	m
	Say	=	0.30	m
	Grit Storage Depth	=	0.25	m
	Total Liquid Depth required	=	0.55	m
	Length of Grit Pit	_	0.50	m
	Width of Grit Pit	_	0.50	m
			0.30	
	Depth of Grit Pit	=		m
	Free Board	=	1.20	m
3	RAW SEWAGE SUMP (WET WE	LL)		
	No. of Units	=	1	No.
	Average Flow	=	0.20	MLD
		=	8.333	m³/hr
		=	0.0023	m3/sec
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
	3	=	0.60	MLD
		=	25	m <sup>3</sup> /hr
			0.007	m³/sec
		=	0.007	111 /560
	Hydraulic Retention Time (HRT)	=	120	min
	at Average Flow			
	Volume required	=	0.0023 x 120 x 60	
		=	17	m <sup>3</sup>
	Hydraulic Retention Time (HRT)	_	Volume / Average Flow	
	at Peak Flow	_	volume / /worage r low	
		=	39	min
		<	30	min
	Total Volume of Wet Well	=	17	$m^3$
	0:1.14 (0.14.5)			
	Side Water Depth (SWD) provided	=	1.50	m
	Plan Area of Wet Well	=	11.04	$m^2$
	Length/width of Sump required	=	3.32	m
	Length/width of Sump provided	_	3.40	m
	Volume of Sump provided	_	17.34	m <sup>3</sup>
		_	1.00	
	Length of Pump Pit	=		m
	Width of Pump Pit	=	0.50	m
	Depth of Pump Pit	=	0.30	m
	Free Board		1.20	m

Design Considerations				
Design flow	=	0.20	MLD	
3	=	200.00	Cum/Day	
Peak flow factor	=	3.00		
r dark now radio				
Pumping machinery				
Friction factor for Fittings in				
Pressure Mains				
Elbow 90 degrees	=	10		
Friction Factor for each	=	1		
Friction factor for all	=	10		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	6		
Friction Factor for each	=	0.3		
Friction factor for all	=	1.8		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	14.7		_
Stage		low	ave	peak
Average flow, cum / day	=		200.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	120	200	400
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0035	0.0035	0.0046
Dia needed, m	=	0.066	0.066	0.077
Dia needed, mm	=	66	66	77
Dia provided, mm (User)	=	75	75	75
Radius, m	=	0.038	0.038	0.038
Radius power 0.63	=	0.126	0.126	0.126
S power 0.54	=	0.040	0.067	0.100
S	=	0.003	0.007	0.014
Slope 1 in	=	388.1	150.7	71.1
length, m	=	35	35	35
Friction in pipeline, m	=	0.1	0.2	0.5
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings Friction in fittings, m	=	14.7	14.7	14.7
L FLOTLON IN TITLINGO IN	=	0.3	0.7	1.7

Static lift, m	=	3.5	3.5	3.5
Total head, m	=	3.8	4.2	5.2
Efficiency of pumpset	=	0.8	0.8	0.8
Discharge, lps	=	2.1	3.5	6.9
Discharge, Cum/Hr		7.5	12.5	25.0
•	=			
Kw required	=	0.323	0.538	1.075
HP required	=	0.5	1.0	1.5
Number of Pumps	=	2	2	2
TIGER BIO FILTER				
DESIGN STATEMENT-TBF1- 50	KLD			
Normals are of managinar in a language		40	Llus	
Number of pumping hours	=	16	Hrs	
Number of BMF tanks provided	=	4	Nos	
Design flow to each tank	=	50.00	Cum/day	
	=	3.13	Cum/ Hr for 16	3 Hr
	=	0.87	lps	
Inlet BOD	=	250.00	mg/l	
Inlet TSS	=	400.00	mg/l	
BOD load applied	=	12.5	kg/day	
BOD uptake rate	=	0.1	Kg of BOD /	(0.5 - 1.0)
•			Kg of worms	,
Worms required	=	125	Kg worms	
Sewage application rate	=	1.85	Cum/Sqm/da	(1 - 2
compact of the compac			у	Cum/Sqm/day
			·	)
Area required	=	27.03	Sqm	
Area Provided	=	28	Sqm	
Area of each crate	=	0.4	Sqm	
Number of crates	=	70	Nos	
say	=	72	Nos	
Crate in longitudinal direction	=	18	Nos	
Crate in travers direction	=	4	Nos	
crates provided	=	<del>-</del> 72	Nos	OK
-		4.00		OK
Width provided	=		m	
Length required	=	11.00	m	
Depth provided	=	1.2	m	
TERTIARY TREATMENT UNIT				
Design Considerations				
Design flow	=	0.20	MLD	
g	=	200.00	Cum/Day	
Dook flow forter		3.00	Carri, Day	
Peak flow factor	=	3.00		
EII TED EEED TANK				
FILTER FEED TANK	_	1	Nos	
Number of FFT provided	=	-		
Number of operating hours	=	16	Hrs	
Design flow	=	200.00	Cum/Day	
		21:7 6/1	L LIMO/LIK	

12.50

Cum/Hr

4

5

1

	=	0.00347	Cum/Sec
Hydraulic Retention time		60	min
	=		Cum
Volume required	=	12.50	
Depth	=	1.50	m
Civil Tanks			
Area	=	8.34	Sqm
Length/Width required	=	2.89	m
Length/Width provided	=	3.00	m
Freeboard provided	=	0.50	m
Volume Provided		13.50	Cum
DESIGN STATEMENT-TTU E	&M		
220.01.01,112.11.11.02	<b></b>		
Design Considerations			
Design flow	=	0.20	MLD
3	=	200.00	Cum/Day
Peak flow factor	=	3.00	Guilli Bay
Peak now factor	_	5.00	
Decreasing a second by a second			
Pumping machinery			
Friction factor for Fittings in			
Pressure Mains		_	
Elbow 90 degrees	=	5	
Friction Factor for each	=	1	

Pumping machinery		
Friction factor for Fittings in		
Pressure Mains		
Elbow 90 degrees	=	5
Friction Factor for each	=	1
Friction factor for all	=	5
Elbow 45 degrees	=	0
Friction Factor for each	=	0.75
Friction factor for all	=	0
Elbow 22 degrees	=	0
Friction Factor for each	=	0.5
Friction factor for all	=	0
Tee 90 degrees	=	0
Friction Factor for each	=	1.5
Friction factor for all	=	0
Tee in straight pipe	=	5
Friction Factor for each	=	0.3
Friction factor for all	=	1.5
Gate valve open	=	1
Friction Factor for each	=	0.4
Friction factor for all	=	0.4
Swing check	=	1
Friction Factor for each	=	2.5
Friction factor for all	=	2.5
Total friction factor	=	9.4
Stage		low
Average flow, cum / day	=	
D (:		

Total friction factor	=	9.4		
Stage		low	ave	peak
Average flow, cum / day	=		200.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	120	200	400
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.8	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0026	0.0035	0.0046

Dia needed, m	=	0.058	0.066	0.077
Dia needed, mm	=	58	66	77
Dia provided, mm (User)	=	75	75	75
Radius, m	=	0.038	0.038	0.038
Radius power 0.63	=	0.126	0.126	0.126
S power 0.54	=	0.053	0.067	0.100
S	=	0.004	0.007	0.014
Slope 1 in	=	227.8	150.7	71.1
length, m	=	20	20	20
Friction in pipeline, m	=	0.1	0.1	0.3
Velocity head, m	=	0.033	0.051	0.115
Frction factor in fittings	=	9.4	9.4	9.4
Friction in fittings, m	=	0.3	0.5	1.1
Static lift, m	=	8.0	8.0	8.0
Total head, m	=	8.3	8.5	9.1
Efficiency of pumpset	=	0.8	0.8	0.8
Discharge, lps	=	2.1	3.5	6.9
Discharge, Cum/Hr	=	7.5	12.5	25.0
Kw required	=	0.553	0.922	1.843
HP provided	=	1.0	1.5	2.5
Number of Pumps	=	2	2	2
PRESSURE SAND FILTER				
Number of unit provided Designed @ 16 hrs working for	=	1	Nos.	
flow of	=	12.50	m3/h	
Loading rate	=	12.00	m3/m2/h	
Area of DMF	=	1.04	m2	
Dia of DMF	=	1.15	m	
Provided	=	1.200	m	
Backwash water				
Backwash velocity	=	15.00	m/hr	
backwash flowrate	=	16.27	m3/h	
Backwash volume for 20 mins	=	5.42	m3	
ACTIVATED CARBON FILTER				
Number of unit provided Designed @ 16 hrs working for	=	1	Nos.	
flow of	=	12.50	m3/h	
Loading rate	=	12.00	m3/m2/h	
Area of ACF	=	1.04	m2	
Dia of ACF	=	1.15	m	
Provided	=	1.200	m	
Backwash water				
Backwash velocity	=	15.00	m/hr	
backwash flowrate	=	16.27	m3/h	
Backwash volume for 20 mins	=	5.42	m3	
CHLORINE DOSING SYSTEM				
NaOCI DOSING SYSTEM				
Average Flow		12.50	m3/hr	
	_			

Design Chlorine Dosage (Max)	=	3	mg/l
Concentration of Chlorine in commercially available NaOCl	=	10%	
Design NaOCI Dosage	=	30	mg/l
Operating hours	=	16.0	hr
Quantity of NaOCI required	=	12.5 X 30 X 16	6 / 1000
	=	6.00	Kg/day
Design Strength of NaOCI Solution	=	100%	
Volume of NaOCI Solution	=	6 / (1 X 10	00)
	=	0.010	m3
No. of Dosing Tanks provided	=	1	Nos.
Volume of each Dosing Tank	=	0.01 / 1	
	=	0.01	m3
	=	100	Litres
No. of Working NaOCI Dosing Pump provided	=	1	No.
Capacity of each NaOCI Dosing Pump required	=	Total Volume of Nat (No. of Dosing	
	=	0.01 / ( 1 X 16 )	
	=	1.00	LPH
Capacity of each NaOCI Dosing Pump provided	=	1.00	LPH
No. of Standby NaOCI Dosing Pump provided	=	1	No.

# SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 200 KLD CAPACITY

S I.	Unit name	N o	Leng th	Widt h		Height		So	oling	P(	cc	Ra	oft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	<b>5</b>	+bk		M/
		N	m	m	M	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	2.0	0.5	0.2	1.0	1.2	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	2.5	0.6	0.5	1.2	1.7	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
3	Raw Sewage Sump	1	3.4	3.4	1.5	1.2	2.7	0.2	0.3	0.1	0.1	0.2	0.3	0.2		0.2	100
4	TBF Bed 50 KLD	4	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	3.0	3.0	1.5	0.5	2.0	0.2	0.3	0.1	0.1	0.2	0.2	0.2		0.2	100
6	Filter Platform	1	2.3	3.5				0.2	0.3	0.1	0.1	0.2	0.1				60

#### Assumptions

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound		soil	Muru	Soft roc	har d	Tota
0.0 to 1.5 m	=	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

# TIGER BIO FILTER OF 200 KLD CAPACITY BILL OF QUANTITIES

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
1	Excavation for foundation / pipe trenches in earth, soils of all types, sand, gravel and soft murum, including removing the excavated material upto a distance of 50 metres and lifts as below, stacking and spreading as directed, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-				
	1/259)				
	0.0 to 1.5 m	78.14	Cum	150.00	11,721.00
	1.5 to 3.0 m 3.0 to 4.5 m	26.88	Cum Cum	164.00	4,408.40
	4.5 to 6.0 m	4.10 0.00	Cum	178.00 192.00	729.80 0.00
	MJP/ SSR/ 2021-22 / Section E / Excavation Item No.1/ Page no. 42	0.00	Culli	192.00	0.00
2	Excavation for foundation / pipe trenches in hard murum and boulders, W.B.M. road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking and spreading as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-3/259)				
	0.0 to 1.5 m	78.14	Cum	192.00	15,002.90
	1.5 to 3.0 m	26.88	Cum	206.00	5,537.30
	3.0 to 4.5 m	4.10	Cum	220.00	902.00
	4.5 to 6.0 m  MJP/ SSR/ 2021-22/ Section E/ Excavation Item No.3, Page no. 42	0.00	Cum	234.00	0.00
3	Excavation for foundation / pipe trenches in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A- 4/259)				
	0.0 to 1.5 m	78.14	Cum	572.00	44,696.10
	1.5 to 3.0 m	26.88	Cum	597.00	16,047.40
	3.0 to 4.5 m	4.10	Cum	622.00	2,550.20
	4.5 to 6.0 m  MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.5, Page no. 42	0.00	Cum	647.00	0.00
	J				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below,				
	stacking as directed by Engineer-in-charge, normal dewatering, excluding backfilling, etc. complete by all means. (Bd-A-6/259)				
	0.0 to 1.5 m	78.14	Cum	1,017.00	79,468.40
	1.5 to 3.0 m	26.88	Cum	1,042.00	28,009.00
	3.0 to 4.5 m	4.10	Cum	1,067.00	4,374.70
	4.5 to 6.0 m	0.00	Cum	1,092.00	0.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43				
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)  MJP/ SSR/ 2021-22 / Section E/	100.75	Cum	1,175.00	118,381.30
	Excavati				
6	Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38	29.81	Cum	5,640.00	168,128.40
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.1, Page no.49			5,6 15.55	.00, .20
7	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	33.52	Cum	7,448.00	249,657.00
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY	30.02	20111	.,	2.0,007.00
	MIX CONCRETE/ Item No.2, Page no. 49				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or				
	Tor reinforcement) For Beams / Braces / Lintels In RCC M-300	0.78	Cum	8,624.00	6,726.80
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50				
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	4.53	Cum	9,247.00	41,889.00
	Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300			1,21110	.,
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or				
	Tor reinforcement)  Chajjas / Parapets / Curtain Walls	15.16	Cum	9,218.00	139,744.90
	/Partition Walls / Pardies In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)				
	c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY  MIX CONCRETE Item No.8 / Page no. 52	4.41	MT	70,658.00	311,601.80
12	Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U- 1/537)  MJP/ SSR/ 2021-22 / SECTION - F: IRON	6.79	Sqm	1,895.00	12,867.10
	AND STRUCTURAL STEEL WORK Item No.1 / Page				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-in-charge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C- 3/275)	2.99	MT	71,286.00	213,014.00
	AND STRUCTURAL STEEL WORK Item No.3,				
14	Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sq.m.).	301.60	Sqm	777.00	234,343.20
	PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224		oq	111100	20 1,0 10120
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete  PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by engineer incharge and BDG- 2 and 5 Item	59.48	Cum	6,305.00	375,021.40
	No.893, Page no. 190				
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference No. Bd. L.2 Page No. 368 Item No.950, Page no. 201	326.60	Sqm	257.00	83,936.20
	5				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding				
	and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and	190.00	Sqm	529.00	100,510.00
	Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201				
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.	400.00	Course	10.00	4 000 00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411	190.00	Sqm	10.00	1,900.00
	30.03 Nelerence No. Bu. F. I Fage No. 411				
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.	190.00	Cam	8.00	1 520 00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412	190.00	Sqm	8.00	1,520.00
20	Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-incharge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)	50.00	HP/	77.00	4040.00
	MJP/ SSR/ 2021-22 / Section E/ Excavat	56.00	Hr.	77.00	4,312.00
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/ Excavat	207.15	Cum	84.00	17,400.60
	Exodetat				
22	Transportation as per STATEMENT VI Including loading, unloading and stacking Earth (4.8 Cum) lead 15 Km	320.87	Cum	604.45	193,949.90
			I		

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
23	Screen (Manual) of size 1.7 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90				
	degree bend.	0.85	Sqm	35,000.00	29,750.00
24	Grit pump				
24	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION -				
	Pumps, Page no. 6, 7of size 1.7 m length 1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00
	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	1.00	110	00,001.00	00,001.00
25	Raw Sewage Pumps				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	2 HP (Up to 12000 LPH)	2.00	Nos	69,113.00	138,226.00
26	TTU Feed pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	2 HP (Up to 12000 LPH)	2.00	Nos	69,113.00	138,226.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.2 m x 2 m minimum height	1.00	Nos	236,000.00	236,000.00
	J			, -	,

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
28	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.2 m x 2 m minimum height	1.00	Nos	236,000.00	236,000.00
29	NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency				
	Mixing Tank of 100 Ltrs capacity	100.00	Ltrs	8.00	800.00
	Dosing Pump	2.00	Nos	15,000.00	30,000.00
30	Control Panel				
	Designing, Supplying, Installing, commissioning & testing of PLC Panel. Including PLC with CPU & Power supply unit, power supplyb cables interfacing cards, interfacing cables,  MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION]	1.00	No	32,272.00	32,272.00
31	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.				
	> 7.5 HP & Up to 12.5 HP  MJP /MECH/ ELECT/ SSR/ 2021-22  SECTION 10 - LG [L.T. SWITCHGEAR AND PROTECTION] Item no. LG 3 Page no. 27	6.00	nos	7,150.00	42,900.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
32	Main power supply cable				
	3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable				
	Supplying and erecting, Flat flexible				
	submersible cable with, Copper Conductor,				
	PVC insulated, and PVC sheathed.				
	3 core 16 sq mm	25.00	m	549.00	13,725.00
33	Power cables				
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable				
	Supplying and erecting, XLPE / PVC				
	insulated, armoured cable 1100 V grade with				
	ISI mark Four core, solid / stranded				
	aluminium conductor with 6 mm thick 25 mm				
	width M.S. spacer with				
	G.I. Earth wire 6 sq mm, complete erected on				
	wall / on pole with 25 X 3 mm M.S. clamps or				
	in provided trench in an approved manner.				
	4 Core 6 sq mm	90.00	m	137.00	12,330.00
	MJP MECH/ ELECT/ SSR/ 2021-22				
	SECTION				
	12 - CB [ L.T. CABLE ] Item no. CB 6 Page				
24	Control Cobles				
34	Control Cables  Copper conductor PVC insulated,				
	Copper conductor PVC insulated, Unarmoured control cable				
	Supplying and erecting Un-armoured control				
	cable with ISI mark stranded / solid copper				
	conductor 1.1 kV grade complete erected on				
	wall / panel or in provided trench in an				
	approved manner.				
	4 core 2.5 sq mm	90.00	m	137.00	12,330.00
	MJP MECH/ ELECT/ SSR/ 2021-22/				,
	SECTION 12 - CB [ L.T. CABLE ] Item no. CB				
	8-				
	Plumbing Items				
35	Providing and supplying in standard lengths				
	ISI mark rigid unplasticised PVC pipes				
	suitable for potable water with solvent				
	cement joints including cost of couplers, as				
	per IS specification no. 4985 / 1988 excluding				
	GST levied by GOI and GOM in all respect,				
	including transportation, freight charges,				
	inspection charges, loading, unloading,				
	conveyance to the departmental stores and				
	stacking the same in closed shed duly				
	protected from sun rays and rains including				
	cost of jointing material i.e. solvent cement,				
	etc. complete (selffit type to be jointed with cement solvent).				
	Coment Suiventy.				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	1) 10% of cost of pipes shall be considered				
	for cost of PVC specials for estimate purpose				
	only.				
	2) One coupler and required cement solvent				
	shall be provided with each full length pipe cost of which is included in rates below.				
	cost of which is included in rates below.				
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C.				
4	PIPES, Page no.77				
1	Raw Sewage pump to TBF Distribution  Main header				
а	75 mm.	35.00	m	211.00	7,385.00
	PVC Specials- 10%	33.00	111	211.00	7,383.50
	r v C Speciais- 1076				730.30
b	Distribution				
	63 mm.	25.00	m	149.00	3,725.00
	PVC Specials- 10%				372.50
	•				
2	TBF collection to FFT (gravity)				
а	Main header				
	75 mm.	60.00	m	211.00	12,660.00
	PVC Specials- 10%				1,266.00
b	collection tributary				
Ь	63 mm.	10.00	m	149.00	1,490.00
	PVC Specials- 10%	10.00		140.00	149.00
	1 10 00001010 1070				1 10.00
3	TTU Plumbing				
	75 mm.	20.00	m	211.00	4,220.00
	PVC Specials- 10%				422.00
4	TBF distribution				
	63 mm.	20.00	m	149.00	2,980.00
	PVC Specials- 10%				298.00
36	Labour				
	Plumber	12.00	days	641.00	7,692.00
	Helper	12.00		579.00	6,948.00
	MJP/ SSR/ 2021-22 / SECTION - B LABOUR				
	& MACHINERY , Page no. 14				
37	Providing double flange sluice valve				
	confirming for IS- 14846 including worn gear				
	arrangements as per test pressure, stainless				
	steel spindle, caps, including inspection charges, transportation upto departmental				
	store, unloading, stacking excluding GST				
	levied by GOI & GOM in all respect etc.				
	complete.				
	Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump				
	80 mm.	2.00	Nos	5,132.00	10,264.00
	Filter Feed Pump			5,.52.00	. 5,2550

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	80 mm. MJP/ SSR/ 2021-22 / SECTION - I(XII) :	2.00	Nos	5,132.00	10,264.00
	PIPES APPURTENANCES , Page no. 132				
38	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)				
	Without by pass arrangement -PN -1				
	Raw Sewage pump 80 mm.	2.00	Nos	4 002 00	9 194 00
	Filter Feed Pump	2.00	1105	4,092.00	8,184.00
	80 mm.	2.00	Nos	4,092.00	8,184.00
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 131			,	,
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc. complete.	288.00	Nos	4,750.00	1,368,000.00
	Market rate				
40	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	27.40	Cum	1,730.00	47,402.00
41	Trasnsportation Godhara to Pune distance by Road 660 Km.  MJP/ SSR/ 2021-22 / SECTION -	27.40	Cum	11,031.37	302,259.60
	C : TRANSPORTATION Page no.				
42	Stone Aggregate 20 mm  MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	27.40	Cum	900.00	24,660.00
43	Transportation as per STATEMENT VI Including loading, unloading and stacking				
	Manure or sludge (5.52 Cum) lead 25 Km MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.	105.80	Cum	747.48	79,083.40
			NET 1	OTAL Rs.	5,388,210.80

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				2.30		
Α	0.0 to 1.5 m	1	5.70	2.80	1.5	23.94	Cum
	Soil					5.99	Cum
	Murum					5.99	Cum
	Soft rock					5.99	Cum
	hard rock					5.99	Cum
В	1.5 to 3.0 m	1	5.7	2.80	8.0	12.77	Cum
	soil					3.2	Cum
	Murum					3.2	Cum
	Soft rock					3.2	Cum
	hard rock					3.2	Cum
С	3.0 to 4.5 m	1	4.7	2.30	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	4.7	2.30	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	Screen	1	3.20	1.20	0.30	1.16	Cum
	Grit	1	3.70	0.60	0.30	0.67	Cum
	extra for grit chamber	1	0.50	0.60	0.30	0.09	
	-			Total for gri		0.76	Cum
3	PCC M20						
	Screen	1	2.80	1.00	0.10	0.28	Cum
	Grit	1	3.30	0.60	0.10	0.2	Cum
		1	0.50	0.40	0.20	0.04	Cum
	Internal slope	1	Area	0.12	0.60	0.08	Cum
	Internal slope	1	Area	0.06	0.60	0.04	Cum
				Total for gri	it	0.36	Cum
4	Raft M30						
	Screen	1	2.60	0.90	0.15	0.36	Cum
	Grit	1	3.10	0.60	0.15	0.28	Cum
		1	0.50	0.30	0.15	0.03	Cum
				Total for gri	it	0.31	Cum
5	RCC Wall						
	Screen						
	Long Wall	2	2.20	0.10	1.40	0.62	Cum

Sr.				5 ( )			
No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Short Wall	2	0.70	0.10	1.40	0.2	Cum
				Total for so	creen	0.82	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	0.50	0.10	1.95	0.1	Cum
	Short Wall	2	0.60	0.10	1.95	0.24	Cum
				Total for gr	it	0.34	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	80	Cum	1.83	0.15	MT
7	Fabrication work in Frame and Grating for Access						
	Screen	1	2.20	0.70		1.54	Sqm
	Grit	1	2.70	0.70		1.89	Sqm
					Total	3.43	Sqm
8	Removing excess exacavated material out of site						
	Screen chamber	1	2.20	0.70	1.20	1.85	Cum
	Grit Chamber	1	2.70	0.60	1.75	2.84	Cum
	soling, PCC, Raft volume					3.11	Cum
	Total Volume					7.8	Cum
	bulkage @ 40%					10.92	Cum
9	Refilling and compaction						
	Total Excavation					36.71	Cum
	Deduction for tank volume,					_	
	soling, PCC, Raft					7.8	Cum
	Refilling and compaction volume					28.91	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				3.40		
Α	0.0 to 1.5 m	1	7.4	7.40	1.5	82.14	Cum
	soil					20.54	Cum
	Murum					20.54	Cum
	Soft rock					20.54	Cum
	hard rock					20.54	Cum
В	1.5 to 3.0 m	1	6.40	6.40	1.5	61.44	Cum
	soil					15.36	Cum
	Murum					15.36	Cum
	Soft rock					15.36	Cum
	hard rock					15.36	Cum
					-		
С	3.0 to 4.5 m	1	6.40	6.40	0.4	16.39	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					4.1	Cum
	Murum					4.1	Cum
	Soft rock					4.1	Cum
	hard rock					4.1	Cum
D	4.5 to 6.0 m	1	5.40	5.40	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	RSS	1	4.80	4.80	0.30	6.92	Cum
	1.00		1.00	1.00	0.00	0.02	Carri
3	PCC M20						
	RSS	1	4.40	4.40	0.10	1.94	Cum
4	Raft M30						
-4	RSS	1	4.20	4.20	0.30	5.3	Cum
	N33	1	4.20	4.20	0.30	5.5	Cum
5	RCC Wall						
	Long Wall	2	3.80	0.20	2.90	4.41	Cum
	Short Wall	2	3.40	0.20	2.90	3.95	Cum
					Total	8.36	Cum
6	Beams						
	Beam 1	1	3.40	0.2	0.3	0.21	Cum
	Beam 2	1	3.40	0.2	0.3	0.21	Cum
					Total	0.42	Cum
7	Slab	1	3.80	3.80	0.2	2.89	Cum
	Deduction for manhole	-2	1.20	0.70	0.2	-0.34	Cum
					Total	2.55	Cum
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C		_			
		um	100	Cum	16.63	1.67	MT
9	Fabrication work in Frame and Grating for Access						
	RSS	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	RSS	1	3.80	3.80	2.70	38.99	Cum
	soling, PCC, Raft volume					14.16	Cum
	Total Volume					53.15	Cum
	bulkage @ 40%					74.41	Cum
11	Refilling and compaction						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					159.97	Cum
	Deduction for tank volume, soling, PCC, Raft					53.15	Cum
	Refilling and compaction volume					106.82	Cum
12	Dewatering						
	7 Days x 4 hours/day	days	7	hours / day	4	28	Hrs

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
2	Soling						
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
	TBF	1	12.06	5.06	0.10	6.11	Cum
4	Raft M30						
	TBF	1	11.86	4.86	0.10	5.77	Cum
5	Brick Wall						
	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
					Total for	T 14.87	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	Sqm
	Short Wall	2	4.00		1.20	9.6	Sqm
	External				Total	81.65	Sqm
	Long Wall	2	11.46		1.20	27.51	Sqm
	Short Wall	2	4.46		1.20	10.71	Sqm
	Wall Top	1	30.92	0.3	1.20	9.28	Sqm
				0.0	Total	47.50	Sqm
7	External-white-wash	1				47.50	Sqm
8	External-colour-wash	1				47.50	Sqm
9	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	60	Cum	5.77	0.35	MT
10	Removing excess exacavated material out of site						
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				2.60		
Α	0.0 to 1.5 m	1	6.0	6.00	1.5	54	Cum
	soil					13.5	Cum
	Murum					13.5	Cum
	Soft rock					13.5	Cum
	hard rock					13.5	Cum
В	1.5 to 3.0 m	1	5.50	5.50	1.1	33.28	Cum
	soil					8.32	Cum
	Murum					8.32	Cum
	Soft rock					8.32	Cum
	hard rock					8.32	Cum
С	3.0 to 4.5 m	1	5.00	5.00	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	5.00	5.00	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	FFT	1	4.40	4.40	0.30	5.81	Cum
3	PCC M20						
	FFT	1	4.00	4.00	0.10	1.6	Cum
4	Raft M30						
	FFT	1	3.80	3.80	0.20	2.89	Cum
_							
5	RCC Wall						
	Long Wall	2	3.40	0.20	2.20	3	Cum
	Short Wall	2	3.00	0.20	2.20	2.64	Cum
					Total	5.64	Cum
_	D						
6	Beams		0.00	0.0	2.0	0.40	0
	Beam 1	1	3.00	0.2	0.3	0.18	Cum
	Beam 2	1	3.00	0.2	0.3	0.18	Cum
					Total	0.36	Cum
7	Clab	4	0.40	0.40	0.0	0.00	0
7	Slab  Deduction for manhala	1	3.40	3.40	0.2	2.32	Cum
	Deduction for manhole	-2	1.20	0.70	0.2	-0.34	Cum
	<u> </u>				Total	1.98	Cum

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	10.87	1.09	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	FFT	1	3.40	3.40	2.00	23.12	Cum
	soling, PCC, Raft volume					10.3	Cum
	Total Volume					33.42	Cum
	bulkage @ 40%					46.79	Cum
11	Refilling and compaction						
	Total Excavation					87.28	Cum
	Deduction for tank volume, soling, PCC, Raft					33.42	Cum
	Refilling and compaction volume		_			53.86	Cum
12	Dewatering						
12	7 Days x 4 hours/day	days	7	hours/day	4	28	Hrs

#### **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	3.5	4.70	0.55	9.05	Cum
	soil					2.27	Cum
	Murum					2.27	Cum
	Soft rock					2.27	Cum
	hard rock					2.27	Cum
2	Soling						
	Filter Platform	1	3.30	4.50	0.30	4.46	Cum
3	PCC M20						
	Filter Platform	1	2.90	4.10	0.10	1.19	Cum
4	Raft M30						
	Filter Platform	1	2.70	3.90	0.15	1.58	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	60	Cum	1.58	0.1	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					5.65	Cum
	Total Volume					5.65	Cum
	bulkage @ 40%					7.91	Cum
7	Refilling and compaction						
	Total Excavation					9.05	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					5.65	Cum
	Refilling and compaction volume					3.4	Cum

#### **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing	288				288	Nos
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	288	0.82	0.58	0.2	27.4	Cum
3	Trasnsportation Godhara to					27.4	Cum
4	Stone Aggregate 20 mm	288	0.82	0.58	0.2	27.4	Cum
5	Transportation as per STATEMENT VI Including						
	Manure or sludge (5.52 Cum)	288	0.82	0.56	0.8	105.8	Cum

### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr. No.	Item Description	Nos.	Unit
1	Screen (Manual) of size 1.7 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	1	No
2	Grit pump		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size  1.7 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
	1111 (Op to 3000 E111)		140
3	Raw Sewage Pumps Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	2 HP (Up to 12000 LPH)	2	Nos
4	TTU Feed pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	2 HP (Up to 12000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and		
	Dia 1.2 m x 2 m minimum height	1	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.2 m x 2 m minimum height	1	Nos
7	PurAll Tablet Chlorinator + cartridge	0	nos

### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr.	Item Description	Nos.	Unit
No.	·	1403.	Jill
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH		
	Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz		
а	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
8	Control Panel		
	Designing, Supplying, Installing, commissioning & testing of PLC Panel.		
	Including PLC with CPU & Power supply unit, power supplyb cables interfacing		
	cards, interfacing cables, wireless modules with 25% extra quantity of all		
	accessories.		
	PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		
	AUTOMATION ] Item no. 1.4 Page no. 69		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage		
	induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over		
	load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	> 7.5 HP & Up to 12.5 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
10	Main power supply cable		
	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,		
	PVC insulated, and PVC sheathed.		
	3 core 16 sq mm	25	m
11	Power cables		
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade		
	with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25		
	mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall /		
	on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	90	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		
	CB 6 Page no. 35		
12	Control Cables		
	Copper conductor PVC insulated, Unarmoured control cable		

### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

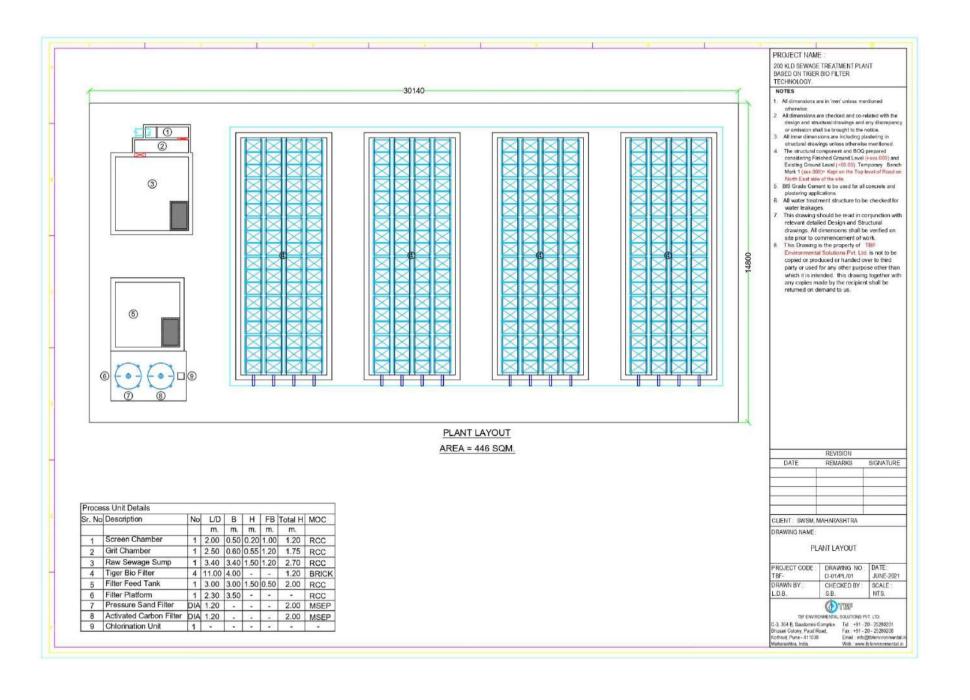
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	90	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

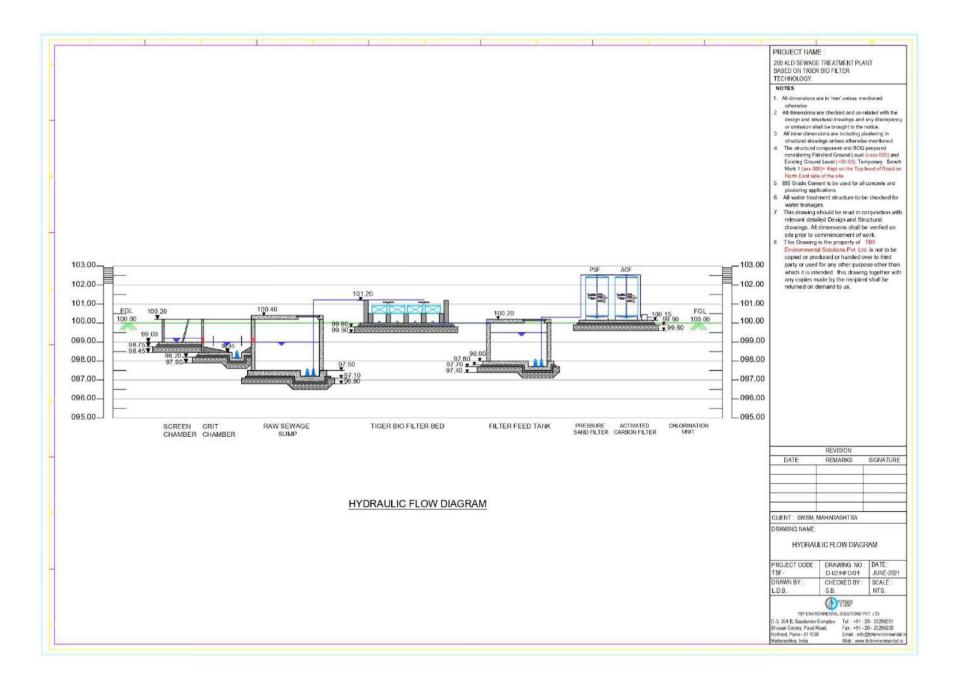
#### **MEASUREMENT SHEET - PLUMBING**

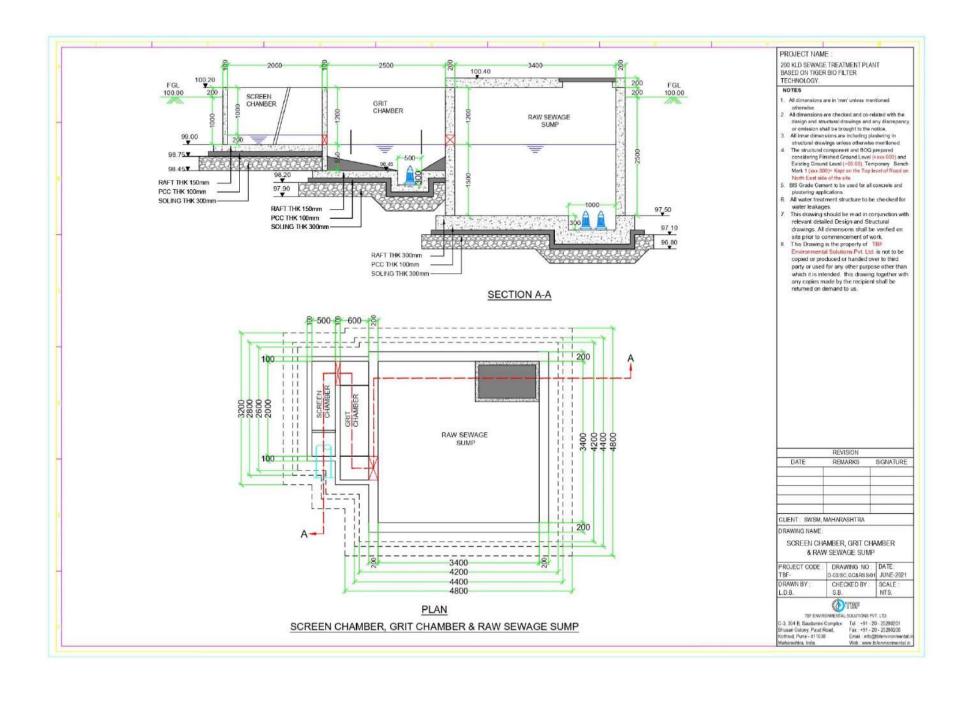
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges, inspection charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed shed duly protected from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit type to be jointed with cement solvent).					
	<ol> <li>1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.</li> <li>2) One coupler and required cement solvent shall be provided with each full length pipe cost of which is included in rates below.</li> </ol>					
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES,					
1	Page no.77 Raw Sewage pump to TBF Distribution					
a	Main header	Dia	75			
	75 mm.	1	35		35	m
	PVC Specials- 10%					
b	Distribution					
	63 mm.	1	25		25	m
	PVC Specials- 10%					
2	TBF collection to FFT (gravity)					
а	Main header					
	75 mm.	1	60		60	m
	PVC Specials- 10%					
1.						
b	collection tributory 63 mm.	1	10		10	m
	PVC Specials- 10%		10		10	m
	1 10 Openicio 1070					
3	TTU Plumbing	Dia	75			
	75 mm.	1	20		20	m
	PVC Specials- 10%					
	TDE PAR C			<b>N</b> 1 (1		
4	TBF distribution	4		No. of be		m
	63 mm. PVC Specials- 10%	1	5	4	20	m
	1 VO Opcolato 1070					
5	Labour	Nos	Days			
	Plumber	2	6		12	days
	Helper	2	6		12	days
6	Sluice valves					

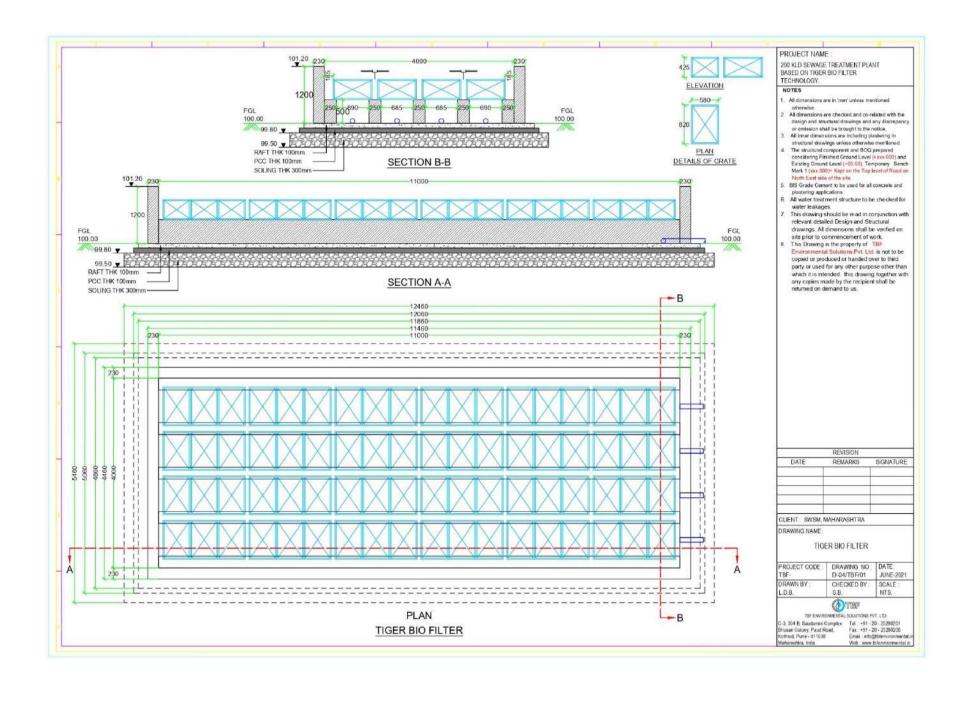
#### **MEASUREMENT SHEET - PLUMBING**

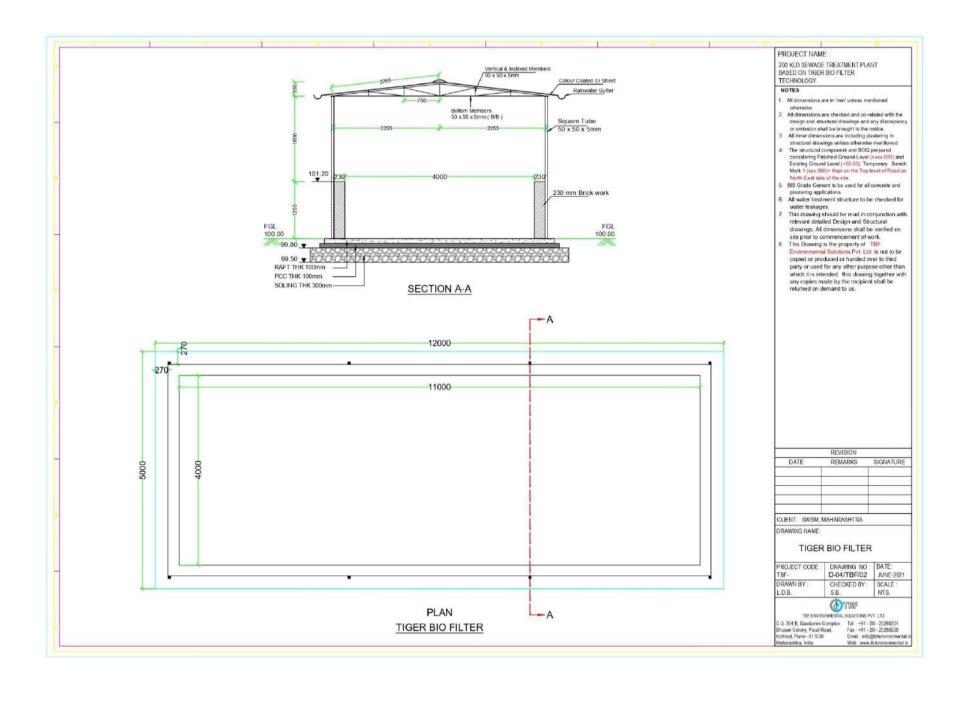
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming					
	for IS- 14846 including worn gear arrangements					
	as per test pressure, stainless steel spindle, caps,					
	including inspection charges, transportation upto					
	departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc.					
	complete.					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES , Page no. 132					
	Raw Sewage pump					
	80 mm.	2			2	Nos
	Filter Feed Pump					
	80 mm.	2			2	Nos
7	Reflux valves (non-return valves )					
	Providing and supplying ISI mark CI D/F reflux					
	valves (non-return valves ) of following dia					
	including railway freight, inspection charges,					
	unloading from railway wagon, loading into truck, transportation upto departmental stores,					
	unloading, stacking excluding GST levied by GOI					
	& GOM in all respect etc. complete. Reflux					
	valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES , Page no. 131					
	Raw Sewage pump					
	80 mm.	2			2	Nos
	Filter Feed Pump			_		
	80 mm.	2			2	Nos

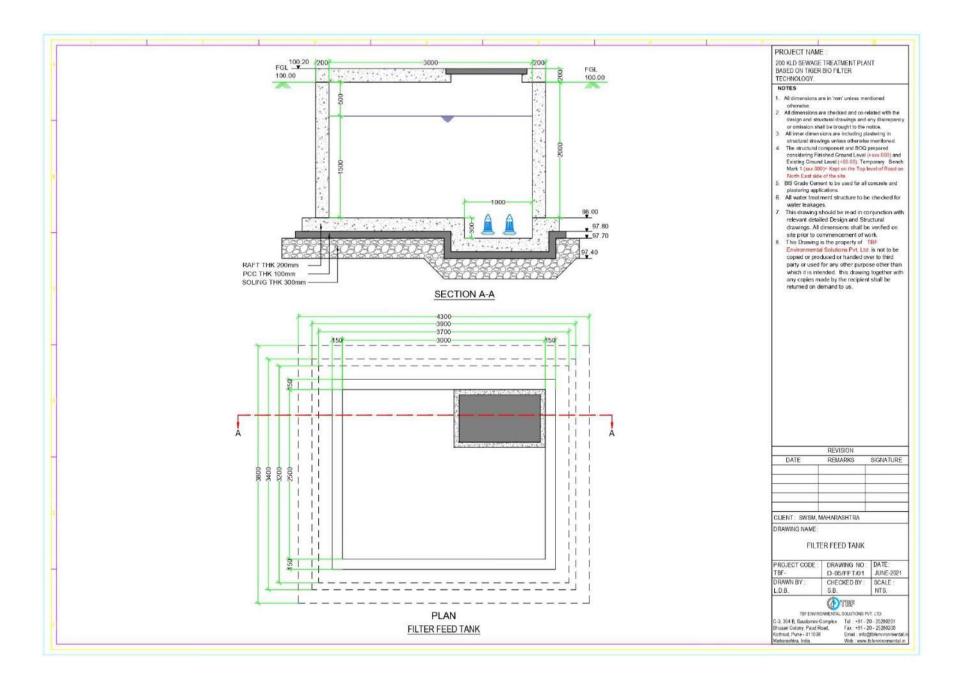


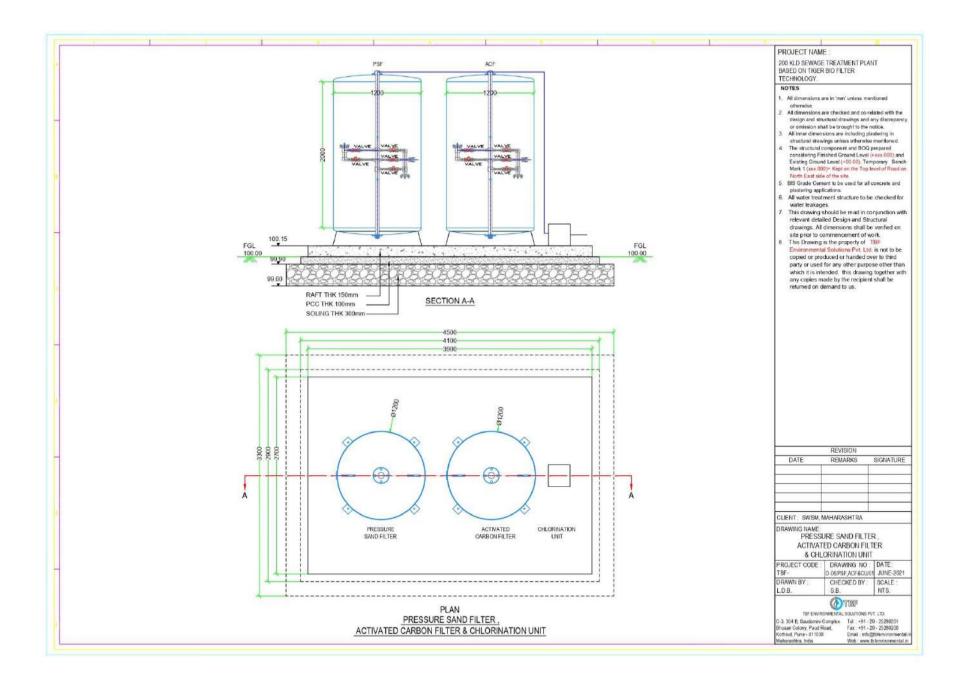












# 300 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 300 KLD CAPACITY

	Design flow	=	<b>300.00</b> 0.300	KLD MLD
	Peak flow factor	=	3.00	
1	SCREEN CHANNELS: MANUAL			
	No. of Manual Screen	=	1	No.
	Average Flow	=	0.30	MLD
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
		=	0.90	MLD
		=	37.50	m³/hr
		=	0.010	m³/sec
	Average Flow	=	0.30	MLD
		=	12.500	m³/hr
		=	0.003	m³/sec
	Design Flow in each Screen	=	0.010	m³/sec
			1	No.
		=	0.010	m³/sec
	Average Flow in each Screen	=	0.003	m³/sec
			1	No.
		=	0.003	m³/sec
	Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	Clear Area of Opening through Screen for Peak Flow	=	0.010	m³/sec
	Screen for Peak Flow		1.2	m/sec
		=	0.008	$m^2$
	Clear Area of Opening through	=	0.003	m³/sec
	Screen for Average Flow		0.6	m/sec
		=	0.005	$m^2$
	Considering maximum Area of Opening through Screen	=	0.008	$m^2$
	Clear Spacing of Bars	=	10	mm
	Cloal Opacing of Dais	_	10	111111

Thickness of Bars	=	5	mm	
Gross Area of Screen	=	0.008x(10+5)/10		
3.000 7.100 G. 30.0011	=	0.012	$m^2$	
Assuming Depth of Screen Channel	=	200.00	mm	
Gross Width of Screen	=	0.012/0.2		
	=	0.060	m	
No. of Bars	=	(Gross Width of Scree	n / Center to	Center
		Spacing of Bars) - 1 0.06/((10+5)/1000		
	=	)-1		
	=	3.0	Nos.	
Say	=	3	Nos.	
Width of Screen provided	=	(Number of Bars+1) x		g + (Number of
, , , , , , , , , , , , , , , , , , , ,	=	Bars x Bar Thickness) (3+1)x10+(3x5)		
	=	55	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel	=	0.20	m	
provided L:B	=	4.00		
Length of Screen Channel provided	_	2.00	m	
Longin of Corcon Chamier provided			•••	Invert Depth
Freeboard provided	=	1.00	m	of incoming sewer
Total Depth of Screen Chamber	=	1.20	m	
Velocity in Channel at Average Flow	=	Average Flow / Cross Channel	Sectional Are	ea of Screen
	=	0.003/((0.5x0.2)/1000	<b>k</b> 1000)	
	=	0.030	m/sec	
	>	0.300	m/sec	
Head Loss across Screen				
Head Loss across Screen	=	0.0728 (V <sup>2</sup> - v <sup>2</sup> )		
V = Velocity through Screen at	=	Peak Flow through So		
	=	Peak Flow through So of Opening	g through Scr	
V = Velocity through Screen at Peak Flow		Peak Flow through So of Opening 1.250	through Scr m/sec	een
V = Velocity through Screen at	=	Peak Flow through So of Opening 1.250 Peak Flow through Sectional Area	g through Scr m/sec Screen Char	een nnel / Cross
<ul><li>V = Velocity through Screen at Peak Flow</li><li>v = Velocity in approach Channel at Peak Flow</li></ul>	=	Peak Flow through So of Opening 1.250 Peak Flow through	g through Scr m/sec Screen Char	een nnel / Cross
<ul><li>V = Velocity through Screen at Peak Flow</li><li>v = Velocity in approach Channel at</li></ul>	= =	Peak Flow through So of Opening 1.250 Peak Flow through Sectional Area	g through Scr m/sec Screen Char a of Screen C	een nnel / Cross
<ul><li>V = Velocity through Screen at Peak Flow</li><li>v = Velocity in approach Channel at Peak Flow</li><li>Head Loss across Screen at Peak</li></ul>	= = =	Peak Flow through So of Opening 1.250 Peak Flow through Sectional Area 0.8	g through Scr m/sec Screen Char a of Screen C m/sec	een nnel / Cross
<ul> <li>V = Velocity through Screen at Peak Flow</li> <li>v = Velocity in approach Channel at Peak Flow</li> <li>Head Loss across Screen at Peak Flow</li> <li>Head Loss across Screen at 50%</li> </ul>	= = =	Peak Flow through So of Opening 1.250 Peak Flow through Sectional Area 0.8	g through Scr m/sec Screen Char a of Screen C m/sec	een nnel / Cross
V = Velocity through Screen at Peak Flow  v = Velocity in approach Channel at Peak Flow  Head Loss across Screen at Peak Flow  Head Loss across Screen at 50% Clogged Condition  Velocity through Screen at 50% Clogged Condition at Peak Flow Head Loss across screen at 50%	= = =	Peak Flow through So of Opening 1.250 Peak Flow through Sectional Area 0.8 0.063	g through Scr m/sec Screen Char a of Screen C m/sec m	een nnel / Cross
V = Velocity through Screen at Peak Flow  v = Velocity in approach Channel at Peak Flow  Head Loss across Screen at Peak Flow  Head Loss across Screen at 50% Clogged Condition  Velocity through Screen at 50% Clogged Condition at Peak Flow	= = =	Peak Flow through So of Opening 1.250 Peak Flow through Sectional Area 0.8 0.063	g through Scr m/sec Screen Char a of Screen C m/sec m	een nnel / Cross

Average Flow	=	0.30	MLD
Peak Flow Factor	=	3.00	
Design Flow	=	Peak Flow	
Peak Flow	=	0.90	MLD
	=	900	m³/day
	=	38	m³/hr
	=	0.010	m³/sec
Design Flow to each Grit Chamber	=	900/1	
	=	900	m³/day
	=	38	m³/hr
	=	0.010	m³/sec
According to CPHEEO Manual			
Particle Size	=	0.15	mm
Specific Gravity	=	2.65	
Surface Overflow Rate for 100% removal efficiency in an ideal Grit Chamber	=	Settling Velocity	of the minimum size of Particles to be removed
	=	1.5	m/s
	=	1296	m <sup>3</sup> /m <sup>2</sup> /day
Considering Efficiency of removal of	_	750/	
desired Particles, $\eta = 75\%$	=	75%	
and Measure of Settling Basin			
Performance,	=	0.125	
n = 1/8 for very good performance			2. 2
Design Overflow Rate	=	857	m <sup>3</sup> /m <sup>2</sup> /day
Surface Overflow Rate for 0.15 mm			3, 2,,
dia. Particle Size with Specific	=	1555	m <sup>3</sup> /m <sup>2</sup> /day
Gravity $S_s > 2.65$ Table 5.6			2. 2
Considering Design Overflow Rate	=	960	m <sup>3</sup> /m <sup>2</sup> /day
			2
Area of Grit Chamber required	=	900	m³/day
		960	m³/m²/day
			2
	=	0.94	m <sup>2</sup>
L:B ratio	=	2	
Length of Chamber provided	=	2.50	m
Width of Chamber provided	=	0.70	m
Hydraulic Retention Time (HRT) in Grit Chamber at Peak Flow	=	60	sec
Volume of Grit Chamber required	=	0.01x60	
volume of One Chamber required		0.6	$m^3$
	=	0.0	111
Depth required in Grit Chamber	=	0.6 / (2.5x0.7)	
Dopar roquirou in One Onambor	=	0.07 (2.5x0.7)	m
Say	=	0.40	m
Grit Storage Depth	=	0.25	m
		00	• • •

	Total Liquid Depth required Length of Grit Pit Width of Grit Pit Depth of Grit Pit	= = =	0.65 0.50 0.50 0.30	m m m
	Free Board	=	1.20	m
3	RAW SEWAGE SUMP (WET WELL)			
	No. of Units	=	1	No.
	Average Flow	=	0.30	MLD
		=	12.500 0.0035	m³/hr m3/sec
		=	0.0035	1113/560
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
		=	0.90	MLD
		=	38	m <sup>3</sup> /hr
		=	0.010	m³/sec
	Hydraulic Retention Time (HRT) at Average Flow	=	120	min
	Volume required	=	0.0035 x 120 x 60	
		=	25	$m^3$
	Hydraulic Retention Time (HRT) at Peak Flow	=	Volume / Average F	Flow
		=	42	min
		<	30	min
	Total Volume of Wet Well	=	25	$m^3$
	Side Water Depth (SWD) provided	=	2.00	m
	Plan Area of Wet Well	=	12.60	$m^2$
	Length/width of Sump required	=	3.55	m
	Length/width of Sump provided	=	3.60	m 3
	Volume of Sump provided	=	25.92	m <sup>3</sup>
	Length of Pump Pit Width of Pump Pit	=	1.00 0.50	m m
	Depth of Pump Pit	=	0.30	m
	Free Board		1.20	m
3. 1	DESIGN STATEMENT-RSS E&M			
	Design Considerations			
	Design flow	=	0.30	MLD
	Peak flow factor	=	300.00 3.00	Cum/Day

### Pumping machinery

Friction factor for Fittings in Pressure Mains				
Elbow 90 degrees	=	12		
Friction Factor for each	=	1		
Friction factor for all	=	12		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	7		
Friction Factor for each	=	0.3		
Friction factor for all		2.1		
	=	2. i 1		
Gate valve open Friction Factor for each	=			
	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	17		
Stage		low	ave	peak
Average flow, cum / day	=	0.0	300.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	180	300	600
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0052	0.0052	0.0069
Dia needed, m	=	0.081	0.081	0.094
Dia needed, mm	=	81	81	94
Dia provided, mm (User)	=	90	90	90
Radius, m	=	0.045	0.045	0.045
Radius power 0.63	=	0.142	0.142	0.142
S power 0.54	=	0.036	0.059	0.089
S	=	0.002	0.005	0.011
Slope 1 in	=	480.1	186.4	88.0
length, m	=	40	40	40
Friction in pipeline, m	=	0.1	0.2	0.5
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	17.0	17.0	17.0
Friction in fittings, m	=	0.3	0.9	1.9
Static lift, m	=	3.5	3.5	3.5
Total head, m	=	3.8	4.4	5.4
Efficiency of pumpset	=	0.8	0.8	8.0
Discharge, lps	=	3.1	5.2	10.4
Discharge, Cum/Hr	=	11.3	18.8	37.5
Kw required	=	0.486	0.808	1.613
•		-	-	=

HP required Number of Pumps	= =	1.0 2	1.5 2	2.5 2
TIGER BIO FILTER DESIGN STATEMENT-TBF1- 50	KLD			
Number of pumping hours	=	16	Hrs	
Number of BMF tanks provided	=	6	Nos	
Design flow to each tank	=	50.00	Cum/day	
	=	3.13	Cum/ Hr for 16	6 Hr
	=	0.87	lps	-
Inlat DOD		250.00	or /l	
Inlet BOD	=	250.00	mg/l	
Inlet TSS	=	400.00	mg/l	
BOD load applied	=	12.5	kg/day	(0.5.4.0)
BOD uptake rate	=	0.1	Kg of BOD / Kg of worms	(0.5 - 1.0)
Worms required	=	125	Kg worms	
Sewage application rate	=	1.85	Cum/Sqm/da y	(1 - 2 Cum/Sqm/da y)
Area required	=	27.03	Sqm	у)
Area Provided	=	28	Sqm	
Area of each crate	=	0.4	Sqm	
Number of crates	=	70	Nos	
say	=	72	Nos	
Crate in longitudinal direction	=	18	Nos	
Crate in travers direction	=	4	Nos	
crates provided	=	72	Nos	OK
Width provided	=	4.00	m	
Length required	=	11.00	m	
Depth provided	=	1.2	m	
2 op.ii. provided				
TERTIARY TREATMENT UNIT				
Design Considerations				
Design flow	=	0.30	MLD	
	=	300.00	Cum/Day	
Peak flow factor	=	3.00		
FILTER FEED TANK				
Number of FFT provided	=	1	Nos	
Number of operating hours	=	16	Hrs	
Design flow	=	300.00	Cum/Day	
	_	18.75	Cum/Hr	
	_	0.00521	Cum/Sec	
Hydraulic Retention time	_	60	min	
Volume required	_	18.75	Cum	
Depth	_	2.00	m	
Civil Tanks	_			
Area	=	9.38	Sqm	
Length/Width required	=	3.06	m	
21.9	_	0.00		

Length/Width provided	=	3.50	m
Freeboard provided	=	0.50	m
Volume Provided		24.50	Cum

DESIGN STATEMENT-TTU E&M				
Design Considerations				
Design flow	=	0.30	MLD	
3	=	300.00	Cum/Day	
Peak flow factor	=	3.00	,	
Tour new factor				
Pumping machinery				
Friction factor for Fittings in				
Pressure Mains				
Elbow 90 degrees	=	5		
Friction Factor for each	=	1		
Friction factor for all	=	5		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	5		
Friction Factor for each	=	0.3		
Friction factor for all	=	1.5		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	9.4		
Stage		low	ave	peak
Average flow, cum / day	=		300.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	180	300	600
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.8	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0039	0.0052	0.0069
Dia needed, m	=	0.071	0.081	0.094
Dia needed, mm	=	71	81	94
Dia provided, mm (User)	=	75	75	75
Radius, m	=	0.038	0.038	0.038
Radius power 0.63	=	0.126	0.126	0.126
S power 0.54	=	0.053	0.067	0.100
S	=	0.004	0.007	0.014

	Slope 1 in	=	227.8	150.7	71.1
	length, m	=	20	20	20
	Friction in pipeline, m	=	0.1	0.1	0.3
	Velocity head, m	=	0.033	0.051	0.115
	Frction factor in fittings	=	9.4	9.4	9.4
	Friction in fittings, m	=	0.3	0.5	1.1
	Static lift, m	=	8.0	8.0	8.0
	Total head, m	=	8.3	8.5	9.1
	Efficiency of pumpset	=	0.8	0.8	0.8
	Discharge, lps	=	3.1	5.2	10.4
	Discharge, Cum/Hr	=	11.3	18.8	37.5
	Kw required	=	0.833	1.386	2.765
	HP provided	=	1.5	2.0	4.0
	Number of Pumps	=	2	2	2
2	PRESSURE SAND FILTER				
	Number of unit provided	=	1	Nos.	
	Designed @ 16 hrs working for flow of	=	18.75	m3/h	
	Loading rate	=	12.00	m3/m2/h	
	Area of DMF		1.56	m2	
	Dia of DMF	=	1.36		
		=		m	
	Provided	=	1.500	m	
	Backwash water		45.00	4	
	Backwash velocity	=	15.00	m/hr	
	backwash flowrate	=	24.91	m3/h	
	Backwash volume for 20 mins	=	8.30	m3	
3	ACTIVATED CARBON FILTER				
	Number of unit provided	=	1	Nos.	
	Designed @ 16 hrs working for		40.75	O /ln	
	flow of	=	18.75	m3/h	
	Loading rate	=	12.00	m3/m2/h	
	Area of ACF	=	1.56	m2	
	Dia of ACF	=	1.41	m	
	Provided	=	1.500	m	
	Backwash water				
	Backwash velocity	=	15.00	m/hr	
	backwash flowrate	=	24.91	m3/h	
	Backwash volume for 20 mins	=	8.30	m3	
4	CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM				
	Average Flow	=	18.75	m3/hr	
		_			
	Design Chlorine Dosage (Max)	_	3	mg/l	
		=			
	Concentration of Chlorine in commercially available NaOCI	=	10%		

Design NaOCI Dosage	=	30	mg/l
Operating hours	=	16.0	hr
Quantity of NaOCI required	=	18.75 X 30 X	16 / 1000
	=	9.00	Kg/day
Design Strength of NaOCl Solution	=	100%	
Volume of NaOCI Solution	=	9 / (1 X 10	000)
	=	0.010	m3
No. of Dosing Tanks provided	=	1	Nos.
Volume of each Dosing Tank	=	0.01 / 1	
	=	0.01	m3
	=	100	Litres
No. of Working NaOCI Dosing Pump provided	=	1	No.
Capacity of each NaOCI Dosing Pump required	=	Total Volume of Na (No. of Dosing	
	=	0.01 / ( 1 X 16 )	
	=	0.001	m3/hr
	=	1.00	LPH
Capacity of each NaOCI Dosing Pump provided	=	1.00	LPH
No. of Standby NaOCI Dosing Pump provided	=	1	No.

## SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 300 KLD CAPACITY

S I.	Unit name	N o	Leng th	Widt h		Height		So	oling	P(	cc	Ra	oft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	<b>5</b>	+bk		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	2.0	0.5	0.2	1.0	1.2	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	2.5	0.7	0.6	1.2	1.8	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
3	Raw Sewage Sump	1	3.6	3.6	2.0	1.2	3.2	0.2	0.3	0.1	0.1	0.2	0.3	0.2		0.2	100
4	TBF Bed 50 KLD	6	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	3.5	3.5	2.0	0.5	2.5	0.2	0.3	0.1	0.1	0.2	0.2	0.2		0.2	100
6	Filter Platform	1	2.6	4.1				0.2	0.3	0.1	0.1	0.2	0.1				60

#### Assumptions

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound strata		soil	Muru	Soft roc	har d	Tota I
0.0 to 1.5 m	=	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

### TIGER BIO FILTER OF 300 KLD CAPACITY BILL OF QUANTITIES

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
1	Excavation for foundation / pipe trenches in earth, soils of all types, sand, gravel and soft murum, including removing the excavated material upto a distance of 50 metres and lifts as below, stacking and spreading as directed, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-1/259)				
	0.0 to 1.5 m	100.24	Cum	150.00	15,036.00
	1.5 to 3.0 m	33.56	Cum	164.00	5,503.90
	3.0 to 4.5 m	10.57	Cum	178.00	1,881.50
	4.5 to 6.0 m	0.00	Cum	192.00	0.00
	MJP/ SSR/ 2021-22 / Section E / Excavation Item No.1/ Page no. 42				
2	Excavation for foundation / pipe trenches in hard murum and boulders, W.B.M. road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking and spreading as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-3/259)			8.00	
	0.0 to 1.5 m	100.24	Cum	192.00	19,246.10
	1.5 to 3.0 m	33.56	Cum	206.00	6,913.40
	3.0 to 4.5 m	10.57	Cum	220.00	2,325.40
	4.5 to 6.0 m  MJP/ SSR/ 2021-22/ Section E/ Excavation Item No.3, Page no. 42	0.00	Cum	234.00	0.00
3	Excavation for foundation / pipe trenches in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A- 4/259)				
	0.0 to 1.5 m	100.24	Cum	572.00	57,337.30
	1.5 to 3.0 m	33.56	Cum	597.00	20,035.40
	3.0 to 4.5 m	10.57	Cum	622.00	6,574.60
	4.5 to 6.0 m  MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.5, Page no. 42	0.00	Cum	647.00	0.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below, stacking as directed by Engineer-in-charge,				
	normal dewatering, excluding backfilling, etc. complete by all means. (Bd-A-6/259)				
	0.0 to 1.5 m	100.24	Cum	1,017.00	101,944.10
	1.5 to 3.0 m	33.56	Cum	1,042.00	34,969.60
	3.0 to 4.5 m	10.57	Cum	1,067.00	11,278.20
	4.5 to 6.0 m	0.00	Cum	1,092.00	0.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43				
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)  MJP/ SSR/ 2021-22 / Section E/	144.71	Cum	1,175.00	170,034.30
	Excavati				
6	Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN	43.05	Cum	5,640.00	242,802.00
	REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.1, Page no.49				
	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	46.88	Cum	7,448.00	349,162.30
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY		33711	.,	3.0,.02.00
	MIX CONCRETE/ Item No.2, Page no. 49				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or				
	Tor reinforcement)	0.86	Cum	8,624.00	7,416.70
	For Beams / Braces / Lintels In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50				
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	5.57	Cum	9,247.00	51,505.80
	Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300	5.57	Juli	5,217.00	01,000.00
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or				
	Tor reinforcement)  Chajjas / Parapets / Curtain Walls	19.56	Cum	9,218.00	180,304.10
	/Partition Walls / Pardies In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)				
	c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY  MIX CONCRETE Item No.8 / Page no. 52	5.83	MT	70,658.00	411,936.20
12	Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U- 1/537)	7.06	Sqm	1,895.00	13,378.70
	MJP/ SSR/ 2021-22 / SECTION - F : IRON AND STRUCTURAL STEEL WORK Item No.1 / Page				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-in-charge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C- 3/275)				
	MJP/ SSR/ 2021-22 / SECTION - F :: IRON AND STRUCTURAL STEEL WORK Item No.3,	4.48	MT	71,286.00	319,521.00
14	Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sq.m.).	452.40	Sqm	777.00	351,514.80
	PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224	102.10	Oqiii	777.00	301,011.00
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete  PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by engineer incharge and BDG- 2 and 5 Item	89.22	Cum	6,305.00	562,532.10
	No.893, Page no. 190				
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference No. Bd. L.2 Page No. 368 Item No.950,	489.90	Sqm	257.00	125,904.30
	Page no. 201				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding				
	and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201	285.00	Sqm	529.00	150,765.00
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.	285.00	Corre	10.00	2.050.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411	265.00	Sqm	10.00	2,850.00
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.	285.00	Sqm	8.00	2,280.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412	200.00	oqiii	0.00	2,200.00
20	Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-incharge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)	04.00	HP/	77.00	4.000.00
	MJP/ SSR/ 2021-22 / Section E/ Excavat	64.00	Hr.	77.00	4,928.00
0.1	Defilies the transfer of 9.11				
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/ Excavat	250.32	Cum	84.00	21,026.90
22	Transportation as per STATEMENT VI Including loading, unloading and stacking Earth (4.8 Cum) lead 15 Km	457.87	Cum	604.45	276,759.60

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
23	Screen (Manual) of size 1.7 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90				
	degree bend.	0.85	Sqm	35,000.00	29,750.00
24	Grit pump				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.7 m length				
	1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00
25	Raw Sewage Pumps				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	3 HP (Up to 18000 LPH)	2.00	Nos	90,830.00	181,660.00
	0111 (Op to 10000 E111)	2.00	1403	30,000.00	101,000.00
26	TTU Feed pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	3 HP (Up to 18000 LPH)	2.00	Nos	90,830.00	181,660.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.5 m x 2 m minimum height	1.00	Nos	372,000.00	372,000.00
	<u> </u>			,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
28	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.5 m x 2 m minimum height	1.00	Nos	372,000.00	372,000.00
29	NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency				
	Mixing Tank of 100 Ltrs capacity	100.00	Ltrs	8.00	800.00
	Dosing Pump	2.00	Nos	15,000.00	30,000.00
30	Control Panel				
	Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter ,for all pumps installed.  MJP/ MECH/ ELECT / SSR/ 2021-22/	1.00	No	50,041.00	50,041.00
	SECTION 19 - SA [ SCADA & AUTOMATION]				
31	Supplying and erecting Fully Automatic Star				
31	Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.  > 7.5 HP & Up to 12.5 HP	6.00	nos	7,150.00	42,900.00
	- 1.0 111 a op to 12.0 111	5.00	1100	7,100.00	۰،۲۷,000.00

Sr.				ı	
No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP /MECH/ ELECT/ SSR/ 2021-22				
	SECTION 10 - LG [L.T. SWITCHGEAR AND				
	PROTECTION] Item no. LG 3 Page no. 27				
32	Main power supply cable				
	3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable				
	Supplying and erecting, Flat flexible				
	submersible cable with, Copper Conductor,				
	PVC insulated, and PVC sheathed.				
	3 core 16 sq mm	25.00	m	549.00	13,725.00
33	Power cables				
	Aluminium conductor 4 Core, XLPE /				
	PVC insulated & armoured cable				
	Supplying and erecting, XLPE / PVC				
	insulated, armoured cable 1100 V grade with				
	ISI mark Four core, solid / stranded				
	aluminium conductor with 6 mm thick 25 mm				
	width M.S. spacer with				
	G.I. Earth wire 6 sq mm, complete erected on wall / on pole with 25 X 3 mm M.S. clamps or				
	in provided trench in an approved manner.				
	4 Core 6 sq mm	105.00	m	137.00	14,385.00
	MJP MECH/ ELECT/ SSR/ 2021-22			707700	,
	SECTION				
	12 - CB [ L.T. CABLE ] Item no. CB 6 Page				
34	Control Cables				
	Copper conductor PVC insulated,				
	Unarmoured control cable				
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper				
	conductor 1.1 kV grade complete erected on				
	wall / panel or in provided trench in an				
	approved manner.				
	4 core 2.5 sq mm	105.00	m	137.00	14,385.00
	MJP MECH/ ELECT/ SSR/ 2021-22/				
	SECTION 12 - CB [ L.T. CABLE ] Item no. CB				
	8-				

35 Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect,	Amount (Rs.)
ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect,	
suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect,	
cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect,	
per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect,	
l la divella a la company a (la company a (la company) a la company a la company a la company a la company a company a la	
including transportation, freight charges,	
inspection charges, loading, unloading, conveyance to the departmental stores and	
stacking the same in closed shed duly	
protected from sun rays and rains including	
cost of jointing material i.e. solvent cement,	
etc. complete (selffit type to be jointed with	
cement solvent).	
1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose	
only.	
2) One coupler and required cement solvent	
shall be provided with each full length pipe	
cost of which is included in rates below.	
MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C.	
PIPES, Page no.77	
1 Raw Sewage pump to TBF Distribution	
a Main header	12 120 00
90 mm. 40.00 m 303.00 PVC Specials- 10%	12,120.00 1,212.00
1 ve eposiale 1070	1,212.00
b Distribution	
63 mm. 50.00 m 149.00	7,450.00
PVC Specials- 10%	745.00
2 TBF collection to FFT (gravity)	
a Main header	
110 mm. 80.00 m 428.00	34,240.00
PVC Specials- 10%	3,424.00
b collection tributory	
75 mm. 20.00 m 211.00	4,220.00
PVC Specials- 10%	422.00
2 TTU Diversion	
3   TTU Plumbing	4 220 00
75 mm.   20.00 m   211.00   PVC Specials- 10%	4,220.00 422.00
1.10 00001010 1070	722.00
4 TBF distribution	
63 mm. 30.00 m 149.00	4,470.00
PVC Specials- 10%	447.00
36 Labour	
Plumber   14.00 days   641.00	8,974.00
Helper   21.00 days   579.00	12,159.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / SECTION - B LABOUR & MACHINERY , Page no. 14				
37	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.				
	Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump	0.00	<b>.</b>	0.005.00	40.070.00
	100 mm.	2.00	Nos	6,835.00	13,670.00
	Filter Feed Pump 80 mm.	2.00	Nos	5 122 00	10 264 00
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132	2.00	INOS	5,132.00	10,264.00
38	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)				
	Without by pass arrangement -PN -1				
	Raw Sewage pump				
	100 mm.	2.00	Nos	5,713.00	11,426.00
	Filter Feed Pump				
	80 mm.  MJP/ SSR/ 2021-22 / SECTION - I(XII):  PIPES APPURTENANCES, Page no. 131	2.00	Nos	4,092.00	8,184.00
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as	100			
	directed etc. complete.  Market rate	432.00	Nos	4,750.00	2,052,000.00
40	David and Consider filters and At				
40	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, MJP/ SSR/ 2021-22 / SECTION- A	41.10	Cum	1,730.00	71,103.00
	MATERIALS				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
41	Trasnsportation Godhara to Pune distance by Road 660 Km.	41.10	Cum	11,031.37	453,389.40
	MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.				
42	Stone Aggregate 20 mm  MJP/ SSR/ 2021-22 / SECTION- A	41.10	Cum	900.00	36,990.00
	MATERIALS				
43	Transportation as per STATEMENT VI Including loading, unloading and stacking				
	Manure or sludge (5.52 Cum) lead 25 Km MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.	158.70	Cum	747.48	118,625.10
			NET	TOTAL Rs.	7,769,803.80

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				2.40		
Α	0.0 to 1.5 m	1	5.70	2.90	1.5	24.8	Cum
	soil					6.2	Cum
	Murum					6.2	Cum
	Soft rock					6.2	Cum
	hard rock					6.2	Cum
1	15.00						
В	1.5 to 3.0 m	1	5.7	2.90	0.9	14.88	Cum
	soil					3.72	Cum
	Murum					3.72	Cum
	Soft rock					3.72	Cum
	hard rock					3.72	Cum
С	3.0 to 4.5 m	1	4.7	2.40	0	0	Cum
	soil	-	4.7	2.40	U	0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
	TIAIG TOCK	+ +				0	Cum
D	4.5 to 6.0 m	1	4.7	2.40	0	0	Cum
	soil	<del>'</del>	1.,	2.10		0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	Screen	1	3.20	1.20	0.30	1.16	Cum
	Grit	1	3.70	0.70	0.30	0.78	Cum
	extra for grit chamber	1	0.50	0.60	0.30	0.09	Cum
				Total for gri	t	0.87	Cum
3	PCC M20						
	Screen	1	2.80	1.00	0.10	0.28	Cum
	Grit	1	3.30	0.70	0.10	0.24	Cum
		1	0.50	0.40	0.20	0.04	Cum
	Internal slope	1	Area	0.14	0.70	0.11	Cum
	Internal slope	1	Area	0.07	0.70	0.06	Cum
				Total for gri	t	0.45	Cum
_	D (1100						
4	Raft M30						
	Screen	1	2.60	0.90	0.15	0.36	Cum
	Grit	1	3.10	0.70	0.15	0.33	Cum
		1	0.50	0.30	0.15	0.03	Cum
_	DOO Wall			Total for gri	t	0.36	Cum
5	RCC Wall						
	Screen		0.00	0.40	4 40	0.00	<b>O</b> 1
	Long Wall	2	2.20	0.10	1.40	0.62	Cum

Sr.	Kara Basadadan	NI	1 ()	D ()	11 ()	0	11
No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Short Wall	2	0.70	0.10	1.40	0.2	Cum
				Total for so	reen	0.82	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	0.50	0.10	2.05	0.11	Cum
	Short Wall	2	0.70	0.10	2.05	0.29	Cum
				Total for gr	it	0.4	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	80	Cum	1.94	0.16	MT
	Fabrication work in Frame and						
7	Grating for Access						
	Screen	1	2.20	0.70		1.54	Sqm
	Grit	1	2.70	0.80		2.16	Sqm
					Total	3.7	Sqm
8	Removing excess exacavated material out of site						
	Screen chamber	1	2.20	0.70	1.20	1.85	Cum
	Grit Chamber	1	2.70	0.70	1.85	3.5	Cum
	soling, PCC, Raft volume					3.31	Cum
	Total Volume					8.66	Cum
	bulkage @ 40%					12.13	Cum
9	Refilling and compaction						
	Total Excavation					39.68	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					8.66	Cum
	Refilling and compaction volume					31.02	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				3.90		
Α	0.0 to 1.5 m	1	7.6	7.60	1.5	86.64	Cum
	soil					21.66	Cum
	Murum					21.66	Cum
	Soft rock					21.66	Cum
	hard rock					21.66	Cum
В	1.5 to 3.0 m	1	6.60	6.60	1.5	65.34	Cum
	soil					16.34	Cum
	Murum					16.34	Cum
	Soft rock					16.34	Cum
	hard rock					16.34	Cum
С	3.0 to 4.5 m	1	6.60	6.60	0.9	39.21	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					9.81	Cum
	Murum					9.81	Cum
	Soft rock					9.81	Cum
	hard rock					9.81	Cum
D	4.5 to 6.0 m	1	5.60	5.60	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	RSS	1	5.00	5.00	0.30	7.5	Cum
3	PCC M20						
	RSS	1	4.60	4.60	0.10	2.12	Cum
4	Raft M30						
4	RSS	1	4.40	4.40	0.30	5.81	Cum
	100	'	4.40	4.40	0.30	5.61	Culli
5	RCC Wall				0.10		
	Long Wall	2	4.00	0.20	3.40	5.44	Cum
	Short Wall	2	3.60	0.20	3.40 Total	4.9 10.34	Cum Cum
					Total	10.01	Cum
6	Beams						
	Beam 1	1	3.60	0.2	0.3	0.22	Cum
	Beam 2	1	3.60	0.2	0.3	0.22	Cum
					Total	0.44	Cum
7	Slab	1	4.00	4.00	0.2	3.2	Cum
	Deduction for manhole	-2	1.20	0.70	0.2	-0.34	Cum
					Total	2.86	Cum
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	19.45	1.95	MT
	Entrication work in France and	+					
9	Fabrication work in Frame and Grating for Access						
	RSS	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	RSS	1	4.00	4.00	3.20	51.2	Cum
	soling, PCC, Raft volume					15.43	Cum
	Total Volume					66.63	Cum
	bulkage @ 40%					93.29	Cum
11	Refilling and compaction						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					191.19	Cum
	Deduction for tank volume, soling, PCC, Raft					66.63	Cum
	Refilling and compaction volume					124.56	Cum
12	Dewatering						
	8 Days x 4 hours/day	days	8	hours / day	4	32	Hrs

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
2	Soling						
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
	TBF	1	12.06	5.06	0.10	6.11	Cum
A	Doff MOO						
4	Raft M30	4	44.00	4.00	0.10	r 77	Cura
	TBF	1	11.86	4.86	0.10	5.77	Cum
5	Brick Wall						
5	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
	Orace Support Wall		11.00	0.20	Total for	T 14.87	Cum
					1 otal 101	1 14.07	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	
	Short Wall	2	4.00		1.20	9.6	Sqm
					Total	81.65	Sqm
	External						
	Long Wall	2	11.46		1.20	27.51	Sqm
	Short Wall	2	4.46		1.20	10.71	Sqm
	Wall Top	1	30.92	0.3		9.28	Sqm
					Total	47.50	Sqm
	Fortonia I code!					47.50	
7	External-white-wash	1				47.50	Sqm
8	External colour wash	1				47 FO	Sam
0	External-colour-wash					47.50	Sqm
9	Stool HCDM / CDC @ V-/C	Kg/C	00	Cure	F 77	0.05	N 4∓
	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	5.77	0.35	MT
10	Removing excess exacavated						
-	material out of site					00.00	
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m x		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				3.10		
Α	0.0 to 1.5 m	1	6.5	6.50	1.5	63.38	Cum
	soil					15.85	Cum
	Murum					15.85	Cum
	Soft rock					15.85	Cum
	hard rock					15.85	Cum
В	1.5 to 3.0 m	1	6.00	6.00	1.5	54	Cum
	soil					13.5	Cum
	Murum					13.5	Cum
	Soft rock					13.5	Cum
	hard rock					13.5	Cum
С	3.0 to 4.5 m	1	5.50	5.50	0.1	3.03	Cum
	soil					0.76	Cum
	Murum					0.76	Cum
	Soft rock					0.76	Cum
	hard rock					0.76	Cum
D	4.5 to 6.0 m	1	5.50	5.50	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	FFT	1	4.90	4.90	0.30	7.21	Cum
3	PCC M20						
	FFT	1	4.50	4.50	0.10	2.03	Cum
4	Raft M30						
	FFT	1	4.30	4.30	0.20	3.7	Cum
5	RCC Wall						
	Long Wall	2	3.90	0.20	2.70	4.22	Cum
	Short Wall	2	3.50	0.20	2.70	3.78	Cum
					Total	8	Cum
6	Beams						
	Beam 1	1	3.50	0.2	0.3	0.21	Cum
	Beam 2	1	3.50	0.2	0.3	0.21	Cum
					Total	0.42	Cum
7	Slab	1	3.90	3.90	0.2	3.05	Cum
	Deduction for manhole	-	1.20	0.70	0.2	-0.34	Cum
					Total	2.71	Cum

#### MEASUREMENT SHEET - FILTER FEED TANK

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	14.83	1.49	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	FFT	1	3.90	3.90	2.50	38.03	Cum
	soling, PCC, Raft volume					12.94	Cum
	Total Volume					50.97	Cum
	bulkage @ 40%					71.36	Cum
11	Refilling and compaction						
	Total Excavation					120.41	Cum
	Deduction for tank volume, soling, PCC, Raft					50.97	Cum
	Refilling and compaction volume					69.44	Cum
12	Dewatering						
	8 Days x 4 hours/day	days	8	hours/day	4	32	Hrs

#### **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	3.8	5.30	0.55	11.08	Cum
	soil					2.77	Cum
	Murum					2.77	Cum
	Soft rock					2.77	Cum
	hard rock					2.77	Cum
2	Soling						
	Filter Platform	1	3.60	5.10	0.30	5.51	Cum
3	PCC M20						
	Filter Platform	1	3.20	4.70	0.10	1.51	Cum
4	Raft M30						
	Filter Platform	1	3.00	4.50	0.15	2.03	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	60	Cum	2.03	0.13	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					7.02	Cum
	Total Volume					7.02	Cum
	bulkage @ 40%					9.83	Cum
7	Refilling and compaction						
	Total Excavation					11.08	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					7.02	Cum
	Refilling and compaction volume					4.06	Cum

#### **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.	432				432	Nos
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	432	0.82	0.58	0.2	41.1	Cum
3	Trasnsportation Godhara to					41.1	Cum
4	Stone Aggregate 20 mm	432	0.82	0.58	0.2	41.1	Cum
5	Transportation as per STATEMENT VI Including loading,						
	Manure or sludge (5.52 Cum) lead	432	0.82	0.56	0.8	158.7	Cum

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr. No.	Item Description	Nos.	Unit
1	Screen (Manual) of size 1.7 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	1	No
2	Grit pump  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.7 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
3	Raw Sewage Pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7 3 HP (Up to 18000 LPH)	2	Nos
1	TTIL Food numpo		
4	TTU Feed pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7 3 HP (Up to 18000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.5 m x 2 m minimum height	1	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.5 m x 2 m minimum height	1	Nos
7	PurAll Tablet Chlorinator + cartridge	0	nos

#### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr.	Item Description	Nos.	Unit
No.	-		
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz		
а	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
	Booming if unitp		1403
8	Control Panel		
	Design, Supply, Installing, Commissioning & Testing of Master PLC control		
	monitoring and communication panel as per IEC 61131 at Pure Water Sump		
	suitable for monitoring and control of pure water Pumps. Pressure Transmitters,		
	Level Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed.		
	Master PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		
	AUTOMATION ] Item no. 2.7 Page no. 72		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage		
	induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over		
	load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	> 7.5 HP & Up to 12.5 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
10	Main power supply cable		
	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,		
	PVC insulated, and PVC sheathed.	05	
	3 core 16 sq mm	25	m
4.4	Dower applies		
11	Power cables  Aluminium conductor 4 Core, XLDE / DVC insulated 8 armoured cable		
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade		
	with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall /		
	on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	105	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.	105	111
	CB 6 Page no. 35		
	00 01 ago 110. 00		
12	Control Cables		
	Copper conductor PVC insulated, Unarmoured control cable		

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

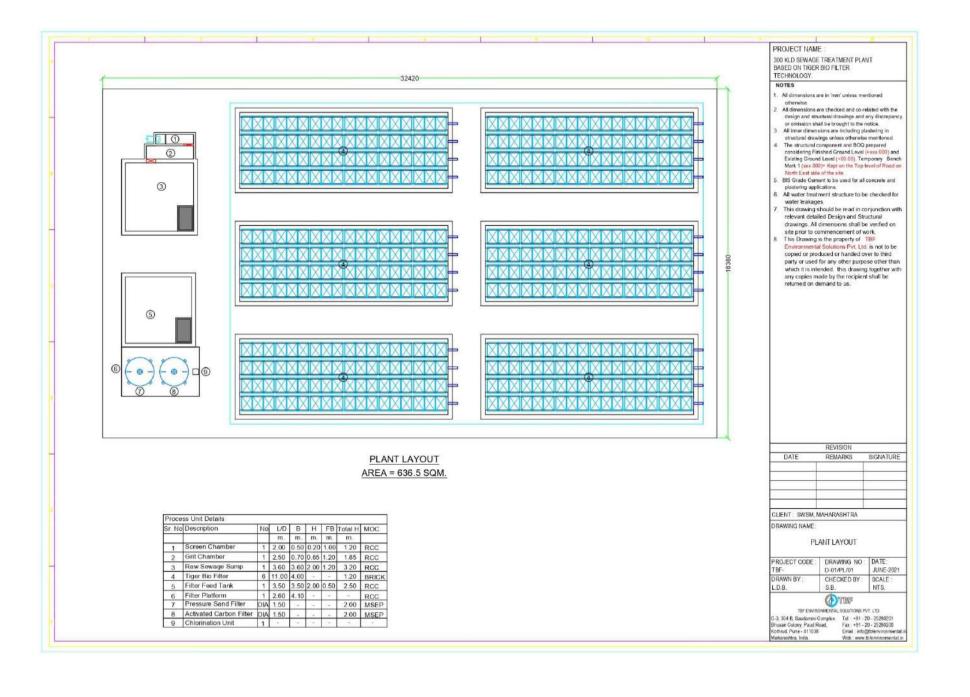
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	105	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

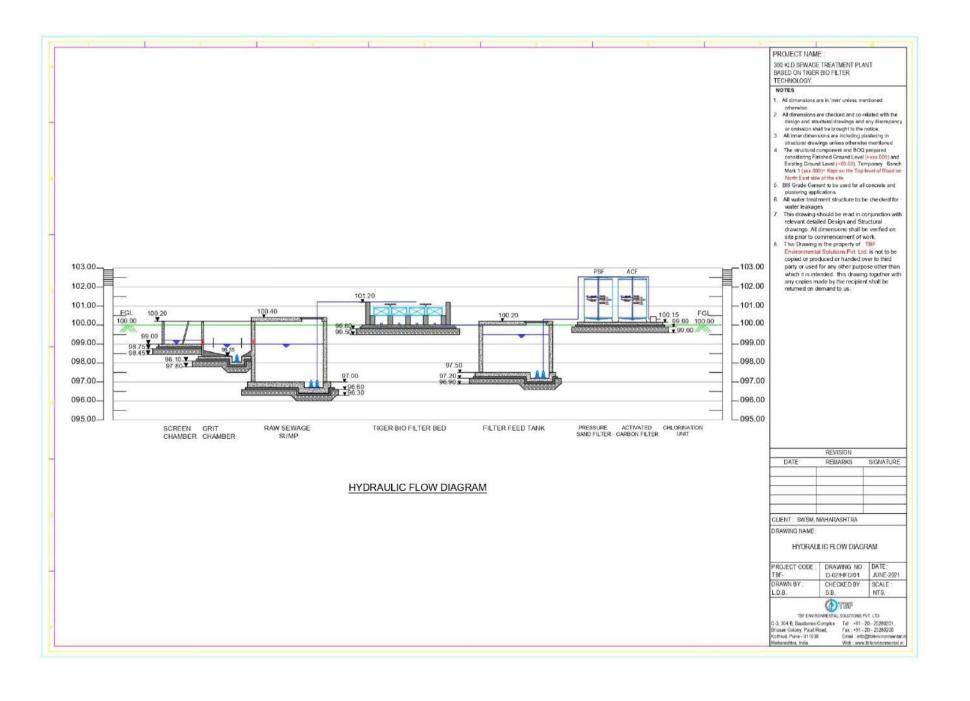
#### **MEASUREMENT SHEET - PLUMBING**

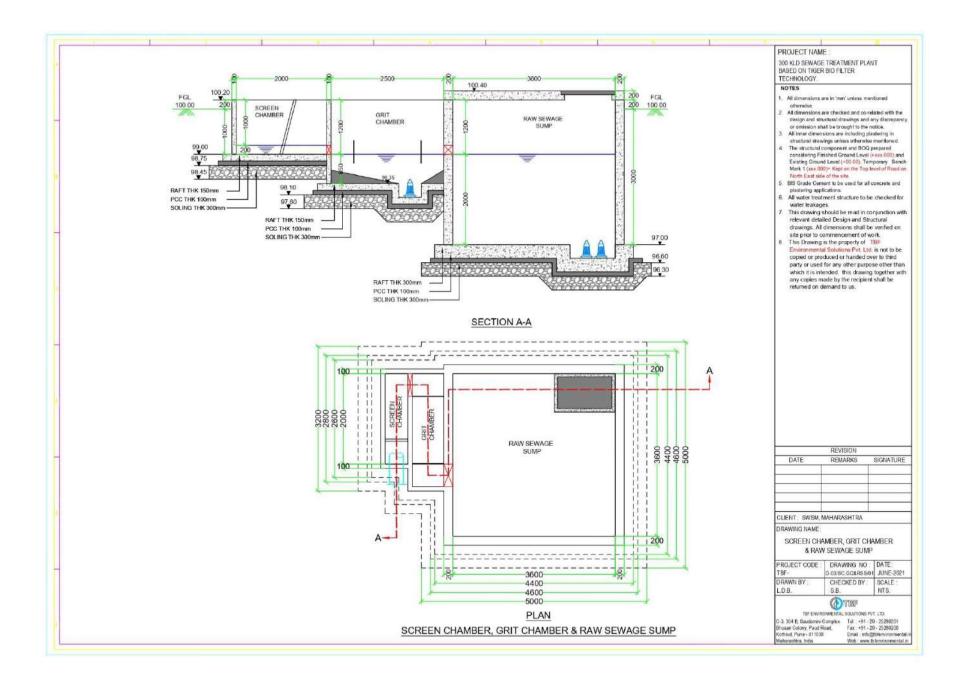
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges, inspection charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed shed duly protected from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit type to be jointed with cement solvent).					
	<ol> <li>1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.</li> <li>2) One coupler and required cement solvent shall be provided with each full length pipe cost of which is included in rates below.</li> </ol>					
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES,					
1	Page no.77 Raw Sewage pump to TBF Distribution					
a	Main header	Dia	90			
<u> </u>	90 mm.	1	40		40	m
	PVC Specials- 10%					
b	Distribution					
	63 mm.	1	50		50	m
	PVC Specials- 10%					
2	TBF collection to FFT (gravity)					
	Main header					
	110 mm.	1	80		80	m
	PVC Specials- 10%					
b	collection tributory		22			
	75 mm.	1	20		20	m
	PVC Specials- 10%					
3	TTU Plumbing	Dia	75			
	75 mm.	1	20		20	m
	PVC Specials- 10%					
4	TBF distribution			No. of be		
	63 mm.	1	5	6	30	m
	PVC Specials- 10%					
5	Labour	Nos	Days			
5	Plumber	2	Days 7		14	days
	Helper	3	7		21	days
	<b>-</b>					
6	Sluice valves					

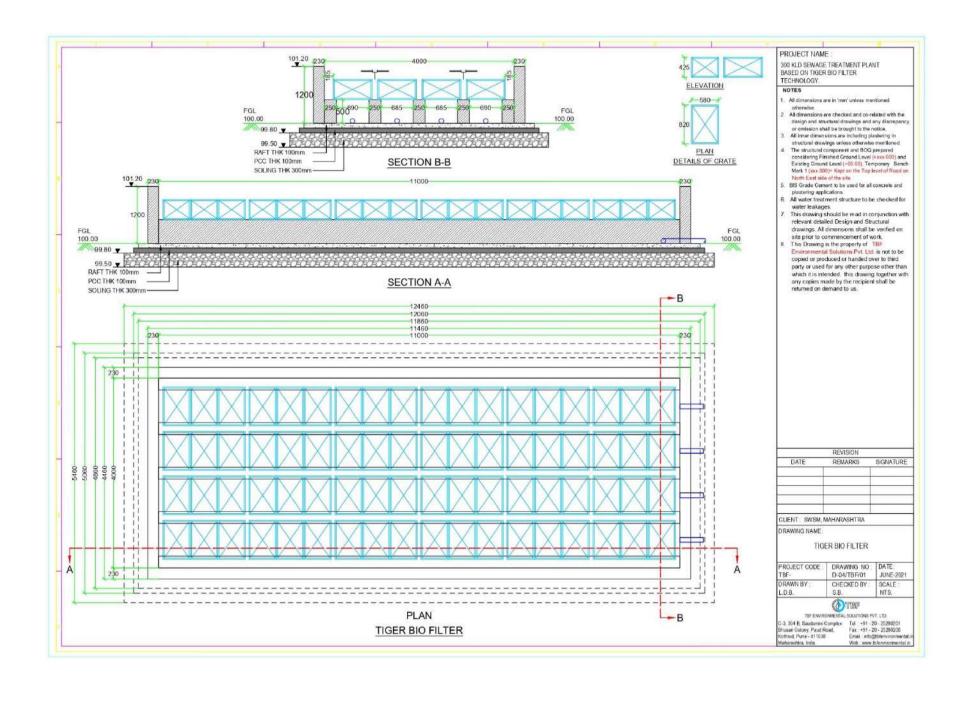
#### **MEASUREMENT SHEET - PLUMBING**

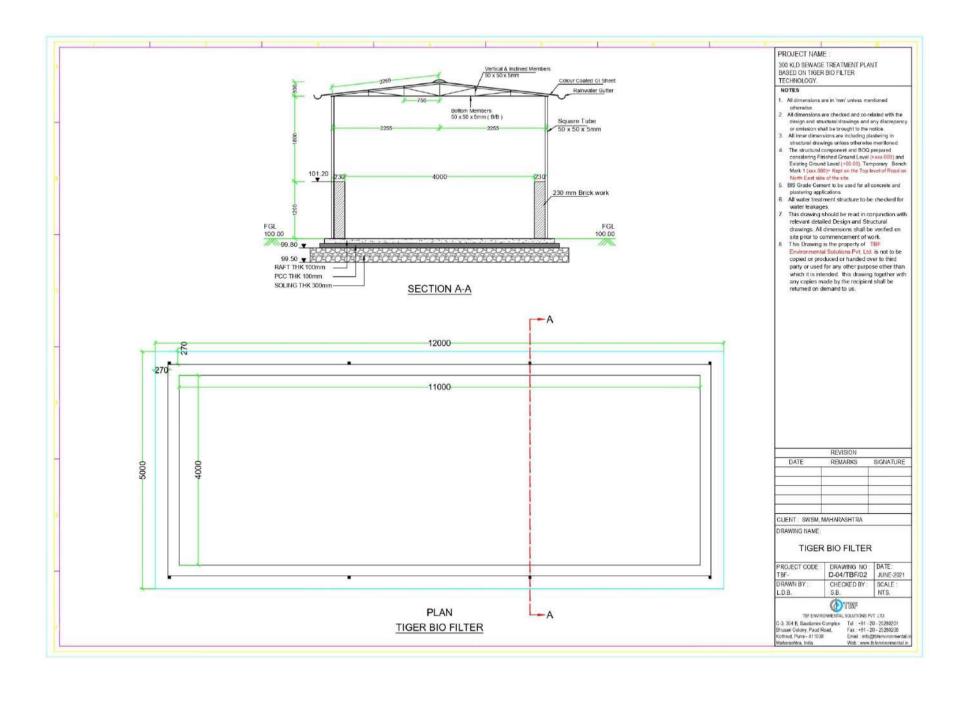
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming					
	for IS- 14846 including worn gear arrangements					
	as per test pressure, stainless steel spindle, caps,					
	including inspection charges, transportation upto					
	departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc.					
	complete.					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES, Page no. 132					
	Raw Sewage pump					
	100 mm.	2			2	Nos
	Filter Feed Pump					
	80 mm.	2			2	Nos
7	Reflux valves (non-return valves )					
	Providing and supplying ISI mark CI D/F reflux					
	valves (non-return valves ) of following dia					
	including railway freight, inspection charges,					
	unloading from railway wagon, loading into truck, transportation upto departmental stores,					
	transportation upto departmental stores, unloading, stacking excluding GST levied by GOI					
	& GOM in all respect etc. complete. Reflux					
	valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES , Page no. 131					
	Raw Sewage pump					
	100 mm.	2			2	Nos
	Filter Feed Pump					
	80 mm.	2			2	Nos

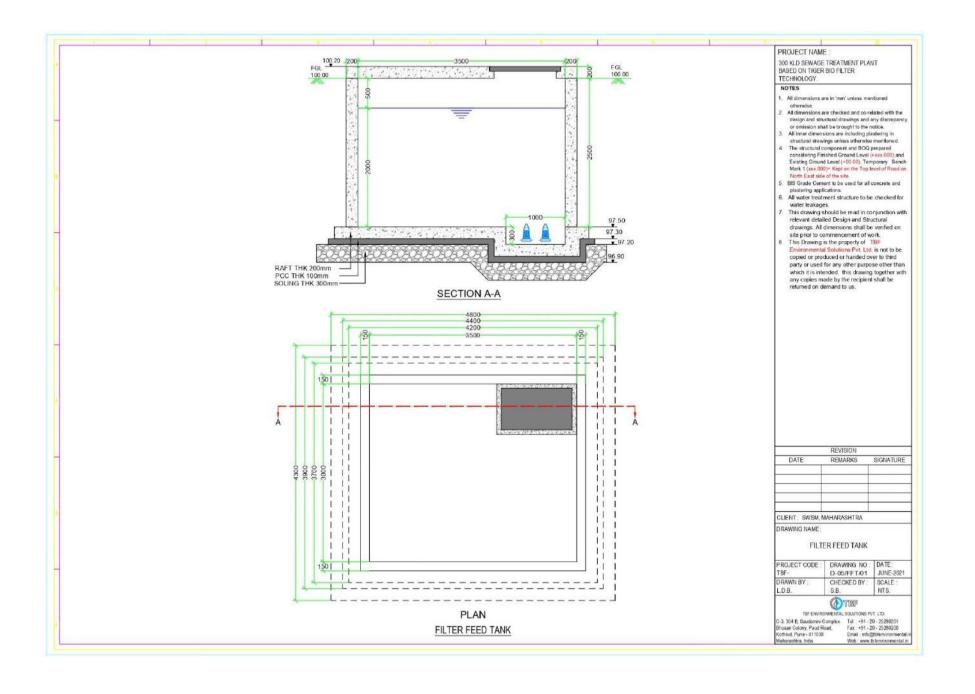


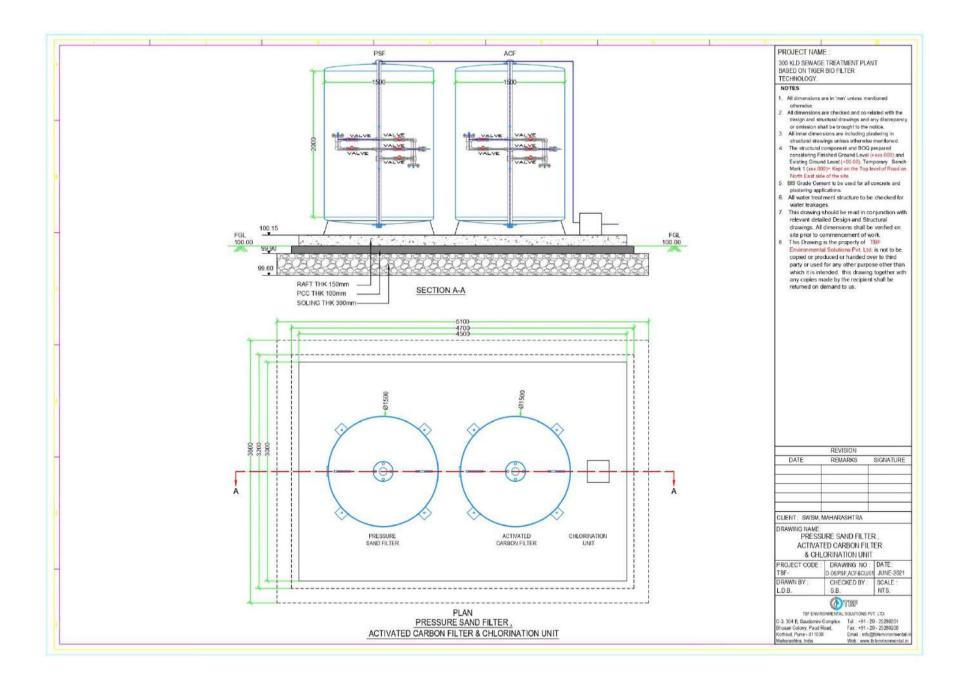












### 400 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 400 KLD CAPACITY

	Design flow	=	<b>400.00</b> 0.400	KLD MLD
	Peak flow factor	=	3.00	
1	SCREEN CHANNELS: MANUAL No. of Manual Screen Average Flow Peak Flow Factor	= =	1 0.40 3.00	No. MLD
	Design Flow	= = =	Peak Flow 1.20 50.00 0.014	MLD m³/hr m³/sec
	Average Flow	= = =	0.40 16.667 0.005	MLD m³/hr m³/sec
	Design Flow in each Screen	=	0.014 1	m³/sec No.
	Average Flow in each Screen	=	0.014	m <sup>3</sup> /sec
		=	1 0.005	No. m³/sec
	Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	Clear Area of Opening through Screen for Peak Flow	=	0.014 1.2	m³/sec m/sec
		=	0.012	$m^2$
	Clear Area of Opening through Screen for Average Flow	=	0.005 0.6	m³/sec m/sec
		=	0.008	$m^2$
	Considering maximum Area of Opening through Screen	=	0.012	$m^2$
	Clear Spacing of Bars	=	10	mm

Thickness of Bars	=	5	mm	
Gross Area of Screen	=	0.012x(10+5)/10		
	=	0.018	$m^2$	
Assuming Depth of Screen Channel	=	250.00	mm	
Gross Width of Screen	=	0.018/0.25		
No. of Bars	=	0.072 (Gross Width of Screen of Bars) - 1	m / Center to	Center Spacing
	=	0.072/((10+5)/1000) -1		
	=	3.8	Nos.	
Say	=	4 (Normalis = 1 of Decret 4) = 0	Nos.	a (Neverland
Width of Screen provided	=	(Number of Bars+1) x C Bars x Bar Thickness) (4+1)x10+(4x5)	lear Spacin	g + (Number of
	=	70	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel provided	=	0.25	m	
L:B	=	4.00		
Length of Screen Channel provided	=	2.00	m	
Freeboard provided	=	1.00	m	Invert Depth of incoming sewer
Total Depth of Screen Chamber	=	1.25	m	
Velocity in Channel at Average Flow	=	Average Flow / Cross S Channel	ectional Are	ea of Screen
	=	0.005/((0.5x0.25)/1000x	•	
	=	0.040 0.300	m/sec m/sec	
	>	0.300	111/560	
Head Loss across Screen				
Head Loss across Screen	=	$0.0728 (V^2 - v^2)$		
V = Velocity through Screen at Peak Flow	=	Peak Flow through Screen	een Channe hrough Scre	
	=	1.120	m/sec	0
v = Velocity in approach Channel at Peak Flow	=	Peak Flow through Sectional Area	of Screen (	
Head Loss across Screen at Peak	=	0.8	m/sec	
Flow	=	0.047	m	
Head Loss across Screen at 50% Clogged Condition				
Velocity through Screen at 50% Clogged Condition at Peak Flow	=	2.240	m/sec	
Head Loss across screen at 50% Clogged Condition at Peak Flow	=	0.321	m	
	>	0.300	m/sec	OK

#### 2 CONVENTIONAL GRIT CHAMBER: MANUAL

No of Crit Chamber			
No. of Grit Chamber	=	1	N# D
Average Flow	=	0.40	MLD
Peak Flow Factor	=	3.00	
Design Flow	=	Peak Flow	
Peak Flow	=	1.20	MLD
	=	1200	m³/day
	=	50	m³/hr
	=	0.014	m³/sec
Design Flow to each Grit			
Chamber	=	1200/1	
	=	1200	m³/day
	=	50	m³/hr
		0.014	m³/sec
	=	0.014	III /SeC
A 1: ( ODUEEO M 1			
According to CPHEEO Manual		0.45	
Particle Size	=	0.15	mm
Specific Gravity	=	2.65	
Surface Overflow Rate for 100%		Settling Velocity	of the minimum size of Particles to
removal efficiency in an ideal Grit	=	<b>3 ,</b>	be removed
Chamber		1 5	m/o
	=	1.5	m/s
	=	1296	m³/m²/day
Considering Efficiency of removal	=	75%	
of desired Particles, $\eta = 75\%$			
and Measure of Settling Basin			
Performance,	=	0.125	
n = 1/8 for very good performance			
Design Overflow Rate	=	857	m³/m²/day
Surface Overflow Rate for 0.15			
mm dia. Particle Size with Specific	=	1555	m³/m²/day
Gravity S <sub>s</sub> > 2.65 Table 5.6			·
Considering Design Overflow		000	3, 2,,
Rate	=	960	m³/m²/day
Area of Grit Chamber required	=	1200	m³/day
·		960	m³/m²/day
		000	m /m /day
		1.05	$m^2$
1. D	=	1.25	Ш
L:B ratio	=	2	
Length of Chamber provided	=	3.00	m
Width of Chamber provided	=	0.80	m
Hydraulic Retention Time (HRT)	=	60	sec
in Grit Chamber at Peak Flow	_		300
Volume of Grit Chamber required	=	0.014x60	
	=	0.84	$m^3$

	Depth required in Grit Chamber	=	0.84 / (3x0.8)	
		=	0.35	m
	Say	=	0.40	m
	Grit Storage Depth	=	0.30	m
	Total Liquid Depth required	=	0.70	m
	Length of Grit Pit	=	0.50	m
	Width of Grit Pit	=	0.50	m
	Depth of Grit Pit	=	0.30	m
	Free Board	=	1.25	m
3	RAW SEWAGE SUMP (WET WEL	1.)		
	No. of Units	- <i>)</i> =	1	No.
	Average Flow	=	0.40	MLD
		=	16.667	m <sup>3</sup> /hr
		=	0.0046	m3/sec
			0.001.0	
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
		=	1.20	MLD
		=	50	m³/hr
		=	0.014	m³/sec
	Hydraulia Datantian Time (HDT)			
	Hydraulic Retention Time (HRT) at Average Flow	=	120	min
	Volume required	=	0.0046 x 120 x 60	
	voiamo roquirou	=	33	$m^3$
			00	
	Hydraulic Retention Time (HRT)	=	Volume / Average Flow	
	at Peak Flow	_	volume / Average i low	
		=	39	min
		<	30	min
		•		
	Total Volume of Wet Well		33	
	Total Volume of Wet Well	=	33	m <sup>3</sup>
	Total Volume of Wet Well Side Water Depth (SWD)			m <sup>3</sup>
	Side Water Depth (SWD) provided		2.00	m³ m
	Side Water Depth (SWD) provided Plan Area of Wet Well		<b>2.00</b> 16.56	m <sup>3</sup>
	Side Water Depth (SWD) provided Plan Area of Wet Well Length/width of Sump required		<b>2.00</b> 16.56 4.07	m³ m
	Side Water Depth (SWD) provided Plan Area of Wet Well Length/width of Sump required Length/width of Sump provided	= =	<b>2.00</b> 16.56 4.07 <b>4.10</b>	m <sup>3</sup> m  m <sup>2</sup> m  m
	Side Water Depth (SWD) provided Plan Area of Wet Well Length/width of Sump required Length/width of Sump provided Volume of Sump provided	= = = =	2.00 16.56 4.07 4.10 33.62	m <sup>3</sup> m m <sup>2</sup> m
	Side Water Depth (SWD) provided Plan Area of Wet Well Length/width of Sump required Length/width of Sump provided Volume of Sump provided Length of Pump Pit	= = = =	2.00 16.56 4.07 4.10 33.62 1.00	m <sup>3</sup> m  m <sup>2</sup> m  m
	Side Water Depth (SWD) provided Plan Area of Wet Well Length/width of Sump required Length/width of Sump provided Volume of Sump provided Length of Pump Pit Width of Pump Pit	= = = = =	2.00 16.56 4.07 4.10 33.62 1.00 0.50	m <sup>3</sup> m m <sup>2</sup> m m m m m
	Side Water Depth (SWD) provided Plan Area of Wet Well Length/width of Sump required Length/width of Sump provided Volume of Sump provided Length of Pump Pit	= = = = =	2.00 16.56 4.07 4.10 33.62 1.00	m <sup>3</sup> m m <sup>2</sup> m m m m

#### 3.1 DESIGN STATEMENT-RSS E&M

Design Considerations				
Design flow	=	0.40	MLD	
_	=	400.00	Cum/Day	
Peak flow factor	=	3.00	·	
Pumping machinery				
Friction factor for Fittings in Pressure Mains				
Elbow 90 degrees	=	13		
Friction Factor for each	_	1		
Friction factor for all	=	13		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	8		
Friction Factor for each	=	0.3		
Friction factor for all	=	2.4		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	18.3		
Stage		low	ave	peak
Average flow, cum / day	=		400.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	240	400	800
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0069	0.0069	0.0093
Dia needed, m	=	0.094	0.094	0.109
Dia needed, mm	=	94	94	109
Dia provided, mm (User)	=	90	90	90
Radius, m	=	0.045	0.045	0.045
Radius power 0.63	=	0.142	0.142	0.142
S power 0.54	=	0.036	0.059	0.089
S Slone 1 in	=	0.002	0.005	0.011
Slope 1 in	=	480.1	186.4	88.0
length, m	=	40 0.1	40 0.2	40 0.5
Friction in pipeline, m	=	0.1	0.2	0.5

Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	18.3	18.3	18.3
Friction in fittings, m	=	0.3	0.9	2.1
Static lift, m	=	3.5	3.5	3.5
Total head, m	=	3.8	4.4	5.6
Efficiency of pumpset	=	0.8	8.0	0.8
Discharge, lps	=	4.2	6.9	13.9
Discharge, Cum/Hr	=	15.0	25.0	50.0
Kw required	=	0.645	1.075	2.150
HP required	=	1.0	1.5	3.0
Number of Pumps	=	2	2	2
·				
TIGER BIO FILTER				
<b>DESIGN STATEMENT-TBF1-50</b>	KLD			
Number of pumping hours	=	16	Hrs	
Number of BMF tanks provided	=	8	Nos	
Design flow to each tank	=	50.00	Cum/day	
	=	3.13	Cum/ Hr for 16	Hr
	=	0.87	lps	
Inlet BOD	=	250.00	mg/l	
Inlet TSS	=	400.00	mg/l	
BOD load applied	=	12.5	kg/day	
BOD uptake rate	=	0.1	Kg of BOD /	(0.5 - 1.0)
·			Kg of worms	,
Worms required	=	125	Kg worms	
Sewage application rate	=	1.85	Cum/Sqm/day	(1 - 2
				Cum/Sqm/day)
Area required	=	27.03	Sqm	
Area Provided	=	28	Sqm	
Area of each crate	=	0.4	Sqm	
Number of crates	=	70	Nos	
say	=	72	Nos	
Crate in longitudinal direction	=	18	Nos	
Crate in travers direction	=	4	Nos	
crates provided	=	72	Nos	OK
Width provided	=	4.00	m	
Length required	=	11.00	m	
Depth provided	=	1.2	m	
TERTIARY TREATMENT UNIT				
Design Considerations				
Design flow	=	0.40	MLD	
_	=	400.00	Cum/Day	
Peak flow factor	=	3.00	•	
FILTER FEED TANK				
Number of FFT provided	=	1	Nos	
Number of operating hours	=	16	Hrs	
-				

5.1

Design flow	=	400.00	Cum/Day	
2 00.g	_	25.00	Cum/Hr	
	_	0.00694	Cum/Sec	
Hydraulic Retention time	_	60	min	
Volume required	_	25.00	Cum	
Depth	_	2.00	m	
Civil Tanks	_			
Area	=	12.50	Sqm	
Length/Width required	_	3.54	m	
Length/Width provided	=	4.00	m	
Freeboard provided	=	0.50	m	
Volume Provided		32.00	Cum	
DESIGN STATEMENT-TTU E&M				
Design Considerations				
Design flow	=	0.40	MLD	
	=	400.00	Cum/Day	
Peak flow factor	=	3.00		
Pumping machinery				
Friction factor for Fittings in				
Pressure Mains				
Elbow 90 degrees	=	5		
Friction Factor for each	=	1		
Friction factor for all	=	5		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	5		
Friction Factor for each	=	0.3		
Friction factor for all	=	1.5 1		
Gate valve open Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	_	2.5		
Total friction factor	=	9.4		
Stage	_	low	ave	peak
Average flow, cum / day	=	10 44	400.00	peak
Proportion	_	0.6	400.00	2
Design flow, cum / day	=	240	400	800
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.8	1.0	1.5
		<del></del>		

Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0052	0.0069	0.0093
Dia needed, m	=	0.081	0.094	0.109
Dia needed, mm	=	81	94	109
Dia provided, mm (User)	=	90	110	90
Radius, m	=	0.045	0.055	0.045
Radius power 0.63	=	0.142	0.161	0.142
S power 0.54	=	0.048	0.052	0.089
S	=	0.004	0.004	0.011
Slope 1 in	=	281.8	235.6	88.0
length, m	=	25	25	25
Friction in pipeline, m	=	0.1	0.1	0.3
Velocity head, m	=	0.033	0.051	0.115
Frction factor in fittings	=	9.4	9.4	9.4
Friction in fittings, m	=	0.3	0.5	1.1
Static lift, m	=	8.0	8.0	8.0
Total head, m	=	8.3	8.5	9.1
Efficiency of pumpset	=	0.8	0.8	0.8
Discharge, lps	=	4.2	6.9	13.9
Discharge, Cum/Hr	=	15.0	25.0	50.0
Kw required	=	1.106	1.843	3.686
HP provided	=	1.5	2.5	5.0
Number of Pumps	=	2	2	2
·				
PRESSURE SAND FILTER				
Number of unit provided	=	2	Nos.	
Designed @ 16 hrs working for				
flow of	=	12.50	m3/h	
Loading rate	=	12.00	m3/m2/h	
Area of DMF	=	1.04	m2	
Dia of DMF	=	1.15	m	
Provided	=	1.200	m	
Backwash water				
Backwash velocity	=	15.00	m/hr	
backwash flowrate	=	16.27	m3/h	
Backwash volume for 20 mins	=	5.42	m3	
ACTIVATED CARBON FILTER				
Number of unit provided	=	2	Nos.	
Designed @ 16 hrs working for		40.50	O /la	
flow of	=	12.50	m3/h	
Loading rate	=	12.00	m3/m2/h	
Area of ACF	=	1.04	m2	
Dia of ACF	=	1.15	m	
Provided	=	1.200	m	
Backwash water		/ <del>-</del>	4	
Backwash velocity	=	15.00	m/hr	
backwash flowrate	=	16.27	m3/h	
Backwash volume for 20 mins	=	5.42	m3	

### 5.4 CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM

5.2

5.3

Average Flow	=	25.00	m3/hr
Design Chlorine Dosage (Max)		3	mg/l
Concentration of Chlorine in commercially available NaOCl	=	10%	
Design NaOCI Dosage	=	30	mg/l
Operating hours	=	16.0	hr
Quantity of NaOCI required		25 X 30 X 1	6 / 1000
	=	12.00	Kg/day
Design Strength of NaOCI		100%	
Solution Volume of NaOCl Solution	=	12 / (1 X <sup>-</sup>	1000)
	=	0.020	m3
No. of Dosing Tanks provided	=	1	Nos.
Volume of each Dosing Tank	=	0.02 / 1	
	=	0.02	m3
	=	100	Litres
No. of Working NaOCI Dosing Pump provided	=	1	No.
Capacity of each NaOCI Dosing Pump required	=	Total Volume of Na (No. of Dosin 0.02 / (1 X 16)	
	=	0.001	m3/hr
	=	1.00	LPH
Capacity of each NaOCI Dosing	=	1.00	LPH
Pump provided  No. of Standby NaOCI Dosing  Pump provided	=	1	No.

## SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 400 KLD CAPACITY

S I.	Unit name	N o	Leng th	Widt h		Height		So	oling	P(	cc	Ra	oft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	<b>5</b>	+bk		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	2.0	0.5	0.2	1.0	1.2	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	3.0	0.8	0.7	1.2	1.9	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
3	Raw Sewage Sump	1	4.1	4.1	2.0	1.2	3.2	0.2	0.3	0.1	0.1	0.2	0.3	0.2		0.2	100
4	TBF Bed 50 KLD	8	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	4.0	4.0	2.0	0.5	2.5	0.2	0.3	0.1	0.1	0.2	0.2	0.2		0.2	100
6	Filter Platform	1	4.0	3.6				0.2	0.3	0.1	0.1	0.2	0.1				60

#### Assumptions

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound		soil	Muru	Soft roc	har d	Tota
0.0 to 1.5 m	=	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

### TIGER BIO FILTER OF 400 KLD CAPACITY BILL OF QUANTITIES

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
1	Excavation for foundation / pipe trenches in earth, soils of all types, sand, gravel and soft murum, including removing the excavated material upto a distance of 50 metres and lifts as below, stacking and spreading as directed, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-1/259)				
	0.0 to 1.5 m	126.23	Cum	150.00	18,934.50
	1.5 to 3.0 m	40.43	Cum	164.00	6,630.60
	3.0 to 4.5 m	13.26	Cum	178.00	2,360.30
	4.5 to 6.0 m	0.00	Cum	192.00	0.00
	MJP/ SSR/ 2021-22 / Section E / Excavation Item No.1/ Page no. 42				
2	Excavation for foundation / pipe trenches in hard murum and boulders, W.B.M. road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking and spreading as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-3/259)			8.00	
	0.0 to 1.5 m	126.23	Cum	192.00	24,236.20
	1.5 to 3.0 m	40.43	Cum	206.00	8,328.60
	3.0 to 4.5 m	13.26	Cum	220.00	2,917.20
	4.5 to 6.0 m MJP/ SSR/ 2021-22/ Section E/ Excavation Item No.3, Page no. 42	0.00	Cum	234.00	0.00
3	Excavation for foundation / pipe trenches in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A- 4/259)				
	0.0 to 1.5 m	126.23	Cum	572.00	72,203.60
	1.5 to 3.0 m	40.43	Cum	597.00	24,136.80
	3.0 to 4.5 m	13.26	Cum	622.00	8,247.80
	4.5 to 6.0 m	0.00	Cum	647.00	0.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.5, Page no. 42				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below,				
	stacking as directed by Engineer-in-charge, normal dewatering, excluding backfilling, etc. complete by all means. (Bd-A-6/259)				
	0.0 to 1.5 m	126.23	Cum	1,017.00	128,376.00
	1.5 to 3.0 m	40.43	Cum	1,042.00	42,128.10
	3.0 to 4.5 m	13.26	Cum	1,067.00	14,148.50
	4.5 to 6.0 m	0.00	Cum	1,092.00	0.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43				
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)	191.02	Cum	1,175.00	224,448.50
	MJP/ SSR/ 2021-22 / Section E/ Excavati				
6	Draviding and leving in situ Coment Conserts				
0	Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38	57.05	Cum	5,640.00	321,762.00
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.1, Page no.49	37.03	Cum	3,040.00	321,702.00
7	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	61.96	Cum	7,448.00	461,478.10
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY	01.30	Juili	1,7770.00	701,770.10
	MIX CONCRETE/ Item No.2, Page no. 49				
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or				
	Tor reinforcement)	0.98	Cum	8,624.00	8,451.60
	For Beams / Braces / Lintels In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50				
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	7.61	Cum	9,247.00	70,369.70
	jj	7.01	Juili	5,277.00	10,309.10
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or				
	Tor reinforcement)  Chajjas / Parapets / Curtain Walls  (Partition Wells / Partition to POOM 200)	27.92	Cum	9,218.00	257,366.60
	/Partition Walls / Pardies In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)				
	c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY  MIX CONCRETE Item No.8 / Page no. 52	7.90	MT	70,658.00	558,198.20
12	Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U- 1/537)	7.78	Sqm	1,895.00	14,743.10
	MJP/ SSR/ 2021-22 / SECTION - F : IRON AND STRUCTURAL STEEL WORK Item No.1 / Page				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-in-charge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C- 3/275)	5.98	MT	71,286.00	426,028.00
	MJP/ SSR/ 2021-22 / SECTION - F :: IRON AND STRUCTURAL STEEL WORK Item No.3,				
14	Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sq.m.).	603.20	Sqm	777.00	468,686.40
	PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224	000.20	Oqiii	777.00	100,000.10
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete  PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by	118.96	Cum	6,305.00	750,042.80
	engineer incharge and BDG- 2 and 5 Item No.893, Page no. 190				
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference	653.20	Sqm	257.00	167,872.40
	No. Bd. L.2 Page No. 368 Item No.950, Page no. 201				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding				
	and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and	380.00	Sqm	529.00	201,020.00
	Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201				
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.	200.00	Course	40.00	2 200 00
	PWD / SSR 2020-21 / Colouring SSR Item No.	380.00	Sqm	10.00	3,800.00
	36.03 Reference No. Bd. P. I Page No. 411				
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.	380.00	Sqm	8.00	3,040.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412	000.00	Oqiii	0.00	0,010.00
20	Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-incharge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)	04.00	HP/	77.00	4.000.00
	MJP/ SSR/ 2021-22 / Section E/ Excavat	64.00	Hr.	77.00	4,928.00
	Defilies the state of the state				
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/ Excavat	285.95	Cum	84.00	24,019.80
22	Transportation as per STATEMENT VI Including loading, unloading and stacking Earth (4.8 Cum) lead 15 Km	606.92	Cum	604.45	366,852.80

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	Electronic shall to acc				
23	Screen (Manual) of size 1.75 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	0.00	Sam	25,000,00	20 625 00
	degree bend.	0.88	Sqm	35,000.00	30,625.00
24	Grit pump				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.75 m length				
	1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00
	, , ,				
25	Raw Sewage Pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	5 HP (Up to 35000 LPH)	2.00	Nos	104,459.00	208,918.00
	3111 (Op to 33000 Et 11)	2.00	1105	104,439.00	200,910.00
26	TTU Feed pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	5 HP (Up to 35000 LPH)	2.00	Nos	104,459.00	208,918.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.2 m x 2 m minimum height	2.00	Nos	236,000.00	472,000.00
	<u> </u>		-	,	,

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
28	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal				
	Dia 1.2 m x 2 m minimum height	2.00	Nos	236,000.00	472,000.00
29	NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency				
	Mixing Tank of 100 Ltrs capacity	100.00	Ltrs	8.00	800.00
	Dosing Pump	2.00	Nos	15,000.00	30,000.00
30	Control Panel				
30	Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter ,for all pumps installed.	1.00	No	50,041.00	50,041.00
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION ]				
31	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.  > 7.5 HP & Up to 12.5 HP	6.00	nos	7,150.00	42,900.00
		5.00	3	.,100.00	12,000.00

Sr.					1
No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP /MECH/ ELECT/ SSR/ 2021-22				
	SECTION 10 - LG [L.T. SWITCHGEAR AND				
	PROTECTION] Item no. LG 3 Page no. 27				
32	Main power supply cable				
	3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable				
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,				
	PVC insulated, and PVC sheathed.				
	3 core 16 sq mm	25.00	m	549.00	13,725.00
	3 0010 10 34 Hilli	20.00	111	343.00	13,723.00
33	Power cables				
	Aluminium conductor 4 Core, XLPE /				
	PVC insulated & armoured cable				
	Supplying and erecting, XLPE / PVC				
	insulated, armoured cable 1100 V grade with				
	ISI mark Four core, solid / stranded				
	aluminium conductor with 6 mm thick 25 mm				
	width M.S. spacer with				
	G.I. Earth wire 6 sq mm, complete erected on				
	wall / on pole with 25 X 3 mm M.S. clamps or				
	in provided trench in an approved manner.	115.00	100	127.00	15 755 00
	4 Core 6 sq mm  MJP MECH/ ELECT/ SSR/ 2021-22	115.00	m	137.00	15,755.00
	SECTION				
	12 - CB [ L.T. CABLE ] Item no. CB 6 Page				
	:2 05 [ 2:11 0 / 1522 ] 1.0 110: 05 0 1 dg0				
34	Control Cables				
	Copper conductor PVC insulated,				
	Unarmoured control cable				
	Supplying and erecting Un-armoured control				
	cable with ISI mark stranded / solid copper				
	conductor 1.1 kV grade complete erected on				
	wall / panel or in provided trench in an				
	approved manner.	44= 00		10= 00	1==== 00
	4 core 2.5 sq mm	115.00	m	137.00	15,755.00
	MJP MECH/ ELECT/ SSR/ 2021-22/				
	SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-				

	Plumbing Items				
Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
35	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges, inspection charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed shed duly protected from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit type to be jointed with cement solvent).				
	<ol> <li>1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.</li> <li>2) One coupler and required cement solvent about the provided with each full length pipe.</li> </ol>				
	shall be provided with each full length pipe MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES, Page no.77				
1	Raw Sewage pump to TBF Distribution				
а	Main header				
	90 mm.	40.00	m	303.00	12,120.00
	PVC Specials- 10%				1,212.00
b	Distribution				
Ь	75 mm.	55.00	m	211.00	11,605.00
	PVC Specials- 10%	33.00	111	211.00	1,160.50
	Tre eposition 1070				1,100.00
2	TBF collection to FFT (gravity)				
а	Main header				
	110 mm.	100.00	m	428.00	42,800.00
	PVC Specials- 10%				4,280.00
b	collection tributory				
	75 mm.	20.00	m	211.00	4,220.00
	PVC Specials- 10%				422.00
	·				
3	TTU Plumbing				
	90 mm.	25.00	m	303.00	7,575.00
	PVC Specials- 10%				757.50
4	TBF distribution				
	63 mm.	40.00	m	149.00	5,960.00
	PVC Specials- 10%				596.00
36	Labour				
	Plumber	16.00	days	641.00	10,256.00
	Helper	32.00	days	579.00	18,528.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / SECTION - B LABOUR & MACHINERY , Page no. 14				
37	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.				
	Sluice valves - PN -1 (Without by pass)				
-	Raw Sewage pump	0.00	Niss	0.005.00	40.070.00
	100 mm. Filter Feed Pump	2.00	Nos	6,835.00	13,670.00
	100 mm.	2.00	Nos	6,835.00	13,670.00
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132	2.00	1405	0,033.00	13,070.00
38	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)				
	Without by pass arrangement -PN -1				
	Raw Sewage pump				
	100 mm.	2.00	Nos	5,713.00	11,426.00
	Filter Feed Pump				44.400.00
	100 mm.  MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 131	2.00	Nos	5,713.00	11,426.00
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc. complete.	<b>576</b> 00	Noo	4.750.00	2 726 000 00
	Market rate	576.00	Nos	4,750.00	2,736,000.00
40	Rapid sand Gravity filter sand At				
+0	Source (Godhara, Gokak, Kanhan, MJP/ SSR/ 2021-22 / SECTION- A	54.79	Cum	1,730.00	94,786.70
	MATERIALS				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
41	Trasnsportation Godhara to Pune distance by Road 660 Km.	54.79	Cum	11,031.37	604,408.80
	MJP/ SSR/ 2021-22 / SECTION - C: TRANSPORTATION Page no.				
42	Stone Aggregate 20 mm  MJP/ SSR/ 2021-22 / SECTION- A	54.79	Cum	900.00	49,311.00
43	MATERIALS  Transportation as per STATEMENT VI				
40	Including loading, unloading and stacking  Manure or sludge (5.52 Cum) lead 25 Km	211.60	Cum	747.48	158,166.80
	MJP/ SSR/ 2021-22 / SECTION - C: TRANSPORTATION Page no.	211100	Cum	7	100,100.00
			NET	TOTAL Rs.	10,130,204.50

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				2.50		
Α	0.0 to 1.5 m	1	6.20	3.00	1.5	27.9	Cum
	soil					6.98	Cum
	Murum					6.98	Cum
	Soft rock					6.98	Cum
	hard rock					6.98	Cum
В	1.5 to 3.0 m	1	6.2	3.00	1	18.6	Cum
	soil					4.65	Cum
	Murum					4.65	Cum
	Soft rock					4.65	Cum
	hard rock					4.65	Cum
	0.01.45			0.50			0
С	3.0 to 4.5 m	1	5.2	2.50	0	0	Cum
-	soil					0	Cum
-	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	5.2	2.50	0	0	Cum
	soil		5.2	2.50	U	0	Cum
	Murum	+				0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
	TIAIU TOCK					U	Cuiii
2	Soling						
	Screen	1	3.20	1.20	0.30	1.16	Cum
	Grit	1	4.20	0.80	0.30	1.01	Cum
	extra for grit chamber	1	1.00	0.60	0.30		Cum
	oma ioi gin chambei	<u> </u>	1.00	Total for gri		1.19	Cum
				I stem for gri	•		
3	PCC M20						
	Screen	1	2.80	1.00	0.10	0.28	Cum
	Grit	1	3.80	0.80	0.10	0.31	Cum
		1	1.00	0.40	0.20	0.08	Cum
	Internal slope	1	Area	0.19	0.80	0.16	Cum
	Internal slope	1	Area	0.10	0.80	0.08	Cum
	·			Total for gri	t	0.63	Cum
4	Raft M30						
	Screen	1	2.60	0.90	0.15	0.36	Cum
	Grit	1	3.60	0.80	0.15	0.44	Cum
		1	1.00	0.30	0.15	0.05	Cum
				Total for gri	t	0.49	Cum
5	RCC Wall						
	Screen						
	Long Wall	2	2.20	0.10	1.45	0.64	Cum

Sr.	Itom Deceription	Nos.	1 (m)	D (m)	Ll /m\	Quantity	Unit
No.	Item Description	NOS.	L (m)	B (m)	H (m)	Quantity	Unit
	Short Wall	2	0.70	0.10	1.45	0.21	Cum
				Total for so	reen	0.85	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	1.00	0.10	2.15	0.22	Cum
	Short Wall	2	0.80	0.10	2.15	0.35	Cum
				Total for gr	it	0.57	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
<u> </u>		um	80	Cum	2.27	0.19	MT
-	Fabrica Can words in France and						
7	Fabrication work in Frame and Grating for Access						
	Screen	1	2.20	0.70		1.54	Sqm
	Grit	1	3.20	0.90		2.88	Sqm
					Total	4.42	Sqm
8	Removing excess exacavated material out of site						
	Screen chamber	1	2.20	0.70	1.25	1.93	Cum
	Grit Chamber	1	3.20	0.80	1.95	5	Cum
	soling, PCC, Raft volume					3.87	Cum
	Total Volume					10.8	Cum
	bulkage @ 40%					15.12	Cum
9	Refilling and compaction						
	Total Excavation					46.5	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					10.8	Cum
	Refilling and compaction volume					35.7	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				3.95		
Α	0.0 to 1.5 m	1	8.2	8.20	1.5	100.86	Cum
	soil					25.22	Cum
	Murum					25.22	Cum
	Soft rock					25.22	Cum
	hard rock					25.22	Cum
В	1.5 to 3.0 m	1	7.20	7.20	1.5	77.76	Cum
	soil					19.44	Cum
	Murum					19.44	Cum
	Soft rock					19.44	Cum
	hard rock					19.44	Cum
С	3.0 to 4.5 m	1	7.20	7.20	0.95	49.25	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					12.32	Cum
	Murum					12.32	Cum
	Soft rock					12.32	Cum
	hard rock					12.32	Cum
	1-1-0-0						
D	4.5 to 6.0 m	1	6.20	6.20	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock hard rock					0	Cum
	nard rock					0	Cum
2	Soling						
	RSS	1	5.60	5.60	0.30	9.41	Cum
	1.00		0.00	0.00	0.00	0.11	Carri
3	PCC M20						
	RSS	1	5.20	5.20	0.10	2.71	Cum
4	Raft M30						
	RSS	1	5.00	5.00	0.30	7.5	Cum
5	RCC Wall						
	Long Wall	2	4.60	0.25	3.45	7.94	Cum
	Short Wall	2	4.10	0.25	3.45	7.08	Cum
					Total	15.02	Cum
6	Beams						
	Beam 1	1	4.10	0.2	0.3	0.25	Cum
	Beam 2	1	4.10	0.2	0.3	0.25	Cum
					Total	0.5	Cum
7	Slab	1	4.60	4.60	0.2	4.24	Cum
	Deduction for manhole	-2	1.20	0.70	0.2	-0.34	Cum
	Deduction for marmore		1.20	0.70	Total	3.9	Cum
					· otal	0.0	- Cum
	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
8	3 1 2 3	um	100	Cum	26.92	2.7	MT
9	Fabrication work in Frame and						
9	Grating for Access						
	RSS	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated						
	material out of site				2		
	RSS	1	4.60	4.60	3.25	68.77	Cum
	soling, PCC, Raft volume					19.62	Cum
	Total Volume					88.39	Cum
	bulkage @ 40%					123.75	Cum
11	Refilling and compaction	+ +					
1.1	INGILLING AND COMPACTION						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					227.87	Cum
	Deduction for tank volume, soling, PCC, Raft					88.39	Cum
	Refilling and compaction volume					139.48	Cum
12	Dewatering						
	8 Days x 4 hours/day	days	8	hours / day	4	32	Hrs

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
2	Soling	1	40.40	<b>5</b> 40	0.00	00.44	0
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
3	TBF	1	12.06	5.06	0.10	6.11	Cum
	IDF	'	12.00	5.06	0.10	0.11	Cum
4	Raft M30	1					
	TBF	1	11.86	4.86	0.10	5.77	Cum
		+ '	11.00	7.00	0.10	5.11	Juili
5	Brick Wall	+ +					
	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
					Total for	T 14.87	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	Sqm
	Short Wall	2	4.00		1.20	9.6	Sqm
	Enternal				Total	81.65	Sqm
	External		44.40		4.00	07.54	C
	Long Wall	2	11.46		1.20	27.51	Sqm
	Short Wall	2	4.46	0.0	1.20	10.71	Sqm
	Wall Top	1	30.92	0.3	Total	9.28	Sqm
		+ +			TUIAI	47.50	Sqm
7	External-white-wash	1				47.50	Sqm
	EAGITIAL WILLE-WASII	+ '				71.30	ЭЧП
8	External-colour-wash	1				47.50	Sqm
	Zacinal colour wach	† †				17.00	- Sqiii
		Kg/C					
9	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	5.77	0.35	MT
					<u> </u>	3.03	
40	Removing excess exacavated						
10	material out of site						
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m x		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

#### MEASUREMENT SHEET - FILTER FEED TANK

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				3.10		
Α	0.0 to 1.5 m	1	7.1	7.10	1.5	75.62	Cum
	soil					18.91	Cum
	Murum					18.91	Cum
	Soft rock					18.91	Cum
	hard rock					18.91	Cum
В	1.5 to 3.0 m	1	6.60	6.60	1.5	65.34	Cum
	soil					16.34	Cum
	Murum					16.34	Cum
	Soft rock					16.34	Cum
	hard rock					16.34	Cum
С	3.0 to 4.5 m	1	6.10	6.10	0.1	3.73	Cum
	soil		3113			0.94	Cum
	Murum					0.94	Cum
	Soft rock					0.94	Cum
	hard rock					0.94	Cum
	Tidia Took					0.01	Odin
D	4.5 to 6.0 m	1	6.10	6.10	0	0	Cum
	soil		0.10	0.10	Ü	0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
	Tidia Took					<u> </u>	Odili
2	Soling						
	FFT	1	5.50	5.50	0.30	9.08	Cum
		<u>'</u>	0.00	0.00	0.00	0.00	Odili
3	PCC M20	+					
	FFT	1	5.10	5.10	0.10	2.61	Cum
		-	0.10	0.10	0.10	2.01	Odili
4	Raft M30						
	FFT	1	4.90	4.90	0.20	4.81	Cum
	- 1 1 1	-	4.50	4.50	0.20	7.01	Odili
5	RCC Wall						
	Long Wall	2	4.50	0.25	2.70	6.08	Cum
	Short Wall	2	4.00	0.25	2.70	5.40	Cum
	C. O. C.		1.00	0.20	Total	11.48	Cum
					10101	11.70	Carri
6	Beams						
	Beam 1	1	4.00	0.2	0.3	0.24	Cum
	Beam 2	1	4.00	0.2	0.3	0.24	Cum
	Douin 2		7.00	٥.٧	Total	0.48	Cum
					iotai	0.40	Juili
7	Slab	1	4.50	4.50	0.2	4.05	Cum
- 1	Deduction for manhole		1.20	0.70	0.2	-0.34	Cum
	Deduction for marinole	<del>-</del>	1.20	0.70	Total	3.71	Cum
			+		ı olal	3.71	Cuili

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	20.48	2.05	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	FFT	1	4.50	4.50	2.50	50.63	Cum
	soling, PCC, Raft volume					16.5	Cum
	Total Volume					67.13	Cum
	bulkage @ 40%					93.99	Cum
11	Refilling and compaction						
	Total Excavation					144.69	Cum
	Deduction for tank volume, soling, PCC, Raft					67.13	Cum
	Refilling and compaction volume					77.56	Cum
12	Dewatering						
	8 Days x 4 hours/day	days	8	hours/day	4	32	Hrs

#### **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	5.2	4.80	0.55	13.73	Cum
	soil					3.44	Cum
	Murum					3.44	Cum
	Soft rock					3.44	Cum
	hard rock					3.44	Cum
2	Soling						
	Filter Platform	1	5.00	4.60	0.30	6.9	Cum
3	PCC M20						
	Filter Platform	1	4.60	4.20	0.10	1.94	Cum
4	Raft M30						
	Filter Platform	1	4.40	4.00	0.15	2.64	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	60	Cum	2.64	0.16	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					8.84	Cum
	Total Volume					8.84	Cum
	bulkage @ 40%					12.38	Cum
7	Refilling and compaction	+ +					
	Total Excavation					13.73	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					8.84	Cum
	Refilling and compaction volume					4.89	Cum

#### **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation &	576				576	Nos
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	576	0.82	0.58	0.2	54.79	Cum
3	Trasnsportation Godhara to					54.79	Cum
						- 4 - 2	
4	Stone Aggregate 20 mm	576	0.82	0.58	0.2	54.79	Cum
5	Transportation as per STATEMENT VI Including loading,						
	Manure or sludge (5.52 Cum) lead	576	0.82	0.56	0.8	211.6	Cum

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr. No.	Item Description	Nos.	Unit
1	Screen (Manual) of size 1.75 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	1	No
2	Crit numn		
2	Grit pump  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size		
	1.75 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
2	Day Cayaga Durana		
3	Raw Sewage Pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	5 HP (Up to 35000 LPH)	2	Nos
	( )	_	
4	TTU Feed pumps Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7	0	Niss
	5 HP (Up to 35000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.2 m x 2 m minimum height	2	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.2 m x 2 m minimum height	2	Nos
7	PurAll Tablet Chlorinator + cartridge	0	nos
	. a adiot Officialisto . Cartilago		1103

#### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr.	Itom Description	Nos.	Unit
No.	Item Description	1405.	Jill
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz		
a	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
	<b>y</b> 1		
8	Control Panel		
	Design, Supply, Installing, Commissioning & Testing of Master PLC control		
	monitoring and communication panel as per IEC 61131 at Pure Water Sump		
	suitable for monitoring and control of pure water Pumps. Pressure Transmitters,		
	Level Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed.		
	Martin DI O Baral	4	<b>.</b>
	Master PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		
	AUTOMATION ] Item no. 2.7 Page no. 72		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage		
"	induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over		
	load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	definitioned to cappity, one complete. Charter with original officer choices.		
	> 7.5 HP & Up to 12.5 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
10	Main power supply cable		
	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,		
	PVC insulated, and PVC sheathed.	0.5	
	3 core 16 sq mm	25	m
11	Power cables		
<u> </u>	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade		
	with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25		
	mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall /		
	on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	115	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		
	CB 6 Page no. 35		
12	Control Cables		
	Copper conductor PVC insulated, Unarmoured control cable		

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

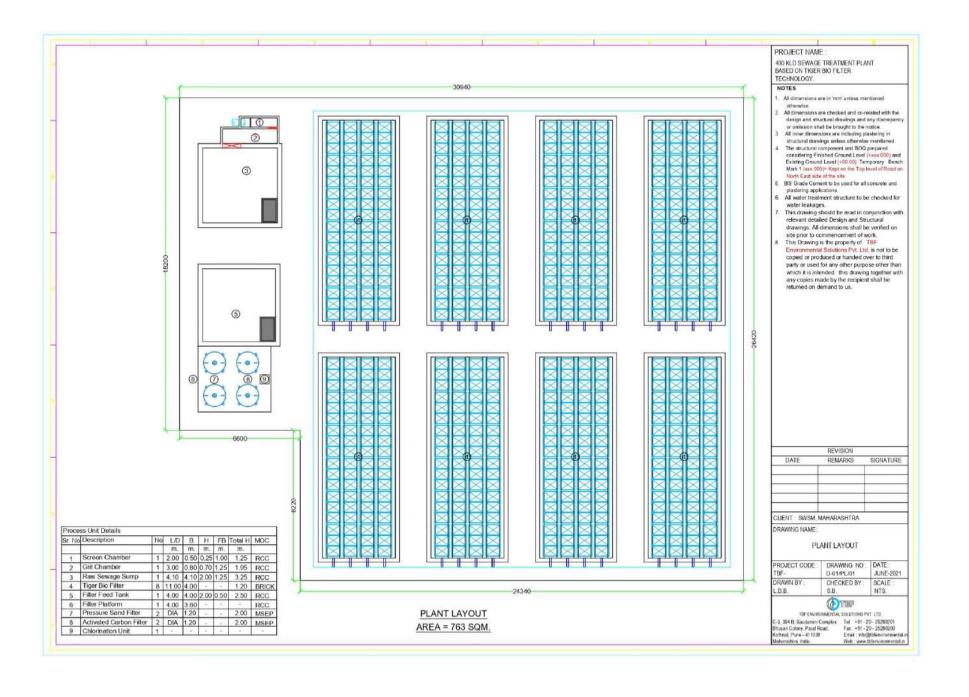
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	115	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

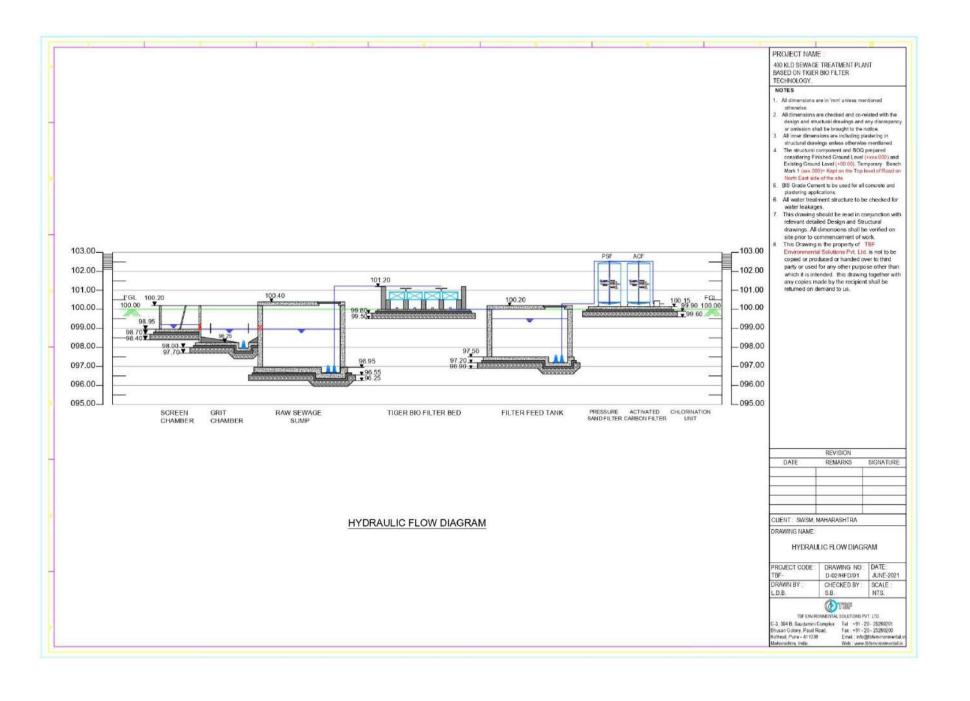
#### **MEASUREMENT SHEET - PLUMBING**

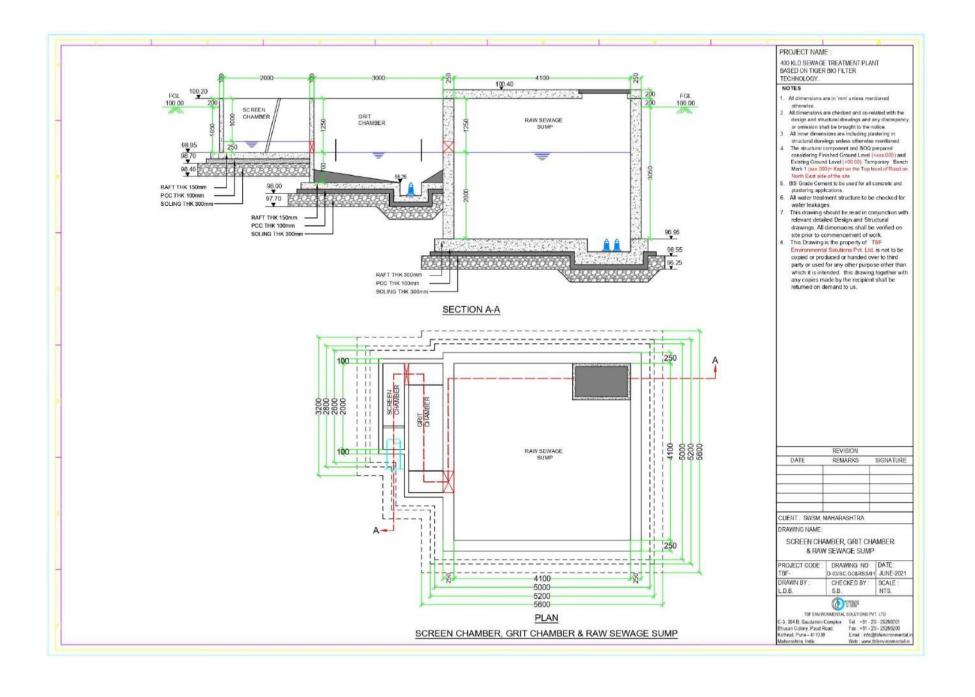
Sr. No.	Item Description	Nos.	L (m)	В	Quantity	Unit
	Providing and supplying in standard lengths ISI			(m)		
	mark rigid unplasticised PVC pipes suitable for					
	potable water with solvent cement joints including					
	cost of couplers, as per IS specification no. 4985 /					
	1988 excluding GST levied by GOI and GOM in all					
	respect, including transportation, freight charges,					
	inspection charges, loading, unloading,					
	conveyance to the departmental stores and stacking the same in closed shed duly protected					
	from sun rays and rains including cost of jointing					
	material i.e. solvent cement, etc. complete (selffit					
	type to be jointed with cement solvent).					
	1) 10% of cost of pipes shall be considered for cost					
	of PVC specials for estimate purpose only.					
	One coupler and required cement solvent shall					
	be provided with each full length pipe cost of which					
	is included in rates below.					
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C.					
	PIPES,					
1	Raw Sewage pump to TBF Distribution	D:-	00			
а	Main header 90 mm.	Dia 1	90 40		40	m
	PVC Specials- 10%		40		40	m
	1 VO Opeciais 1070					
b	Distribution					
	75 mm.	1	55		55	m
	PVC Specials- 10%					
	TDE collection to FET (are vity)	<u> </u>				
2 a	TBF collection to FFT (gravity)  Main header					
а	110 mm.	1	100		100	m
	PVC Specials- 10%	'	100		100	111
b	collection tributory					
	75 mm.	1	20		20	m
	PVC Specials- 10%	ļ				
	TTI I Diversità e	D:-	00			
3	TTU Plumbing	Dia	90		25	m
	90 mm. PVC Specials- 10%	1	25		25	m
	1 VO Opeciais- 1070					
4	TBF distribution	<u> </u>		No. of b	eds	
	63 mm.	1	5	8	40	m
	PVC Specials- 10%					
5	Labour	Nos	Days		4.0	
	Plumber	2	8		16	days
	Helper	4	8		32	days
6	Sluice valves					
	Sidios vaivos	<u> </u>				<u> </u>

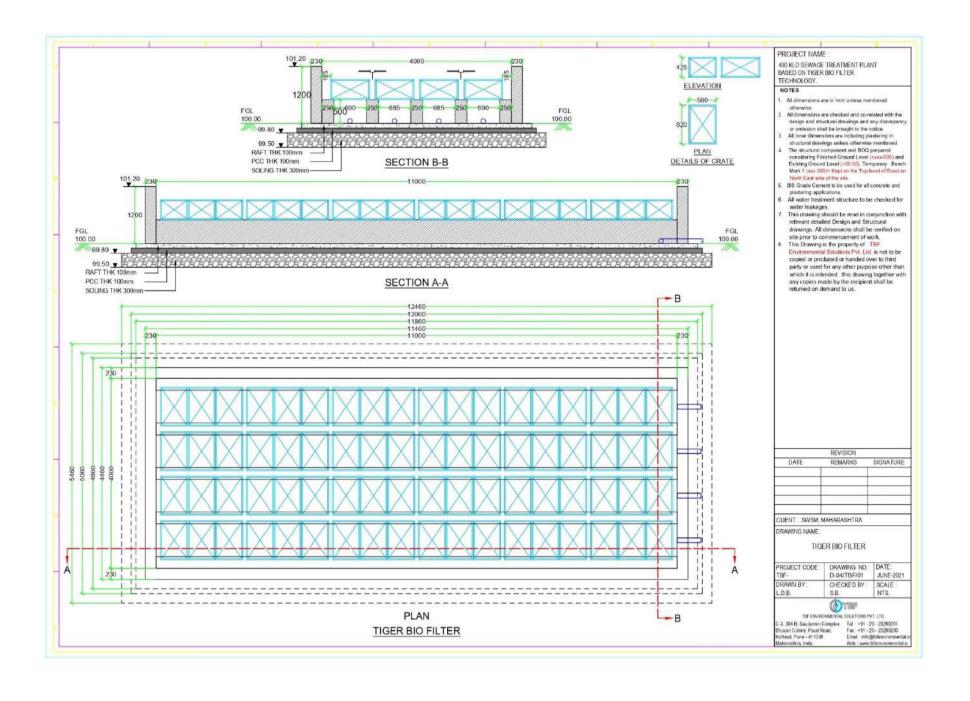
#### **MEASUREMENT SHEET - PLUMBING**

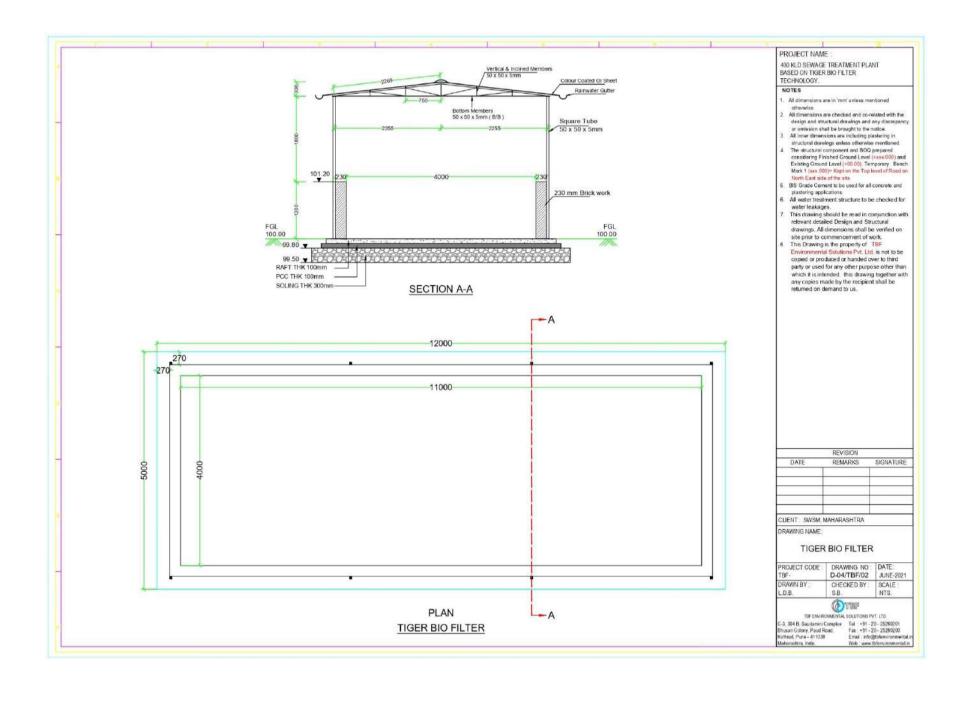
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming					
	for IS- 14846 including worn gear arrangements					
	as per test pressure, stainless steel spindle, caps,					
	including inspection charges, transportation upto departmental store, unloading, stacking excluding					
	GST levied by GOI & GOM in all respect etc.					
	complete.					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES, Page no. 132					
	Raw Sewage pump					
	100 mm.	2			2	Nos
	Filter Feed Pump				_	
	100 mm.	2			2	Nos
7	Defleye velves (non metuma velves )					
7	Reflux valves (non-return valves ) Providing and supplying ISI mark CI D/F reflux					
	valves (non-return valves ) of following dia					
	including railway freight, inspection charges,					
	unloading from railway wagon, loading into truck,					
	transportation upto departmental stores,					
	unloading, stacking excluding GST levied by GOI					
	& GOM in all respect etc. complete. Reflux					
	valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII):					
	PIPES APPURTENANCES, Page no. 131					
	Raw Sewage pump					
	100 mm.	2			2	Nos
	Filter Feed Pump					<u> </u>
	100 mm.	2			2	Nos

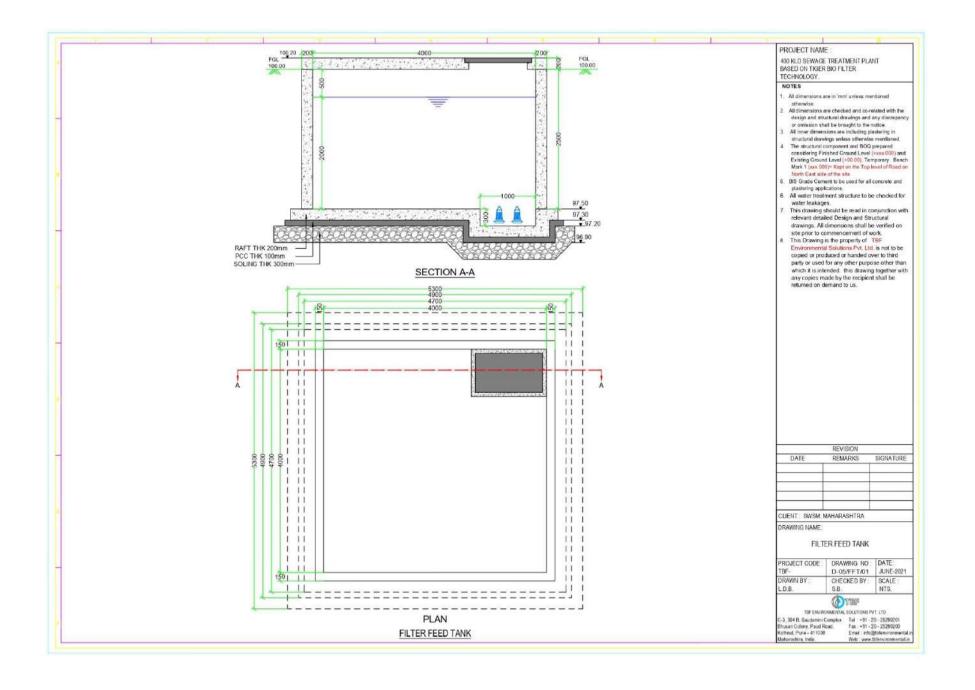


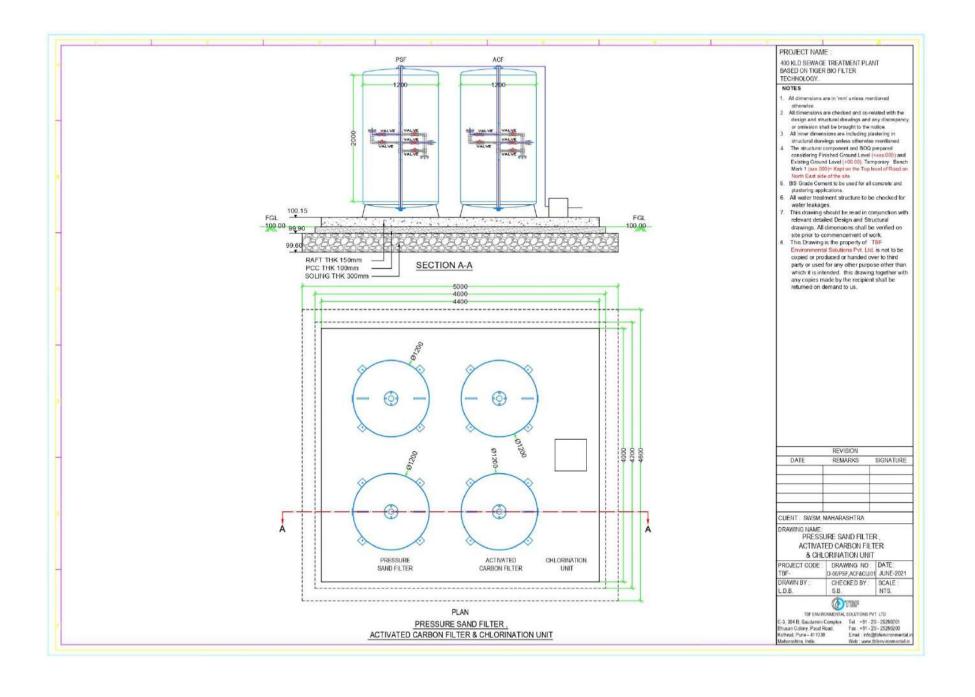












### 500 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 500 KLD CAPACITY

	Design flow	=	<b>500.00</b> 0.500	KLD MLD
	Peak flow factor	=	3.00	
1	SCREEN CHANNELS: MANUAL			
	No. of Manual Screen	=	1	No.
	Average Flow	=	0.50	MLD
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
		=	1.50	MLD
		=	62.50	m³/hr
		=	0.017	m³/sec
	Average Flow	=	0.50	MLD
		=	20.833	m³/hr
		=	0.006	m³/sec
	Design Flow in each Screen	=	0.017	m³/sec
			1	No.
		=	0.017	m³/sec
	Average Flow in each Screen	=	0.006	m³/sec
			1	No.
		=	0.006	m³/sec
	Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	Clear Area of Opening through Screen		0.017	m³/sec
	for Peak Flow	=	0.017	III /Sec
			1.2	m/sec
		=	0.014	$m^2$
	Clear Area of Opening through Screen	=	0.006	m³/sec
	for Average Flow			
			0.6	m/sec
		=	0.010	$m^2$
	Considering maximum Area of Opening through Screen	=	0.014	m²

Clear Spacing of Bars	=	10	mm	
Thickness of Bars	_	5	mm	
Thiothiode of Bare		<b>O</b>		
Gross Area of Screen	=	0.014x(10+5)/10		
	=	0.021	$m^2$	
Assuming Depth of Screen Channel	=	300.00	mm	
Gross Width of Screen	=	0.021/0.3		
	=	0.070	m	
No. of Bars	=	(Gross Width of Scree of Bars) - 1	n / Center to C	Center Spacing
	=	0.07/((10+5)/1000)-		
	=	3.7	Nos.	
Say	=	4	Nos.	
•		(Number of Bars+1) x	Clear Spacing	+ (Number of
Width of Screen provided	=	Bars x Bar Thickness)		•
	=	(4+1)x10+(4x5)		
	=	70	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel provided	=	0.30	m	
L:B	=	4.00		
Length of Screen Channel provided	=	2.00	m	Invert Denth
Freeboard provided	=	1.00	m	Invert Depth of incoming sewer
Total Depth of Screen Chamber	=	1.30	m	
Velocity in Channel at Average Flow	=	Average Flow / Cross Channel	Sectional Area	a of Screen
	=	0.006/((0.5x0.3)/1000x	x1000)	
	=	0.040	m/sec	
	>	0.300	m/sec	
Head Loss across Screen				
Head Loss across Screen		0.0700 (1/22)		
	=	0.0728 (V <sup>2</sup> - V <sup>2</sup> )	oroon Chonno	I / Cloor Aroo of
V = Velocity through Screen at Peak	=	Peak Flow through S		
		Peak Flow through S	creen Channe g through Scre m/sec	
V = Velocity through Screen at Peak	=	Peak Flow through S Opening 1.133 Peak Flow throug	g through Scre m/sec	een nnel / Cross
<ul><li>V = Velocity through Screen at Peak Flow</li><li>v = Velocity in approach Channel at</li></ul>	=	Peak Flow through S Opening 1.133 Peak Flow throug	g through Scre m/sec th Screen Cha	een nnel / Cross
<ul><li>V = Velocity through Screen at Peak Flow</li><li>v = Velocity in approach Channel at</li></ul>	= =	Peak Flow through S Opening 1.133 Peak Flow throug Sectional Ar	g through Scre m/sec h Screen Cha ea of Screen C	een nnel / Cross
V = Velocity through Screen at Peak Flow  v = Velocity in approach Channel at Peak Flow  Head Loss across Screen at Peak Flow  Head Loss across Screen at 50%	= = =	Peak Flow through S Opening 1.133 Peak Flow throug Sectional Are 0.8	g through Scre m/sec th Screen Cha ea of Screen C m/sec	een nnel / Cross
V = Velocity through Screen at Peak Flow  v = Velocity in approach Channel at Peak Flow  Head Loss across Screen at Peak Flow	= = =	Peak Flow through S Opening 1.133 Peak Flow throug Sectional Are 0.8	g through Scre m/sec th Screen Cha ea of Screen C m/sec	een nnel / Cross
V = Velocity through Screen at Peak Flow  v = Velocity in approach Channel at Peak Flow  Head Loss across Screen at Peak Flow  Head Loss across Screen at 50% Clogged Condition Velocity through Screen at 50%	= = =	Peak Flow through Sopening 1.133 Peak Flow through Sectional Are 0.8 0.046	g through Scre m/sec th Screen Cha ea of Screen C m/sec m	een nnel / Cross

#### 2 CONVENTIONAL GRIT CHAMBER: MANUAL

CONVENTIONAL GRIT CHAMBER: N	IANU		
No. of Grit Chamber	=	1	
Average Flow	=	0.50	MLD
Peak Flow Factor	=	3.00	
Design Flow	=	Peak Flow	
Peak Flow	=	1.50	MLD
	=	1500	m³/day
	=	63	m³/hr
	=	0.017	m³/sec
Design Flow to each Grit Chamber	=	1500/1	
	=	1500	m³/day
	=	63	m³/hr
	=	0.017	m³/sec
According to CPHEEO Manual			
Particle Size	=	0.15	mm
Specific Gravity	=	2.65	
Surface Overflow Rate for 100%		Settling Velocity	of the minimum size of Particles to
removal efficiency in an ideal Grit	=	Colling Volcoity	be removed
Chamber	_	1.5	m/s
	=		
0	=	1296	m <sup>3</sup> /m <sup>2</sup> /day
Considering Efficiency of removal of desired Particles, η = 75%	=	75%	
and Measure of Settling Basin Performance,	=	0.125	
n = 1/8 for very good performance	_	0.125	
Design Overflow Rate	=	857	m³/m²/day
200.g.r evernew rate		00.	/ / 44)
Surface Overflow Rate for 0.15 mm			
dia. Particle Size with Specific Gravity	=	1555	m³/m²/day
$S_s > 2.65$ Table 5.6		.000	/ / day
Considering Design Overflow Rate	=	960	m <sup>3</sup> /m <sup>2</sup> /day
Considering Design Overnow Nate	_	300	III /III /day
Area of Grit Chamber required	=	1500	m³/day
Area of one chamber required	_	960	m <sup>3</sup> /m <sup>2</sup> /day
		900	III /III /day
	_	1.56	$m^2$
L:B ratio	=	2	111
Length of Chamber provided	_	3.00	m
Width of Chamber provided	_	0.90	m m
Width of Chamber provided	_	0.90	111
Hydraulic Retention Time (HRT) in			
Grit Chamber at Peak Flow	=	60	sec
Volume of Grit Chamber required	=	0.017x60	
•	=	1.02	$m^3$
		- <del>-</del>	

	Depth required in Grit Chamber	=	1.02 / (3x0.9)	
		=	0.38	m
	Say	=	0.40	m
	Grit Storage Depth	=	0.30	m
	Total Liquid Depth required	=	0.70	m
	Length of Grit Pit	=	0.50	m
	Width of Grit Pit	=	0.50	m
	Depth of Grit Pit	=	0.30	m
	Free Board	=	1.30	m
3	RAW SEWAGE SUMP (WET WELL)			
	No. of Units	=	1	No.
	Average Flow	=	0.50	MLD
		=	20.833	m³/hr
		=	0.0058	m3/sec
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
	-	=	1.50	MLD
		=	63	m³/hr
		=	0.017	m³/sec
	Hydraulic Retention Time (HRT) at Average Flow	=	120	min
	Volume required	=	0.0058 x 120 x 60	
		=	42	$m^3$
	Hydraulic Retention Time (HRT) at		Values / Averess Flour	
	Peak Flow	=	Volume / Average Flow	
		=	41	min
		<	30	min
	Total Volume of Wet Well	=	42	$m^3$
	Side Water Depth (SWD) provided	=	2.00	m
	Plan Area of Wet Well	=	20.88	$m^2$
	Length/width of Sump required	=	4.57	m
	Length/width of Sump provided	=	4.60	m
	Volume of Sump provided	=	42.32	$m^3$
	Length of Pump Pit	=	1.00	m
	Width of Pump Pit	=	0.50	m
	Depth of Pump Pit	=	0.30	m
	Free Board		1.30	m

#### 3.1 DESIGN STATEMENT-RSS E&M

**Design Considerations** 

Design flow	=	<b>0.50</b> 500.00	MLD Cum/Day	
Peak flow factor	=	3.00		
Pumping machinery Friction factor for Fittings in Pressure Mains				
Elbow 90 degrees	=	15		
Friction Factor for each	=	1		
Friction factor for all	=	15		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	10		
Friction Factor for each	=	0.3		
Friction factor for all	=	3		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	20.9		
Stage		low	ave	peak
Average flow, cum / day	=		500.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	300	500	1000
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0087	0.0087	0.0116
Dia needed, m	=	0.105	0.105	0.121
Dia needed, mm	=	105	105	121
Dia provided, mm (User)	=	110	110	110
Radius, m	=	0.055	0.055	0.055
Radius power 0.63	=	0.161	0.161	0.161
S power 0.54	=	0.031	0.052	0.079
S	=	0.002	0.004	0.009
Slope 1 in	=	606.7	235.6	111.2
length, m	=	45	45	45
Friction in pipeline, m	=	0.1	0.2	0.4
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	20.9	20.9	20.9
Friction in fittings, m	=	0.4	1.1	2.4

	Static lift, m	=	4.0	4.0	4.0
	Total head, m	=	4.4	5.1	6.4
	Efficiency of pumpset	=	0.8	0.8	0.8
	Discharge, lps	=	5.2	8.7	17.4
	Discharge, Cum/Hr	=	18.8	31.3	62.5
	Kw required	=	0.808	1.346	2.688
	HP required	=	1.5	2.0	4.0
	Number of Pumps	=	2	2	2
	ramber of ramps	_	_	_	2
4	TIGER BIO FILTER DESIGN STATEMENT-TBF1- 50 KLD				
	DEGIGITATEMENT IBLE GOTTED				
	Number of pumping hours	=	16	Hrs	
	Number of BMF tanks provided	=	10	Nos	
	Design flow to each tank	=	50.00	Cum/day	
	· ·	=	3.13	Cum/ Hr for 16	Hr
		=	0.87	lps	
				•	
	Inlet BOD	=	250.00	mg/l	
	Inlet TSS	=	400.00	mg/l	
	BOD load applied	=	12.5	kg/day	
	BOD uptake rate	=	0.1	Kg of BOD / Kg of worms	(0.5 - 1.0)
	Worms required	=	125	Kg worms	
	Sewage application rate	=	1.85	Cum/Sqm/day	(1 - 2 Cum/Sqm/day)
	Area required	=	27.03	Sqm	. ,,
	Area Provided	=	28	Sqm	
	Area of each crate	=	0.4	Sqm	
	Number of crates	=	70	Nos	
	say	=	72	Nos	
	Crate in longitudinal direction	=	18	Nos	
	Crate in travers direction	=	4	Nos	
	crates provided	=	72	Nos	OK
	Width provided	=	4.00	m	
	Length required	=	11.00	m	
	Depth provided	=	1.2	m	
	_ op p. o				
5	TERTIARY TREATMENT UNIT				
	Design Considerations				
	Design flow	=	0.50	MLD	
		=	500.00	Cum/Day	
	Peak flow factor	=	3.00	,	
5.1	FILTER FEED TANK				
J. 1	Number of FFT provided	=	1	Nos	
	Number of operating hours	=	16	Hrs	
	Design flow		500.00	Cum/Day	
	Dough now	=	31.25	Cum/Hr	
		=	J1.ZJ	Guii/I II	

	_	0.00868	Cum/Sec	
Hydraulic Retention time	=	<b>60</b>	min	
Volume required	_	31.25	Cum	
Depth	=	2.00	m	
Civil Tanks	_	2.00		
Area	=	15.63	Sqm	
Length/Width required	_	3.95	m	
Length/Width provided	_	4.00	m	
Freeboard provided	_	0.50	m	
Volume Provided	=	32.00	Cum	
volume i rovided		32.00	Odili	
DESIGN STATEMENT-TTU E&M				
Design Considerations		_		
Design flow	=	0.50	MLD	
	=	500.00	Cum/Day	
Peak flow factor	=	3.00		
Dumming machiness				
Pumping machinery				
Friction factor for Fittings in Pressure Mains				
Elbow 90 degrees	=	5		
Friction Factor for each	=	1		
Friction factor for all	=	5		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	5		
Friction Factor for each	=	0.3		
Friction factor for all	=	1.5		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	9.4		
Stage		low	ave	peak
Average flow, cum / day	=		500.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	300	500	1000
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.8	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0

Area needed, sqm	=	0.0065	0.0087	0.0116
Dia needed, m	=	0.091	0.105	0.121
Dia needed, mm	=	91	105	121
Dia provided, mm (User)	=	110	110	110
Radius, m	=	0.055	0.055	0.055
Radius power 0.63	=	0.161	0.161	0.161
S power 0.54	=	0.042	0.052	0.079
S	=	0.003	0.004	0.009
Slope 1 in	=	356.1	235.6	111.2
length, m	=	25	25	25
Friction in pipeline, m	=	0.1	0.1	0.2
Velocity head, m	=	0.033	0.051	0.115
Frction factor in fittings	=	9.4	9.4	9.4
Friction in fittings, m	=	0.3	0.5	1.1
Static lift, m	=	8.0	8.0	8.0
Total head, m	=	8.3	8.5	9.1
Efficiency of pumpset	=	8.0	0.8	0.8
Discharge, lps	=	5.2	8.7	17.4
Discharge, Cum/Hr	=	18.8	31.3	62.5
Kw required	=	1.386	2.307	4.608
HP provided	=	2.0	3.5	6.5
Number of Pumps	=	2	2	2
PRESSURE SAND FILTER				
Number of unit provided	=	2	Nos.	
Designed @ 16 hrs working for flow		45.00	O /la	
of	=	15.63	m3/h	
Loading rate	=	12.00	m3/m2/h	
Area of DMF	=	1.30	m2	
Dia of DMF Provided	=	1.29	m m	
Backwash water	=	1.300	m	
	_	15.00	m/hr	
Backwash velocity backwash flowrate	=	15.00 19.71	m3/h	
Backwash volume for 20 mins	=	6.57	m3	
Dackwash volume for 20 mins	=	0.57	IIIS	
ACTIVATED CARBON FILTER				
Number of unit provided	=	2	Nos.	
Designed @ 16 hrs working for flow			- "	
of	=	15.63	m3/h	
Loading rate	=	12.00	m3/m2/h	
Area of ACF	=	1.30	m2	
Dia of ACF	=	1.29	m	
Provided	=	1.300	m	
Backwash water			/1	
Backwash velocity	=	15.00	m/hr	
backwash flowrate	=	19.71	m3/h	
Backwash volume for 20 mins	=	6.57	m3	

5.2

5.3

### 5.4 CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM

Average Flow	=	31.25	m3/hr
Design Chlorine Dosage (Max)	=	3	mg/l
Concentration of Chlorine in commercially available NaOCI	=	10%	
Design NaOCI Dosage	=	30	mg/l
Operating hours	=	16.0	hr
Quantity of NaOCI required	=	31.25 X 30 X	16 / 1000
	=	15.00	Kg/day
Design Strength of NaOCI Solution	=	100%	
Volume of NaOCI Solution	=	15 / (1 X 1	000)
	=	0.020	m3
No. of Dosing Tanks provided	=	1	Nos.
Volume of each Dosing Tank	=	0.02 / 1	
	=	0.02	m3
	=	100	Litres
No. of Working NaOCI Dosing Pump provided	=	1	No.
Capacity of each NaOCI Dosing Pump required	=	Total Volume of Na (No. of Dosing 0.02 / (1 X 16)	
	=	0.001	m3/hr
	=	1.00	LPH
Capacity of each NaOCI Dosing Pump provided	_	1.00	LPH
No. of Standby NaOCI Dosing Pump provided	=	1	No.

## SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 500 KLD CAPACITY

S I.	Unit name	N o	Leng th	Widt h		Height		So	oling	P(	cc	Ra	oft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	<b>5</b>	+bk		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	2.0	0.5	0.3	1.0	1.3	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	3.0	0.9	0.7	1.3	2.0	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
3	Raw Sewage Sump	1	4.6	4.6	2.0	1.3	3.3	0.2	0.3	0.1	0.1	0.2	0.3	0.2		0.2	100
4	TBF Bed 50 KLD	1	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	4.0	4.0	2.0	0.5	2.5	0.2	0.3	0.1	0.1	0.2	0.2	0.2		0.2	100
6	Filter Platform	1	4.2	3.8				0.2	0.3	0.1	0.1	0.2	0.1				60

#### Assumptions

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound strata		soil	Muru	Soft roc	har d	Tota I
0.0 to 1.5 m	=	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

### TIGER BIO FILTER OF 500 KLD CAPACITY BILL OF QUANTITIES

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
1	Excavation for foundation / pipe trenches in earth, soils of all types, sand, gravel and soft murum, including removing the excavated material upto a distance of 50 metres and lifts as below, stacking and spreading as directed, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-1/259)				
	0.0 to 1.5 m	147.83	Cum	150.00	22,174.50
	1.5 to 3.0 m	43.63	Cum	164.00	7,155.40
	3.0 to 4.5 m	15.77	Cum	178.00	2,807.10
	4.5 to 6.0 m	0.00	Cum	192.00	0.00
	MJP/ SSR/ 2021-22 / Section E /				
	Excavation Item No.1/ Page no. 42				
2	Excavation for foundation / pipe trenches in hard murum and boulders, W.B.M. road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking and spreading as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-3/259)				
	0.0 to 1.5 m	147.83	Cum	192.00	28,383.40
	1.5 to 3.0 m	43.63	Cum	206.00	8,987.80
	3.0 to 4.5 m	15.77	Cum	220.00	3,469.40
	4.5 to 6.0 m	0.00	Cum	234.00	0.00
	MJP/ SSR/ 2021-22/ Section E/ Excavation Item No.3, Page no. 42				
3	Excavation for foundation / pipe trenches in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A- 4/259)				
	0.0 to 1.5 m	147.83	Cum	572.00	84,558.80
	1.5 to 3.0 m	43.63	Cum	597.00	26,047.20
	3.0 to 4.5 m	15.77	Cum	622.00	9,809.00
	4.5 to 6.0 m	0.00	Cum	647.00	0.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.5, Page no. 42				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, excluding backfilling, etc. complete by all means. (Bd-A-6/259)				
	0.0 to 1.5 m	147.83	Cum	1,017.00	150,343.20
	1.5 to 3.0 m	43.63	Cum	1,042.00	45,462.50
	3.0 to 4.5 m	15.77	Cum	1,067.00	16,826.60
	4.5 to 6.0 m	0.00	Cum	1,092.00	0.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43				
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)  MJP/ SSR/ 2021-22 / Section E/ Excavati	234.32	Cum	1,175.00	275,326.00
6	Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN	70.06	Cum	5,640.00	395,138.40
	REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.1, Page no.49				
7	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)				
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY	75.39	Cum	7,448.00	561,504.80
	MIX CONCRETE/ Item No.2, Page no. 49				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	1.04	Cum	8,624.00	8,969.00
	For Beams / Braces / Lintels In RCC M-300	1.01	Odiii	0,02 1.00	0,000.00
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50				
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	8.58	Cum	9,247.00	79,339.30
	Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300j				
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or				
	Tor reinforcement)  Chajjas / Parapets / Curtain Walls	29.95	Cum	9,218.00	276,079.10
	/Partition Walls / Pardies In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)				
	c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY  MIX CONCRETE Item No.8 / Page no. 52	9.08	MT	70,658.00	641,574.70
12	Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U- 1/537)	8.10	Sqm	1,895.00	15,349.50
	MJP/ SSR/ 2021-22 / SECTION - F : IRON AND STRUCTURAL STEEL WORK Item No.1 / Page				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-in-charge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C- 3/275)				
	MJP/ SSR/ 2021-22 / SECTION - F :: IRON	7.47	MT	71,286.00	532,535.00
	AND STRUCTURAL STEEL WORK Item No.3,				
14	Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sq.m.).	754.00	Sqm	777.00	585,858.00
	PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224				
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete	148.70	Cum	6,305.00	937,553.50
	PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by engineer incharge and BDG- 2 and 5 Item No.893, Page no. 190				
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference No. Bd. L.2 Page No. 368 Item No.950,	816.50	Sqm	257.00	209,840.50
	Page no. 201				
		<u> </u>			

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and	475.00	Sqm	529.00	251,275.00
	Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201				
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.	475.00	Cass	10.00	4.750.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411	475.00	Sqm	10.00	4,750.00
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.	475.00	Sqm	8.00	3,800.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412			3.00	0,000.00
20	Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-incharge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)	80.00	HP/ Hr.	77.00	6,160.00
	MJP/ SSR/ 2021-22 / Section E/ Excavat				
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/ Excavat	307.79	Cum	84.00	25,854.40
22	Transportation as per STATEMENT VI Including loading, unloading and stacking	729.24	Cum	604.45	440,789.20

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	Earth (4.8 Cum) lead 15 Km				
23	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	0.90	Sqm	35,000.00	31,500.00
	acgree seria.	0.50	Oqiii	33,000.00	01,000.00
24	Grit pump				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION - Pumps, Page no. 6, 7of size 1.8 m length				
	1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00
	1111 (OP to 5000 Et 11)	1.00	140	00,004.00	00,004.00
25	Raw Sewage Pumps Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	5 HP (Up to 35000 LPH)	2.00	Nos	104,459.00	208,918.00
26	TTU Feed pumps Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	5 HP (Up to 35000 LPH)	2.00	Nos	104,459.00	208,918.00
	(			12.,100.00	
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.3 m x 2 m minimum height	2.00	Nos	348,000.00	696,000.00

	Qty	Unit	Rate	Amount (Rs.)
Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal				
Dia 1.3 m x 2 m minimum height	2.00	Nos	348,000.00	696,000.00
NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency				
Mixing Tank of 100 Ltrs capacity	100.00	Ltrs	8.00	800.00
Dosing Pump	2.00	Nos	15,000.00	30,000.00
Control Panal				
Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter ,for all pumps installed.	1.00	No	50,041.00	50,041.00
SECTION 19 - SA [ SCADA & AUTOMATION ]				
Supplying and erecting Fully Automatic Star				
Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.	6.00	nos	7.150.00	42,900.00
	with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the madia.  Dia 1.3 m x 2 m minimum height  NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency  Mixing Tank of 100 Ltrs capacity  Dosing Pump  Control Panel  Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed.  MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION ]  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel	with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the madia.  Dia 1.3 m x 2 m minimum height  2.00  NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency  Mixing Tank of 100 Ltrs capacity  Dosing Pump  2.00  Control Panel  Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitter, Turbidity Transmitter, PH Transmitter, Turbidity Transmitter, PH Transmitter, Turbidity Transmitter ,for all pumps installed.  MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION ]  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380-440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.	with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal that machia Dia 1.3 m x 2 m minimum height 2.00 Nos  NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency  Mixing Tank of 100 Ltrs capacity 100.00 Ltrs Dosing Pump 2.00 Nos  Control Panel Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitter, Turbidity Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed. 1.00 No  MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION ] 1.00 No  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.	with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the modia Dia 1.3 m x 2 m minimum height 2.00 Nos 348,000.00  NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teffon) Voltage 230 Volt Frequency Mixing Tank of 100 Ltrs capacity 100.00 Ltrs 8.00 Dosing Pump 2.00 Nos 15,000.00  Control Panel Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed. 1.00 No 50,041.00  MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION ]  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.

Sr.					
No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP /MECH/ ELECT/ SSR/ 2021-22				
	SECTION 10 - LG [L.T. SWITCHGEAR AND				
	PROTECTION] Item no. LG 3 Page no. 27				
32	Main power supply cable				
	3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable				
	Supplying and erecting, Flat flexible				
	submersible cable with, Copper Conductor,				
	PVC insulated, and PVC sheathed.				
	3 core 16 sq mm	25.00	m	549.00	13,725.00
33	Power cables				
	Aluminium conductor 4 Core, XLPE /				
	PVC insulated & armoured cable				
	Supplying and erecting, XLPE / PVC				
	insulated, armoured cable 1100 V grade with				
	ISI mark Four core, solid / stranded				
	aluminium conductor with 6 mm thick 25 mm width M.S. spacer with				
	G.I. Earth wire 6 sq mm, complete erected on				
	wall / on pole with 25 X 3 mm M.S. clamps or				
	in provided trench in an approved manner.				
	4 Core 6 sq mm	125.00	m	137.00	17,125.00
	MJP MECH/ ELECT/ SSR/ 2021-22				
	SECTION				
	12 - CB [ L.T. CABLE ] Item no. CB 6 Page				
24	Control Cables				
34	Copper conductor PVC insulated,				
	Unarmoured control cable				
	Supplying and erecting Un-armoured control				
	cable with ISI mark stranded / solid copper				
	conductor 1.1 kV grade complete erected on				
	wall / panel or in provided trench in an				
	approved manner.	107.05		40-05	4= 10= 65
	4 core 2.5 sq mm	125.00	m	137.00	17,125.00
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB				
	8-				
	-				

	Plumbing Items				
Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
35	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges, inspection charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed shed duly protected from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit type to be jointed with				
	<ol> <li>1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.</li> <li>2) One coupler and required cement solvent shall be provided with each full length pipe</li> </ol>				
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES, Page no.77				
1	Raw Sewage pump to TBF Distribution				
а	Main header				
	110 mm.	45.00	m	428.00	19,260.00
	PVC Specials- 10%				1,926.00
b	Distribution				
Ь	90 mm.	65.00	m	303.00	19,695.00
	PVC Specials- 10%	03.00	111	303.00	1,969.50
	1 VC Specials- 1076				1,909.30
2	TBF collection to FFT (gravity)				
a	Main header				
	110 mm.	120.00	m	428.00	51,360.00
	PVC Specials- 10%				5,136.00
b	collection tributory				
	75 mm.	20.00	m	211.00	4,220.00
	PVC Specials- 10%				422.00
3	TTU Plumbing				
3	110 mm.	25.00	m	428.00	10,700.00
	PVC Specials- 10%	20.00		120.00	1,070.00
4	TBF distribution	50.00		4.40.00	7.450.00
	63 mm.	50.00	m	149.00	7,450.00
	PVC Specials- 10%				745.00
36	Labour				
	Plumber	20.00	days	641.00	12,820.00
	Helper	40.00	days	579.00	23,160.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / SECTION - B LABOUR & MACHINERY , Page no. 14				
	a wittermiterer, rage ne. Fr				
37	confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.				
	Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump	0.00		0.005.00	40.070.00
-	100 mm.	2.00	Nos	6,835.00	13,670.00
	Filter Feed Pump 100 mm.	2.00	Nos	6,835.00	13,670.00
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132	2.00	NOS	6,635.00	13,670.00
38	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)				
	Without by pass arrangement -PN -1				
	Raw Sewage pump				
	100 mm.	2.00	Nos	5,713.00	11,426.00
	Filter Feed Pump				
	100 mm.  MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 131	2.00	Nos	5,713.00	11,426.00
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc. complete.	720.00	Nos	4,750.00	3,420,000.00
	Market rate	120.00	1403	+,1 50.00	5,420,000.00
40	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	68.49	Cum	1,730.00	118,487.70

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
41	Trasnsportation Godhara to Pune distance by Road 660 Km.	68.49	Cum	11,031.37	755,538.60
	MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.				
42	Stone Aggregate 20 mm  MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	68.49	Cum	900.00	61,641.00
43	Transportation as per STATEMENT VI Including loading, unloading and stacking				
	Manure or sludge (5.52 Cum) lead 25 Km MJP/ SSR/ 2021-22 / SECTION - C: TRANSPORTATION Page no.	264.50	Cum	747.48	197,708.50
		NET TOTAL Rs.			12,502,928.60

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				2.55		
Α	0.0 to 1.5 m	1	6.20	3.10	1.5	28.83	Cum
	soil					7.21	Cum
	Murum					7.21	Cum
	Soft rock					7.21	Cum
	hard rock					7.21	Cum
В	1.5 to 3.0 m	1	6.2	3.10	1.05	20.19	Cum
	soil					5.05	Cum
	Murum					5.05	Cum
	Soft rock					5.05	Cum
	hard rock					5.05	Cum
	0.01.45			0.00			
С	3.0 to 4.5 m	1	5.2	2.60	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	5.2	2.60	0	0	Cum
	soil		5.2	2.00	U	0	Cum
	Murum	+				0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
	TIAI A TOCK					0	Cum
2	Soling						
	Screen	1	3.20	1.20	0.30	1.16	Cum
	Grit	1	4.20	0.90	0.30	1.14	Cum
	extra for grit chamber	1 1	1.00	0.60	0.30		Cum
,	- commercial graduation			Total for gri		1.32	Cum
					-		
3	PCC M20						
	Screen	1	2.80	1.00	0.10	0.28	Cum
	Grit	1	3.80	0.90	0.10	0.35	Cum
		1	1.00	0.40	0.20	0.08	Cum
	Internal slope	1	Area	0.19	0.90	0.18	Cum
	Internal slope	1	Area	0.10	0.90	0.09	Cum
				Total for gri	t	0.7	Cum
4	Raft M30						
	Screen	1	2.60	0.90	0.15	0.36	Cum
	Grit	1	3.60	0.90	0.15	0.49	Cum
		1	1.00	0.30	0.15	0.05	Cum
				Total for gri	t	0.54	Cum
5	RCC Wall						
	Screen						
	Long Wall	2	2.20	0.10	1.50	0.66	Cum

Sr.	Kara Basarintian	N	1 ()	D ()	11 ()	0	1111
No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Short Wall	2	0.70	0.10	1.50	0.21	Cum
				Total for so	reen	0.87	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	1.00	0.10	2.20	0.22	Cum
	Short Wall	2	0.90	0.10	2.20	0.4	Cum
				Total for gr	it	0.62	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	80	Cum	2.39	0.2	MT
	Fabrication work in Frame and						
7	Grating for Access						
	Screen	1	2.20	0.70		1.54	Sqm
	Grit	1	3.20	1.00		3.2	Sqm
					Total	4.74	Sqm
8	Removing excess exacavated material out of site						
	Screen chamber	1	2.20	0.70	1.30	2.01	Cum
	Grit Chamber	1	3.20	0.90	2.00	5.76	Cum
	soling, PCC, Raft volume					4.09	Cum
	Total Volume					11.86	Cum
	bulkage @ 40%					16.61	Cum
9	Refilling and compaction						
	Total Excavation					49.02	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					11.86	Cum
	Refilling and compaction volume					37.16	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				4.00		
Α	0.0 to 1.5 m	1	8.7	8.70	1.5	113.54	Cum
	soil					28.39	Cum
	Murum					28.39	Cum
	Soft rock					28.39	Cum
	hard rock					28.39	Cum
В	1.5 to 3.0 m	1	7.70	7.70	1.5	88.94	Cum
	soil					22.24	Cum
	Murum					22.24	Cum
	Soft rock					22.24	Cum
	hard rock					22.24	Cum
С	3.0 to 4.5 m	1	7.70	7.70	1	59.29	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					14.83	Cum
	Murum					14.83	Cum
	Soft rock					14.83	Cum
	hard rock					14.83	Cum
D	4.5 to 6.0 m	1	6.70	6.70	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	RSS	1	6.10	6.10	0.30	11.17	Cum
3	PCC M20						
	RSS	1	5.70	5.70	0.10	3.25	Cum
4	Raft M30						
-	RSS	1	5.50	5.50	0.30	9.08	Cum
			0.00	0.00	0.00	0.00	Cum
5	RCC Wall						
	Long Wall	2	5.10	0.25	3.50	8.93	Cum
	Short Wall	2	4.60	0.25	3.50	8.05	Cum
					Total	16.98	Cum
6	Beams						
	Beam 1	1	4.60	0.2	0.3	0.28	Cum
	Beam 2	1	4.60	0.2	0.3	0.28	Cum
					Total	0.56	Cum
7	Slab	1	5.10	5.10	0.2	5.21	Cum
	Deduction for manhole	-2	1.20	0.70	0.2	-0.34	Cum
					Total	4.87	Cum
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	31.49	3.15	MT
9	Fabrication work in Frame and Grating for Access						
	RSS	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	RSS	1	5.10	5.10	3.30	85.84	Cum
	soling, PCC, Raft volume					23.5	Cum
	Total Volume					109.34	Cum
	bulkage @ 40%					153.08	Cum
11	Refilling and compaction						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					261.77	Cum
	Deduction for tank volume, soling, PCC, Raft					109.34	Cum
	Refilling and compaction volume					152.43	Cum
12	Dewatering						
	10 Days x 4 hours/day	days	10	hours / day	4	40	Hrs

# **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
2	Soling						
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
	TBF	1	12.06	5.06	0.10	6.11	Cum
A	Doff MOO						
4	Raft M30	4	44.00	4.00	0.10	r 77	Cura
	TBF	1	11.86	4.86	0.10	5.77	Cum
5	Brick Wall						
5	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
	Orace Support Wall		11.00	0.20	Total for	T 14.87	Cum
					1 otal 101	1 14.07	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	
	Short Wall	2	4.00		1.20	9.6	Sqm
					Total	81.65	Sqm
	External						
	Long Wall	2	11.46		1.20	27.51	Sqm
	Short Wall	2	4.46		1.20	10.71	Sqm
	Wall Top	1	30.92	0.3		9.28	Sqm
					Total	47.50	Sqm
	Fortonia I code!					47.50	
7	External-white-wash	1				47.50	Sqm
8	External colour wash	1				47 FO	Sam
0	External-colour-wash					47.50	Sqm
9	Stool HCDM / CDC @ V-/C	Kg/C	00	Cure	F 77	0.05	N 4∓
	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	5.77	0.35	MT
10	Removing excess exacavated						
-	material out of site					00.00	
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

# **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m x		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

# MEASUREMENT SHEET - FILTER FEED TANK

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				3.10		
Α	0.0 to 1.5 m	1	7.1	7.10	1.5	75.62	Cum
	soil					18.91	Cum
	Murum					18.91	Cum
	Soft rock					18.91	Cum
	hard rock					18.91	Cum
В	1.5 to 3.0 m	1	6.60	6.60	1.5	65.34	Cum
	soil					16.34	Cum
	Murum					16.34	Cum
	Soft rock					16.34	Cum
	hard rock					16.34	Cum
С	3.0 to 4.5 m	1	6.10	6.10	0.1	3.73	Cum
	soil		3113			0.94	Cum
	Murum					0.94	Cum
	Soft rock					0.94	Cum
	hard rock					0.94	Cum
	Tidia Took					0.01	Odin
D	4.5 to 6.0 m	1	6.10	6.10	0	0	Cum
	soil		0.10	0.10	Ü	0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
	Tidia Took					<u> </u>	Odili
2	Soling						
	FFT	1	5.50	5.50	0.30	9.08	Cum
		<u>'</u>	0.00	0.00	0.00	0.00	Odili
3	PCC M20	+					
	FFT	1	5.10	5.10	0.10	2.61	Cum
		-	0.10	0.10	0.10	2.01	Odili
4	Raft M30						
	FFT	1	4.90	4.90	0.20	4.81	Cum
		-	4.50	4.50	0.20	7.01	Odili
5	RCC Wall						
	Long Wall	2	4.50	0.25	2.70	6.08	Cum
	Short Wall	2	4.00	0.25	2.70	5.40	Cum
	C. O. C.		1.00	0.20	Total	11.48	Cum
					10101	11.70	Carri
6	Beams						
	Beam 1	1	4.00	0.2	0.3	0.24	Cum
	Beam 2	1	4.00	0.2	0.3	0.24	Cum
	Douin 2		7.00	0.2	Total	0.48	Cum
					iotai	0.40	Juili
7	Slab	1	4.50	4.50	0.2	4.05	Cum
- 1	Deduction for manhole		1.20	0.70	0.2	-0.34	Cum
	Deduction for marinole	+ -	1.20	0.70	Total	3.71	Cum
			+		ı olal	3.71	Cuili

# **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	20.48	2.05	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	FFT	1	4.50	4.50	2.50	50.63	Cum
	soling, PCC, Raft volume					16.5	Cum
	Total Volume					67.13	Cum
	bulkage @ 40%					93.99	Cum
11	Refilling and compaction						
	Total Excavation					144.69	Cum
	Deduction for tank volume, soling, PCC, Raft					67.13	Cum
	Refilling and compaction volume					77.56	Cum
12	Dewatering						
	10 Days x 4 hours/day	days	10	hours/day	4	40	Hrs

# **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	5.4	5.00	0.55	14.85	Cum
	soil					3.72	Cum
	Murum					3.72	Cum
	Soft rock					3.72	Cum
	hard rock					3.72	Cum
2	Soling						
	Filter Platform	1	5.20	4.80	0.30	7.49	Cum
3	PCC M20						
	Filter Platform	1	4.80	4.40	0.10	2.12	Cum
4	Raft M30						
	Filter Platform	1	4.60	4.20	0.15	2.9	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	60	Cum	2.9	0.18	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					9.61	Cum
	Total Volume					9.61	Cum
	bulkage @ 40%					13.46	Cum
7	Refilling and compaction						
	Total Excavation					14.85	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					9.61	Cum
	Refilling and compaction volume					5.24	Cum

# **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.	720				720	Nos
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	720	0.82	0.58	0.2	68.49	Cum
	r coagr cana,	120	0.02	0.00	0.2	00.40	Odin
3	Trasnsportation Godhara to					68.49	Cum
4	Stone Aggregate 20 mm	720	0.82	0.58	0.2	68.49	Cum
5	Transportation as per STATEMENT VI Including loading,						
	Manure or sludge (5.52 Cum) lead	720	0.82	0.56	0.8	264.5	Cum

# MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr. No.	Item Description	Nos.	Unit
1	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	1	No
	Crit numer		
2	Grit pump  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size		
	1.8 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
3	Raw Sewage Pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	5 HP (Up to 35000 LPH)	2	Nos
4	TTU Feed pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	5 HP (Up to 35000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.3 m x 2 m minimum height	2	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.3 m x 2 m minimum height	2	Nos
	Dun All Tablet Oblevin ster a contrider	^	
7	PurAll Tablet Chlorinator + cartridge	0	nos

# **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr. No.	Item Description	Nos.	Unit
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH		
	Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz		
a	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
8	Control Panel		
	Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed.		
	Master PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		INU
	AUTOMATION ] Item no. 2.7 Page no. 72		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.		
	> 7.5 HP & Up to 12.5 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR AND PROTECTION] Item no. LG 3 Page no. 27		
10	Main navanavanlu sahia		
10	Main power supply cable		
	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor, PVC insulated, and PVC sheathed.		
	3 core 16 sq mm	25	m
44	Davies askins		
11	Power cables  Aluminium conductor 4 Core, XI DE / DVC inculated 8 armoured cable		
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved manner.		
	4 Core 6 sq mm	125	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no. CB 6 Page no. 35		
12	Control Cables		
	Copper conductor PVC insulated, Unarmoured control cable		

# MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

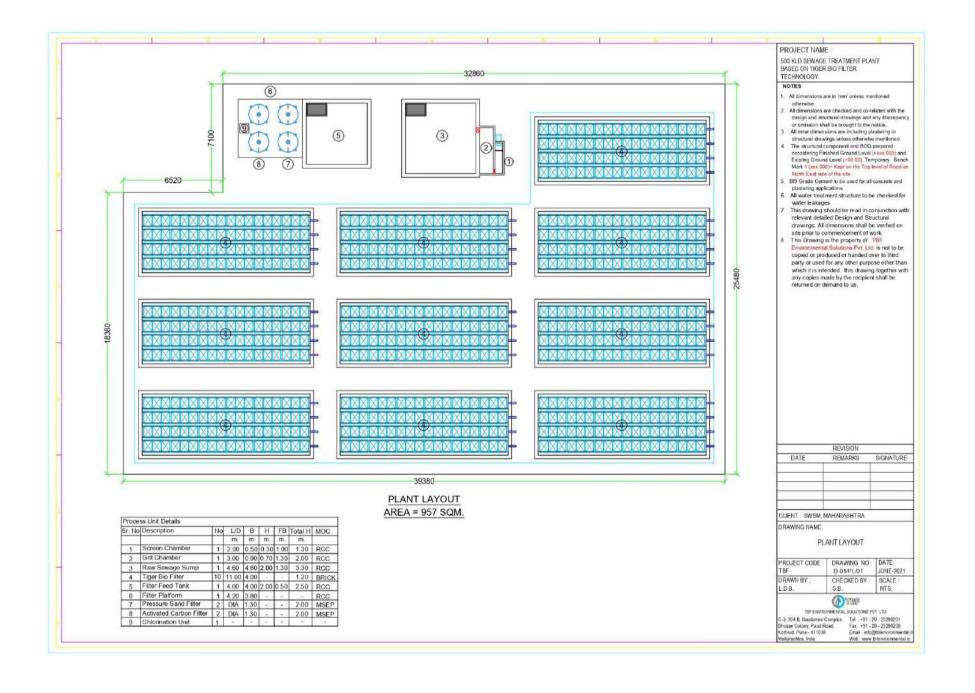
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	125	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

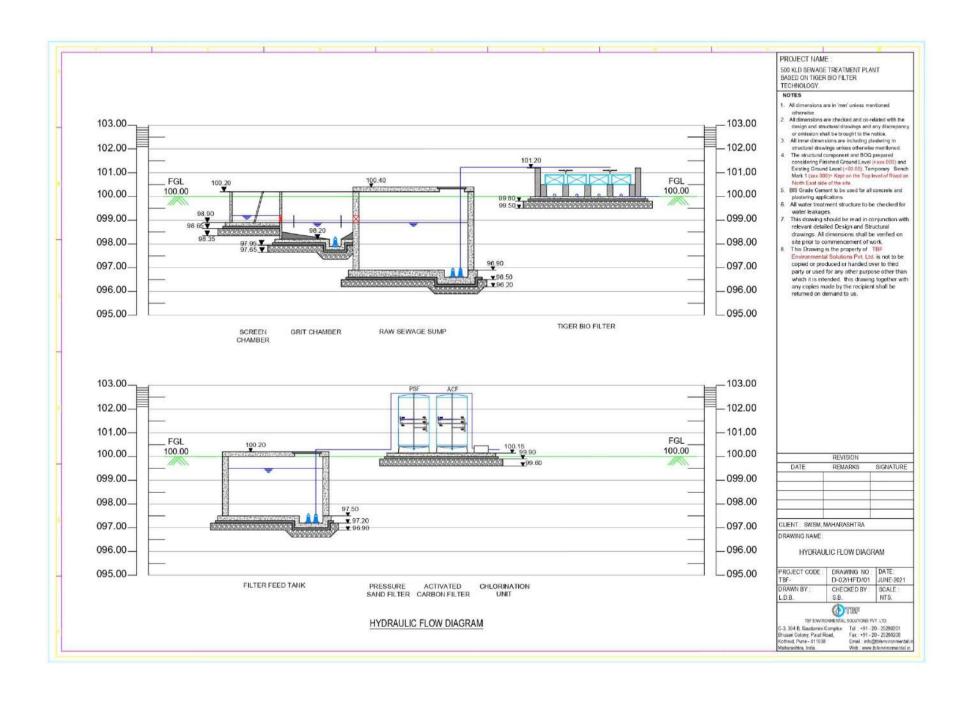
# **MEASUREMENT SHEET - PLUMBING**

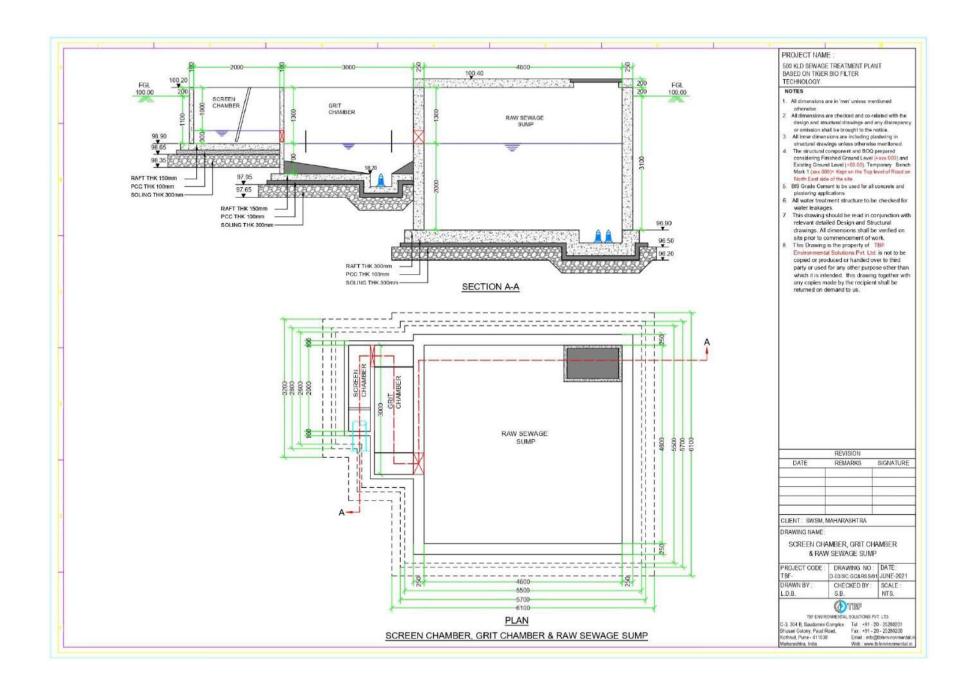
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges, inspection charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed shed duly protected from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit			/m)		
	<ul><li>type to be jointed with cement solvent).</li><li>1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.</li></ul>					
	<ol> <li>One coupler and required cement solvent shall be provided with each full length pipe cost of which is included in rates below.</li> </ol>					
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES,					
1	Raw Sewage pump to TBF Distribution					
а	Main header	Dia	110			
	110 mm.	1	45		45	m
	PVC Specials- 10%					
b	Distribution					
	90 mm.	1	65		65	m
	PVC Specials- 10%	1	00		00	111
	F VC Specials- 1078					
2	TBF collection to FFT (gravity)					
a	Main header					
_ u	110 mm.	1	120		120	m
	PVC Specials- 10%	1	120		120	111
	T VO Openials Toyl					
b	collection tributory					
	75 mm.	1	20		20	m
	PVC Specials- 10%					
3	TTU Plumbing	Dia	110			
	110 mm.	1	25		25	m
	PVC Specials- 10%					
4	TBF distribution			No. of b	neds	
	63 mm.	1	5	10. 01 L	50	m
	PVC Specials- 10%	<u>'</u>	J	10	30	
	1.10 0000000 1070					
5	Labour	Nos	Days			
	Plumber	2	10		20	days
	Helper	4	10		40	days
					-	
6	Sluice valves					

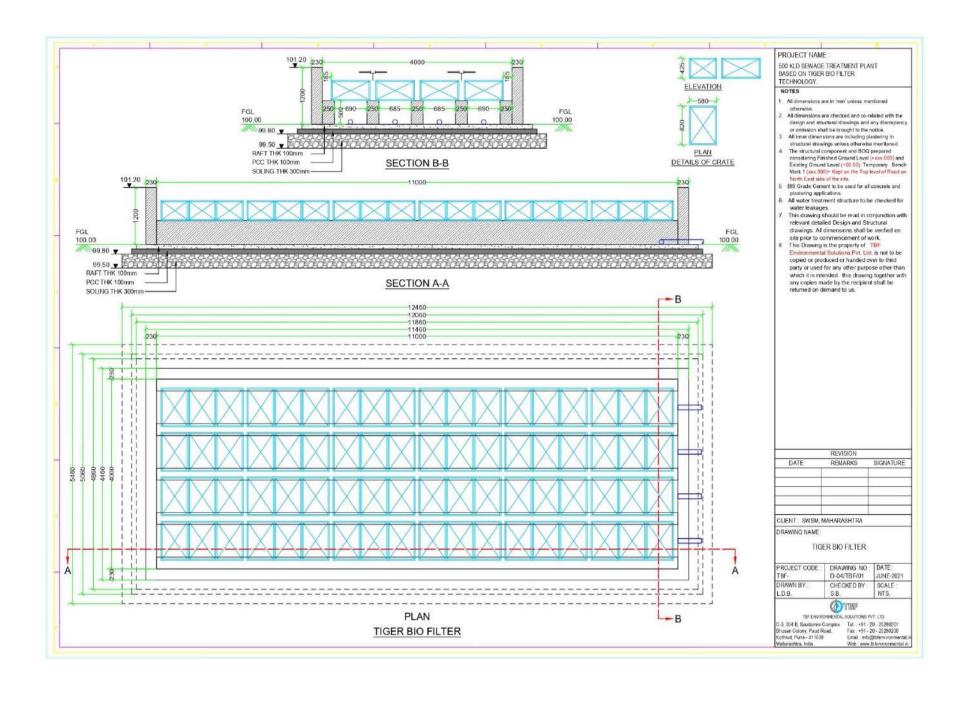
#### **MEASUREMENT SHEET - PLUMBING**

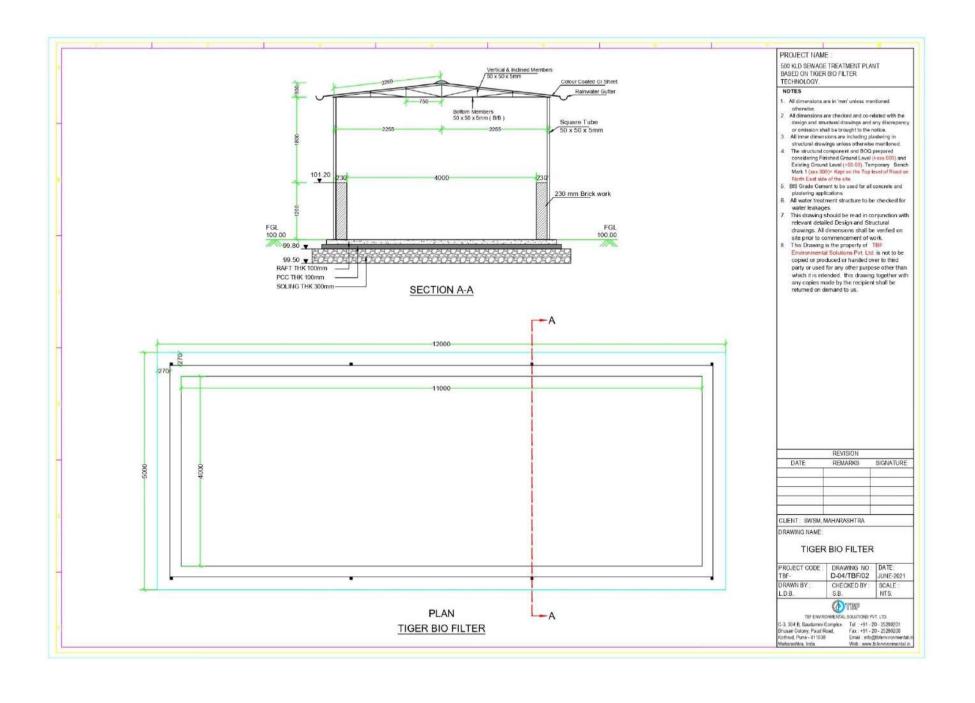
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132					
	Raw Sewage pump					
	100 mm.	2			2	Nos
	100 mm.					1103
	Filter Feed Pump					
	100 mm.	2			2	Nos
	100 111111	_				1100
7	Reflux valves (non-return valves )					
	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII): PIPES APPURTENANCES, Page no. 131					
	Raw Sewage pump					
	100 mm.	2			2	Nos
	Filter Feed Pump					
	100 mm.	2			2	Nos

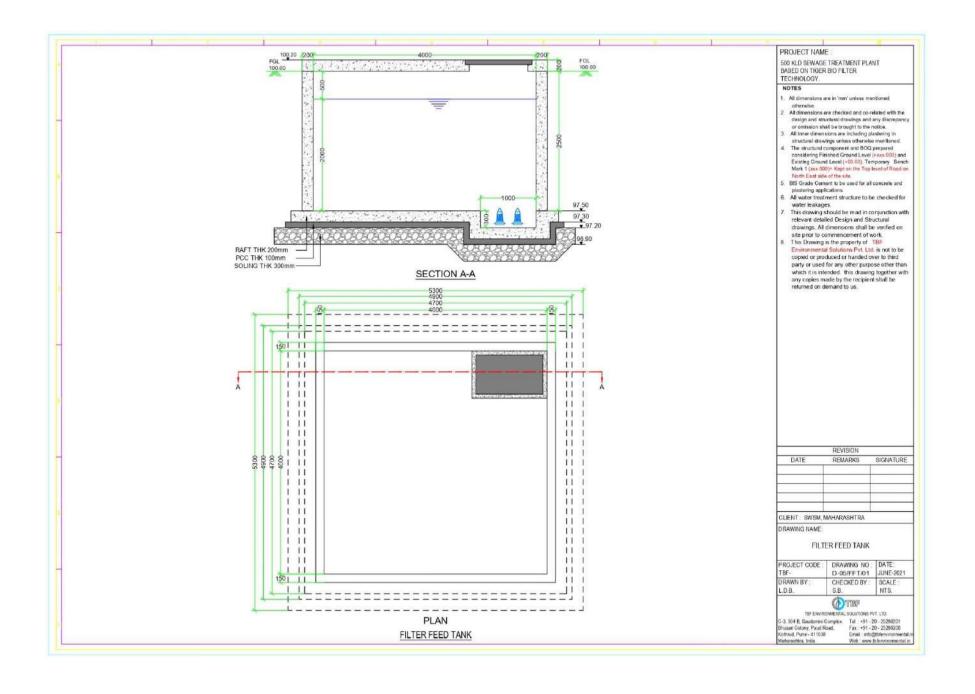


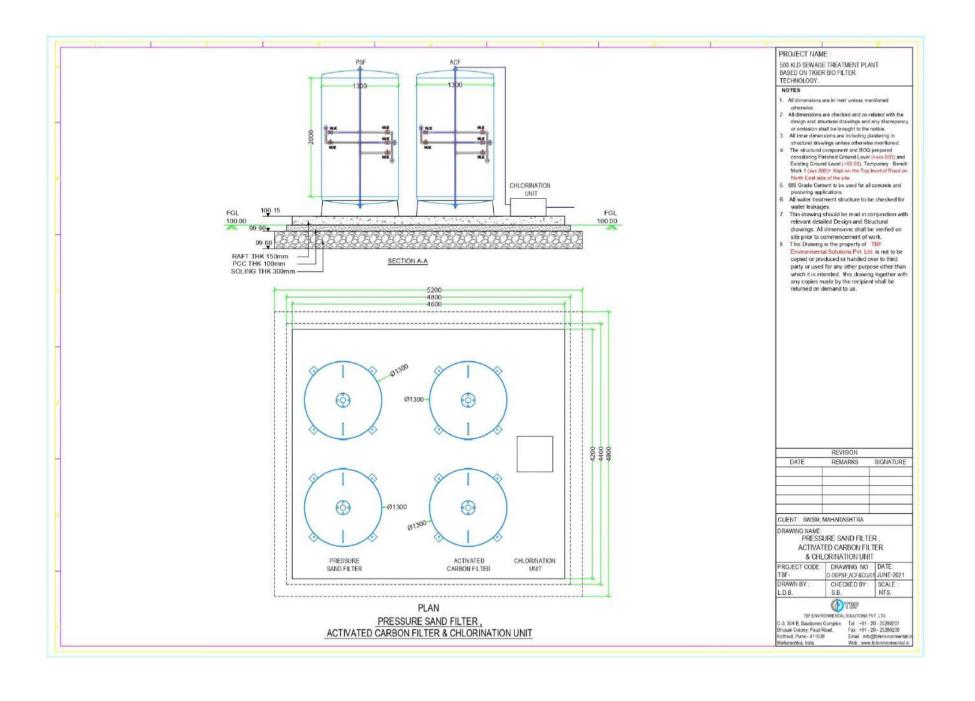












# 750 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 750 KLD CAPACITY

	Design flow	=	<b>750.00</b> 0.750	KLD MLD
	Peak flow factor	=	3.00	
1	SCREEN CHANNELS: MANUAL			
	No. of Manual Screen	=	1	No.
	Average Flow	=	0.75	MLD
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
		=	2.25	MLD
		=	93.75	m³/hr
		=	0.026	m <sup>3</sup> /sec
	Average Flow	=	0.75	MLD
		=	31.250	m³/hr
		=	0.009	m³/sec
	Design Flow in each Screen	=	0.026	m³/sec
			1	No.
		=	0.026	m³/sec
	Average Flow in each Screen	=	0.009	m³/sec
			1	No.
		=	0.009	m³/sec
	Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	Clear Area of Opening through	=	0.026	m³/sec
	Screen for Peak Flow	_		
			1.2	m/sec
		=	0.022	$m^2$
	Clear Area of Opening through Screen for Average Flow	=	0.009	m³/sec
	Ü		0.6	m/sec
		=	0.015	$m^2$
	Considering maximum Area of	=	0.022	$m^2$
	Opening through Screen			
	Clear Spacing of Bars	=	10	mm

Thickness of Bars	=	5	mm	
Gross Area of Screen	=	0.022x(10+5)/10		
31353 7 Hou of Colocii	=	0.033	$m^2$	
Assuming Depth of Screen Channel	=	300.00	mm	
Gross Width of Screen	=	0.033/0.3		
	=	0.110	m	
No. of Bars	=	(Gross Width of Screer of Bars) - 1 0.11/((10+5)/1000)-	n / Center to C	Center Spacing
	=	1		
	=	6.3	Nos.	
Say	=	7	Nos.	()
Width of Screen provided	=	(Number of Bars+1) x (Bars x Bar Thickness)	Diear Spacing	) + (Number of
	=	(7+1)x10+(7x5) 115	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel provided	=	0.30	m	
L:B	=	6.00		
Length of Screen Channel provided	=	3.00	m	
Freeboard provided	=	1.00	m	Invert Depth of incoming sewer
Total Depth of Screen Chamber	=	1.30	m	3011-01
Velocity in Channel at Average Flow	=	Average Flow / Cross S Channel	Sectional Area	a of Screen
	=	0.009/((0.5x0.3)/1000x	1000)	
	=	0.060	m/sec	
	>	0.300	m/sec	
Head Loss across Screen				
Head Loss across Screen	=	$0.0728 (V^2 - v^2)$		
V = Velocity through Screen at Peak Flow	=	Peak Flow through Sc Opening	reen Channe through Scre	
	=	1.083	m/sec	
v = Velocity in approach Channel at Peak Flow	=	Peak Flow through Sectional Are	n Screen Cha a of Screen C	
	=	0.8	m/sec	
Head Loss across Screen at Peak Flow	=	0.040	m	
Head Loss across Screen at 50% Clogged Condition				
Velocity through Screen at 50% Clogged Condition at Peak Flow	=	2.167	m/sec	
Head Loss across screen at 50% Clogged Condition at Peak Flow	=	0.297	m	
c.oggod condition at 1 oak 1 low	>	0.300	m/sec	ок

# 2 CONVENTIONAL GRIT CHAMBER: MANUAL

No. of Grit Chamber		ANUAL 1	
	=	-	MID
Average Flow	=	0.75	MLD
Peak Flow Factor	=	3.00	
Design Flow	=	Peak Flow	
Peak Flow	=	2.25	MLD
	=	2250	m³/day
	=	94	m³/hr
	=	0.026	m³/sec
		0.0_0	, 555
Design Flow to each Grit Chamber	=	2250/1	
Design Flow to each ont onamber		2250	m³/day
	=		•
	=	94	m³/hr
	=	0.026	m³/sec
According to CPHEEO Manual			
Particle Size	=	0.15	mm
Specific Gravity	=	2.65	
•			
Surface Overflow Rate for 100%		Cottling \/alaaitu	of the mainimenum size of Doutisles to
removal efficiency in an ideal Grit	=	Settling velocity	of the minimum size of Particles to be removed
Chamber			be removed
	=	1.5	m/s
	=	1296	m³/m²/day
Considering Efficiency of removal		750/	
of desired Particles, η = 75%	=	75%	
and Measure of Settling Basin			
Performance,	=	0.125	
n = 1/8 for very good performance			
Design Overflow Rate	=	857	m³/m²/day
			•
Surface Overflow Rate for 0.15			
mm dia. Particle Size with Specific	=	1555	m <sup>3</sup> /m <sup>2</sup> /day
Gravity $S_s > 2.65$ Table 5.6	_	1000	III /III /day
•		000	3, 2,,
Considering Design Overflow Rate	=	960	m³/m²/day
Area of Grit Chamber required	=	2250	m³/day
		960	m³/m²/day
	=	2.34	$m^2$
L:B ratio	_	3	
Length of Chamber provided	_	4.00	m
Width of Chamber provided	_	0.90	m
Width of Chamber provided	_	0.30	111
Hydraulia Potantian Tima (UDT) in			
Hydraulic Retention Time (HRT) in Grit Chamber at Peak Flow	=	60	sec
	_	0.006460	
Volume of Grit Chamber required	=	0.026x60	3
	=	1.56	$m^3$
Depth required in Grit Chamber	=	1.56 / (4x0.9)	

		=	0.43	m
	Say	=	0.50	m
	Grit Storage Depth	=	0.30	m
	Total Liquid Depth required	=	0.80	m
	Length of Grit Pit	=	0.50	m
	Width of Grit Pit	=	0.50	m
	Depth of Grit Pit	=	0.30	m
	Free Board	=	1.30	m
3	RAW SEWAGE SUMP (WET WELI	L <b>)</b>		
	No. of Units	=	1	No.
	Average Flow	=	0.75	MLD
		=	31.250	m³/hr
		=	0.0087	m3/sec
	Peak Flow Factor	=	3.00	
	Design Flow		Peak Flow	
	Design Flow	=	2.25	MLD
		=		m <sup>3</sup> /hr
		=	94	
		=	0.026	m <sup>3</sup> /sec
	Hydraulic Retention Time (HRT) at			
	Average Flow	=	120	min
	Volume required	=	0.0087 x 120 x 60	
		=	63	$m^3$
	Hydraulic Retention Time (HRT) at	=	Volume / Average Flow	
	Peak Flow		•	
		=	40	min
		<	30	min
	Total Volume of Wet Well		63	$m^3$
	Total volume of vvet vveli	=	03	111
	Side Water Depth (SWD) provided	=	2.00	m
	Plan Area of Wet Well	=	31.32	m <sup>2</sup>
	Length/width of Sump required	=	5.60	m
	Length/width of Sump provided	=	5.60	m
	Volume of Sump provided	_	62.72	m <sup>3</sup>
	Length of Pump Pit	=	1.00	m
	Width of Pump Pit	=	0.50	m
	Depth of Pump Pit	=	0.30	m
	Free Board		1.30	m
	5 - 5 - 5			
3.1	DESIGN STATEMENT-RSS E&M			
	Design Considerations			
	- Joseph Gorioladialidio			

0.75

750.00

3.00

MLD

Cum/Day

Design flow

Peak flow factor

# **Pumping machinery**

Pressure Mains

=	20
=	1
=	20
=	0
=	0.75
=	0
=	0
=	0.5
=	0
=	0
=	1.5
=	0
=	13
=	0.3
=	3.9
=	1
=	0.4
=	0.4
=	1
	= = = = = = = = = = = = = = = = = = = =

Friction Factor for each Friction factor for all

Discharge, lps

2.5

Total friction factor	=	26.8		
Stage		low	ave	peak
Average flow, cum / day	=		750.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	450	750	1500
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0130	0.0130	0.0174
Dia needed, m	=	0.129	0.129	0.149
Dia needed, mm	=	129	129	149
Dia provided, mm (User)	=	140	140	140
Radius, m	=	0.070	0.070	0.070
Radius power 0.63	=	0.187	0.187	0.187
S power 0.54	=	0.027	0.045	0.067
S	=	0.001	0.003	0.007
Slope 1 in	=	803.8	312.1	147.3
length, m	=	55	55	55
Friction in pipeline, m	=	0.1	0.2	0.4
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	26.8	26.8	26.8
Friction in fittings, m	=	0.5	1.4	3.1
Static lift, m	=	4.5	4.5	4.5
Total head, m	=	5.0	5.9	7.6
Efficiency of pumpset	=	8.0	0.8	8.0

7.8

=

13.0

26.0

2.5

=

=

Discharge, Cum/Hr					
Kw required         =         1.208         2.017         4.034           HP required         =         2.0         3.0         5.5           Number of Pumps         =         2         2         2           TIGER BIO FILTER DESIGN STATEMENT-TBF1-50 KLD           Number of gumping hours         =         16         Hrs           Number of BMF tanks provided         =         15         Nos           Design flow to each tank         =         50.00         Cum/day           =         3.13         Cum/ Hr for 16 Hr         Lead of the complex o	Discharge, Cum/Hr	=	28.1	46.9	93.8
HP required	_	=	1.208	2.017	4.034
Number of Pumps	•	=			
Number of pumping hours	•	=			
Number of pumping hours	rtambor or r ampo		_	_	_
Number of pumping hours	TIGER BIO FILTER				
Number of pumping hours	DESIGN STATEMENT-TBF1- 50	KLD			
Number of BMF tanks provided   E					
Number of BMF tanks provided   E	Number of pumping hours	=	16	Hrs	
Design flow to each tank		=	15	Nos	
	•	=	50.00	Cum/dav	
	3	=		· ·	Hr
Inlet BOD		=			
Inlet TSS			0.0.	.,,	
Inlet TSS	Inlet BOD	=	250.00	ma/l	
BOD load applied		=		-	
BOD uptake rate		=		-	
Worms required			_		(0.5 - 1.0)
Worms required         =         1.85         Cum/Sqm/day         (1 - 2 Cum/Sqm/day)           Area required         =         27.03         Sqm           Area required         =         28         Sqm           Area of each crate         =         0.4         Sqm           Number of crates         =         70         Nos           say         =         72         Nos           Crate in longitudinal direction         =         18         Nos           Crate in travers direction         =         18         Nos           Crate in travers direction         =         4         Nos           Crates provided         =         72         Nos         OK           Width provided         =         72         Nos         OK           Width provided         =         1.2         m           TERTIARY TREATMENT UNIT           Design Considerations           Design flow         =         0.75         MLD           FILTER FEED TANK         Nos         Cum/Day           Peak flow factor         =         1         Nos           Number of FFT provided         =         1         Nos <tr< td=""><td>DOD aptake rate</td><td>_</td><td>0.1</td><td></td><td>(0.0 1.0)</td></tr<>	DOD aptake rate	_	0.1		(0.0 1.0)
Sewage application rate         =         1.85         Cum/Sqm/day         (1 - 2 Cum/Sqm/day)           Area required         =         27.03         Sqm           Area Provided         =         28         Sqm           Area of each crate         =         0.4         Sqm           Number of crates         =         70         Nos           say         =         72         Nos           Crate in longitudinal direction         =         18         Nos           Crate in longitudinal direction         =         18         Nos           Crate in travers direction         =         4         Nos           Crate in travers direction         =         4         Nos           Crate in travers direction         =         4         Nos           Crate in travers direction         =         72         Nos         OK           Width provided         =         72         Nos         OK           Width provided         =         1.2         m           TERTIARY TREATMENT UNIT           Design flow         =         0.75         MLD           FILTER FEED TANK           Number of FFT provided <td< td=""><td>Worms required</td><td>=</td><td>125</td><td>_</td><td></td></td<>	Worms required	=	125	_	
Area required	-	=		•	(1 - 2
Area required         =         27.03         Sqm           Area Provided         =         28         Sqm           Area of each crate         =         0.4         Sqm           Number of crates         =         70         Nos           Say         =         72         Nos           Crate in longitudinal direction         =         18         Nos           Crate in travers direction         =         4         Nos           crates provided         =         72         Nos         OK           Width provided         =         4.00         m         m           Length required         =         11.00         m         m           TERTIARY TREATMENT UNIT           Design flow         =         0.75         MLD           =         750.00         Cum/Day           Peak flow factor         =         3.00           FILTER FEED TANK           Number of FFT provided         =         1         Nos           Number of operating hours         =         16         Hrs           Design flow         =         750.00         Cum/Day           =         46.88	cowago application rate		1.00	ouni, oqiri, aay	
Area Provided         =         28         Sqm           Area of each crate         =         0.4         Sqm           Number of crates         =         70         Nos           say         =         72         Nos           Crate in longitudinal direction         =         18         Nos           Crate in travers direction         =         4         Nos           Crates provided         =         72         Nos         OK           Width provided         =         72         Nos         OK           Width provided         =         11.00         m         m           Length required         =         11.2         m         m           TERTIARY TREATMENT UNIT           Design flow         =         0.75         MLD           Experimental Systems           Design flow         =         0.75         MLD           FILTER FEED TANK           Number of FFT provided         =         1         Nos           Number of operating hours         =         16         Hrs           Design flow         =         750.00         Cum/Day           = </td <td>Area required</td> <td>=</td> <td>27.03</td> <td>Sam</td> <td>. ,</td>	Area required	=	27.03	Sam	. ,
Area of each crate	•	=		-	
Number of crates         =         70         Nos           say         =         72         Nos           Crate in longitudinal direction         =         18         Nos           Crate in travers direction         =         4         Nos           crates provided         =         72         Nos         OK           Width provided         =         4.00         m           Length required         =         11.00         m           Depth provided         =         1.2         m    TERTIARY TREATMENT UNIT  Design Considerations  Design flow  =     =         0.75         MLD           =         750.00         Cum/Day           Peak flow factor         =         3.00    FILTER FEED TANK  Number of FFT provided  =     1     Nos           Number of operating hours         =         16         Hrs           Design flow         =         750.00         Cum/Day           =         46.88         Cum/Hr           =         0.01302         Cum/Sec           Hydraulic Retention time         =         60         min           Volume required         =         46.88         Cum           Depth		=	_	-	
say = 72 Nos Crate in longitudinal direction = 18 Nos Crate in travers direction = 4 Nos crates provided = 72 Nos OK Width provided = 4.00 m Length required = 11.00 m Depth provided = 1.2 m   TERTIARY TREATMENT UNIT  Design Considerations Design flow = 0.75 MLD = 750.00 Cum/Day Peak flow factor = 3.00  FILTER FEED TANK Number of FFT provided = 1 Nos Number of operating hours = 16 Hrs Design flow = 750.00 Cum/Day  = 46.88 Cum/Hr = 0.01302 Cum/Sec Hydraulic Retention time = 60 min Volume required = 46.88 Cum Depth = 2.00 m				•	
Crate in longitudinal direction = 18 Nos Crate in travers direction = 4 Nos crates provided = 72 Nos OK Width provided = 4.00 m Length required = 11.00 m Depth provided = 1.2 m  TERTIARY TREATMENT UNIT  Design Considerations Design flow = 0.75 MLD = 750.00 Cum/Day Peak flow factor = 3.00  FILTER FEED TANK Number of FFT provided = 1 Nos Number of operating hours = 16 Hrs Design flow = 750.00 Cum/Day = 46.88 Cum/Hr = 0.01302 Cum/Sec Hydraulic Retention time = 60 min Volume required = 46.88 Cum Depth = 2.00 m					
Crate in travers direction = 4 Nos crates provided = 72 Nos OK  Width provided = 4.00 m  Length required = 11.00 m  Depth provided = 1.2 m   TERTIARY TREATMENT UNIT  Design Considerations  Design flow = 0.75 MLD  = 750.00 Cum/Day  Peak flow factor = 3.00  FILTER FEED TANK  Number of FFT provided = 1 Nos  Number of operating hours = 16 Hrs  Design flow = 750.00 Cum/Day  = 46.88 Cum/Hr  = 0.01302 Cum/Sec  Hydraulic Retention time = 60 min  Volume required = 46.88 Cum  Depth = 2.00 m	-				
crates provided = 72 Nos OK Width provided = 4.00 m Length required = 11.00 m Depth provided = 1.2 m  TERTIARY TREATMENT UNIT  Design Considerations Design flow = 0.75 MLD	<u> </u>				
Width provided = 4.00 m  Length required = 11.00 m  Depth provided = 1.2 m   TERTIARY TREATMENT UNIT  Design Considerations Design flow = 0.75 MLD					OK
Length required = 11.00 m  Depth provided = 1.2 m  TERTIARY TREATMENT UNIT  Design Considerations Design flow = 0.75 MLD	•				OK
Depth provided = 1.2 m  TERTIARY TREATMENT UNIT  Design Considerations Design flow = 0.75 MLD	•				
TERTIARY TREATMENT UNIT  Design Considerations Design flow = 0.75 MLD					
Design ConsiderationsDesign flow=0.75MLD=750.00Cum/DayPeak flow factor=3.00FILTER FEED TANK Number of FFT provided=1NosNumber of operating hours=16HrsDesign flow=750.00Cum/Day=46.88Cum/Hr=0.01302Cum/SecHydraulic Retention time=60minVolume required=46.88CumDepth=2.00m	Depth provided	=	1.2	m	
Design ConsiderationsDesign flow=0.75MLD=750.00Cum/DayPeak flow factor=3.00FILTER FEED TANK Number of FFT provided=1NosNumber of operating hours=16HrsDesign flow=750.00Cum/Day=46.88Cum/Hr=0.01302Cum/SecHydraulic Retention time=60minVolume required=46.88CumDepth=2.00m	TEDTIA DV TDE ATMENT I INIT				
Design flow         =         0.75         MLD           =         750.00         Cum/Day           Peak flow factor         =         3.00           FILTER FEED TANK           Number of FFT provided         =         1         Nos           Number of operating hours         =         16         Hrs           Design flow         =         750.00         Cum/Day           =         46.88         Cum/Hr           =         0.01302         Cum/Sec           Hydraulic Retention time         =         60         min           Volume required         =         46.88         Cum           Depth         =         2.00         m	TERTIARY TREATMENT UNIT				
Design flow         =         0.75         MLD           =         750.00         Cum/Day           Peak flow factor         =         3.00           FILTER FEED TANK           Number of FFT provided         =         1         Nos           Number of operating hours         =         16         Hrs           Design flow         =         750.00         Cum/Day           =         46.88         Cum/Hr           =         0.01302         Cum/Sec           Hydraulic Retention time         =         60         min           Volume required         =         46.88         Cum           Depth         =         2.00         m	Design Considerations				
= 750.00   Cum/Day	•	_	0.75	MLD	
Peak flow factor = 3.00  FILTER FEED TANK Number of FFT provided = 1 Nos Number of operating hours = 16 Hrs Design flow = 750.00 Cum/Day = 46.88 Cum/Hr = 0.01302 Cum/Sec Hydraulic Retention time = 60 min Volume required = 46.88 Cum Depth = 2.00 m	Design now				
FILTER FEED TANK  Number of FFT provided = 1 Nos  Number of operating hours = 16 Hrs  Design flow = 750.00 Cum/Day  = 46.88 Cum/Hr  = 0.01302 Cum/Sec  Hydraulic Retention time = 60 min  Volume required = 46.88 Cum  Depth = 2.00 m	<b>5</b>			Culli/Day	
Number of FFT provided         =         1         Nos           Number of operating hours         =         16         Hrs           Design flow         =         750.00         Cum/Day           =         46.88         Cum/Hr           =         0.01302         Cum/Sec           Hydraulic Retention time         =         60         min           Volume required         =         46.88         Cum           Depth         =         2.00         m	Peak flow factor	=	3.00		
Number of FFT provided         =         1         Nos           Number of operating hours         =         16         Hrs           Design flow         =         750.00         Cum/Day           =         46.88         Cum/Hr           =         0.01302         Cum/Sec           Hydraulic Retention time         =         60         min           Volume required         =         46.88         Cum           Depth         =         2.00         m	EU 755 5555 744U				
Number of operating hours         =         16         Hrs           Design flow         =         750.00         Cum/Day           =         46.88         Cum/Hr           =         0.01302         Cum/Sec           Hydraulic Retention time         =         60         min           Volume required         =         46.88         Cum           Depth         =         2.00         m			4	Noo	
Design flow = 750.00	-		-		
= 46.88 Cum/Hr = 0.01302 Cum/Sec Hydraulic Retention time = 60 min Volume required = 46.88 Cum Depth = 2.00 m	. •	=			
= 0.01302 Cum/Sec  Hydraulic Retention time = 60 min  Volume required = 46.88 Cum  Depth = 2.00 m	Design flow	=			
Hydraulic Retention time = 60 min  Volume required = 46.88 Cum  Depth = 2.00 m		=			
Volume required = 46.88 Cum  Depth = <b>2.00</b> m		=			
Depth = <b>2.00</b> m	-	=			
!	•	=		Cum	
Civil Tanks	•	=	2.00	m	
	Civil Tanks				

5.1

Area	=	23.44	Sqm
Length/Width required	=	4.84	m
Length/Width provided	=	5.00	m
Freeboard provided	=	0.50	m
Volume Provided		50.00	Cum

# **DESIGN STATEMENT-TTU E&M**

Design Considerations	
Decian flow	

Design flow	=	0.75	MLD
	=	750.00	Cum/Day
Peak flow factor	=	3.00	

#### **Pumping machinery**

Pumping machinery		
Friction factor for Fittings in		
Pressure Mains		
Elbow 90 degrees	=	5
Friction Factor for each	=	1
Friction factor for all	=	5
Elbow 45 degrees	=	0
Friction Factor for each	=	0.75
Friction factor for all	=	0
Elbow 22 degrees	=	0
Friction Factor for each	=	0.5
Friction factor for all	=	0
Tee 90 degrees	=	0
Friction Factor for each	=	1.5
Friction factor for all	=	0
Tee in straight pipe	=	5
Friction Factor for each	=	0.3
Friction factor for all	=	1.5
Gate valve open	=	1
Friction Factor for each	=	0.4
Friction factor for all	=	0.4
Swing check	=	1
Friction Factor for each	=	2.5
Friction factor for all	=	2.5
Total friction factor	=	9.4
Stage		low
Average flow, cum / day	=	

Stage		low	ave	peak
Average flow, cum / day	=		750.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	450	750	1500
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.8	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0098	0.0130	0.0174
Dia needed, m	=	0.112	0.129	0.149
Dia needed, mm	=	112	129	149
Dia provided, mm (User)	=	140	140	140
Radius, m	=	0.070	0.070	0.070
Radius power 0.63	=	0.187	0.187	0.187

	_				
	S power 0.54	=	0.036	0.045	0.067
	S	=	0.002	0.003	0.007
	Slope 1 in	=	471.8	312.1	147.3
	length, m	=	30	30	30
	Friction in pipeline, m	=	0.1	0.1	0.2
	Velocity head, m	=	0.033	0.051	0.115
	Frction factor in fittings	=	9.4	9.4	9.4
	Friction in fittings, m	=	0.3	0.5	1.1
	Static lift, m	=	10.0	10.0	10.0
	Total head, m	=	10.3	10.5	11.1
	Efficiency of pumpset	=	0.8	0.8	0.8
	Discharge, lps		7.8	13.0	26.0
	• .	=			
	Discharge, Cum/Hr	=	28.1	46.9	93.8
	Kw required	=	2.072	3.458	6.915
	HP provided	=	3.0	5.0	9.5
	Number of Pumps	=	2	2	2
5.2	PRESSURE SAND FILTER				
	Number of unit provided	=	2	Nos.	
	Designed @ 16 hrs working for				
	flow of	=	23.44	m3/h	
	Loading rate	=	12.00	m3/m2/h	
	Area of DMF	=	1.95	m2	
	Dia of DMF	=	1.58	m	
	Provided	=	1.600	m	
	Backwash water				
	Backwash velocity	=	15.00	m/hr	
	backwash flowrate	=	29.71	m3/h	
	Backwash volume for 20 mins	=	9.90	m3	
	Dackwash volume for 20 mins	_	3.30	1110	
5.3	ACTIVATED CARBON FILTER				
J.J			0	Maa	
	Number of unit provided  Designed @ 16 hrs working for	=	2	Nos.	
	flow of	=	23.44	m3/h	
	Loading rate		12.00	m3/m2/h	
	Area of ACF	=	1.95	m2	
		=			
	Dia of ACF	=	1.58	m	
	Provided	=	1.600	m	
	Backwash water				
	Backwash velocity	=	15.00	m/hr	
	backwash flowrate	=	29.71	m3/h	
	Backwash volume for 20 mins	=	9.90	m3	
5.4	CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM				
	Average Flow		46.88	m3/hr	
	Avolugo i low	=	<del>-1</del> 0.00	1110/111	
	Design Chlorine Dosage (Max)		3	mg/l	
	- 3	=	-	<del>y</del>	
	Concentration of Chlorine in		10%		
	commercially available NaOCI	=			

Design NaOCI Dosage		30	mg/l
Operating hours	=	16.0	hr
Quantity of NaOCI required		46.875 X 30 X	16 / 1000
	=	22.50	Kg/day
Design Strength of NaOCI Solution		100%	
Volume of NaOCI Solution	=	22.5 / (1 X	1000)
	=	0.030	m3
No. of Dosing Tanks provided	=	1	Nos.
Volume of each Dosing Tank	_	0.03 / 1	
	=	0.03	m3
No. of Working NaOCI Dosing Pump provided	=	1	No.
Capacity of each NaOCI Dosing Pump required	=	Total Volume of Na (No. of Dosin 0.03 / (1 X 16)	
	=	0.002	m3/hr
	=	2.00	LPH
Capacity of each NaOCI Dosing Pump provided	=	2.00	LPH
No. of Standby NaOCI Dosing Pump provided	=	1	No.

# SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 750 KLD CAPACITY

S I.	Unit name	N o	Leng th	Widt h		Height		So	oling	P(	cc	Ra	oft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	<b>5</b>	+bk		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	3.0	0.5	0.3	1.0	1.3	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	4.0	0.9	0.8	1.3	2.1	0.2	0.3	0.1	0.1	0.2	0.2	0.1			80
3	Raw Sewage Sump	1	5.6	5.6	2.0	1.3	3.3	0.2	0.3	0.1	0.1	0.2	0.3	0.2		0.2	100
4	TBF Bed 50 KLD	1	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	5.0	5.0	2.0	0.5	2.5	0.2	0.3	0.1	0.1	0.2	0.2	0.2		0.2	100
6	Filter Platform	1	4.8	4.4				0.2	0.3	0.1	0.1	0.2	0.1				60

#### Assumptions

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound		soil	Muru	Soft roc	har d	Tota
0.0 to 1.5 m	=	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

## TIGER BIO FILTER OF 750 KLD CAPACITY BILL OF QUANTITIES

Qty Unit Rat	Rate Amount (Rs.)
nches in evel and ing the ice of 50 iting and evatering, ion and e. (Bd-A-	
207.20 Cum	450.00 24.002.50
	150.00 31,093.50 164.00 9,307.00
	164.00 9,307.00 178.00 3,595.60
	192.00 0.00
2	7.02.100
trenches in B.M. road and material are area and reading as a point of the condition applete. (Bd-	8.00
207.29 Cum 19	192.00 39,799.70
56.75 Cum 20	206.00 11,690.50
	220.00 4,444.00
cavation 0.00 Cum 23	234.00 0.00
renches in e masonry removing ance of 50 as below, in-charge, e bed for illing, etc.	
207.29 Cum 57	572.00 118,569.90
	597.00 33,879.80
	622.00 12,564.40
0.00 Cum 64	647.00 0.00
56.75 Cum 59 20.20 Cum 62 0.00 Cum 64	597.00 622.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, excluding backfilling, etc. complete by all means. (Bd-A-6/259)				
	0.0 to 1.5 m	207.29	Cum	1,017.00	210,814.00
	1.5 to 3.0 m	56.75	Cum	1,042.00	59,133.50
	3.0 to 4.5 m	20.20	Cum	1,067.00	21,553.40
	4.5 to 6.0 m	0.00	Cum	1,092.00	0.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43				
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)  MJP/ SSR/ 2021-22 / Section E/  Excavat	346.47	Cum	1,175.00	407,102.30
6	Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38	103.89	Cum	5,640.00	585,939.60
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.1, Page no.49			·	·
7	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	111.33	Cum	7,448.00	829,185.90
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY			.,	2=3, 33.33
	MIX CONCRETE/ Item No.2, Page no. 49				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.)				
	(Excluding M.S. or Tor reinforcement)  For Beams / Braces / Lintels In RCC M-300	1.28	Cum	8,624.00	11,038.80
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50				
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	12.82	Cum	9,247.00	118,546.60
	Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300		2 3	2,2	113,013130
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.)				
	(Excluding M.S. or Tor reinforcement)  Chajjas / Parapets / Curtain Walls	36.48	Cum	9,218.00	336,272.70
	/Partition Walls / Pardies In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN				
	REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar				
	reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)	12.50	MT	70.659.00	990 594 20
	c) Corrosion Resistant Steel (Fe 500) MJP/ SSR/ 2021-22 / SECTION - G : PLAIN	12.59	MT	70,658.00	889,584.30
	REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.8 / Page no. 52				
12	Providing and fixing mild steel grill work for				
12	windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U- 1/537)  MJP/ SSR/ 2021-22 / SECTION - F : IRON AND STRUCTURAL STEEL WORK Item	9.80	Sqm	1,895.00	18,571.00
	No.1 / Page				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-incharge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C- 3/275)	11.21	MT	71,286.00	798,802.50
	AND STRUCTURAL STEEL WORK Item No.3,				
14	Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sq.m.).	1131.00	Sqm	777.00	878,787.00
	PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224			7,7,100	3. 6,1 67.166
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete	223.05	Cum	6,305.00	1,406,330.30
	PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by engineer incharge and BDG- 2 and 5 Item No.893, Page no. 190				
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference No. Bd. L.2 Page No. 368 Item No.950,	1224.75	Sqm	257.00	314,760.80
	Page no. 201				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding				
	and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201	712.50	Sqm	529.00	376,912.50
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down oto complete.	740.50	0	40.00	7.405.00
	etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411	712.50	Sqm	10.00	7,125.00
10					
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item	712.50	Sqm	8.00	5,700.00
	No. 36.04 Reference No. Bd. P.2 Page No. 412				
20	Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)	96.00	HP/ Hr.	77.00	7,392.00
	MJP/ SSR/ 2021-22 / Section E/ Excav	30.00	1111.	77.00	7,002.00
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including			_	
	consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/  Excav	369.87	Cum	84.00	31,069.10
22	Transportation as per STATEMENT VI Including loading, unloading and stacking Earth (4.8 Cum) lead 15 Km	1073.60	Cum	604.45	648,937.60

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
23	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS				
	rod of total length 200 mm straight and 50 mm of 90 degree bend.	0.90	Sqm	35,000.00	31,500.00
24	Grit pump				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION -				
	Pumps, Page no. 6, 7of size 1.8 m length 1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00
	1111 (Op to 5500 E. 11)	1.00	140	00,004.00	00,004.00
25	Raw Sewage Pumps				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION -				
	7.5 HP (Up to 72000 LPH)	2.00	Nos	109,079.00	218,158.00
26	TTU Feed pumps Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	7.5 HP (Up to 72000 LPH)	2.00	Nos	109,079.00	218,158.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.6 m x 2 m minimum height	2.00	Nos	454,000.00	908,000.00

Activated Carbon Filter of FRP / MSEP vessel				Amount (Rs.)
with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and				
Dia 1.6 m x 2 m minimum height	2.00	Nos	454,000.00	908,000.00
NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency				
<u> </u>		Ltrs	8.00	800.00
Dosing Pump	2.00	Nos	15,000.00	30,000.00
Control Panel				
Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter ,for all pumps installed.  MJP/ MECH/ ELECT / SSR/ 2021-22/	1.00	No	50,041.00	50,041.00
SECTION 19 - SA [ SCADA & AUTOMATION]				
Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.	6.00	nos	7 150 00	42,900.00
	and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and Dia 1.6 m x 2 m minimum height  NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency  Mixing Tank of 100 Ltrs capacity  Dosing Pump  Control Panel  Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed.  MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION]  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel	and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and  Dia 1.6 m x 2 m minimum height  2.00  NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency  Mixing Tank of 100 Ltrs capacity  Dosing Pump  2.00  Control Panel  Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed.  MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION]  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.	and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and Dia 1.6 m x 2 m minimum height 2.00 Nos  NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency  Mixing Tank of 100 Ltrs capacity 100.00 Ltrs Dosing Pump 2.00 Nos  Control Panel Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter , For all pumps installed. 1.00 No  MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION]  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.	and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and  Dia 1.6 m x 2 m minimum height  2.00 Nos 454,000.00  NaOCI Chlorinator  Pump Diaphragm Type / peristaltic type / Solenoid  Max Flow Rate Upto 101PH Power Source Electric Phase Single  Material PP / PTFE(Teflon) Voltage 230 Volt Frequency  Mixing Tank of 100 Ltrs capacity 100.00 Ltrs 8.00  Dosing Pump 2.00 Nos 15,000.00  Control Panel  Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitters, Level Transmitter, PH Transmitters, Level Transmitter, For all pumps installed.  MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION]  Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380-440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.

Sr.				ı	1
No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP /MECH/ ELECT/ SSR/ 2021-22				
	SECTION 10 - LG [L.T. SWITCHGEAR AND				
	PROTECTION] Item no. LG 3 Page no. 27				
32	Main power supply cable				
	3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable				
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,				
	PVC insulated, and PVC sheathed.				
	3 core 16 sq mm	25.00	m	549.00	13,725.00
33	Power cables				
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable				
	Supplying and erecting, XLPE / PVC				
	insulated, armoured cable 1100 V grade with				
	ISI mark Four core, solid / stranded				
	aluminium conductor with 6 mm thick 25 mm				
	width M.S. spacer with				
	G.I. Earth wire 6 sq mm, complete erected on wall / on pole with 25 X 3 mm M.S.				
	clamps or in provided trench in an approved				
	4 Core 6 sq mm	140.00	m	137.00	19,180.00
	MJP MECH/ ELECT/ SSR/ 2021-22				·
	SECTION				
	12 - CB [ L.T. CABLE ] Item no. CB 6 Page				
34	Control Cables				
	Copper conductor PVC insulated,				
	Unarmoured control cable				
	Supplying and erecting Un-armoured control				
	cable with ISI mark stranded / solid copper				
	conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an				
	approved manner.				
	4 core 2.5 sq mm	140.00	m	137.00	19,180.00
	MJP MECH/ ELECT/ SSR/ 2021-22/				
	SECTION 12 - CB [ L.T. CABLE ] Item no. CB				
	8-				

	Plumbing Items				
Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
35	Providing and supplying in standard lengths				
	ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent				
	cement joints including cost of couplers, as				
	per IS specification no. 4985 / 1988				
	excluding GST levied by GOI and GOM in all				
	respect, including transportation, freight				
	charges, inspection charges, loading,				
	unloading, conveyance to the departmental stores and stacking the same in closed shed				
	duly protected from sun rays and rains				
	including cost of jointing material i.e. solvent				
	cement, etc. complete (selffit type to be				
	jointed with cement solvent).				
	1) 10% of cost of pipes shall be considered				
	for cost of PVC specials for estimate purpose only.				
	One coupler and required cement solvent				
	shall be provided with each full length pipe				
	cost of which is included in rates below.				
	MID/OOD/OOM OO/OFOTION I/II) DAYO				
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES, Page no.77				
1	Raw Sewage pump to TBF Distribution				
а	Main header				
	140 mm.	55.00	m	693.00	38,115.00
	PVC Specials- 10%				3,811.50
b	Distribution				
	110 mm.	75.00	m	428.00	32,100.00
	PVC Specials- 10%				3,210.00
2	TBF collection to FFT (gravity)				
а	Main header 140 mm.	150.00	m	693.00	103,950.00
	PVC Specials- 10%	130.00	m	093.00	10,395.00
					10,000.00
b	collection tributory				
	75 mm.	25.00	m	211.00	5,275.00
	PVC Specials- 10%				527.50
3	TTU Plumbing				
	140 mm.	30.00	m	693.00	20,790.00
	PVC Specials- 10%				2,079.00
4	TBF distribution	75.00	100	4.40.00	44 475 00
	63 mm. PVC Specials- 10%	75.00	m	149.00	11,175.00 1,117.50
	1 vo Specials- 10/0				1,117.50
36	Labour				
	Plumber	20.00	days	641.00	12,820.00
	Helper	60.00	days	579.00	34,740.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / SECTION - B LABOUR & MACHINERY , Page no. 14				
37	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.				
	Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump 150 mm.	0.00	Niss	40.054.00	20 502 00
	Filter Feed Pump	2.00	Nos	10,251.00	20,502.00
	150 mm.	2.00	Nos	10,251.00	20,502.00
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132	2.00	1105	10,231.00	20,302.00
38	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)				
	Without by pass arrangement -PN -1				
	Raw Sewage pump				
	150 mm.	2.00	Nos	9,876.00	19,752.00
	Filter Feed Pump				
	150 mm.  MJP/ SSR/ 2021-22 / SECTION - I(XII):  PIPES APPURTENANCES, Page no. 131	2.00	Nos	9,876.00	19,752.00
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc. complete.	1080.00	Nos	4,750.00	5,130,000.00
	Market rate			·	
40	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan,	102.73	Cum	1,730.00	177,722.90
	MJP/ SSR/ 2021-22 / SECTION- A MATERIALS			,	, ==:3

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
41	Trasnsportation Godhara to Pune distance by Road 660 Km.	102.73	Cum	11,031.37	1,133,252.70
	MJP/ SSR/ 2021-22 / SECTION - C: TRANSPORTATION Page no.				
42	Stone Aggregate 20 mm  MJP/ SSR/ 2021-22 / SECTION- A  MATERIALS	102.73	Cum	900.00	92,457.00
43	Transportation as per STATEMENT VI Including loading, unloading and stacking				
	Manure or sludge (5.52 Cum) lead 25 Km MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.	396.75	Cum	747.48	296,562.70
			NET -	TOTAL Rs.	17,947,408.10

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				2.70		
Α	0.0 to 1.5 m	1	7.20	3.10	1.5	33.48	Cum
	soil					8.37	Cum
	Murum					8.37	Cum
	Soft rock					8.37	Cum
	hard rock					8.37	Cum
В	1.5 to 3.0 m	1	7.2	3.10	1.2	26.79	Cum
	soil					6.7	Cum
	Murum					6.7	Cum
	Soft rock					6.7	Cum
	hard rock					6.7	Cum
	0.01.45		0.0	0.00			0
С	3.0 to 4.5 m	1	6.2	2.60	0	0	Cum
-	soil					0	Cum
-	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	6.2	2.60	0	0	Cum
	soil		0.2	2.00	U	0	Cum
	Murum	+				0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
	TIAIU TOCK					U	Cuiii
2	Soling						
	Screen	1	4.20	1.20	0.30	1.52	Cum
	Grit	1	5.20	0.90	0.30	1.41	Cum
	extra for grit chamber	1 1	1.00	0.60	0.30		Cum
	oma ioi gin chambei	<u> </u>	1.00	Total for gri		1.59	Cum
				I stem for gri	•		
3	PCC M20						
	Screen	1	3.80	1.00	0.10	0.38	Cum
	Grit	1	4.80	0.90	0.10	0.44	Cum
		1	1.00	0.40	0.20	0.08	Cum
	Internal slope	1	Area	0.31	0.90	0.28	Cum
	Internal slope	1	Area	0.16	0.90	0.14	Cum
	·			Total for gri	t	0.94	Cum
4	Raft M30						
	Screen	1	3.60	0.90	0.15	0.49	Cum
	Grit	1	4.60	0.90	0.20	0.83	Cum
		1	1.00	0.30	0.20	0.06	Cum
				Total for gri	t	0.89	Cum
5	RCC Wall						
	Screen						
	Long Wall	2	3.20	0.10	1.50	0.96	Cum

Sr.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
No.	item bescription	1103.	L (III)	D (III)	11 (111)	Quantity	Oilit
	Short Wall	2	0.70	0.10	1.50	0.21	Cum
				Total for so	reen	1.17	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	1.00	0.10	2.30	0.23	Cum
	Short Wall	2	0.90	0.10	2.30	0.42	Cum
				Total for gr	it	0.65	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	80	Cum	3.2	0.26	MT
7	Fabrication work in Frame and Grating for Access						
	Screen	1	3.20	0.70		2.24	Sqm
	Grit	1	4.20	1.00		4.2	Sqm
					Total	6.44	Sqm
							,
8	Removing excess exacavated material out of site						
	Screen chamber	1	3.20	0.70	1.30	2.92	Cum
	Grit Chamber	1	4.20	0.70	2.10	7.94	Cum
	soling, PCC, Raft volume		1.20	0.00	2.10	5.39	Cum
	Total Volume					16.25	Cum
	bulkage @ 40%					22.75	Cum
	20						34
9	Refilling and compaction						
	Total Excavation					60.27	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					16.25	Cum
	Refilling and compaction volume					44.02	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				4.00		
Α	0.0 to 1.5 m	1	9.7	9.70	1.5	141.14	Cum
	soil					35.29	Cum
	Murum					35.29	Cum
	Soft rock					35.29	Cum
	hard rock					35.29	Cum
В	1.5 to 3.0 m	1	8.70	8.70	1.5	113.54	Cum
	soil					28.39	Cum
	Murum					28.39	Cum
	Soft rock					28.39	Cum
	hard rock					28.39	Cum
С	3.0 to 4.5 m	1	8.70	8.70	1	75.69	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					18.93	Cum
	Murum					18.93	Cum
	Soft rock					18.93	Cum
	hard rock					18.93	Cum
	4.5.to.00.m		7.70	7.70	0	0	C: ::==
D	4.5 to 6.0 m soil	1	7.70	7.70	0	0	Cum Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
	TIAIU TOCK					0	Cum
2	Soling						
	RSS	1	7.10	7.10	0.30	15.13	Cum
3	PCC M20						
	RSS	1	6.70	6.70	0.10	4.49	Cum
	D. (c. Marc						
4	Raft M30		0.50	0.50	0.00	10.00	
	RSS	1	6.50	6.50	0.30	12.68	Cum
5	RCC Wall						
	Long Wall	2	6.10	0.25	3.50	10.68	Cum
	Short Wall	2	5.60	0.25	3.50	9.8	Cum
	Chert Train		0.00	0.20	Total	20.48	Cum
6	Beams						
	Beam 1	1	5.60	0.2	0.3	0.34	Cum
	Beam 2	1	5.60	0.2	0.3	0.34	Cum
					Total	0.68	Cum
7	Slab	1	6.10	6.10	0.2	7.45	Cum
	Deduction for manhole	-2	1.20	0.70	0.2	-0.34	Cum
					Total	7.11	Cum
	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
8	Steer - Hortin / Cito & rtg/Cum	um	100	Cum	40.95	4.1	MT
		dill	100	Ouiii	+0.00	7.1	1011
	Fabrication work in Frame and						
9	Grating for Access						
	RSS	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated						
	material out of site				2.55		
	RSS	1	6.10	6.10	3.30	122.8	Cum
	soling, PCC, Raft volume					32.3	Cum
	Total Volume					155.1	Cum
	bulkage @ 40%					217.14	Cum
11	Refilling and compaction						
1.1	remining and compaction						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					330.37	Cum
	Deduction for tank volume, soling, PCC, Raft					155.1	Cum
	Refilling and compaction volume					175.27	Cum
12	Dewatering						
	12 Days x 4 hours/day	days	12	hours / day	4	48	Hrs

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
2	Soling						
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
	TBF	1	12.06	5.06	0.10	6.11	Cum
A	Doff MOO						
4	Raft M30	4	44.00	4.00	0.10	r 77	Cura
	TBF	1	11.86	4.86	0.10	5.77	Cum
5	Brick Wall						
5	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
	Orace Support Wall		11.00	0.20	Total for	T 14.87	Cum
					1 otal 101	1 14.07	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	
	Short Wall	2	4.00		1.20	9.6	Sqm
					Total	81.65	Sqm
	External						
	Long Wall	2	11.46		1.20	27.51	Sqm
	Short Wall	2	4.46		1.20	10.71	Sqm
	Wall Top	1	30.92	0.3		9.28	Sqm
					Total	47.50	Sqm
	Fortonia I code!					47.50	
7	External-white-wash	1				47.50	Sqm
8	External colour wash	1				47 FO	Sam
0	External-colour-wash					47.50	Sqm
9	Stool HCDM / CDC @ V-/C	Kg/C	00	Cure	F 77	0.05	N 4∓
	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	5.77	0.35	MT
10	Removing excess exacavated						
-	material out of site					00.00	
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m x		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

#### MEASUREMENT SHEET - FILTER FEED TANK

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				3.10		
Α	0.0 to 1.5 m	1	8.1	8.10	1.5	98.42	Cum
	soil					24.61	Cum
	Murum					24.61	Cum
	Soft rock					24.61	Cum
	hard rock					24.61	Cum
В	1.5 to 3.0 m	1	7.60	7.60	1.5	86.64	Cum
Ь	soil	+ '+	7.60	7.00	1.5	21.66	Cum
	Murum	+ +				21.66	Cum
	Soft rock	+ +				21.66	Cum
	hard rock					21.66	Cum
	TIGITO TOOK	+ +				21.00	Odili
С	3.0 to 4.5 m	1	7.10	7.10	0.1	5.05	Cum
	soil					1.27	Cum
	Murum					1.27	Cum
	Soft rock					1.27	Cum
	hard rock					1.27	Cum
D	4.5 to 6.0 m	1	7.10	7.10	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	FFT	1	6.50	6.50	0.30	12.68	Cum
	111	- '	0.50	0.50	0.30	12.00	Cum
3	PCC M20	+ +					
	FFT	1	6.10	6.10	0.10	3.73	Cum
		<del>                                     </del>		00	0.1.0	00	
4	Raft M30						
	FFT	1	5.90	5.90	0.20	6.97	Cum
5	RCC Wall						
	Long Wall	2	5.50	0.25	2.70	7.43	Cum
	Short Wall	2	5.00	0.25	2.70	6.75	Cum
					Total	14.18	Cum
6	Pooms	+ +					
0	Beams Beam 1	1	5.00	0.2	0.3	0.3	Cum
	Beam 2	1	5.00	0.2	0.3	0.3	Cum
	DGAITI Z	+ +	3.00	0.2	Total	0.6	Cum
		+ +			ıolai	0.0	Guill
7	Slab	1	5.50	5.50	0.2	6.05	Cum
<b>–</b>	Deduction for manhole	+ +	1.20	0.70	0.2	-0.34	Cum
			20	5.7 0	Total	5.71	Cum
		+			- 1	J 1	

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	27.46	2.75	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
		<u> </u>	<b>5.50</b>	F F0	0.50	75.00	0
	FFT	1	5.50	5.50	2.50	75.63	Cum
	soling, PCC, Raft volume					23.38	Cum
	Total Volume					99.01	Cum
	bulkage @ 40%					138.62	Cum
11	Refilling and compaction						
11	Total Excavation	1				100 11	Cum
						190.11	Cum
	Deduction for tank volume, soling, PCC, Raft					99.01	Cum
	Refilling and compaction volume					91.1	Cum
	-						
12	Dewatering						
	12 Days x 4 hours/day	days	12	hours/day	4	48	Hrs

#### **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	6.0	5.60	0.55	18.48	Cum
	soil					4.62	Cum
	Murum					4.62	Cum
	Soft rock					4.62	Cum
	hard rock					4.62	Cum
2	Soling						
	Filter Platform	1	5.80	5.40	0.30	9.4	Cum
3	PCC M20						
	Filter Platform	1	5.40	5.00	0.10	2.7	Cum
4	Raft M30						
	Filter Platform	1	5.20	4.80	0.15	3.75	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	60	Cum	3.75	0.23	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					12.1	Cum
	Total Volume					12.1	Cum
	bulkage @ 40%					16.94	Cum
7	Refilling and compaction	+ +					
	Total Excavation					18.48	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					12.1	Cum
	Refilling and compaction volume					6.38	Cum

#### **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.	1080				1080	Nos
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	1080	0.82	0.58	0.2	102.73	Cum
	,						
3	Trasnsportation Godhara to					102.73	Cum
4	Stone Aggregate 20 mm	1080	0.82	0.58	0.2	102.73	Cum
5	Transportation as per STATEMENT VI Including loading,						
	Manure or sludge (5.52 Cum) lead	1080	0.82	0.56	0.8	396.75	Cum

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr.	Itam Description	Nos.	Unit
No.	Item Description	NOS.	Unit
1	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.		
		1	No
	Onit according		
2	Grit pump  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste		
	application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size		
	1.8 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
3	Raw Sewage Pumps		
3	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste		
	application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	7.5 HP (Up to 72000 LPH)	2	Nos
4	TTU Feed pumps		
4	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste		
	application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	7.5 HP (Up to 72000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.6 m x 2 m minimum height	2	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.6 m x 2 m minimum height	2	Nos
7	PurAll Tablet Chlorinator + cartridge	0	nos
	1 diAii Tabiot Officilitator + cartilage	U	nos

#### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr.	Item Description	Nos.	Unit
No.	item Description	NUS.	Ollit
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz		
а	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
8	Control Panel		
	Design, Supply, Installing, Commissioning & Testing of Master PLC control		
	monitoring and communication panel as per IEC 61131 at Pure Water Sump		
	suitable for monitoring and control of pure water Pumps. Pressure Transmitters,		
	Level Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed.		
	Master PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		
	AUTOMATION ] Item no. 2.7 Page no. 72		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage		
9	induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over		
	load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	definitioned to cappity, one complete. Charter with original officer choices.		
	> 7.5 HP & Up to 12.5 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
10	Main power supply cable		
	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,		
	PVC insulated, and PVC sheathed.	0.5	
	3 core 16 sq mm	25	m
11	Power cables		
<del>- ' '-</del>	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade		
	with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25		
	mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall /		
	on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	140	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		
	CB 6 Page no. 35		
12	Control Cables		
	Copper conductor PVC insulated, Unarmoured control cable		

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

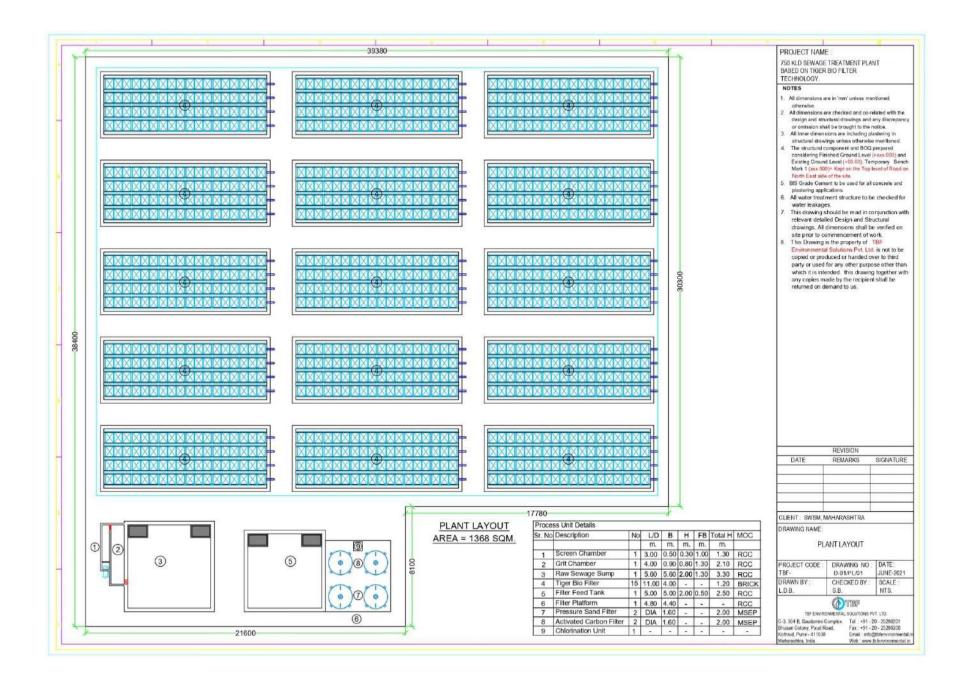
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	140	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

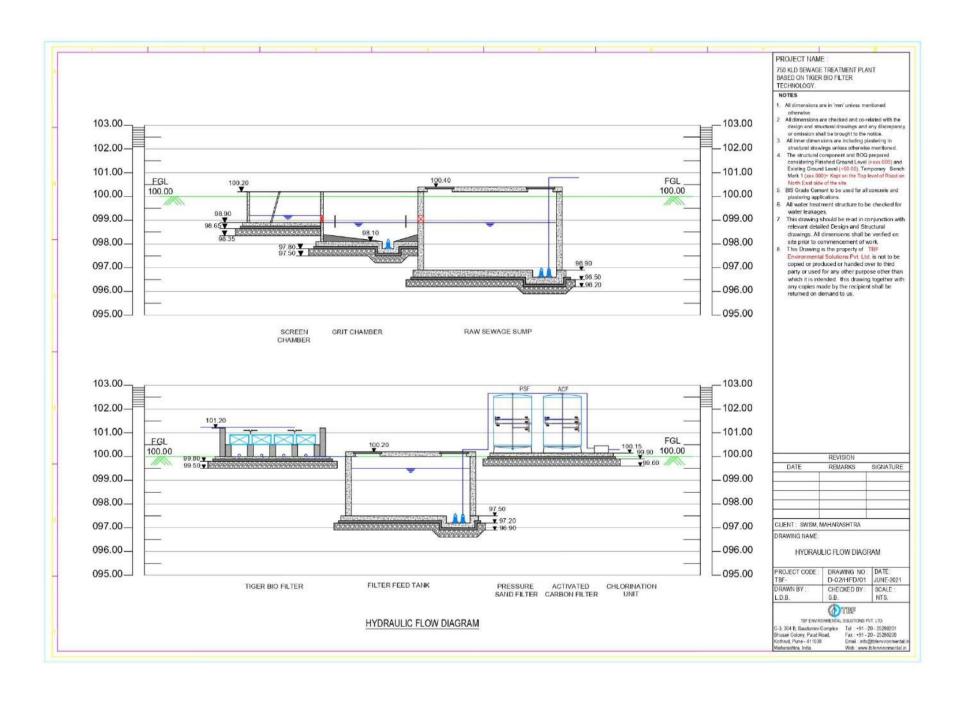
#### **MEASUREMENT SHEET - PLUMBING**

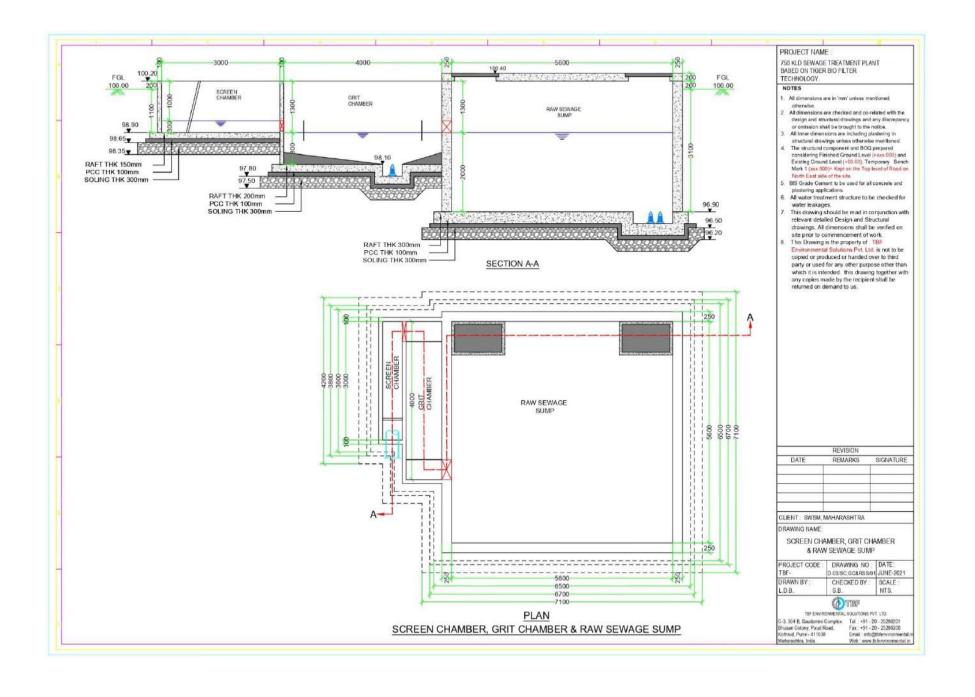
Sr. No.	Item Description	Nos.	L (m)	В	Quantity	Unit
	Providing and supplying in standard lengths ISI			(m)		
	mark rigid unplasticised PVC pipes suitable for					
	potable water with solvent cement joints including					
	cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all					
	respect, including transportation, freight charges,					
	inspection charges, loading, unloading,					
	conveyance to the departmental stores and					
	stacking the same in closed shed duly protected					
	from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit					
	type to be jointed with cement solvent).					
	•••	-				
	<ol> <li>1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.</li> </ol>					
	One coupler and required cement solvent shall					
	be provided with each full length pipe cost of which					
	is included in rates below.					
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C.					
1	PIPES, Raw Sewage pump to TBF Distribution					
а	Main header	Dia	140			
	140 mm.	1	55		55	m
	PVC Specials- 10%					
-	Di tili ti					
b	Distribution 110 mm.	1	75		75	m
	PVC Specials- 10%	<del>  '</del>	13		73	1111
2	TBF collection to FFT (gravity)					
а	Main header					
	140 mm.	1	150		150	m
	PVC Specials- 10%					
b	collection tributory					
	75 mm.	1	25		25	m
	PVC Specials- 10%					
3	TTI Diumbing	Dia	1.10			
3	TTU Plumbing 140 mm.	<u></u> Біа	140 30		30	m
	PVC Specials- 10%		30		30	111
	•					
4	TBF distribution			No. of b		
	63 mm.	1	5	15	75	m
	PVC Specials- 10%					
5	Labour	Nos	Days			
	Plumber	2	10		20	days
	Helper	6	10		60	days
6	Sluice valves	<u> </u>				

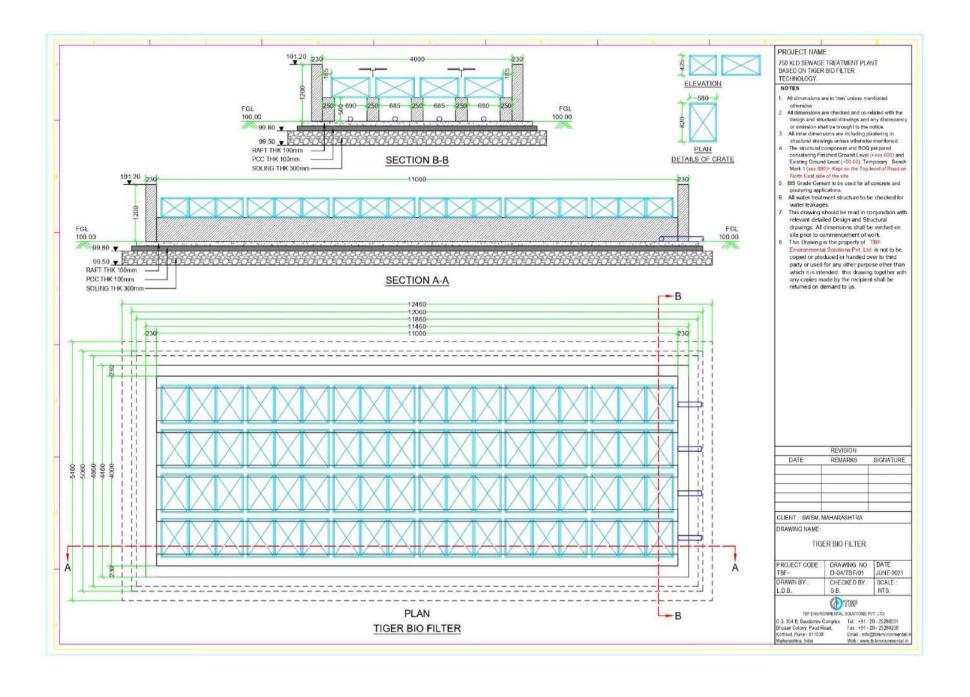
#### **MEASUREMENT SHEET - PLUMBING**

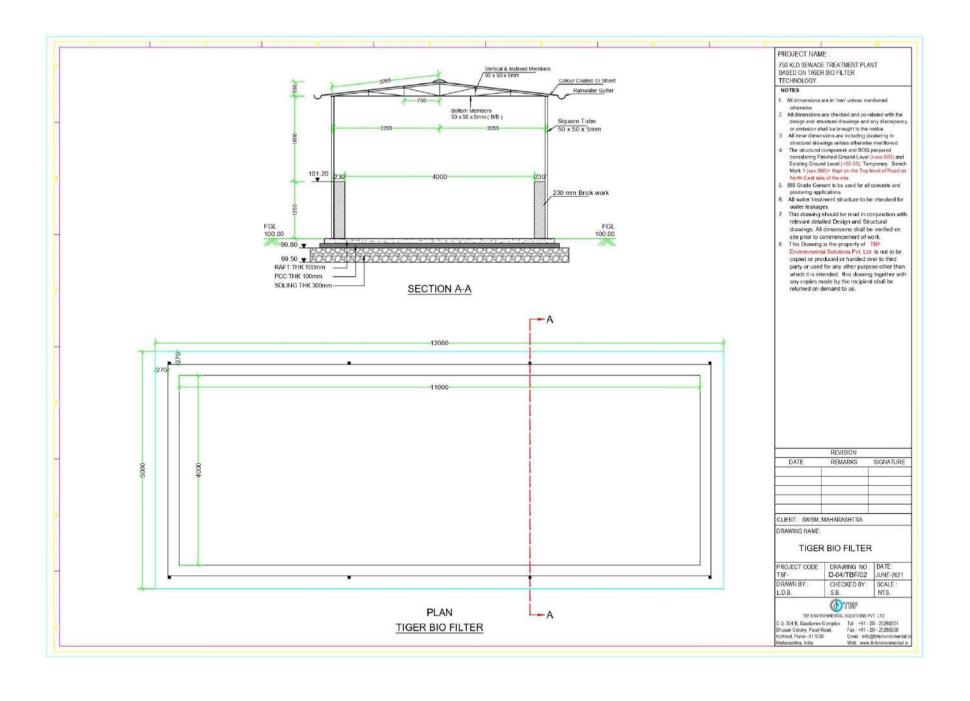
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming					
	for IS- 14846 including worn gear arrangements					
	as per test pressure, stainless steel spindle, caps,					
	including inspection charges, transportation upto					
	departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc.					
	complete.					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES , Page no. 132					
	Raw Sewage pump					
	150 mm.	2			2	Nos
	Filter Feed Pump					
	150 mm.	2			2	Nos
7	Reflux valves (non-return valves )					
	Providing and supplying ISI mark CI D/F reflux					
	valves (non-return valves ) of following dia					
	including railway freight, inspection charges,					
	unloading from railway wagon, loading into truck, transportation upto departmental stores,					
	transportation upto departmental stores, unloading, stacking excluding GST levied by GOI					
	& GOM in all respect etc. complete. Reflux					
	valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES , Page no. 131					
	Raw Sewage pump					
	150 mm.	2			2	Nos
	Filter Feed Pump	_			_	
	150 mm.	2			2	Nos

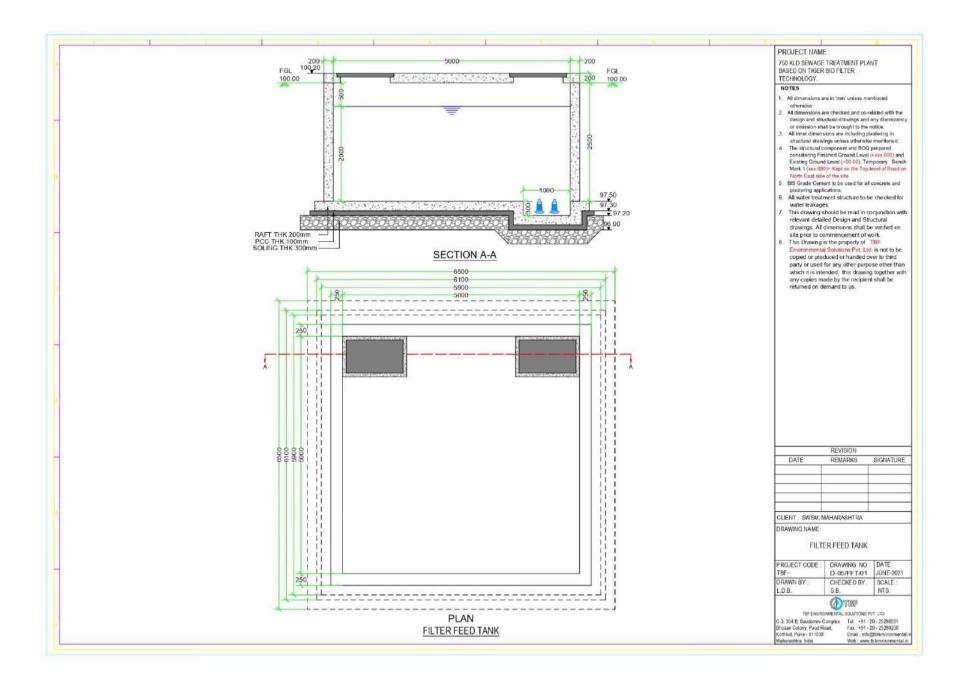


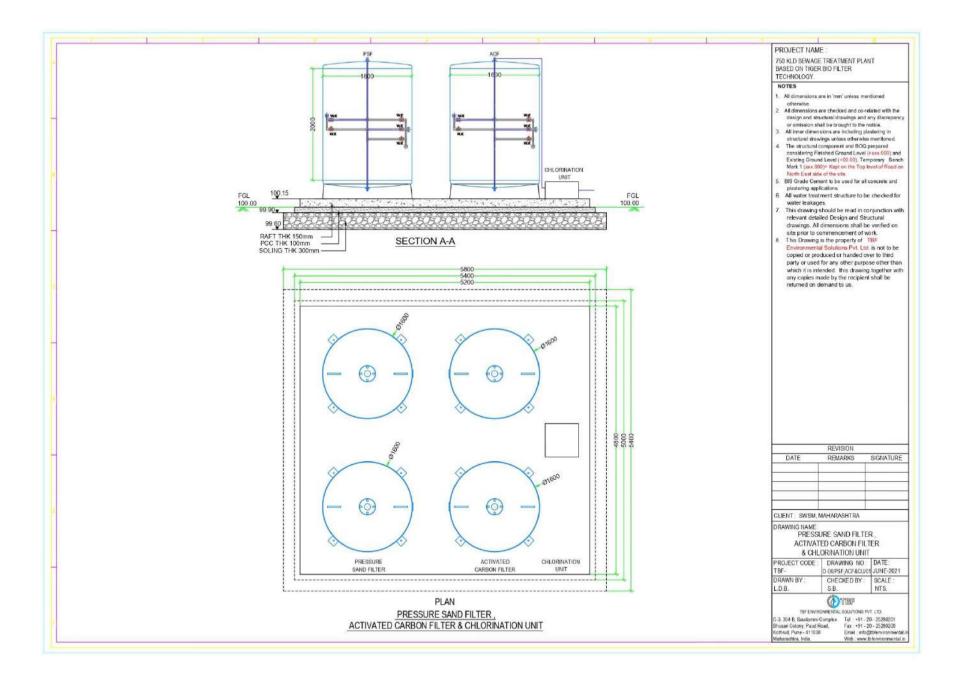












# 1000 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 1000 KLD CAPACITY

	Design flow	=	<b>1000.00</b> 1.000	KLD MLD
	Peak flow factor	=	3.00	
1	SCREEN CHANNELS: MANUAL No. of Manual Screen Average Flow Peak Flow Factor	= =	1 1.00 3.00	No. MLD
	Design Flow	= = = =	Peak Flow 3.00 125.00 0.035	MLD m³/hr m³/sec
	Average Flow	= =	1.00 41.667 0.012	MLD m³/hr m³/sec
	Design Flow in each Screen	=	0.035 1	m³/sec No.
		=	0.035	m <sup>3</sup> /sec
	Average Flow in each Screen	=	0.012 1	m³/sec No.
		=	0.012	m³/sec
	Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	Clear Area of Opening through Screen for Peak Flow	=	0.035 1.2	m³/sec m/sec
		=	0.029	$m^2$
	Clear Area of Opening through Screen for Average Flow	=	0.012 0.6	m³/sec m/sec
		=	0.020	$m^2$
	Considering maximum Area of Opening through Screen Clear Spacing of Bars	=	0.029 10	m²
	Clear Spacing or Dars	=	10	mm

Thickness of Bars	=	5	mm	
Gross Area of Screen	=	0.029x(10+5)/10		
	=	0.044	$m^2$	
Assuming Depth of Screen Channel	=	300.00	mm	
Gross Width of Screen	=	0.044/0.3		
	=	0.147	m	
No. of Bars	=	(Gross Width of Screen / Center to 0		of Bars) - 1
		0.1466666666666667/((10+5)/1000)-	. •	,
	=	1 " ′		
	=	8.8	Nos.	
Say	=	9	Nos.	
Width of Screen provided	=	(Number of Bars+1) x Clear Spacing Thickness)	g + (Number of E	Bars x Bar
	=	(9+1)x10+(9x5)		
	=	145	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel provided	=	0.30	m	
L:B	=	6.00		
Length of Screen Channel provided	=	3.00	m	
				Invert
Freeboard provided	=	1.00	m	Depth of
1 Tooboara provided	_			incomin
				g sewer
Total Depth of Screen Chamber	=	1.30	m	
Velocity in Channel at Average Flow	=	Average Flow / Cross Sectional Are	a of Screen Cha	nnel
	=	0.012/((0.5x0.3)/1000x1000)	,	
	=	0.080	m/sec	
	>	0.300	m/sec	
Head Loss across Screen				
Head Loss across Screen	=	$0.0728 (V^2 - v^2)$		
V = Velocity through Screen at Peak		Peak Flow through Screen Channe	el / Clear Area o	f Openina
Flow	=	through Scr		-1- 5
	=	1.167	m/sec	
v = Velocity in approach Channel at	=	Peak Flow through Screen Channe		nal Area of
Peak Flow	_	Screen Cha		
	=	0.8	m/sec	
Head Loss across Screen at Peak Flow	=	0.053	m	
I IOW				
Head Loss across Screen at 50% Clogged Condition				
Velocity through Screen at 50%			,	
Clogged Condition at Peak Flow	=	2.333	m/sec	
Head Loss across screen at 50%		0.050		
Clogged Condition at Peak Flow	=	0.350	m	
	>	0.300	m/sec	OK
		N 11 1 A 1		

Average Flow	=	1.00	MLD
Peak Flow Factor	=	3.00	
Design Flow	=	Peak Flow	=
Peak Flow	=	3.00	MLD
	=	3000	m³/day
	=	125	m³/hr
	=	0.035	m³/sec
		2222/4	
Design Flow to each Grit Chamber	=	3000/1	37.1
	=	3000	m³/day
	=	125	m³/hr
	=	0.035	m³/sec
According to CPHEEO Manual			
Particle Size	=	0.15	mm
Specific Gravity	=	2.65	111111
Specific Gravity		2.00	
Surface Overflow Rate for 100% removal efficiency in an ideal Grit Chamber	=	Settling Velocity of the minim remove	
	=	1.5	m/s
	=	1296	m <sup>3</sup> /m <sup>2</sup> /day
Considering Efficiency of removal of desired Particles, $\eta = 75\%$	=	75%	
and Measure of Settling Basin Performance,	=	0.125	
n = 1/8 for very good performance			
Design Overflow Rate	=	857	m <sup>3</sup> /m <sup>2</sup> /day
Surface Overflow Rate for 0.15 mm dia. Particle Size with Specific Gravity S <sub>s</sub> > 2.65 Table 5.6	=	1555	m³/m²/day
, -		060	m <sup>3</sup> /m <sup>2</sup> /dov
Considering Design Overflow Rate	=	960	m <sup>3</sup> /m <sup>2</sup> /day
Area of Grit Chamber required	=	3000	m³/day
		960	m <sup>3</sup> /m <sup>2</sup> /day
			, , , , , ,
	=	3.13	$m^2$
L:B ratio	=	3	
Length of Chamber provided	=	4.50	m
Width of Chamber provided	=	1.10	m
Hydraulic Retention Time (HRT) in Grit Chamber at Peak Flow	=	60	sec
Volume of Grit Chamber required	=	0.035x60	
	=	2.1	$m^3$
Danath recognition of the Co. 11 Cl.	_	A //A F. A A\	
Depth required in Grit Chamber		.1 / (4.5x1.1)	
Sav	=	0.42 0.50	m m
Say Grit Storage Depth	=	0.30	m m
Gill Storage Deptil	=	0.30	m

	Total Liquid Depth required Length of Grit Pit Width of Grit Pit Depth of Grit Pit Free Board	= = = = =	0.80 0.50 0.50 0.30 1.30	m m m m
3	RAW SEWAGE SUMP (WET WELL) No. of Units Average Flow	= = =	<b>1</b> 1.00 41.667 0.0116	No. MLD m³/hr m3/sec
	Peak Flow Factor	=	3.00	
	Design Flow	= = = =	Peak Flow 3.00 125 0.035	MLD m³/hr m³/sec
	Hydraulic Retention Time (HRT) at Average Flow Volume required	= = =	<b>120</b> 0.0116 x 120 x 60 84	min m³
	Hydraulic Retention Time (HRT) at Peak Flow	= = <	Volume / Average Flow 40 30	min min
	Total Volume of Wet Well	=	84	$m^3$
	Side Water Depth (SWD) provided Plan Area of Wet Well Length/width of Sump required Length/width of Sump provided Volume of Sump provided Length of Pump Pit Width of Pump Pit Depth of Pump Pit Free Board	= = = = =	2.00 41.76 6.46 6.50 84.50 1.00 0.50 0.30 1.30	m m² m m m³ m m
3.1	DESIGN STATEMENT-RSS E&M			
	Design Considerations Design flow Peak flow factor	= = =	<b>1.00</b> 1000.00 3.00	MLD Cum/Day

### Pumping machinery

Friction factor for Fittings in Pressure Mains

F.II. 00 I		0.5		
Elbow 90 degrees	=	25		
Friction Factor for each	=	1		
Friction factor for all	=	25		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	15		
Friction Factor for each	=	0.3		
Friction factor for all	=	4.5		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	32.4		
Stage		low	ave	peak
Average flow, cum / day	=		1000.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	600	1000	2000
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0174	0.0174	0.0231
Dia needed, m	=	0.149	0.149	0.172
Dia needed, mm	=	149	149	172
Dia provided, mm (User)	=	160	160	160
Radius, m	=	0.080	0.080	0.080
Radius power 0.63	=	0.204	0.204	0.204
S power 0.54	=	0.025	0.041	0.062
S	=	0.001	0.003	0.006
Slope 1 in	=	939.3	364.7	172.1
length, m	=	65	65	65
Friction in pipeline, m	=	0.1	0.2	0.4
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	32.4	32.4	32.4
Friction in fittings, m	=	0.6	1.7	3.7
Static lift, m	=	4.5	4.5	4.5
Total head, m	=	5.1	6.2	8.2
Efficiency of pumpset	=	0.8	0.8	8.0
Discharge, lps	=	10.4	17.4	34.7
Discharge, Cum/Hr	=	37.5	62.5	125.0
Kw required	=	1.613	2.688	5.375
HP required	=	2.5	4.0	7.5
Number of Pumps	=	2	2	2

## 4 TIGER BIO FILTER DESIGN STATEMENT-TBF1- 50 KLD

5

5.1

Freeboard provided

Number of pumping hours	=	16	Hrs	
Number of BMF tanks provided	=	20	Nos	
Design flow to each tank	=	50.00	Cum/day	
Ğ	=	3.13	Cum/ Hr for 16	Hr
	=	0.87	lps	
			·	
Inlet BOD	=	250.00	mg/l	
Inlet TSS	=	400.00	mg/l	
BOD load applied	=	12.5	kg/day	
BOD uptake rate	=	0.1	Kg of BOD / Kg of worms	(0.5 - 1.0)
Worms required	=	125	Kg worms	
Sewage application rate	=	1.85	Cum/Sqm/day	(1 - 2
			, ,	Cum/Sq m/day)
Area required	=	27.03	Sqm	
Area Provided	=	28	Sqm	
Area of each crate	=	0.4	Sqm	
Number of crates	=	70	Nos	
say	=	72	Nos	
Crate in longitudinal direction	=	18	Nos	
Crate in travers direction	=	4	Nos	
crates provided	=	72	Nos	OK
Width provided	=	4.00	m	
Length required	=	11.00	m	
Depth provided	=	1.2	m	
TERTIARY TREATMENT UNIT				
Design Considerations				
Design flow	=	1.00	MLD	
•	=	1000.00	Cum/Day	
Peak flow factor	=	3.00	·	
FILTER FEED TANK				
Number of FFT provided	=	1	Nos	
Number of operating hours	=	16	Hrs	
Design flow	=	1000.00	Cum/Day	
-	=	62.50	Cum/Hr	
	=	0.01736	Cum/Sec	
Hydraulic Retention time	=	60	min	
Volume required	=	62.50	Cum	
Depth	=	2.00	m	
Civil Tanks				
Area	=	31.25	Sqm	
Length/Width required	=	5.59	m .	
Length/Width provided	=	6.00	m	
For the and provided		0.50		

0.50

m

Volume Provided 72.00 Cum

#### **DESIGN STATEMENT-TTU E&M**

Design Considerations				
Design flow	=	1.00	MLD	
	=	1000.00	Cum/Day	
Peak flow factor	=	3.00		
Dumning machinery				
Pumping machinery Friction factor for Fittings in Pressure				
Mains				
Elbow 90 degrees	=	8		
Friction Factor for each	=	1		
Friction factor for all	=	8		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees Friction Factor for each	=	0		
Friction Factor for each	=	1.5 0		
Tee in straight pipe	=	8		
Friction Factor for each	=	0.3		
Friction factor for all	=	2.4		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	13.3		
Stage		low	ave	peak
Average flow, cum / day	=	0.0	1000.00	0
Proportion Design flow, cum / day	=	0.6 600	1 1000	2 2000
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.8	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0130	0.0174	0.0231
Dia needed, m	=	0.129	0.149	0.172
Dia needed, mm	=	129	149	172
Dia provided, mm (User)	=	160	160	160
Radius, m	=	0.080	0.080	0.080
Radius power 0.63	=	0.204	0.204	0.204
S power 0.54	=	0.033	0.041	0.062
S	=	0.002	0.003	0.006
Slope 1 in	=	551.4	364.7	172.1
length, m	=	30	30	30

	Friction in pipeline, m	=	0.1	0.1
	Velocity head, m	=	0.033	0.051
	Frction factor in fittings	=	13.3	13.3
	Friction in fittings, m	=	0.4	0.7
	Static lift, m	=	10.0	10.0
	Total head, m	=	10.4	10.7
	Efficiency of pumpset	=	0.8	0.8
	Discharge, lps	=	10.4	17.4
	Discharge, Cum/Hr	=	37.5	62.5
	Kw required	=	2.765	4.608
	HP provided	=	4.0	6.5
	Number of Pumps	=	2	2
5.2	PRESSURE SAND FILTER			
	Number of unit provided	=	2	Nos.
	Designed @ 16 hrs working for flow	_	2	1103.
	of	=	31.25	m3/h
	Loading rate	=	12.00	m3/m2/h
	Area of DMF	=	2.60	m2
	Dia of DMF	=	1.82	m
	Provided	=	1.900	m
	Backwash water		11000	
	Backwash velocity	=	15.00	m/hr
	backwash flowrate	=	40.74	m3/h
	Backwash volume for 20 mins	=	13.58	m3
	Buokwaon volume for 20 mine	_	10.00	1110
5.3	ACTIVATED CARBON FILTER			
	Number of unit provided	=	2	Nos.
	Designed @ 16 hrs working for flow	_	-	1405.
	of	=	31.25	m3/h
	Loading rate	=	12.00	m3/m2/h
	Area of ACF	=	2.60	m2
	Dia of ACF	=	1.82	m
	Provided	=	1.900	m
	Backwash water			
	Backwash velocity	=	15.00	m/hr
	backwash flowrate	=	40.74	m3/h
	Backwash volume for 20 mins	=	13.58	m3
	Backwach Volamo for 20 mino		10.00	1110
5.4	CHLORINE DOSING SYSTEM			
•	NaOCI DOSING SYSTEM			
	Average Flow		62.50	m3/hr
		=	5	
	Design Chlorine Dosage (Max)		3	mg/l
		=		
	Concentration of Chlorine in		10%	
	commercially available NaOCI	=	00	
				ma/I
	Design NaOCI Dosage	_	30	mg/l
		=		-
	Operating hours	=	16.0	hr

0.2 0.115 13.3 1.5 10.0 11.5 0.8 34.7 125.0 9.215 12.5 2

Quantity of NaOCI required		62.5 X 30 X 16 / 1000	)
	=	30.00	Kg/day
	=		
Design Strength of NaOCI Solution	=	100%	
Volume of NaOCI Solution		30 / (1 X 1000 )	
	=	0.030	m3
No. of Dosing Tanks provided	=	1	Nos.
Volume of each Dosing Tank	=	0.03 / 1	
realine of each peening realing	=	0.03	m3
	=		
	=	100	Litres
No. of Working NaOCI Dosing Pump provided	=	1	No.
Capacity of each NaOCI Dosing Pump required	=	Total Volume of NaOCI Solution / (pumps)	No. of Dosing
		0.03 / (1 X 16)	
	=	0.002	m3/hr
	=	2.00	LPH
Capacity of each NaOCI Dosing	=	2.00	LPH
Pump provided  No. of Standby NaOCI Dosing Pump	=	1	No.
provided	=	ı	INU.

## SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 1000 KLD CAPACITY

S I.	Unit name	N o	Leng th	Widt h		Height		So	oling	P(	cc	Ra	oft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	Ç	+bk		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	3.0	0.5	0.3	1.0	1.3	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	4.5	1.1	0.8	1.3	2.1	0.2	0.3	0.1	0.1	0.2	0.2	0.1			80
3	Raw Sewage Sump	1	6.5	6.5	2.0	1.3	3.3	0.2	0.3	0.1	0.1	0.2	0.3	0.2		0.2	100
4	TBF Bed 50 KLD	2	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	6.0	6.0	2.0	0.5	2.5	0.2	0.3	0.1	0.1	0.2	0.3	0.2		0.2	100
6	Filter Platform	1	5.4	5.0				0.2	0.3	0.1	0.1	0.2	0.1				80

#### Assumptions

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound strata		soil	Muru	Soft roc	har d	Tota I
0.0 to 1.5 m	=	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

### TIGER BIO FILTER OF 1000 KLD CAPACITY BILL OF QUANTITIES

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
1	Excavation for foundation / pipe trenches in earth, soils of all types, sand, gravel and soft murum, including removing the excavated material upto a distance of 50 metres and lifts as below, stacking and spreading as directed, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-1/259)				
	0.0 to 1.5 m	267.98	Cum	150.00	40,197.00
	1.5 to 3.0 m	70.26	Cum	164.00	11,522.70
	3.0 to 4.5 m	28.31	Cum	178.00	5,039.20
	4.5 to 6.0 m	0.00	Cum	192.00	0.00
	MJP/ SSR/ 2021-22 / Section E / Excavation Item No.1/ Page no. 42				
2	Excavation for foundation / pipe trenches in hard murum and boulders, W.B.M. road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking and spreading as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-3/259)			8.00	
	0.0 to 1.5 m	267.98	Cum	192.00	51,452.20
	1.5 to 3.0 m	70.26	Cum	206.00	14,473.60
	3.0 to 4.5 m	28.31	Cum	220.00	6,228.20
	4.5 to 6.0 m  MJP/ SSR/ 2021-22/ Section E/ Excavation Item No.3, Page no. 42	0.00	Cum	234.00	0.00
3	Excavation for foundation / pipe trenches in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A- 4/259)				
	0.0 to 1.5 m	267.98	Cum	572.00	153,284.60
	1.5 to 3.0 m	70.26	Cum	597.00	41,945.30
	3.0 to 4.5 m	28.31	Cum	622.00	17,608.90
	4.5 to 6.0 m  MJP/ SSR/ 2021-22 / Section E/	0.00	Cum	647.00	0.00
	Excavation Item No.5, Page no. 42				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, excluding backfilling, etc. complete by all means. (Bd-A-6/259)				
	0.0 to 1.5 m	267.98	Cum	1,017.00	272,535.70
	1.5 to 3.0 m	70.26	Cum	1,042.00	73,211.00
	3.0 to 4.5 m	28.31	Cum	1,067.00	30,206.80
	4.5 to 6.0 m	0.00	Cum	1,092.00	0.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43				
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)  MJP/ SSR/ 2021-22 / Section E/  Excavat	459.70	Cum	1,175.00	540,147.50
6	Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38	138.16	Cum	5,640.00	779,222.40
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.1, Page no.49				
7	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	157.76	Cum	7,448.00	1,174,996.50
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY			·	
	MIX CONCRETE/ Item No.2, Page no. 49				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	3.00	Cum	8,624.00	25,872.00
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE,				
	READY MIX CONCRETE Item No.4, Page no. 50				
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	17.57	Cum	9,247.00	162,469.80
	Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300			-,=::::0	, :, :
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.)				
	(Excluding M.S. or Tor reinforcement)  Chajjas / Parapets / Curtain Walls	43.64	Cum	9,218.00	402,273.60
	/Partition Walls / Pardies In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)				
	c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY  MIX CONCRETE Item No.8 / Page no. 52	17.48	MT	70,658.00	1,235,101.90
12	Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U- 1/537)  MJP/ SSR/ 2021-22 / SECTION - F: IRON AND STRUCTURAL STEEL WORK Item	12.00	Sqm	1,895.00	22,740.00
	No.1 / Page				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-incharge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C- 3/275)	14.94	MT	71,286.00	1,065,069.90
	MJP/ SSR/ 2021-22 / SECTION - F :: IRON AND STRUCTURAL STEEL WORK Item No.3,				
14	Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sq.m.).	1508.00	Sqm	777.00	1,171,716.00
	PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224				
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete  PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by engineer incharge and BDG- 2 and 5 Item No.893, Page no. 190	297.40	Cum	6,305.00	1,875,107.00
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference No. Bd. L.2 Page No. 368 Item No.950, Page no. 201	1633.00	Sqm	257.00	419,681.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding				
	and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201		Sqm	529.00	502,550.00
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and j brooming down etc. complete.	950.00	Sgm	10.00	9,500.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411	300.00	Oqiii	10.00	3,000.00
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item	950.00	Sqm	8.00	7,600.00
	No. 36.04 Reference No. Bd. P.2 Page No. 412				
20	Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)	144.00	HP/ Hr.	77.00	11,088.00
	MJP/ SSR/ 2021-22 / Section E/ Excav	144.00	1111.	77.00	11,000.00
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/	433.66	Cum	84.00	36,427.50
22	Transportation as per STATEMENT VI Including loading, unloading and stacking Earth (4.8 Cum) lead 15 Km	1445.15	Cum	604.45	873,521.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
23	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50				
	mm of 90 degree bend.	0.90	Sqm	35,000.00	31,500.00
24	Grit pump				
27	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	Pumps, Page no. 6, 7of size 1.8 m length				
	1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00
25	Raw Sewage Pumps				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION -				
	7.5 HP (Up to 72000 LPH)	2.00	Nos	109,079.00	218,158.00
26	TTU Feed pumps Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	7.5 HP (Up to 72000 LPH)	2.00	Nos	109,079.00	218,158.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.9 m x 2 m minimum height	2.00	Nos	620,000.00	1,240,000.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
28	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.9 m x 2 m minimum height	2.00	Nos	620,000.00	1,240,000.00
29	NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency				
	Mixing Tank of 100 Ltrs capacity	100.00	Ltrs	8.00	800.00
	Dosing Pump	2.00	Nos	15,000.00	30,000.00
30	Control Panel  Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter ,for all				
	pumps installed.  MJP/ MECH/ ELECT / SSR/ 2021-22/	1.00	No	50,041.00	50,041.00
	SECTION 19 - SA [ SCADA & AUTOMATION ]				
24	Supplying and areating Fully Assemble Char				
31	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.  > 7.5 HP & Up to 12.5 HP	6.00	nos	7,150.00	42,900.00
	- 1.0111 G OP 10 12.0111	0.00		7,100.00	12,000.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
NO.	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR AND PROTECTION] Item no. LG 3 Page no. 27				
32	Main power supply cable				
	3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable				
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor, PVC insulated, and PVC sheathed.				
	3 core 16 sq mm	35.00	m	549.00	19,215.00
33	Power cables				
33	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade with				
	ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved				
	4 Core 6 sq mm	160.00	m	137.00	21,920.00
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no. CB 6 Page				
	12 OD [ 2.11. G/IDEE ] HOITH HO. OD OT age				
34	Control Cables				
	Copper conductor PVC insulated, Unarmoured control cable				
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.				
	4 core 2.5 sq mm	160.00	m	137.00	21,920.00
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-				
	Plumbing Items				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
35	Providing and supplying in standard lengths				
	ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent				
	cement joints including cost of couplers, as				
	per IS specification no. 4985 / 1988				
	excluding GST levied by GOI and GOM in all				
	respect, including transportation, freight				
	charges, inspection charges, loading,				
	unloading, conveyance to the departmental				
	stores and stacking the same in closed shed				
	duly protected from sun rays and rains				
	including cost of jointing material i.e. solvent cement, etc. complete (selffit type to be				
	jointed with cement solvent).				
	1) 10% of cost of pipes shall be considered				
	for cost of PVC specials for estimate				
	purpose only.				
	2) One coupler and required cement solvent				
	shall be provided with each full length pipe				
	cost of which is included in rates below.  MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C.				
	PIPES, Page no.77				
1	Raw Sewage pump to TBF Distribution				
а	Main header				
	160 mm.	65.00	m	906.00	58,890.00
	PVC Specials- 10%				5,889.00
b	Distribution				
	110 mm.	85.00	m	428.00	36,380.00
	PVC Specials- 10%				3,638.00
2	TBF collection to FFT (gravity)				
а	Main header 140 mm.	180.00	m	693.00	124 740 00
	PVC Specials- 10%	160.00	m	693.00	124,740.00 12,474.00
					12, 11 1.00
b	collection tributory				
	75 mm.	35.00	m	211.00	7,385.00
	PVC Specials- 10%				738.50
3	TTU Plumbing				
	160 mm.	30.00	m	906.00	27,180.00
	PVC Specials- 10%		-	220.00	2,718.00
4	TBF distribution				
	75 mm.	100.00	m	211.00	21,100.00
	PVC Specials- 10%				2,110.00
36	Labour				
	Plumber	30.00	days	641.00	19,230.00
	Helper	70.00	days	579.00	40,530.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / SECTION - B LABOUR & MACHINERY , Page no. 14				
37	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.				
	Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump	0.00	Niss	40.504.00	27.400.00
	200 mm. Filter Feed Pump	2.00	Nos	18,581.00	37,162.00
	200 mm.	2.00	Nos	18,581.00	37,162.00
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132	2.00	1105	18,381.00	37,102.00
38	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)				
	Without by pass arrangement -PN -1				
	Raw Sewage pump				
	200 mm.	2.00	Nos	17,751.00	35,502.00
	Filter Feed Pump				
	200 mm.  MJP/ SSR/ 2021-22 / SECTION - I(XII):  PIPES APPURTENANCES, Page no. 131	2.00	Nos	17,751.00	35,502.00
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc. complete.	1440.00	Nos	4,750.00	6,840,000.00
	Market rate				
4.0	D 11 10 11 11				
40	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	136.98	Cum	1,730.00	236,975.40

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
41	Trasnsportation Godhara to Pune distance by Road 660 Km.	136.98	Cum	11,031.37	1,511,077.10
	MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.				
42	Stone Aggregate 20 mm  MJP/ SSR/ 2021-22 / SECTION- A  MATERIALS	136.98	Cum	900.00	123,282.00
43	Transportation as per STATEMENT VI Including loading, unloading and stacking				
	Manure or sludge (5.52 Cum) lead 25 Km MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.	529.00	Cum	747.48	395,417.00
			NET	TOTAL Rs.	23,851,137.30

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				2.70		
Α	0.0 to 1.5 m	1	7.80	3.40	1.5	39.78	Cum
	soil					9.95	Cum
	Murum					9.95	Cum
	Soft rock						Cum
	hard rock					9.95	Cum
В	1.5 to 3.0 m	1	7.8	3.40	1.2	21.02	Cum
ь	soil	-	1.0	3.40	1.2	1.5 39.78 9.95	Cum
	Murum	+ +					Cum
	Soft rock						Cum
	hard rock						Cum
	TIAI'U TOCK					7.90	Cum
С	3.0 to 4.5 m	1	6.8	2.90	0	0	Cum
	soil						Cum
	Murum						Cum
	Soft rock						Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	6.8	2.90	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling		1.00	4.00	0.00	4.00	
	Screen	1	4.30	1.30			Cum
	Grit	1	5.80	1.10			Cum
	extra for grit chamber	1	1.50				
		+ +		Total for gri	ι	2.22	Cum
3	PCC M20	1					
	Screen	1	3.90	1.10	0.10	0.43	Cum
	Grit	1	5.40	1.10			Cum
		1	1.50	0.45		0.14	Cum
	Internal slope	1	Area	0.36	1.10	0.4	Cum
	Internal slope	1	Area	0.18			Cum
				Total for gri	t	1.34	Cum
4	D-# M00						
4	Raft M30		0.70	4.00	0.45	0.50	0
	Screen	1	3.70	1.00	0.15	0.56	Cum
	Grit	1	5.20	1.10	0.20	1.15	Cum
		1	1.50	0.35	0.20	0.11	Cum
	PCC Wall	<del></del>		Total for gri	ι	1.26	Cum
5	RCC Wall			<del>                                     </del>			
		2	3 30	0.15	1 50	1 /10	Cum
J	Screen Long Wall	2	3.30	0.15	1.50	1.49	9

Sr.	Hom Docarintian	Non	1 ()	D (m)	11 (***)	Overetites	11
No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Short Wall	2	0.80	0.15	1.50	0.36	Cum
				Total for so	reen	1.85	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	1.50	0.15	2.30	0.52	Cum
	Short Wall	2	1.10	0.15	2.30	0.76	Cum
				Total for gr	it	1.28	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	80	Cum	4.95	0.4	MT
7	Fabrication work in Frame and Grating for Access						
	Screen	1	3.30	0.80		2.64	Sqm
	Grit	1	4.80	1.25		6	Sqm
				0	Total	8.64	Sqm
							5 4111
8	Removing excess exacavated						
0	material out of site						
	Screen chamber	1	3.30	0.80	1.30	3.44	Cum
	Grit Chamber	1	4.80	1.10	2.10	11.09	Cum
	soling, PCC, Raft volume					6.89	Cum
	Total Volume					21.42	Cum
	bulkage @ 40%					29.99	Cum
<u></u>							
9	Refilling and compaction	1					
	Total Excavation	1				71.61	Cum
	Deduction for tank volume,					<b></b> -	
	soling, PCC, Raft	1				21.42	Cum
	Refilling and compaction volume					50.19	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				4.05		
Α	0.0 to 1.5 m	1	10.6	10.60	1.5	168.54	Cum
	soil					42.14	Cum
	Murum					42.14	Cum
	Soft rock					42.14	Cum
	hard rock					42.14	Cum
В	1.5 to 3.0 m	1	9.60	9.60	1.5	138.24	Cum
	soil					34.56	Cum
	Murum					34.56	Cum
	Soft rock					34.56	Cum
	hard rock					34.56	Cum
С	3.0 to 4.5 m	1	9.60	9.60	1.05	96.77	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					24.2	Cum
	Murum					24.2	Cum
	Soft rock					24.2	Cum
	hard rock					24.2	Cum
D	4.5 to 6.0 m	1	8.60	8.60	0	0	Cum
	soil			5100		0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	RSS	1	8.00	8.00	0.30	19.2	Cum
3	PCC M20						
	RSS	1	7.60	7.60	0.10	5.78	Cum
4	Raft M30						
•	RSS	1	7.40	7.40	0.35	19.17	Cum
5	RCC Wall						_
	Long Wall	2	7.00	0.25	3.50	12.25	Cum
	Short Wall	2	6.50	0.25	3.50 Total	11.38 23.63	Cum Cum
					TOLAI	23.03	Cum
6	Beams						
	Beam 1	2	6.50	0.2	0.3	0.78	Cum
	Beam 2	2	6.50	0.2	0.3	0.78	Cum
					Total	1.56	Cum
7	Slab	1	7.00	7.00	0.2	9.8	Cum
-	Deduction for manhole	-2	1.20	0.70	0.2	-0.34	Cum
			0	01.0	Total	9.46	Cum
	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
8	Steel Hertitin, Site & Right Still	um	100	Cum	53.82	5.39	MT
9	Fabrication work in Frame and Grating for Access						
	RSS	2	1.20	0.70		1.68	Sqm
	Domoving overce excepted	1					
10	Removing excess exacavated material out of site						
	RSS	1	7.00	7.00	3.30	161.7	Cum
	soling, PCC, Raft volume					44.15	Cum
	Total Volume					205.85	Cum
	bulkage @ 40%					288.19	Cum
11	Refilling and compaction						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					403.55	Cum
	Deduction for tank volume, soling, PCC, Raft					205.85	Cum
	Refilling and compaction volume					197.7	Cum
12	Dewatering						
	18 Days x 4 hours/day	days	18	hours / day	4	72	Hrs

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
2	Soling	1	40.40	<b>5</b> 40	0.00	00.44	0
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
3	TBF	1	12.06	5.06	0.10	6.11	Cum
	IDF	'	12.00	5.06	0.10	0.11	Cum
4	Raft M30	1					
	TBF	1	11.86	4.86	0.10	5.77	Cum
		+ '	11.00	7.00	0.10	5.11	Juili
5	Brick Wall	+ +					
	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
					Total for	T 14.87	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	Sqm
	Short Wall	2	4.00		1.20	9.6	Sqm
	Enternal				Total	81.65	Sqm
	External		44.40		4.00	07.54	C
	Long Wall	2	11.46		1.20	27.51	Sqm
	Short Wall	2	4.46	0.0	1.20	10.71	Sqm
	Wall Top	1	30.92	0.3	Total	9.28 47.50	Sqm
		+ +			TUIAI	47.50	Sqm
7	External-white-wash	1				47.50	Sqm
	EAGITIAL WILLE-WASII	+ '				71.30	ЭЧП
8	External-colour-wash	1				47.50	Sqm
	External colour wash	† '				77.50	- Sqiii
		Kg/C					
9	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	5.77	0.35	MT
					<u> </u>	3.03	
40	Removing excess exacavated						
10	material out of site						
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m x		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

#### MEASUREMENT SHEET - FILTER FEED TANK

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				3.25		
Α	0.0 to 1.5 m	1	9.1	9.10	1.5	124.22	Cum
	soil					31.06	Cum
	Murum					31.06	Cum
	Soft rock					31.06	Cum
	hard rock					31.06	Cum
В	1.5 to 3.0 m	1	8.60	8.60	1.5	110.94	Cum
	soil					27.74	Cum
	Murum					27.74	Cum
	Soft rock					27.74	Cum
	hard rock					27.74	Cum
С	3.0 to 4.5 m	1	8.10	8.10	0.25	16.41	Cum
	soil					4.11	Cum
	Murum					4.11	Cum
	Soft rock					4.11	Cum
	hard rock					4.11	Cum
D	4.5 to 6.0 m	1	8.10	8.10	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	FFT	1	7.50	7.50	0.30	16.88	Cum
3	PCC M20						
	FFT	1	7.10	7.10	0.10	5.05	Cum
4	Raft M30						
	FFT	1	6.90	6.90	0.35	16.67	Cum
_							
5	RCC Wall						
	Long Wall	2	6.50	0.25	2.70	8.78	Cum
	Short Wall	2	6.00	0.25	2.70	8.10	Cum
					Total	16.88	Cum
6	Beams						
	Beam 1	2	6.00	0.2	0.3	0.72	Cum
	Beam 2	2	6.00	0.2	0.3	0.72	Cum
					Total	1.44	Cum
7	Slab	1	6.50	6.50	0.2	8.45	Cum
•	Deduction for manhole	_	1.20	0.70	0.2	-0.34	Cum
		+ +	1.20	5.7 0	Total	8.11	Cum
						21	

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	43.1	4.31	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	FFT	1	6.50	6.50	2.50	105.63	Cum
	soling, PCC, Raft volume					38.6	Cum
	Total Volume					144.23	Cum
	bulkage @ 40%					201.93	Cum
11	Refilling and compaction						
	Total Excavation					251.57	Cum
	Deduction for tank volume, soling, PCC, Raft					144.23	Cum
	Refilling and compaction volume					107.34	Cum
12	Dewatering						
	18 Days x 4 hours/day	days	18	hours/day	4	72	Hrs

#### **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	6.6	6.20	0.55	22.51	Cum
	soil					5.63	Cum
	Murum					5.63	Cum
	Soft rock					5.63	Cum
	hard rock					5.63	Cum
2	Soling						
	Filter Platform	1	6.40	6.00	0.30	11.52	Cum
3	PCC M20						_
	Filter Platform	1	6.00	5.60	0.10	3.36	Cum
	D (1)100						
4	Raft M30						
	Filter Platform	1	5.80	5.40	0.15	4.7	Cum
	0, 1, 1,000,00,00,00,00	17. 70					
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C	00		4.7	0.00	N 4TT
		um	80	Cum	4.7	0.38	MT
	Domoving evenes eveneyated						
6	Removing excess exacavated material out of site						
	soling and PCC volume					14.88	Cum
	Total Volume					14.88	Cum
	bulkage @ 40%					20.84	Cum
	Dunago & TO/0					20.04	Juin
7	Refilling and compaction						
	Total Excavation					22.51	Cum
	Deduction for tank volume,	1					
	soling, PCC, Raft					14.88	Cum
	Refilling and compaction volume					7.63	Cum

#### **MEASUREMENT SHEET - BIO MEDIA**

Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.	1440				1440	Nos
Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	1440	0.82	0.58	0.2	136.98	Cum
Trasnsportation Godhara to					136.98	Cum
Stone Aggregate 20 mm	1440	0.82	0.58	0.2	136.98	Cum
Transportation as per STATEMENT VI Including loading,						
Manure or sludge (5.52 Cum) lead	1440	0.82	0.56	0.8	529	Cum
	container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.  Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)  Transportation Godhara to  Stone Aggregate 20 mm  Transportation as per STATEMENT VI Including loading,	container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.  Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)  Transportation Godhara to  Stone Aggregate 20 mm  1440  Transportation as per STATEMENT VI Including loading,	container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.  Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)  1440  Stone Aggregate 20 mm  1440  O.82  Transportation as per STATEMENT VI Including loading,	container for holding Filter media including Lightweight Expanded Clay Aggregates size ( 8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.  Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)  Transportation Godhara to  Stone Aggregate 20 mm  1440  0.82  0.58  Transportation as per STATEMENT VI Including loading,	container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.  Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)  1440  Stone Aggregate 20 mm  1440  0.82  0.58  0.2  Transportation as per STATEMENT VI Including loading,	container for holding Filter media including Lightweight Expanded Clay Aggregates size ( 8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.  Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)  1440  0.82  0.58  0.2  136.98  Stone Aggregate 20 mm  1440  0.82  0.58  0.2  136.98

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr. No.	Item Description	Nos.	Unit
1	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	1	No
2	Grit pump  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.8 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
3	Raw Sewage Pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	7.5 HP (Up to 72000 LPH)	2	Nos
4	TTU Feed pumps Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	7.5 HP (Up to 72000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.9 m x 2 m minimum height	2	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.9 m x 2 m minimum height	2	Nos
7	Dur All Tablet Chlorinator Leartridge		nas
7	PurAll Tablet Chlorinator + cartridge	0	nos

#### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr.	Item Description	Nos.	Unit
No.	item Description	NUS.	Ollit
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz		
а	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
8	Control Panel		
	Design, Supply, Installing, Commissioning & Testing of Master PLC control		
	monitoring and communication panel as per IEC 61131 at Pure Water Sump		
	suitable for monitoring and control of pure water Pumps. Pressure Transmitters,		
	Level Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed.		
	Master PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		
	AUTOMATION ] Item no. 2.7 Page no. 72		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage		
9	induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over		
	load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	de la complete de complete de la com		
	> 7.5 HP & Up to 12.5 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
10	Main power supply cable		
	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	Cumphing and averting Flot florible subgroupible asking with Organic Organic		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor, PVC insulated, and PVC sheathed.		
	3 core 16 sq mm	35	m
		33	111
11	Power cables		
<u> </u>	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade		
	with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25		
	mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall /		
	on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	160	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		
	CB 6 Page no. 35		
12	Control Cables		
	Copper conductor PVC insulated, Unarmoured control cable		

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

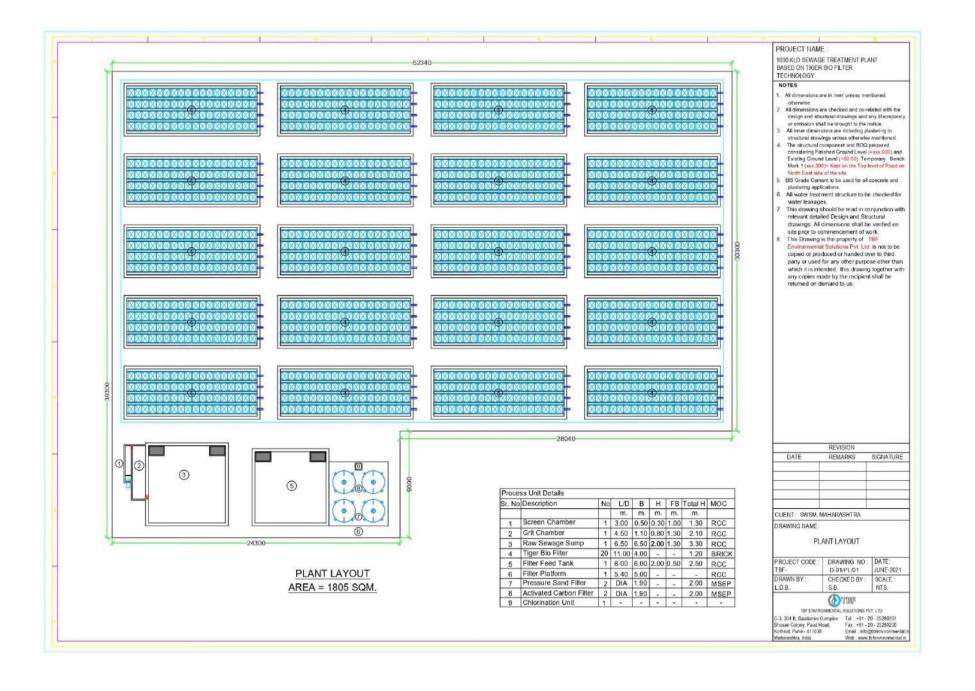
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	160	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

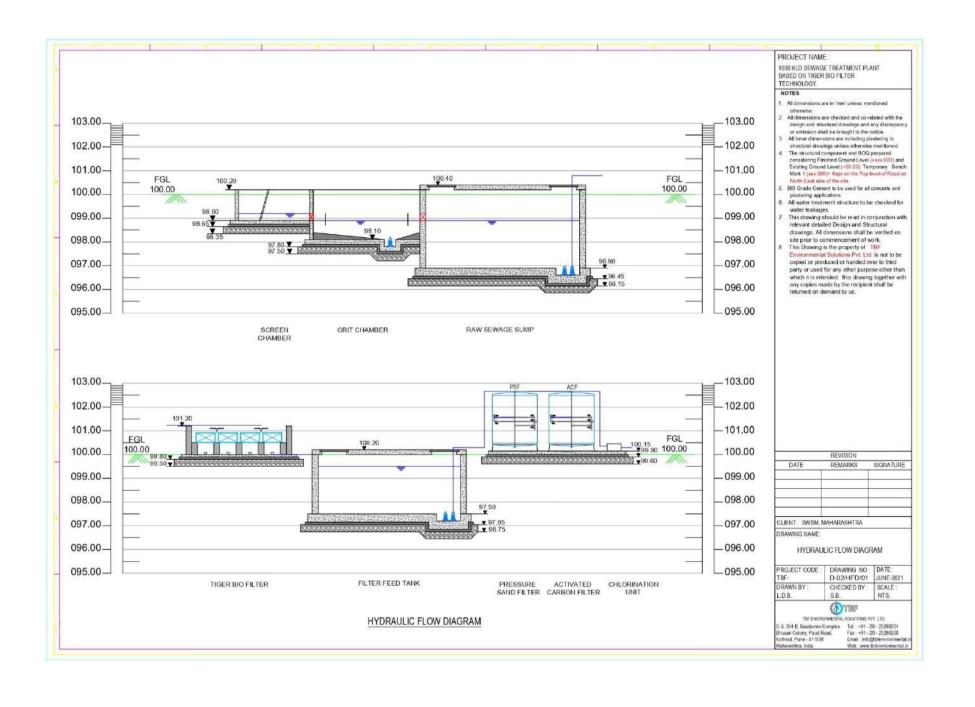
#### **MEASUREMENT SHEET - PLUMBING**

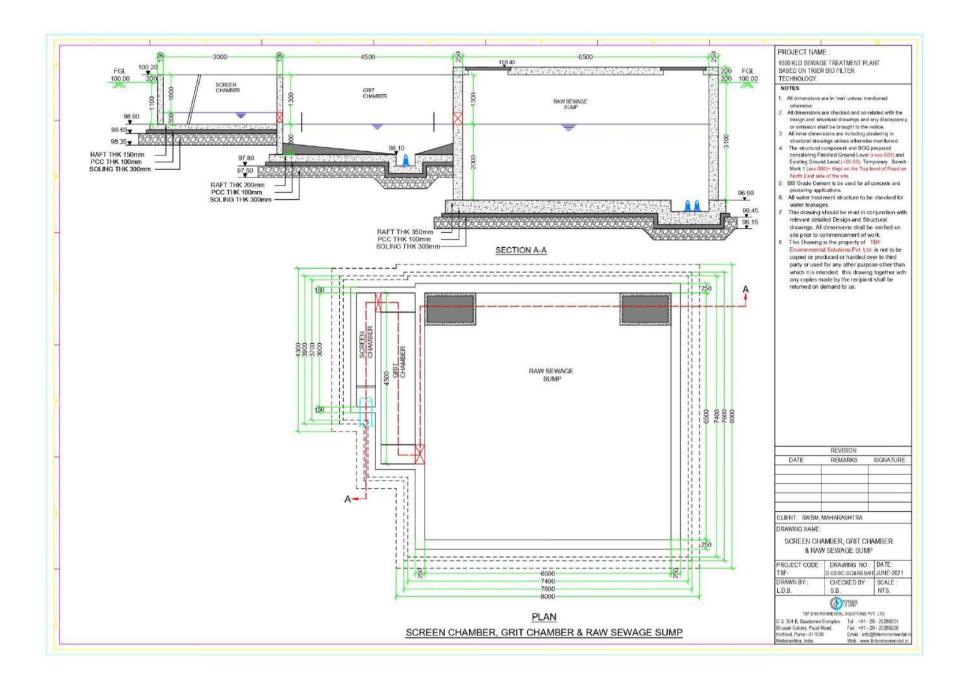
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quan	tity	Unit
	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for						
	potable water with solvent cement joints including						
	cost of couplers, as per IS specification no. 4985 /						
	1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges,						
	inspection charges, loading, unloading,						
	conveyance to the departmental stores and						
	stacking the same in closed shed duly protected						
	from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit						
	type to be jointed with cement solvent).						
	4) 400/ of cost of minor about he considered for cost						
	1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.						
	One coupler and required cement solvent shall						
	be provided with each full length pipe cost of which						
	is included in rates below.						
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES,						
1	Raw Sewage pump to TBF Distribution						
а	Main header 160 mm.	Dia 1	160 65			65	m
	PVC Specials- 10%	ı	65			00	m
	1 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						
b	Distribution						
	110 mm.	1	85			85	m
	PVC Specials- 10%						
2	TBF collection to FFT (gravity)						
а	Main header						
	140 mm.	1	180			180	m
	PVC Specials- 10%						
b	collection tributory						
	75 mm.	1	35			35	m
	PVC Specials- 10%						
3	TTU Plumbing	Dia	160				
	160 mm.	1	30			30	m
	PVC Specials- 10%						
4	TBF distribution			No. of b	eds		
	75 mm.	1	5	20		100	m
	PVC Specials- 10%						
5	Labour	Nos	Days				
	Plumber	3	10			30	days
	Helper	7	10			70	days
-	Christo vehico						
6	Sluice valves						

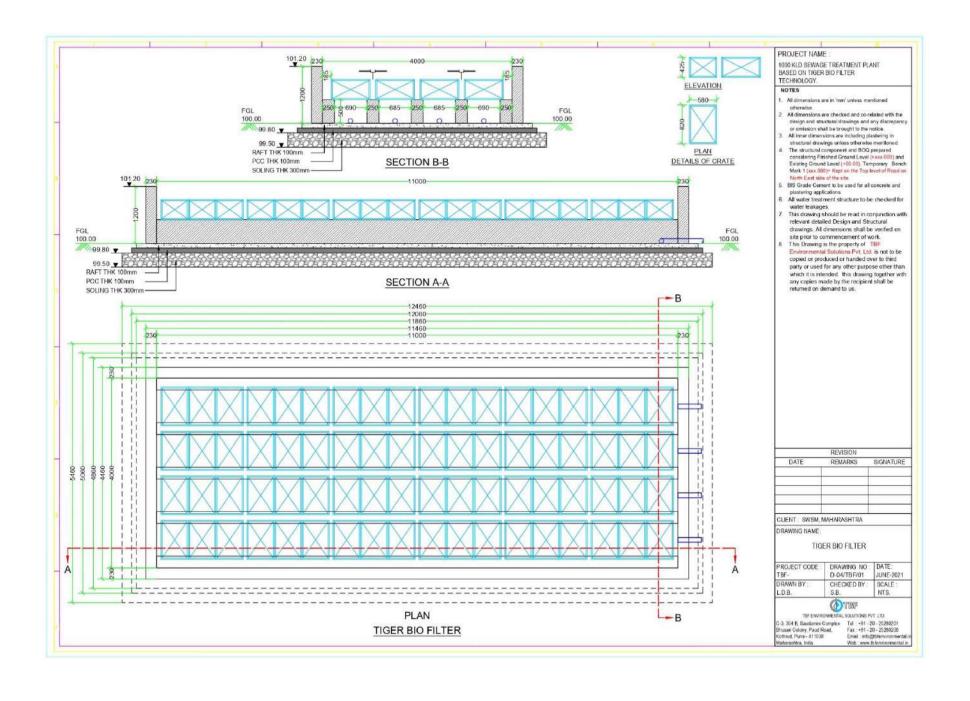
#### **MEASUREMENT SHEET - PLUMBING**

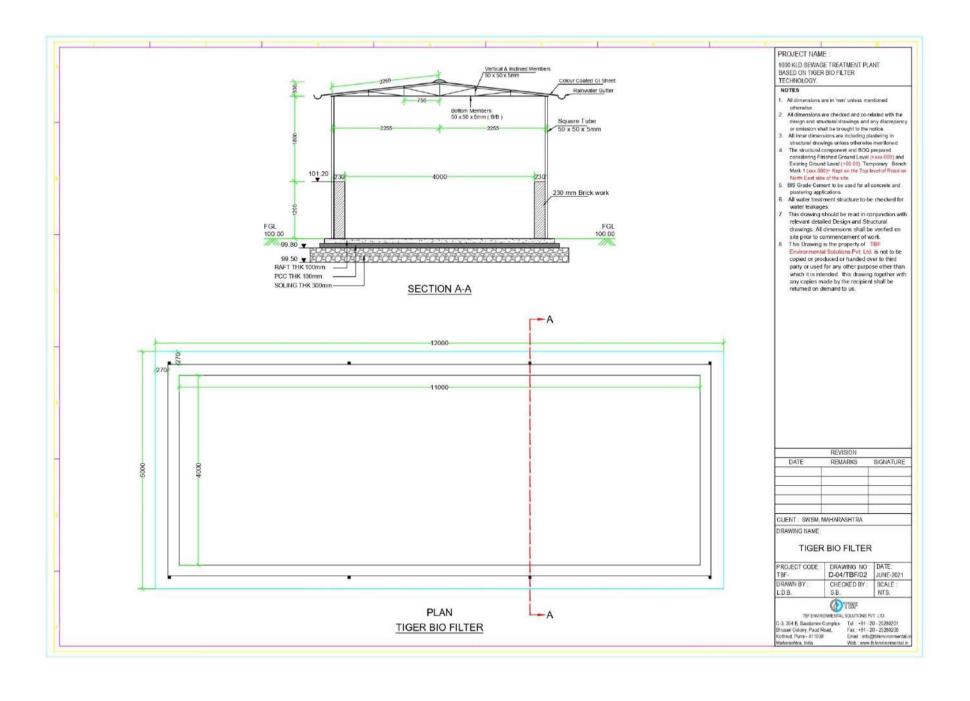
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.  MJP/ SSR/ 2021-22 / SECTION - I(XII):					
	PIPES APPURTENANCES , Page no. 132					
	Raw Sewage pump					NI -
	200 mm.	2			2	Nos
	Filter Feed Pump					
	200 mm.	2			2	Nos
	200 111111.					1403
7	Reflux valves (non-return valves )					
	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 131					
	Raw Sewage pump					
	200 mm.	2			2	Nos
	Filter Feed Pump					
	200 mm.	2			2	Nos

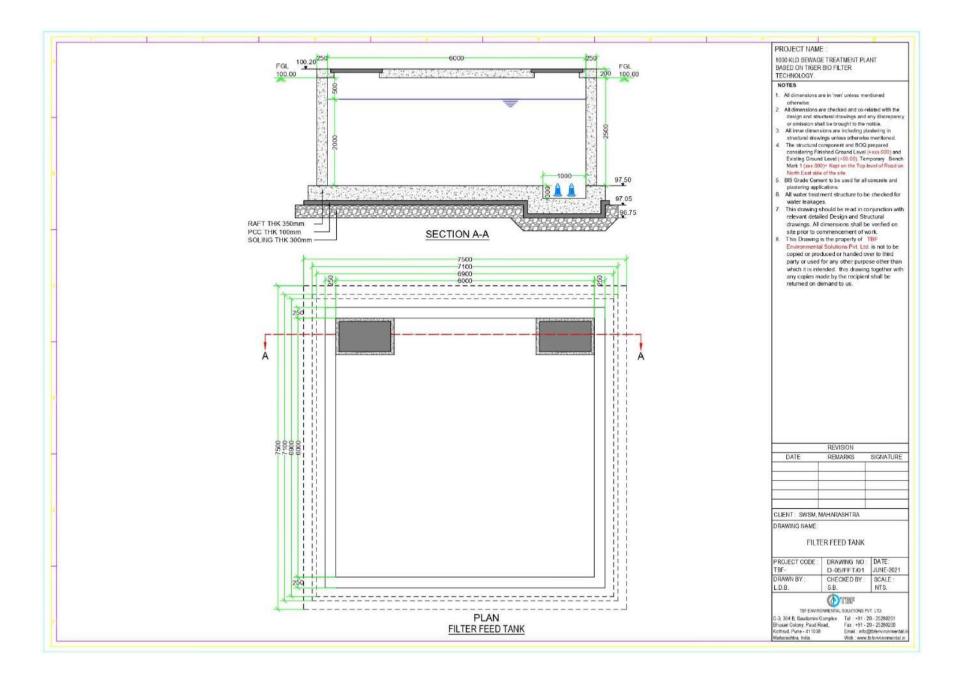


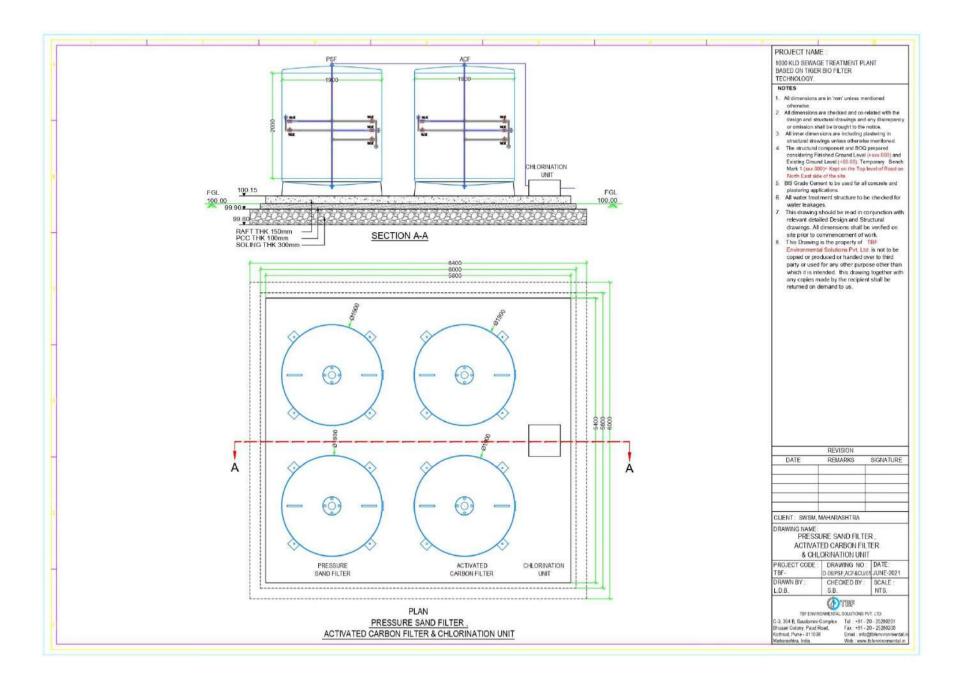












# 1250 KLD STP BASED ON TBF TECHNOLOGY

## PROCESS CALCULATIONS TIGER BIO FILTER OF 1250 KLD CAPACITY

	Design flow	=	<b>1250.00</b> 1.250	KLD MLD
	Peak flow factor	=	3.00	IVILD
1	SCREEN CHANNELS: MANUAL No. of Manual Screen	=	1	No.
	Average Flow	=	1.25	MLD
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
	•	=	3.75	MLD
		=	156.25	m³/hr
		=	0.043	m³/sec
	Average Flow	=	1.25	MLD
		=	52.083	m³/hr
		=	0.014	m <sup>3</sup> /sec
	Design Flow in each Screen	=	0.043	m³/sec
			1	No.
		=	0.043	m³/sec
	Average Flow in each Screen	=	0.014	m³/sec
			1	No.
		=	0.014	m³/sec
	Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	Clear Area of Opening through Screen for Peak Flow	=	0.043	m³/sec
	Screen for Feak Flow		1.2	m/sec
		=	0.036	m²
	Clear Area of Opening through Screen for Average Flow	=	0.014	m³/sec
	Ŭ		0.6	m/sec
		=	0.023	$m^2$
	Considering maximum Area of Opening through Screen	=	0.036	$m^2$
	Clear Spacing of Bars	=	10	mm

Thickness of Bars	=	5	mm	
Gross Area of Screen	=	0.036x(10+5)/10	2	
	=	0.054	$m^2$	
Assuming Depth of Screen Channel	=	300.00	mm	
Gross Width of Screen	=	0.054/0.3		
	=	0.180	m	
No. of Bars	=	(Gross Width of Scree	n / Center to C	enter Spacing
		of Bars) - 1 0.18/((10+5)/1000)-		
	=	1		
	=	11.0	Nos.	
Say	=	11	Nos.	
Width of Screen provided	=	(Number of Bars+1) x Bars x Bar Thickness)	Clear Spacing	+ (Number of
	=	(11+1)x10+(11x5)		
	=	175	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel provided	=	0.30	m	
L:B	=	8.00		
Length of Screen Channel provided	=	4.00	m	
				Invert Depth
Freeboard provided	=	1.00	m	of incoming sewer
Total Depth of Screen Chamber	=	1.30	m	
Velocity in Channel at Average Flow	=	Average Flow / Cross Channel	Sectional Area	of Screen
	=	•		of Screen
		Channel		of Screen
	=	Channel 0.014/((0.5x0.3)/1000x	(1000)	of Screen
	=	Channel 0.014/((0.5x0.3)/1000x 0.093	(1000) m/sec	of Screen
Flow	=	Channel 0.014/((0.5x0.3)/1000x 0.093	(1000) m/sec	of Screen
Head Loss across Screen Head Loss across Screen V = Velocity through Screen at	= = >	Channel 0.014/((0.5x0.3)/1000x 0.093 0.300 0.0728 (V <sup>2</sup> - V <sup>2</sup> ) Peak Flow through So	m/sec m/sec m/sec	/ Clear Area of
Head Loss across Screen Head Loss across Screen	= = >	Channel 0.014/((0.5x0.3)/1000x 0.093 0.300 0.0728 (V² - v²) Peak Flow through So Opening	m/sec m/sec m/sec creen Channel g through Scree	/ Clear Area of
Head Loss across Screen Head Loss across Screen V = Velocity through Screen at Peak Flow	= = >	Channel 0.014/((0.5x0.3)/1000x 0.093 0.300  0.0728 (V² - v²) Peak Flow through So Opening 1.194	m/sec m/sec m/sec creen Channel g through Scree m/sec	/ Clear Area of en
Head Loss across Screen Head Loss across Screen V = Velocity through Screen at	= = >	Channel 0.014/((0.5x0.3)/1000x 0.093 0.300  0.0728 (V² - v²) Peak Flow through So Opening 1.194 Peak Flow through	m/sec m/sec m/sec creen Channel g through Scree m/sec	/ Clear Area of en nnel / Cross
Flow  Head Loss across Screen  Head Loss across Screen  V = Velocity through Screen at  Peak Flow  v = Velocity in approach Channel at	= ; > = = =	Channel 0.014/((0.5x0.3)/1000x 0.093 0.300  0.0728 (V² - v²) Peak Flow through So Opening 1.194 Peak Flow through	c1000)  m/sec  m/sec  creen Channel g through Scree  m/sec  h Screen Char	/ Clear Area of en nnel / Cross
Flow  Head Loss across Screen  Head Loss across Screen  V = Velocity through Screen at  Peak Flow  v = Velocity in approach Channel at	= = >	Channel 0.014/((0.5x0.3)/1000x 0.093 0.300  0.0728 (V² - v²) Peak Flow through So Opening 1.194 Peak Flow through Sectional Are 0.8	creen Channel g through Screen m/sec h Screen Charea of Screen C m/sec	/ Clear Area of en nnel / Cross
Flow  Head Loss across Screen  Head Loss across Screen  V = Velocity through Screen at  Peak Flow  v = Velocity in approach Channel at  Peak Flow	= = >	Channel 0.014/((0.5x0.3)/1000x 0.093 0.300  0.0728 (V² - v²) Peak Flow through So Opening 1.194 Peak Flow through Sectional Are	x1000)  m/sec  m/sec  creen Channel g through Screen m/sec  h Screen Char ea of Screen C	/ Clear Area of en nnel / Cross
Head Loss across Screen Head Loss across Screen V = Velocity through Screen at Peak Flow v = Velocity in approach Channel at Peak Flow Head Loss across Screen at Peak	= = >	Channel 0.014/((0.5x0.3)/1000x 0.093 0.300  0.0728 (V² - v²) Peak Flow through So Opening 1.194 Peak Flow through Sectional Are 0.8	creen Channel g through Screen m/sec h Screen Charea of Screen C m/sec	/ Clear Area of en nnel / Cross
Head Loss across Screen Head Loss across Screen V = Velocity through Screen at Peak Flow  V = Velocity in approach Channel at Peak Flow  Head Loss across Screen at Peak Flow  Head Loss across Screen at 50%	= = >	Channel 0.014/((0.5x0.3)/1000x 0.093 0.300  0.0728 (V² - v²) Peak Flow through So Opening 1.194 Peak Flow through Sectional Are 0.8	creen Channel g through Screen m/sec h Screen Charea of Screen C m/sec	/ Clear Area of en nnel / Cross
Head Loss across Screen Head Loss across Screen V = Velocity through Screen at Peak Flow  V = Velocity in approach Channel at Peak Flow  Head Loss across Screen at Peak Flow  Head Loss across Screen at 50% Clogged Condition Velocity through Screen at 50%	= -> = = = = =	Channel 0.014/((0.5x0.3)/1000x 0.093 0.300  0.0728 (V² - v²) Peak Flow through So Opening 1.194 Peak Flow through Sectional Are 0.8 0.058	m/sec m/sec creen Channel g through Scree m/sec h Screen Char ea of Screen C m/sec m	/ Clear Area of en nnel / Cross
Head Loss across Screen Head Loss across Screen V = Velocity through Screen at Peak Flow  v = Velocity in approach Channel at Peak Flow  Head Loss across Screen at Peak Flow  Head Loss across Screen at 50% Clogged Condition Velocity through Screen at 50% Clogged Condition at Peak Flow Head Loss across screen at 50%	= = > = = = = =	Channel 0.014/((0.5x0.3)/1000x 0.093 0.300  0.0728 (V² - v²) Peak Flow through So Opening 1.194 Peak Flow through Sectional Are 0.8 0.058	m/sec m/sec creen Channel g through Scree m/sec h Screen Char ea of Screen C m/sec m	/ Clear Area of en nnel / Cross

Average Flow	=	1.25	MLD
Peak Flow Factor	=	3.00	
Design Flow	=	Peak Flow	
Peak Flow	=	3.75	MLD
	=	3750	m³/day
	=	156	m³/hr
	=	0.043	m³/sec
Design Flow to each Grit Chamber	=	3750/1	
	=	3750	m³/day
	=	156	m³/hr
	=	0.043	m³/sec
According to CPHEEO Manual			
Particle Size	=	0.15	mm
Specific Gravity	=	2.65	
Surface Overflow Rate for 100% removal efficiency in an ideal Grit Chamber	=	Settling Velocity of	f the minimum size of Particles to be removed
	=	1.5	m/s
	=	1296	m³/m²/day
Considering Efficiency of removal of desired Particles, $\eta = 75\%$	=	75%	
and Measure of Settling Basin			
Performance,	=	0.125	
n = 1/8 for very good performance			
Design Overflow Rate	=	857	m³/m²/day
Surface Overflow Rate for 0.15 mm			3, 2,,
dia. Particle Size with Specific Gravity S <sub>s</sub> > 2.65 Table 5.6	=	1555	m <sup>3</sup> /m <sup>2</sup> /day
•			2. 2
Considering Design Overflow Rate	=	960	m <sup>3</sup> /m <sup>2</sup> /day
			3
Area of Grit Chamber required	=	3750	m³/day
		960	m <sup>3</sup> /m <sup>2</sup> /day
			2
	=	3.91	m <sup>2</sup>
L:B ratio	=	3	
Length of Chamber provided	=	4.50	m
Width of Chamber provided	=	1.20	m
Hydraulic Retention Time (HRT) in			
Grit Chamber at Peak Flow	=	60	sec
Volume of Grit Chamber required	=	0.043x60	
	=	2.58	$m^3$
Depth required in Grit Chamber	=	2.58 / (4.5x1.2)	
	=	0.48	m
Say	=	0.50	m
Grit Storage Depth	=	0.30	m

	Total Liquid Depth required	=	0.80	m
	Length of Grit Pit	=	0.50	m
	Width of Grit Pit	=	0.50	m
	Depth of Grit Pit	=	0.30	m
	Free Board	=	1.30	m
	1100 Dodi.u			
3	RAW SEWAGE SUMP (WET WELL)			
•	No. of Units		1	No.
	Average Flow	=	1.25	MLD
	Average Flow	=		
		=	52.083	m³/hr
		=	0.0145	m3/sec
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
		=	3.75	MLD
		=	156	m³/hr
		=	0.043	m³/sec
	Hydraulic Retention Time (HRT) at			
	Average Flow	=	120	min
	Volume required	=	0.0145 x 120 x 60	
	1	=	104	$m^3$
			101	•••
	Hydraulia Patantian Time (HPT) at			
	Hydraulic Retention Time (HRT) at Peak Flow	=	Volume / Average F	low
	1 Gaix 1 IOW	_	40	min
		=		min
		<	30	111111
	Total Values a of Mat Mall		404	3
	Total Volume of Wet Well	=	104	m <sup>3</sup>
	0:1 14/4 5 4/40(4)5 :1.1		0.50	
	Side Water Depth (SWD) provided	=	2.50	m
	Plan Area of Wet Well	=	41.76	$m^2$
	Length/width of Sump required	=	6.46	m
	Length/width of Sump provided	=	6.50	m
	Volume of Sump provided	=	105.63	$m^3$
	Length of Pump Pit	=	2.00	m
	Width of Pump Pit	=	0.80	m
	Depth of Pump Pit	=	0.30	m
	Free Board		1.30	m
				•••
3.1	DESIGN STATEMENT-RSS E&M			
	DESIGN STATEMENT NOS EGIN			
	Design Considerations			
	Design flow	=	1.25	MLD
		=	1250 00	Cum/Day
	Peak flow factor	=	1250.00 3.00	Cum/Day

Pumping machinery
Friction factor for Fittings in
Pressure Mains

Elbow 90 degrees	=	30		
Friction Factor for each	=	1		
Friction factor for all	=	30		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	18		
Friction Factor for each	=	0.3		
Friction factor for all	=	5.4		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	38.3		
Stage		low	ave	peak
Average flow, cum / day	=		1250.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	750	1250	2500
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0217	0.0217	0.0289
Dia needed, m	=	0.166	0.166	0.192
Dia needed, mm	=	166	166	192
Dia provided, mm (User)	=	180	180	180
Radius, m	=	0.090	0.090	0.090
Radius power 0.63	=	0.219	0.219	0.219
S power 0.54	=	0.023	0.038	0.058
S	=	0.001	0.002	0.005
Slope 1 in	=	1077.7	418.5	197.5
length, m	=	75	75	75
Friction in pipeline, m	=	0.1	0.2	0.4
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	38.3	38.3	38.3
Friction in fittings, m	=	0.7	2.0	4.4
Static lift, m	=	5.0	5.0	5.0
Total head, m	=	5.7	7.0	9.4
Efficiency of pumpset	=	8.0	0.8	0.8
Discharge, lps	=	13.0	21.7	43.4
Discharge, Cum/Hr	=	46.9	78.1	156.3
Kw required	=	2.017	3.359	6.722
HP required	=	3.0	5.0	9.5
Number of Pumps	=	2	2	2

#### 4 **TIGER BIO FILTER**

DESIGN STATEMENT-TBF1- 50	KLD			
Number of pumping hours	=	16	Hrs	
Number of BMF tanks provided	=	25	Nos	
Design flow to each tank	=	50.00	Cum/day	
-	=	3.13	Cum/ Hr for 16	Hr
	=	0.87	lps	
Inlet BOD	=	250.00	mg/l	
Inlet TSS	=	400.00	mg/l	
BOD load applied	=	12.5	kg/day	
BOD uptake rate	=	0.1	Kg of BOD / Kg of worms	(0.5 - 1.0)
Worms required	=	125	Kg worms	
Sewage application rate	=	1.85	Cum/Sqm/day	(1 - 2 Cum/Sqm/day)
Area required	=	27.03	Sqm	
Area Provided	=	28	Sqm	
Area of each crate	=	0.4	Sqm	
Number of crates	=	70	Nos	
say	=	72	Nos	
Crate in longitudinal direction	=	18	Nos	
Crate in travers direction	=	4	Nos	
crates provided	=	72	Nos	OK
Width provided	=	4.00	m	
Length required	=	11.00	m	
Depth provided	=	1.2	m	
TERTIARY TREATMENT UNIT				
<b>Design Considerations</b>				
Design flow	=	1.25	MLD	
	=	1250.00	Cum/Day	
Peak flow factor	=	3.00		
FILTER FEED TANK				
Number of FFT provided	=	1	Nos	
Number of operating hours	=	16	Hrs	
Design flow	=	1250.00	Cum/Day	
		70 12	Cum/∐r	

#### 5.1

5

FILTER FEED TANK				
Number of FFT provided	=	1	Nos	
Number of operating hours	=	16	Hrs	
Design flow	=	1250.00	Cum/Day	
	=	78.13	Cum/Hr	
	=	0.02170	Cum/Sec	
Hydraulic Retention time	=	60	min	
Volume required	=	78.13	Cum	
Depth	=	2.50	m	
Civil Tanks				
Area	=	31.25	Sqm	
Length/Width required	=	5.59	m	
Length/Width provided	=	6.00	m	
Freeboard provided	=	0.50	m	

Volume Provided 90.00 Cum

### **DESIGN STATEMENT-TTU E&M**

Design Considerations Design flow	=	<b>1.25</b> 1250.00	MLD Cum/Day	
Peak flow factor	=	3.00	Carri, Bay	
Pumping machinery Friction factor for Fittings in				
Pressure Mains				
Elbow 90 degrees	=	8		
Friction Factor for each	=	1		
Friction factor for all Elbow 45 degrees	=	8 0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0.75		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	8		
Friction Factor for each	=	0.3		
Friction factor for all  Gate valve open	=	2.4 1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	13.3		
Stage		low	ave	peak
Average flow, cum / day	=	0.0	1250.00	0
Proportion	=	0.6 750	1 1250	2 2500
Design flow, cum / day Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.8	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0163	0.0217	0.0289
Dia needed, m	=	0.144	0.166	0.192
Dia needed, mm	=	144	166	192
Dia provided, mm (User)	=	160	160	160
Radius, m	=	0.080	0.080	0.080
Radius power 0.63	=	0.204	0.204	0.204
S power 0.54 S	=	0.033 0.002	0.041	0.062 0.006
Slope 1 in	=	551.4	0.003 364.7	0.006 172.1
length, m	=	35	35	35
g,	_	00	00	00

	Friction in pipeline, m	=	0.1	0.1	0.2
	Velocity head, m	=	0.033	0.051	0.115
	Frction factor in fittings	=	13.3	13.3	13.3
	Friction in fittings, m	=	0.4	0.7	1.5
	Static lift, m	=	10.0	10.0	10.0
	Total head, m		10.4	10.7	11.5
	·	=			
	Efficiency of pumpset	=	0.8	0.8	0.8
	Discharge, lps	=	13.0	21.7	43.4
	Discharge, Cum/Hr	=	46.9	78.1	156.3
	Kw required	=	3.458	5.758	11.523
	HP provided	=	5.0	8.0	15.5
	Number of Pumps	=	2	2	2
5.2	PRESSURE SAND FILTER				
	Number of unit provided	=	3	Nos.	
	Designed @ 16 hrs working for				
	flow of	=	26.04	m3/h	
	Loading rate	=	12.00	m3/m2/h	
	Area of DMF	=	2.17	m2	
	Dia of DMF	=	1.66	m	
	Provided		1.700	m	
	Backwash water	=	1.700	111	
			45.00	/l	
	Backwash velocity	=	15.00	m/hr	
	backwash flowrate	=	33.27	m3/h	
	Backwash volume for 20 mins	=	11.09	m3	
5.3	ACTIVATED CARBON FILTER				
5.3	Number of unit provided	=	3	Nos.	
5.3	Number of unit provided Designed @ 16 hrs working for				
5.3	Number of unit provided Designed @ 16 hrs working for flow of	=	26.04	m3/h	
5.3	Number of unit provided Designed @ 16 hrs working for flow of Loading rate		26.04 12.00	m3/h m3/m2/h	
5.3	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF	=	26.04 12.00 2.17	m3/h	
5.3	Number of unit provided Designed @ 16 hrs working for flow of Loading rate	=	26.04 12.00	m3/h m3/m2/h	
5.3	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF	= = =	26.04 12.00 2.17	m3/h m3/m2/h m2	
5.3	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF	= = = =	26.04 12.00 2.17 1.66	m3/h m3/m2/h m2 m	
5.3	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided	= = = =	26.04 12.00 2.17 1.66	m3/h m3/m2/h m2 m	
5.3	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water	= = = =	26.04 12.00 2.17 1.66 1.700	m3/h m3/m2/h m2 m m	
5.3	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity	= = = = =	26.04 12.00 2.17 1.66 1.700	m3/h m3/m2/h m2 m m	
5.3 5.4	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity backwash flowrate	= = = = = =	26.04 12.00 2.17 1.66 1.700 15.00 33.27	m3/h m3/m2/h m2 m m m	
	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity backwash flowrate Backwash volume for 20 mins	= = = = = =	26.04 12.00 2.17 1.66 1.700 15.00 33.27	m3/h m3/m2/h m2 m m m	
	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity backwash flowrate Backwash volume for 20 mins  CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM	= = = = = =	26.04 12.00 2.17 1.66 1.700 15.00 33.27	m3/h m3/m2/h m2 m m m	
	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity backwash flowrate Backwash volume for 20 mins  CHLORINE DOSING SYSTEM	= = = = = =	26.04 12.00 2.17 1.66 1.700 15.00 33.27 11.09	m3/h m3/m2/h m2 m m m/hr m3/h m3	
	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity backwash flowrate Backwash volume for 20 mins  CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM		26.04 12.00 2.17 1.66 1.700 15.00 33.27 11.09	m3/h m3/m2/h m2 m m m/hr m3/h m3	
	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity backwash flowrate Backwash volume for 20 mins  CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM Average Flow  Design Chlorine Dosage (Max)	= = = = = =	26.04 12.00 2.17 1.66 1.700 15.00 33.27 11.09	m3/h m3/m2/h m2 m m m/hr m3/h m3	
	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity backwash flowrate Backwash volume for 20 mins  CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM Average Flow  Design Chlorine Dosage (Max)  Concentration of Chlorine in	= = = = =	26.04 12.00 2.17 1.66 1.700 15.00 33.27 11.09	m3/h m3/m2/h m2 m m m/hr m3/h m3	
	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity backwash flowrate Backwash volume for 20 mins  CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM Average Flow  Design Chlorine Dosage (Max)  Concentration of Chlorine in commercially available NaOCI	= = = = =	26.04 12.00 2.17 1.66 1.700 15.00 33.27 11.09 78.13	m3/h m3/m2/h m2 m m m m/hr m3/h m3	
	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity backwash flowrate Backwash volume for 20 mins  CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM Average Flow  Design Chlorine Dosage (Max)  Concentration of Chlorine in	= = = = =	26.04 12.00 2.17 1.66 1.700 15.00 33.27 11.09	m3/h m3/m2/h m2 m m m/hr m3/h m3	
	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity backwash flowrate Backwash volume for 20 mins  CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM Average Flow  Design Chlorine Dosage (Max)  Concentration of Chlorine in commercially available NaOCI Design NaOCI Dosage	= = = = =	26.04 12.00 2.17 1.66 1.700 15.00 33.27 11.09 78.13	m3/h m3/m2/h m2 m m m m/hr m3/h m3  m3/hr mg/l	
	Number of unit provided Designed @ 16 hrs working for flow of Loading rate Area of ACF Dia of ACF Provided Backwash water Backwash velocity backwash flowrate Backwash volume for 20 mins  CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM Average Flow  Design Chlorine Dosage (Max)  Concentration of Chlorine in commercially available NaOCI	= = = = =	26.04 12.00 2.17 1.66 1.700 15.00 33.27 11.09 78.13	m3/h m3/m2/h m2 m m m m/hr m3/h m3	

Quantity of NaOCI required	=	78.125 X 30 >	( 16 / 1000
	_	37.50	Kg/day
	=		
Design Strength of NaOCI Solution	=	100%	
Volume of NaOCI Solution		37.5 / (1 X	1000)
	=	0.040	m3
No. of Dosing Tanks provided	=	1	Nos.
Volume of each Dosing Tank	=	0.04 / 1	
	=	0.04	m3
	=	100	Litres
	=		
No. of Working NaOCI Dosing Pump provided	=	1	No.
Capacity of each NaOCI Dosing Pump required	=	Total Volume of N (No. of Dosir	
		0.04/(1 X 16)	
	=	0.003	m3/hr
	_	3.00	LPH
Capacity of each NaOCI Dosing	=	3.00	LPH
Pump provided  No. of Standby NaOCI Dosing  Pump provided	=	1	No.

### SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 1250 KLD CAPACITY

S I.	Unit name	N o	Leng th	Widt h	1110				Wall k		Slab Thk	Steel - HCR					
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	<b>5</b>	+bk		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	4.0	0.5	0.3	1.0	1.3	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	4.5	1.2	0.8	1.3	2.1	0.2	0.3	0.1	0.1	0.2	0.2	0.1			80
3	Raw Sewage Sump	1	6.5	6.5	2.5	1.3	3.8	0.2	0.3	0.1	0.1	0.2	0.4	0.2		0.2	100
4	TBF Bed 50 KLD	2	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	6.0	6.0	2.5	0.5	3.0	0.2	0.3	0.1	0.1	0.2	0.4	0.2		0.2	100
6	Filter Platform	1	6.7	4.6				0.2	0.3	0.1	0.1	0.2	0.1				80

#### Assumptions

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound		soil	Muru	Soft roc	har d	Tota
0.0 to 1.5 m	=	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

### TIGER BIO FILTER OF 1250 KLD CAPACITY BILL OF QUANTITIES

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
1	Excavation for foundation / pipe trenches in earth, soils of all types, sand, gravel and soft murum, including removing the excavated material upto a distance of 50 metres and lifts as below, stacking and spreading as directed, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-1/250)				
	1/259)	242.75	Cura	450.00	47.000.50
	0.0 to 1.5 m 1.5 to 3.0 m	313.75	Cum	150.00	47,062.50
	3.0 to 4.5 m	70.49 47.69	Cum Cum	164.00 178.00	11,560.40 8,488.90
	4.5 to 6.0 m	1.85	Cum	192.00	355.20
	MJP/ SSR/ 2021-22 / Section E / Excavation Item No.1/ Page no. 42			102100	000.20
2	Excavation for foundation / pipe trenches in hard murum and boulders, W.B.M. road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking and spreading as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-3/259)				
	0.0 to 1.5 m	313.75	Cum	192.00	60,240.00
	1.5 to 3.0 m	70.49	Cum	206.00	14,521.00
	3.0 to 4.5 m	47.69	Cum	220.00	10,491.80
	4.5 to 6.0 m MJP/ SSR/ 2021-22/ Section E/ Excavation Item No.3, Page no. 42	1.85	Cum	234.00	432.90
3	Excavation for foundation / pipe trenches in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A- 4/259)				
	0.0 to 1.5 m	313.75	Cum	572.00	179,465.00
	1.5 to 3.0 m	70.49	Cum	597.00	42,082.60
	3.0 to 4.5 m	47.69	Cum	622.00	29,663.20
	4.5 to 6.0 m	1.85	Cum	647.00	1,197.00
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.5, Page no. 42				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, excluding backfilling, etc. complete by all means. (Bd-A-6/259)				
	0.0 to 1.5 m	313.75	Cum	1,017.00	319,083.80
	1.5 to 3.0 m	70.49	Cum	1,042.00	73,450.60
	3.0 to 4.5 m	47.69	Cum	1,067.00	50,885.30
	4.5 to 6.0 m MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43	1.85	Cum	1,092.00	2,020.20
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)  MJP/ SSR/ 2021-22 / Section E/ Excavat	563.53	Cum	1,175.00	662,147.80
6	Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY	169.27	Cum	5,640.00	954,682.80
	MIX CONCRETE Item No.1, Page no.49				
7	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	192.54	Cum	7,448.00	1,434,038.00
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY		2 11	, 5.55	, : ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	MIX CONCRETE/ Item No.2, Page no. 49				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	3.00	Cum	8,624.00	25,872.00
	For Beams / Braces / Lintels In RCC M-300	3.00	Culli	0,024.00	25,672.00
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50				
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	17.03	Cum	9,247.00	157,476.50
	Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300				
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.)				
	(Excluding M.S. or Tor reinforcement)  Chajjas / Parapets / Curtain Walls	50.31	Cum	9,218.00	463,757.60
	/Partition Walls / Pardies In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)				
	c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY  MIX CONCRETE Item No.8 / Page no. 52	20.41	MT	70,658.00	1,442,129.80
12	Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U- 1/537)  MJP/ SSR/ 2021-22 / SECTION - F: IRON AND STRUCTURAL STEEL WORK Item	16.00	Sqm	1,895.00	30,320.00
	No.1 / Page				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-incharge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C- 3/275)  MJP/ SSR/ 2021-22 / SECTION - F :: IRON AND STRUCTURAL STEEL WORK Item No.3,	18.68	MT	71,286.00	1,331,337.40
14	Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sq.m.).	1885.00	Sqm	777.00	1,464,645.00
	PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224	1000.00	Oqiii	777.00	1, 10 1,0 10.00
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete  PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by engineer incharge and BDG- 2 and 5 Item	371.75	Cum	6,305.00	2,343,883.80
	No.893, Page no. 190				
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference No. Bd. L.2 Page No. 368 Item No.950,	2041.25	Sqm	257.00	524,601.30
	Page no. 201				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding				
	and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201	1187.50	Sqm	529.00	628,187.50
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.	1187.50	Cam	10.00	44.975.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411	1107.50	Sqm	10.00	11,875.00
10					
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.	1187.50	Sqm	8.00	9,500.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412				
20	Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)	176.00	HP/ Hr.	77.00	13,552.00
	MJP/ SSR/ 2021-22 / Section E/	170.00		77.00	10,002.00
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/	485.85	Cum	84.00	40,811.40
	Excav				
22	Transportation as per STATEMENT VI Including loading, unloading and stacking Earth (4.8 Cum) lead 15 Km	1748.57	Cum	604.45	1,056,923.20

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
23	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50				
	mm of 90 degree bend.	0.90	Sqm	35,000.00	31,500.00
24	Grit pump				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION -				
	Pumps, Page no. 6, 7of size 1.8 m length	4.00	<b>.</b>	00.054.00	00.054.00
	1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00
25	Raw Sewage Pumps				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION -				
	10 HP (Up to 90000 LPH)	2.00	Nos	152,969.00	305,938.00
26	TTU Feed pumps				
20	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION -				
	10 HP (Up to 90000 LPH)	2.00	Nos	152,969.00	305,938.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.7 m x 2 m minimum height	3.00	Nos	454,000.00	1,362,000.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
28	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water				
	pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting				
	and underdrain piping including fittings, with				
	standard filter media layer with minimum depth of Activated Carbon 1.0 m supported				
	by gravels. The piping arrangement should				
	provide sufficient pressure for backwash operations and avoid loss of Activated carbon				
	during backwash operation. Suitable openings to be provided to ease addition and				
	Dia 1.7 m x 2 m minimum height	3.00	Nos	454,000.00	1,362,000.00
29	NaOCI Chlorinator Pump Diaphragm Type / peristaltic				
	type / Solenoid				
	Max Flow Rate Upto				
	10LPH Power Source Electric Phase Single				
	Material PP /				
	PTFE(Teflon) Voltage				
	230 Volt Frequency				
	Mixing Tank of 100 Ltrs capacity	100.00	Ltrs	8.00	800.00
	Dosing Pump	2.00	Nos	15,000.00	30,000.00
30	Control Panel				
- 00	Design, Supply, Installing, Commissioning &				
	Testing of Master PLC control monitoring				
	and communication panel as per IEC 61131				
	at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure				
	Transmitters, Level Transmitter, PH				
	Transmitter, Turbidity Transmitter ,for all				
	pumps installed.	1.00	No	50,041.00	50,041.00
	MJP/ MECH/ ELECT / SSR/ 2021-22/				
	SECTION 19 - SA [ SCADA & AUTOMATION ]				
31	Supplying and erecting Fully Automatic Star				
	Delta starter to operate squirrel cage				
	induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load				
	element, and ON - OFF push buttons, with				
	necessary material and connected to supply,				
	etc complete. Starter with original sheet steel				
	encloser.	2.22		7.450.00	40.000.00
	> 7.5 HP & Up to 12.5 HP	6.00	nos	7,150.00	42,900.00

Sr.	Item Description	Qty	Unit	Rate	Amount (Rs.)
No.	MJP /MECH/ ELECT/ SSR/ 2021-22				` ,
	SECTION 10 - LG [L.T. SWITCHGEAR AND				
	PROTECTION] Item no. LG 3 Page no. 27				
32	Main power supply cable  3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable				
	Supplying and erecting, Flat flexible				
	submersible cable with, Copper Conductor,				
	PVC insulated, and PVC sheathed.				
	3 core 16 sq mm	35.00	m	549.00	19,215.00
33	Power cables				
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable				
	Supplying and erecting, XLPE / PVC				
	insulated, armoured cable 1100 V grade with				
	ISI mark Four core, solid / stranded				
	aluminium conductor with 6 mm thick 25 mm				
	width M.S. spacer with				
	G.I. Earth wire 6 sq mm, complete erected				
	on wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved				
	4 Core 6 sq mm	180.00	m	137.00	24,660.00
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION	100.00	111	107.00	24,000.00
	12 - CB [ L.T. CABLE ] Item no. CB 6 Page				
	12 OB [ E.T. ONBEE ] ROM NO. OB OT age				
34	Control Cables				
	Copper conductor PVC insulated,				
	Unarmoured control cable				
	Supplying and erecting Un-armoured control				
	cable with ISI mark stranded / solid copper				
	conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an				
	approved manner.				
	4 core 2.5 sq mm	180.00	m	137.00	24,660.00
	MJP MECH/ ELECT/ SSR/ 2021-22/				•
	SECTION 12 - CB [ L.T. CABLE ] Item no. CB				
	8-				
	Divingh in the trans				
	Plumbing Items				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
35	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges, inspection charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed shed duly protected from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit type to be jointed with cement solvent).				
	<ol> <li>1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.</li> <li>2) One coupler and required cement solvent shall be provided with each full length pipe</li> </ol>				
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES, Page no.77				
1	Raw Sewage pump to TBF Distribution				
а	Main header				
	180 mm.	75.00	m	1,249.00	93,675.00
	PVC Specials- 10%				9,367.50
	D: 4.7. c				
b	Distribution	400.00		600.00	00 200 00
	140 mm. PVC Specials- 10%	100.00	m	693.00	69,300.00
	FVC Specials- 10%				6,930.00
2	TBF collection to FFT (gravity)				
a	Main header				
	140 mm.	200.00	m	693.00	138,600.00
	PVC Specials- 10%				13,860.00
b	collection tributory				
	75 mm.	45.00	m	211.00	9,495.00
	PVC Specials- 10%				949.50
3	TTLL Plumbing				
<u> </u>	TTU Plumbing 160 mm.	35.00	m	906.00	31,710.00
	PVC Specials- 10%	33.00	111	300.00	3,171.00
	1.10 0000000 1070				5,171.00
4	TBF distribution				
	75 mm.	125.00	m	211.00	26,375.00
	PVC Specials- 10%				2,637.50
36	Labour				
	Plumber	40.00	days	641.00	25,640.00
	Helper	80.00	days	579.00	46,320.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / SECTION - B LABOUR & MACHINERY , Page no. 14				
37	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.				
	Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump	0.00	Nice	40.504.00	27.400.00
	200 mm.	2.00	Nos	18,581.00	37,162.00
	Filter Feed Pump 200 mm.	2.00	Nos	10 501 00	27 162 00
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132	2.00	INOS	18,581.00	37,162.00
38	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)				
	Without by pass arrangement -PN -1				
	Raw Sewage pump				
	200 mm.	2.00	Nos	17,751.00	35,502.00
	Filter Feed Pump				
	200 mm.  MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 131	2.00	Nos	17,751.00	35,502.00
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc. complete.	1800.00	Nos	4,750.00	8,550,000.00
	Market rate				
40	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	171.22	Cum	1,730.00	296,210.60

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
41	Trasnsportation Godhara to Pune distance by Road 660 Km.	171.22	Cum	11,031.37	1,888,791.20
	MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.				
42	Stone Aggregate 20 mm  MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	171.22	Cum	900.00	154,098.00
43	Transportation as per STATEMENT VI Including loading, unloading and stacking	004.05		747.40	40.4.074.00
	Manure or sludge (5.52 Cum) lead 25 Km MJP/ SSR/ 2021-22 / SECTION - C: TRANSPORTATION Page no.	661.25	Cum	747.48	494,271.20
		NET TOTAL Rs.		29,081,777.00	

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				2.70		
Α	0.0 to 1.5 m	1	7.80	3.50	1.5	40.95	Cum
	soil					10.24	Cum
	Murum					10.24	Cum
	Soft rock					10.24	Cum
	hard rock					10.24	Cum
В	1.5 to 3.0 m	1	7.8	3.50	1.2	32.76	Cum
	soil					8.19	Cum
	Murum					8.19	Cum
	Soft rock					8.19	Cum
	hard rock					8.19	Cum
	0.045.4.5.55		0.0	0.00	0	0	0
С	3.0 to 4.5 m	1	6.8	3.00	0	0	Cum
	soil Number					0	Cum
	Murum Soft rock					0	Cum Cum
	hard rock					0	
	nard rock					U	Cum
D	4.5 to 6.0 m	1	6.8	3.00	0	0	Cum
	soil	<u>'</u>	0.0	3.00	0	0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
	Tiara rook						Odili
2	Soling						
	Screen	1	5.30	1.30	0.30	2.07	Cum
	Grit	1	5.80	1.20	0.30	2.09	Cum
	extra for grit chamber	1	0.50	0.65	0.30	0.1	Cum
	5			Total for gri		2.19	Cum
3	PCC M20						
	Screen	1	4.90	1.10	0.10	0.54	Cum
	Grit	1	5.40	1.20	0.10	0.65	Cum
		1	0.50	0.45	0.20	0.05	Cum
	Internal slope	1	Area	0.36	1.20	0.43	Cum
	Internal slope	1	Area	0.18	1.20	0.22	Cum
				Total for gri	t	1.35	Cum
4	Raft M30						
	Screen	1	4.70	1.00	0.15	0.71	Cum
	Grit	1	5.20	1.20	0.20	1.25	Cum
		1	0.50	0.35	0.20	0.04	Cum
	DOO W. II			Total for gri	t	1.29	Cum
5	RCC Wall						
	Screen		4.00	0.15	4.50	4.04	
	Long Wall	2	4.30	0.15	1.50	1.94	Cum

Sr.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
No.	item bescription	1103.	L (III)	D (III)	11 (111)	Quantity	Oilit
	Short Wall	2	0.80	0.15	1.50	0.36	Cum
				Total for so	creen	2.3	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	0.50	0.15	2.30	0.18	Cum
	Short Wall	2	1.20	0.15	2.30	0.83	Cum
				Total for gr	it	1.01	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	80	Cum	5.31	0.43	MT
7	Fabrication work in Frame and						
	Grating for Access						
	Screen	1	4.30	0.80		3.44	Sqm
	Grit	1	4.80	1.35		6.48	Sqm
					Total	9.92	Sqm
8	Removing excess exacavated						
	material out of site						
	Screen chamber	1	4.30	0.80	1.30	4.48	Cum
	Grit Chamber	1	4.80	1.20	2.10	12.1	Cum
	soling, PCC, Raft volume					7.5	Cum
	Total Volume					24.08	Cum
	bulkage @ 40%					33.72	Cum
	Defilling and compaction						
9	Refilling and compaction					70.74	0
<u> </u>	Total Excavation					73.71	Cum
	Deduction for tank volume,					04.00	
	soling, PCC, Raft					24.08	Cum
	Refilling and compaction volume					49.63	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				4.60		
Α	0.0 to 1.5 m	1	10.6	10.60	1.5	168.54	Cum
	soil					42.14	Cum
	Murum					42.14	Cum
	Soft rock					42.14	Cum
	hard rock					42.14	Cum
В	1.5 to 3.0 m	1	9.60	9.60	1.5	138.24	Cum
	soil					34.56	Cum
	Murum					34.56	Cum
	Soft rock					34.56	Cum
	hard rock					34.56	Cum
С	3.0 to 4.5 m	1	9.60	9.60	1.5	138.24	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					34.56	Cum
	Murum					34.56	Cum
,	Soft rock					34.56	Cum
	hard rock					34.56	Cum
D	4.5 to 6.0 m	1	8.60	8.60	0.1	7.4	Cum
	soil					1.85	Cum
	Murum					1.85	Cum
	Soft rock					1.85	Cum
	hard rock					1.85	Cum
2	Soling						
)	RSS	1	8.00	8.00	0.30	19.2	Cum
,							
3	PCC M20						
	RSS	1	7.60	7.60	0.10	5.78	Cum
4	Raft M30						
	RSS	1	7.40	7.40	0.40	21.91	Cum
					0110		
5	RCC Wall						
	Long Wall	2	7.00	0.25	4.00	14	Cum
	Short Wall	2	6.50	0.25	4.00	13	Cum
	Onor wan		0.00	0.20	Total	27	Cum
					rotar		Carri
6	Beams						
	Beam 1	2	6.50	0.2	0.3	0.78	Cum
	Beam 2	2	6.50	0.2	0.3	0.78	Cum
	Douin 2		0.00	0.2	Total	1.56	Cum
					Total	1.00	Odili
7	Slab	1	7.00	7.00	0.2	9.8	Cum
	Deduction for manhole	-2	2.20	1.00	0.2	-0.88	Cum
	Deduction for marinole		2.20	1.00	Total	8.92	Cum
					Total	0.02	Cum
	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
8	Steel Hertin Orte & Rg/Gam	um	100	Cum	59.39	5.94	MT
		diii	100	Odili	00.00	0.04	1011
	Fabrication work in Frame and						
9	Grating for Access						
	RSS	2	2.20	1.00		4.4	Sqm
	1100		۷.۷	1.00		7.7	Oqiii
	Removing excess exacavated						
10	material out of site						
	RSS	1	7.00	7.00	3.80	186.2	Cum
	soling, PCC, Raft volume	I	7.00	7.00	3.00	46.89	Cum
	Total Volume					233.09	Cum
	bulkage @ 40%					326.33	Cum
4.4	Dofilling and compaction						
11	Refilling and compaction						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					452.42	Cum
	Deduction for tank volume, soling, PCC, Raft					233.09	Cum
	Refilling and compaction volume					219.33	Cum
12	Dewatering						
	22 Days x 4 hours/day	days	22	hours / day	4	88	Hrs

### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
2	Soling	1	40.40	<b>5</b> 40	0.00	00.44	0
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
3	TBF	1	12.06	5.06	0.10	6.11	Cum
	IDF	'	12.00	5.06	0.10	0.11	Cum
4	Raft M30	1					
	TBF	1	11.86	4.86	0.10	5.77	Cum
		+ '	11.00	7.00	0.10	5.11	Juili
5	Brick Wall	+ +					
	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
					Total for	T 14.87	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	Sqm
	Short Wall	2	4.00		1.20	9.6	Sqm
	Enternal				Total	81.65	Sqm
	External		44.40		4.00	07.54	C
	Long Wall	2	11.46		1.20	27.51	Sqm
	Short Wall	2	4.46	0.0	1.20	10.71	Sqm
	Wall Top	1	30.92	0.3	Total	9.28	Sqm
		+ +			TUIAI	47.50	Sqm
7	External-white-wash	1				47.50	Sqm
	EAGITIAL WILLE-WASII	+ '				71.30	ЭЧП
8	External-colour-wash	1				47.50	Sqm
	Zacinal colour wach	† †				17.00	- Sqiii
		Kg/C					
9	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	5.77	0.35	MT
					<u> </u>	3.03	
40	Removing excess exacavated						
10	material out of site						
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

# **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m x		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

# MEASUREMENT SHEET - FILTER FEED TANK

Soil   Murum   31.06   C	Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
A   0.0 to 1.5 m		FILTER FEED TANK						
Soil	1	Excavation				3.80		
Murum	Α	0.0 to 1.5 m	1	9.1	9.10	1.5	124.22	Cum
Soft rock		soil					31.06	Cum
Soft rock		Murum					31.06	Cum
B 1.5 to 3.0 m 1 8.60 8.60 1.5 110.94 C		Soft rock						Cum
Soil		hard rock					31.06	Cum
Soil								
Murum	В	1.5 to 3.0 m	1	8.60	8.60	1.5	110.94	Cum
Soft rock		soil					27.74	Cum
hard rock		Murum					27.74	Cum
C 3.0 to 4.5 m 1 8.10 8.10 0.8 52.49 C soil 13.13 C Soft rock 14.2 Soft rock 15.2 Soil Soil 15.2 Soft rock 15.2 Soil Soil Soil Soil Soil Soil Soil Soil		Soft rock					27.74	Cum
Soil   Murum   13.13   C		hard rock					27.74	Cum
Soil   Murum   13.13   C								
Murum	С	3.0 to 4.5 m	1	8.10	8.10	0.8	52.49	Cum
Soft rock   13.13   C		soil					13.13	Cum
Nard rock		Murum					13.13	Cum
D   4.5 to 6.0 m		Soft rock					13.13	Cum
Soil		hard rock					13.13	Cum
Soil								
Murum	D	4.5 to 6.0 m	1	8.10	8.10	0	0	Cum
Murum		soil					0	Cum
hard rock		Murum					0	Cum
hard rock		Soft rock					0	Cum
FFT         1         7.50         7.50         0.30         16.88         C           3         PCC M20         Total         Total         Total         Total         16.88         C           4         Raft M30         RFT         1         6.90         6.90         0.40         19.05         C           5         RCC Wall         RCC Wall <t< td=""><td></td><td>hard rock</td><td></td><td></td><td></td><td></td><td>0</td><td>Cum</td></t<>		hard rock					0	Cum
FFT         1         7.50         7.50         0.30         16.88         C           3         PCC M20         Total         Total         Total         Total         16.88         C           4         Raft M30         RFT         1         6.90         6.90         0.40         19.05         C           5         RCC Wall         RCC Wall <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>								
FFT         1         7.50         7.50         0.30         16.88         C           3         PCC M20         7.10         0.10         5.05         C           4         Raft M30         7.10         0.10         5.05         C           5         RCC Wall         7.50         0.25         3.20         10.4         C           5         RCC Wall         2         6.50         0.25         3.20         10.4         C           5         Short Wall         2         6.00         0.25         3.20         9.60         C           6         Beams         7         Total         7         2         6.00         0.2         0.3         0.72         C           7         Slab         1         6.50         6.50         0.2         8.45         C           7         Slab         1         6.50         6.50         0.2         -0.34         C	2	Soling						
3 PCC M20 FFT 1 7.10 7.10 0.10 5.05 C  4 Raft M30 FFT 1 6.90 6.90 0.40 19.05 C  5 RCC Wall Long Wall 2 6.50 0.25 3.20 10.4 C Short Wall 2 6.00 0.25 3.20 9.60 C  6 Beams Beam 1 2 6.00 0.2 0.3 0.72 C Beam 2 2 6.00 0.2 0.3 0.72 C  Total 1.44 C  7 Slab 1 6.50 6.50 0.2 8.45 C Deduction for manhole - 1.20 0.70 0.2 -0.34 C			1	7.50	7.50	0.30	16.88	Cum
FFT         1         7.10         7.10         0.10         5.05         C           4         Raft M30         1         6.90         6.90         0.40         19.05         C           5         RCC Wall         2         6.50         0.25         3.20         10.4         C           Short Wall         2         6.00         0.25         3.20         9.60         C           6         Beams         7         Total         2         6.00         0.2         0.3         0.72         C           7         Slab         1         6.50         6.50         0.2         8.45         C           7         Deduction for manhole         -         1.20         0.70         0.2         -0.34         C								
4       Raft M30	3	PCC M20						
4       Raft M30		FFT	1	7.10	7.10	0.10	5.05	Cum
FFT         1         6.90         6.90         0.40         19.05         C           5         RCC Wall         2         6.50         0.25         3.20         10.4         C           Short Wall         2         6.00         0.25         3.20         9.60         C           6         Beams         Total         20         C           Beam 1         2         6.00         0.2         0.3         0.72         C           Beam 2         2         6.00         0.2         0.3         0.72         C           Total         1.44         C           7         Slab         1         6.50         6.50         0.2         8.45         C           Deduction for manhole         -         1.20         0.70         0.2         -0.34         C								
5         RCC Wall         2         6.50         0.25         3.20         10.4         C           Short Wall         2         6.00         0.25         3.20         9.60         C           Total         20         C         Total         20         C           Beam 1         2         6.00         0.2         0.3         0.72         C           Beam 2         2         6.00         0.2         0.3         0.72         C           Total         1.44         C           Total         1.44         C           Deduction for manhole         -         1.20         0.70         0.2         -0.34         C	4	Raft M30						
Long Wall   2   6.50   0.25   3.20   10.4   C     Short Wall   2   6.00   0.25   3.20   9.60   C     Total   20   C     Beam 1   2   6.00   0.2   0.3   0.72   C     Beam 2   2   6.00   0.2   0.3   0.72   C     Total   1.44   C     Total		FFT	1	6.90	6.90	0.40	19.05	Cum
Long Wall   2   6.50   0.25   3.20   10.4   C     Short Wall   2   6.00   0.25   3.20   9.60   C     Total   20   C     Beam 1   2   6.00   0.2   0.3   0.72   C     Beam 2   2   6.00   0.2   0.3   0.72   C     Total   1.44   C     Deduction for manhole   - 1.20   0.70   0.2   -0.34   C     Total   1.44   C     Total   1.45   C     Total   1.45   C     Total   1.46   C     Total   1.46   C     Total   1.47   C     Total   1.48   C     Total   1.								
Short Wall         2         6.00         0.25         3.20         9.60         C           Total         20         C           Beam 1         2         6.00         0.2         0.3         0.72         C           Beam 2         2         6.00         0.2         0.3         0.72         C           Total         1.44         C           Total         1.44         C           Deduction for manhole         -         1.20         0.70         0.2         -0.34         C	5	RCC Wall						
Short Wall         2         6.00         0.25         3.20         9.60         C           Total         20         C           Beam 1         2         6.00         0.2         0.3         0.72         C           Beam 2         2         6.00         0.2         0.3         0.72         C           Total         1.44         C           Total         1.44         C           Deduction for manhole         -         1.20         0.70         0.2         -0.34         C			2	6.50	0.25	3.20	10.4	Cum
6       Beams         Beam 1       2       6.00       0.2       0.3       0.72       C         Beam 2       2       6.00       0.2       0.3       0.72       C         Total       1.44       C         7       Slab       1       6.50       6.50       0.2       8.45       C         Deduction for manhole       -       1.20       0.70       0.2       -0.34       C								Cum
6       Beams         Beam 1       2       6.00       0.2       0.3       0.72       C         Beam 2       2       6.00       0.2       0.3       0.72       C         Total       1.44       C         Total       1.44       C         Deduction for manhole       -       1.20       0.70       0.2       -0.34       C							20	Cum
Beam 1       2       6.00       0.2       0.3       0.72       C         Beam 2       2       6.00       0.2       0.3       0.72       C         Total       1.44       C         7       Slab       1       6.50       6.50       0.2       8.45       C         Deduction for manhole       -       1.20       0.70       0.2       -0.34       C								
Beam 2     2     6.00     0.2     0.3     0.72     C       Total     1.44     C       7     Slab     1     6.50     6.50     0.2     8.45     C       Deduction for manhole     -     1.20     0.70     0.2     -0.34     C	6	Beams						
Beam 2     2     6.00     0.2     0.3     0.72     C       Total     1.44     C       7     Slab     1     6.50     6.50     0.2     8.45     C       Deduction for manhole     -     1.20     0.70     0.2     -0.34     C		Beam 1	2	6.00	0.2	0.3	0.72	Cum
7         Slab         1         6.50         6.50         0.2         8.45         C           Deduction for manhole         -         1.20         0.70         0.2         -0.34         C		Beam 2	2	6.00	0.2	0.3	0.72	Cum
7 Slab 1 6.50 6.50 0.2 8.45 C Deduction for manhole - 1.20 0.70 0.2 -0.34 C						Total	1.44	Cum
Deduction for manhole         -         1.20         0.70         0.2         -0.34         C								
Deduction for manhole         -         1.20         0.70         0.2         -0.34         C	7	Slab	1	6.50	6.50	0.2	8.45	Cum
		Deduction for manhole						Cum
Total 8.11 C						Total	8.11	Cum

# **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	48.6	4.86	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	FFT	1	6.50	6.50	3.00	126.75	Cum
	soling, PCC, Raft volume					40.98	Cum
	Total Volume					167.73	Cum
	bulkage @ 40%					234.83	Cum
11	Refilling and compaction						
	Total Excavation					287.65	Cum
	Deduction for tank volume, soling, PCC, Raft					167.73	Cum
	Refilling and compaction volume					119.92	Cum
12	Dewatering						
	22 Days x 4 hours/day	days	22	hours/day	4	88	Hrs

# **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	7.9	5.80	0.55	25.21	Cum
	soil					6.31	Cum
	Murum					6.31	Cum
	Soft rock					6.31	Cum
	hard rock					6.31	Cum
2	Soling						
	Filter Platform	1	7.70	5.60	0.30	12.94	Cum
3	PCC M20						
	Filter Platform	1	7.30	5.20	0.10	3.8	Cum
4	Raft M30						
	Filter Platform	1	7.10	5.00	0.15	5.33	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	80	Cum	5.33	0.43	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					16.74	Cum
	Total Volume					16.74	Cum
	bulkage @ 40%					23.44	Cum
7	Refilling and compaction	+ +					
	Total Excavation					25.21	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					16.74	Cum
	Refilling and compaction volume					8.47	Cum

# **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation &	1800				1800	Nos
2	David and Cravity filter and M						
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	1800	0.82	0.58	0.2	171.22	Cum
	,						
3	Trasnsportation Godhara to					171.22	Cum
	0:	1000	0.00	0.50	0.0	474.00	
4	Stone Aggregate 20 mm	1800	0.82	0.58	0.2	171.22	Cum
5	Transportation as per STATEMENT VI Including loading,						
	Manure or sludge (5.52 Cum) lead	1800	0.82	0.56	0.8	661.25	Cum

# MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr.	Item Description	Nos.	Unit
<b>No.</b> 1	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.		
		1	No
2	Grit pump		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.8 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
3	Raw Sewage Pumps		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	10 HP (Up to 90000 LPH)	2	Nos
4	TTU Feed pumps		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	10 HP (Up to 90000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.7 m x 2 m minimum height	3	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.7 m x 2 m minimum height	3	Nos
7	PurAll Tablet Chlorinator + cartridge	0	nos

# **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr.	Itom Description	Nos.	Unit
No.	Item Description	1405.	Jill
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz		
а	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
8	Control Panel		
	Design, Supply, Installing, Commissioning & Testing of Master PLC control		
	monitoring and communication panel as per IEC 61131 at Pure Water Sump		
	suitable for monitoring and control of pure water Pumps. Pressure Transmitters,		
	Level Transmitter, PH Transmitter, Turbidity Transmitter ,for all pumps installed.		
	Master PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		
	AUTOMATION ] Item no. 2.7 Page no. 72		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage		
9	induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over		
	load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	deliniosted to cappiy, etc completel charter man enginal encet clock charter		
	> 7.5 HP & Up to 12.5 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
10	Main power supply cable		
	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,		
	PVC insulated, and PVC sheathed.	25	<b>m</b>
	3 core 16 sq mm	35	m
11	Power cables		
<del>- ' ' -</del>	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade		
	with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25		
	mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall /		
	on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	180	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		
	CB 6 Page no. 35		
12	Control Cables		
	Copper conductor PVC insulated, Unarmoured control cable		

# MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

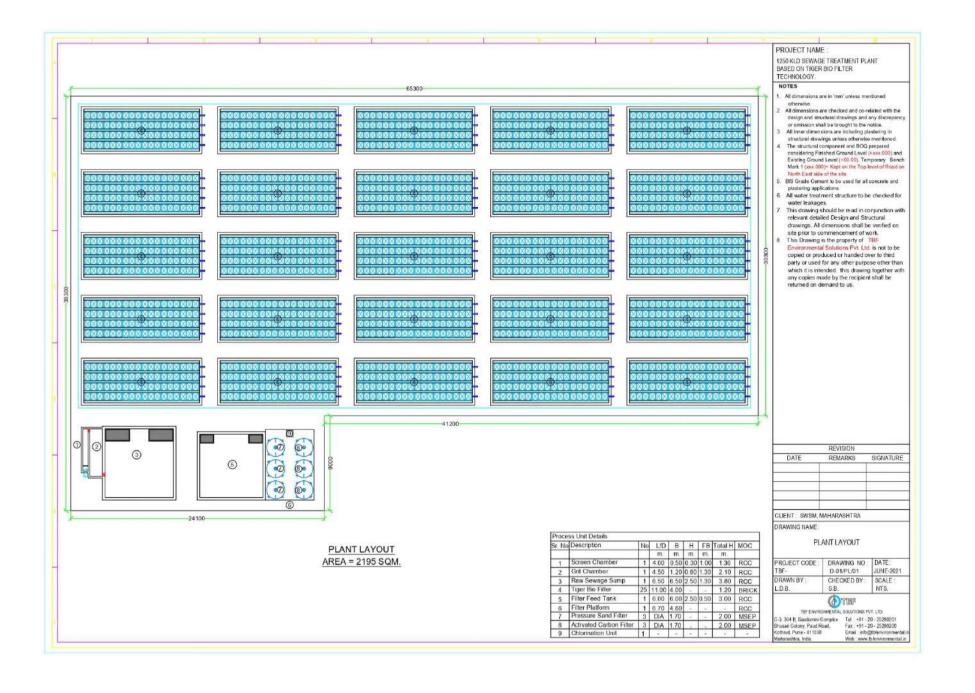
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	180	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

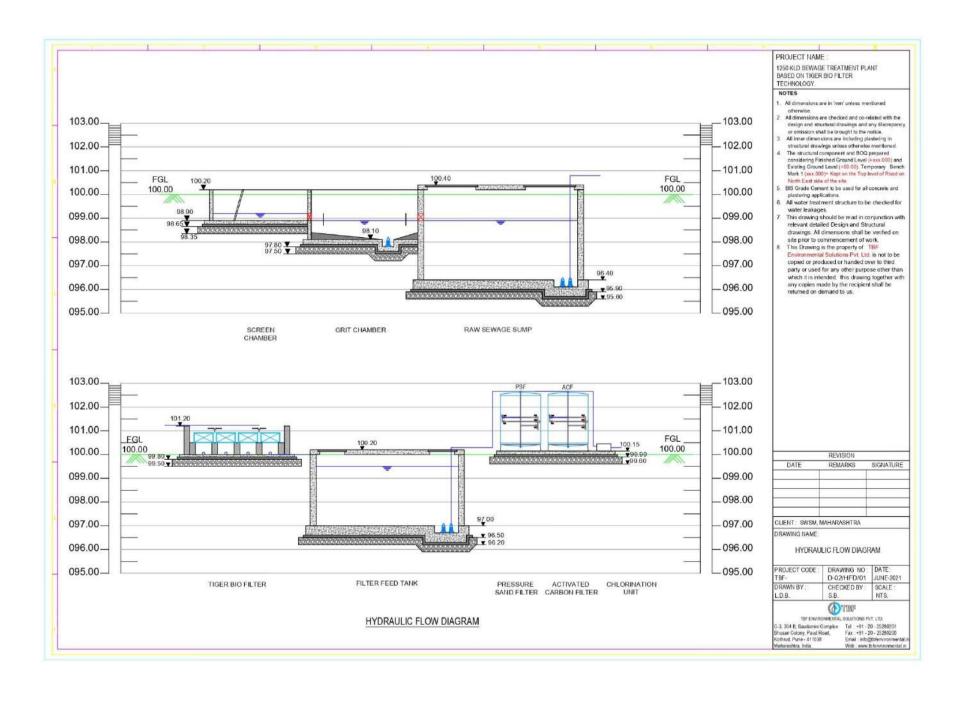
# **MEASUREMENT SHEET - PLUMBING**

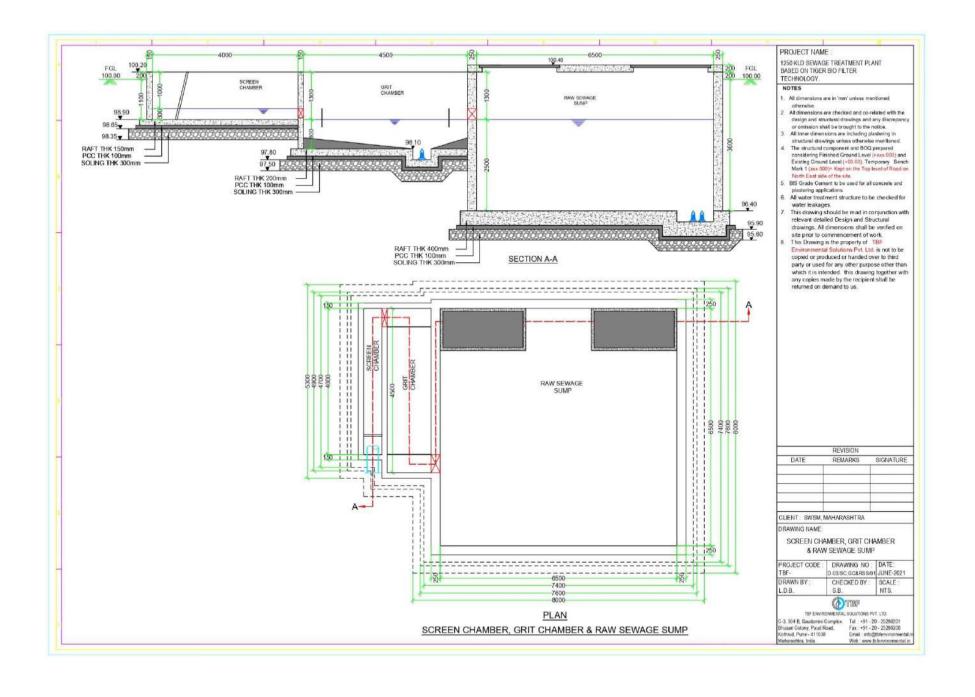
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for					
	potable water with solvent cement joints including					
	cost of couplers, as per IS specification no. 4985 /					
	1988 excluding GST levied by GOI and GOM in all					
	respect, including transportation, freight charges, inspection charges, loading, unloading,					
	conveyance to the departmental stores and					
	stacking the same in closed shed duly protected					
	from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit					
	type to be jointed with cement solvent).					
	, , , , , , , , , , , , , , , , , , ,					
	1) 10% of cost of pipes shall be considered for cost					
	of PVC specials for estimate purpose only.  2) One coupler and required cement solvent shall					
	be provided with each full length pipe cost of which					
	is included in rates below.					
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES,					
1	Raw Sewage pump to TBF Distribution					
а	Main header	Dia	180			
	180 mm.	1	75		75	m
	PVC Specials- 10%					
b	Distribution					
	140 mm.	1	100		100	m
	PVC Specials- 10%					
2	TBF collection to FFT (gravity)					
а	Main header					
	140 mm.	1	200		200	m
	PVC Specials- 10%					
b	collection tributory					
	75 mm.	1	45		45	m
	PVC Specials- 10%					
3	TTU Plumbing	Dia	160			
	160 mm.	1	35		35	m
	PVC Specials- 10%					
4	TBF distribution			No. of b	neds	
7	75 mm.	1	5	25	125	m
	PVC Specials- 10%		-	_		
	Labour	Nas	Davis			
5	Labour Plumber	Nos 4	Days 10		40	days
	Helper	8	10		80	days
						34,0
6	Sluice valves					

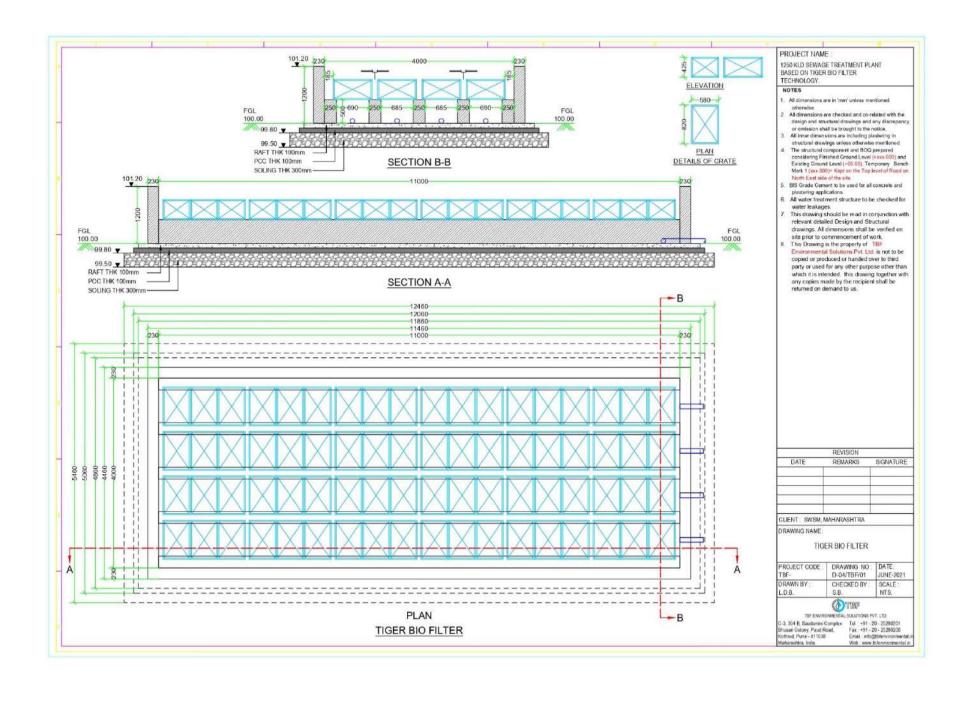
#### **MEASUREMENT SHEET - PLUMBING**

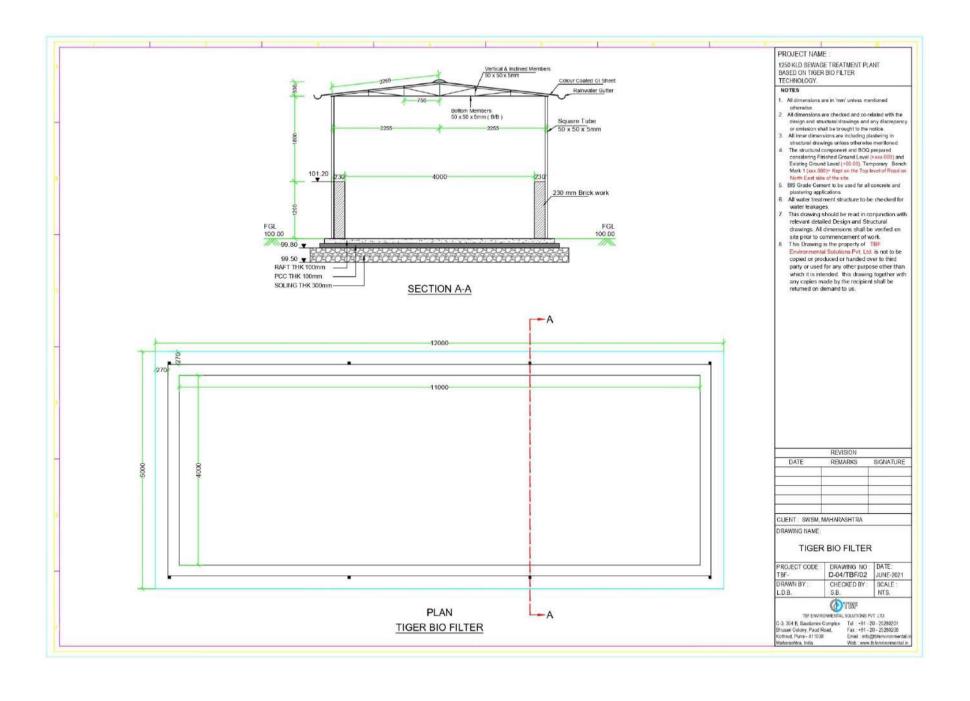
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.  MJP/ SSR/ 2021-22 / SECTION - I(XII):					
	PIPES APPURTENANCES , Page no. 132					
	Raw Sewage pump					NI -
	200 mm.	2			2	Nos
	Filter Feed Pump					
	200 mm.	2			2	Nos
	200 111111.					1403
7	Reflux valves (non-return valves )					
	Providing and supplying ISI mark CI D/F reflux valves (non-return valves ) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 131					
	Raw Sewage pump					
	200 mm.	2			2	Nos
	Filter Feed Pump					
	200 mm.	2			2	Nos

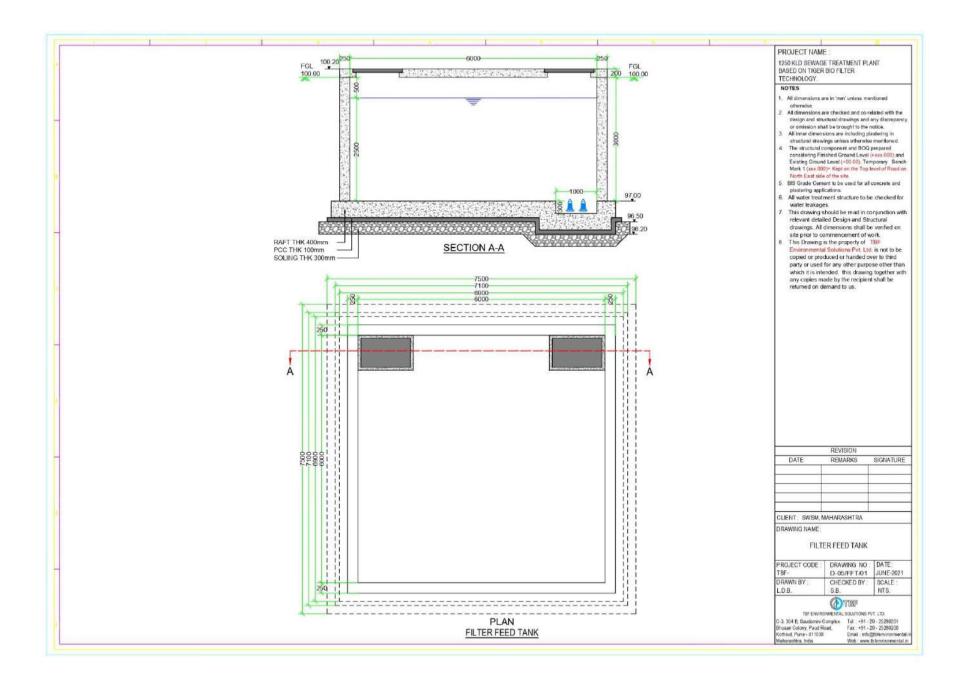


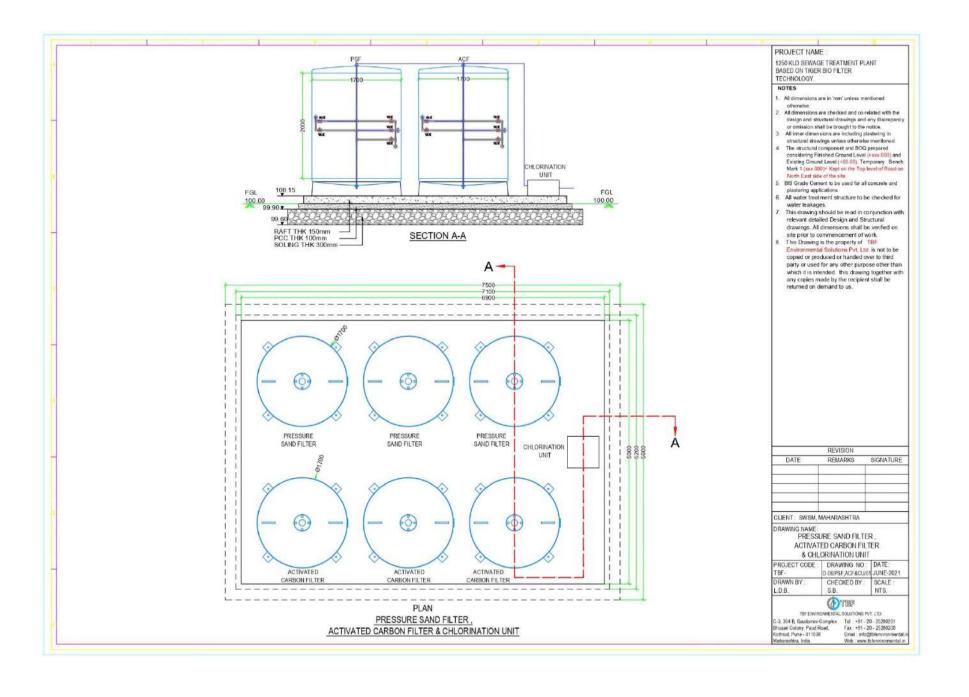












# 1500 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 1500 KLD CAPACITY

	Design flow	=	<b>1500.00</b> 1.500	KLD MLD
	Peak flow factor	=	3.00	
1	SCREEN CHANNELS: MANUAL No. of Manual Screen Average Flow Peak Flow Factor	= = =	1 1.50 3.00	No. MLD
	Design Flow	= = =	Peak Flow 4.50 187.50 0.052	MLD m³/hr m³/sec
	Average Flow	= =	1.50 62.500 0.017	MLD m³/hr m³/sec
	Design Flow in each Screen	=	0.052 1	m³/sec No.
		=	0.052	m³/sec
	Average Flow in each Screen	=	0.017 1	m³/sec No.
		=	0.017	m³/sec
	Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	Clear Area of Opening through Screen for Peak Flow	=	0.052 1.2	m³/sec m/sec
		=	0.043	m²
	Clear Area of Opening through Screen for Average Flow	=	0.017 0.6	m³/sec m/sec
		=	0.028	m <sup>2</sup>
	Considering maximum Area of Opening through Screen Clear Spacing of Bars	=	0.043 10	m² mm
			. 5	

Thickness of Bars	=	5	mm	
Gross Area of Screen	=	0.043x(10+5)/10	2	
	. =	0.065	m <sup>2</sup>	
Assuming Depth of Screen Chann	nel =	300.00	mm	
Gross Width of Screen	=	0.065/0.3		
	=	0.217	m	
No. of Bars	=	(Gross Width of Screen / Center 0.21666666666666667/((10+5)/10	•	3ars) - 1
	=	1 13.4	Nos.	
Say	=	14	Nos.	
Width of Screen provided	=	(Number of Bars+1) x Clear Spa Thickness)	cing + (Number of Bars	s x Bar
	=	(14+1)x10+(14x5)		
	=	220	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel provided	=	0.30	m	
L:B	=	8.00		
Length of Screen Channel provide	ed =	4.00	m	
For the and more fide d		4.00		Invert Dep
Freeboard provided	=	1.00	m	of incomir
Total Depth of Screen Chamber	=	1.30	m	sewer
Velocity in Channel at Average Flo	ow = =	Average Flow / Cross Sectional 0.017/((0.5x0.3)/1000x1000)	Area of Screen Channe	el
	=	0.113	m/sec	
	>	0.300	m/sec	
Head Loss across Screen				
Head Loss across Screen	=	$0.0728 (V^2 - V^2)$		
V = Velocity through Screen at Pe Flow	eak =	Peak Flow through Screen Char	nnel / Clear Area of Op Screen	ening throu
	=	1.156	m/sec	
<ul><li>v = Velocity in approach Channel</li><li>Peak Flow</li></ul>	at =	Peak Flow through Screen Char C	nnel / Cross Sectional / hannel	Area of Scre
	=	0.8	m/sec	
Head Loss across Screen at Peak Flow	=	0.051	m	
Head Loss across Screen at 50 <sup>o</sup> Clogged Condition	%			
Velocity through Screen at 50% Clogged Condition at Peak Flow	=	2.311	m/sec	
Head Loss across screen at 50% Clogged Condition at Peak Flow	=	0.342	m	
Sioggod Condition at 1 care 10w	>	0.300	m/sec	ок
CONVENTIONAL GRIT CHAMBI	ER: MAI	NUAL		
No. of Grit Chamber	=	1		
Average Flow	=	1.50	MLD	
<b>5</b>			_	

Peak Flow Factor	=	3.00	
Design Flow	=	Peak Flow	
Peak Flow	=	4.50	MLD
	=	4500	m³/day
	=	188	m³/hr
	=	0.052	m³/sec
Design Flow to each Grit Chamber	=	4500/1	
	=	4500	m³/day
	=	188	m³/hr
	=	0.052	m³/sec
According to CPHEEO Manual			
Particle Size	=	0.15	mm
Specific Gravity	=	2.65	
Surface Overflow Rate for 100% removal efficiency in an ideal Grit Chamber	=	Settling Velocity of the minimu	m size of Particles to be removed
	=	1.5	m/s
	=	1296	m³/m²/day
Considering Efficiency of removal of desired Particles, $\eta$ = 75%	=	75%	
and Measure of Settling Basin Performance,	=	0.125	
n = 1/8 for very good performance			
Design Overflow Rate	=	857	m³/m²/day
Surface Overflow Rate for 0.15 mm		4555	37 271
dia. Particle Size with Specific Gravity S <sub>s</sub> > 2.65 Table 5.6	=	1555	m <sup>3</sup> /m <sup>2</sup> /day
•			3. 3
Considering Design Overflow Rate	=	960	m <sup>3</sup> /m <sup>2</sup> /day
And a of Chit Ob analysis as a service of		4500	3/.da
Area of Grit Chamber required	=	4500	m³/day
		960	m <sup>3</sup> /m <sup>2</sup> /day
			2
	=	4.69	m <sup>2</sup>
L:B ratio	=	3	
Length of Chamber provided	=	5.00	m
Width of Chamber provided	=	1.30	m
Hydraulic Retention Time (HRT) in Grit Chamber at Peak Flow	=	60	sec
Volume of Grit Chamber required	=	0.052x60	
volatilo di Citt Offambol Toquilou	=	3.12	$m^3$
	_	0.12	***
Depth required in Grit Chamber	=	3.12 / (5x1.3)	
2 Span roganisa in One Onambor	=	0.48	m
Say	_	0.50	m
Grit Storage Depth	=	0.30	m
Total Liquid Depth required	=	0.80	m
1 -1 -1 -1 -1			

	Length of Grit Pit Width of Grit Pit Depth of Grit Pit Free Board	= = =	0.50 0.50 0.30 1.30	m m m m
3	RAW SEWAGE SUMP (WET WELL) No. of Units Average Flow	= = =	<b>1</b> 1.50 62.500 0.0174	No. MLD m³/hr m3/sec
	Peak Flow Factor	=	3.00	
	Design Flow	= = =	Peak Flow 4.50 188 0.052	MLD m³/hr m³/sec
	Hydraulic Retention Time (HRT) at Average Flow Volume required	= =	<b>120</b> 0.0174 x 120 x 60 125	min m³
	Hydraulic Retention Time (HRT) at Peak Flow	= = <	Volume / Average Flow 40 30	min min
	Total Volume of Wet Well	=	125	$m^3$
	Side Water Depth (SWD) provided Plan Area of Wet Well Length/width of Sump required Length/width of Sump provided Volume of Sump provided Length of Pump Pit Width of Pump Pit Depth of Pump Pit Free Board	= = = = = =	2.50 50.11 7.08 7.10 126.03 2.00 0.80 0.30 1.30	m m² m m m³ m m
3.1	DESIGN STATEMENT-RSS E&M			
	Design Considerations Design flow Peak flow factor	= =	<b>1.50</b> 1500.00 3.00	MLD Cum/Day
	Pumping machinery Friction factor for Fittings in Pressure Mains Elbow 90 degrees	=	35	

Friction Factor for each	=	1		
Friction factor for all	=	35		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	20		
Friction Factor for each	=	0.3		
Friction factor for all	=	6		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	43.9		
Stage		low	ave	peak
Average flow, cum / day	=		1500.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	900	1500	3000
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0260	0.0260	0.0347
Dia needed, m	=	0.182	0.182	0.210
Dia needed, mm	=	182	182	210
Dia provided, mm (User)	=	200	200	200
Radius, m	=	0.100	0.100	0.100
Radius power 0.63	=	0.234	0.234	0.234
S power 0.54	=	0.022	0.036	0.054
S	=	0.001	0.002	0.004
Slope 1 in	=	1218.6	473.2	223.3
length, m	=	85	85	85
Friction in pipeline, m	=	0.1	0.2	0.4
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	43.9	43.9	43.9
Friction in fittings, m	=	0.8	2.2	5.0
Static lift, m	=	5.0	5.0	5.0
Total head, m	=	5.8	7.2	10.0
Efficiency of pumpset	=	0.8	0.8	0.8
Discharge, lps	=	15.6	26.0	52.1
Discharge, Cum/Hr	=	56.3	93.8	187.5
Kw required	=	2.421	4.034	8.063
HP required	=	3.5	5.5	11.0
Number of Pumps	=	2	2	2

# **TIGER BIO FILTER DESIGN STATEMENT-TBF1-50 KLD**

5

5.1

	Number of pumping hours	=	16	Hrs	
	Number of BMF tanks provided	=	30	Nos	
	Design flow to each tank	=	50.00	Cum/day	
		=	3.13	Cum/ Hr for 16	Hr
		=	0.87	lps	
	Inlet BOD	=	250.00	mg/l	
	Inlet TSS	=	400.00	mg/l	
	BOD load applied	=	12.5	kg/day	
	BOD uptake rate	=	0.1	Kg of BOD / Kg of worms	(0.5 - 1.0)
	Worms required	=	125	Kg worms	
	Sewage application rate	=	1.85	Cum/Sqm/day	(1 - 2 Cum/Sqm/d
	Area required	=	27.03	Sqm	
	Area Provided	=	28	Sqm	
	Area of each crate	=	0.4	Sqm	
	Number of crates	=	70	Nos	
	say	=	72	Nos	
	Crate in longitudinal direction	=	18	Nos	
	Crate in travers direction	=	4	Nos	
	crates provided	=	72	Nos	OK
	Width provided	=	4.00	m	
	Length required	=	11.00	m	
	Depth provided	=	1.2	m	
	TERTIARY TREATMENT UNIT				
	Design Considerations				
	Design flow	=	1.50	MLD	
		=	1500.00	Cum/Day	
	Peak flow factor	=	3.00		
ļ	FILTER FEED TANK				
	Number of FFT provided	=	1	Nos	
	Number of operating hours	=	16	Hrs	
	Design flow	=	1500.00	Cum/Day	
		=	93.75	Cum/Hr	
		=	0.02604	Cum/Sec	
	Hydraulic Retention time	=	60	min	
	Volume required	=	93.75	Cum	
	Depth	=	2.50	m	
	Civil Tanks				
	Area	=	37.50	Sqm	
	Length/Width required	=	6.12	m	
	Length/Width provided	=	6.50	m	
	Freeboard provided Volume Provided	=	<b>0.50</b> 105.63	m Cum	

# **DESIGN STATEMENT-TTU E&M**

Design Considerations				
Design flow	=	1.50	MLD	
200.3	=	1500.00	Cum/Day	
Peak flow factor	=	3.00	G G11.11 2 G.)	
F Gan How factor				
Pumping machinery				
Friction factor for Fittings in Pressure Mains				
Elbow 90 degrees	=	8		
Friction Factor for each	=	1		
Friction factor for all	=	8		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	8		
Friction Factor for each	=	0.3		
Friction factor for all	=	2.4		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	13.3		
Stage		low	ave	peak
Average flow, cum / day	=		1500.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	900	1500	3000
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.8	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0195	0.0260	0.0347
Dia needed, m	=	0.158	0.182	0.210
Dia needed, mm	=	158	182	210
Dia provided, mm (User)	=	180	180	180
Radius, m	=	0.090	0.090	0.090
Radius power 0.63	=	0.219	0.219	0.219
S power 0.54	=	0.031	0.038	0.058
S	=	0.002	0.002	0.005
Slope 1 in	=	632.6	418.5	197.5
length, m	=	35	35	35
Friction in pipeline, m	=	0.1	0.1	0.2

	Velocity head, m	=	0.033	0.051
	Frction factor in fittings	=	13.3	13.3
	Friction in fittings, m	=	0.4	0.7
	Static lift, m	=	10.0	10.0
	Total head, m	=	10.4	10.7
	Efficiency of pumpset	=	0.8	0.8
	Discharge, lps	=	15.6	26.0
	Discharge, Cum/Hr	=	56.3	93.8
	Kw required	=	4.150	6.915
	HP provided	=	6.0	9.5
	Number of Pumps	=	2	2
	ramber of ramps		_	_
5.2	PRESSURE SAND FILTER			
	Number of unit provided	=	4	Nos.
	Designed @ 16 hrs working for flow			
	of	=	23.44	m3/h
	Loading rate	=	12.00	m3/m2/h
	Area of DMF	=	1.95	m2
	Dia of DMF	=	1.58	m
	Provided	=	1.600	m
	Backwash water			
	Backwash velocity	=	15.00	m/hr
	backwash flowrate	=	29.71	m3/h
	Backwash volume for 20 mins	=	9.90	m3
5.3	ACTIVATED CARBON FILTER			
	Number of unit provided	=	4	Nos.
	Designed @ 16 hrs working for flow			
	of	=	23.44	m3/h
	Loading rate	=	12.00	m3/m2/h
	Area of ACF	=	1.95	m2
	Dia of ACF	=	1.58	m
	Provided	=	1.600	m
	Backwash water			
	Backwash velocity	=	15.00	m/hr
	backwash flowrate	=	29.71	m3/h
	Backwash volume for 20 mins	=	9.90	m3
5.4	CHLORINE DOSING SYSTEM			
	NaOCI DOSING SYSTEM			
	Average Flow		93.75	m3/hr
		=		
	Design Chlorine Dosage (Max)		3	mg/l
	Concentration of Chlorine in	=	100/	
	commercially available NaOCI	=	10%	
	-	_	30	ma/l
	Design NaOCI Dosage	=	30	mg/l
	Operating hours	_	16.0	hr
	1 1 200 3 2 200 2	=		
	Quantity of NaOCI required		93.75 X 30 X 16 / 100	10

0.115 13.3 1.5 10.0 11.5 0.8 52.1 187.5 13.823 19.0 2

	=	45.00	1/ / -l · ·
	=	45.00	Kg/day
Design Strength of NaOCI Solution		100%	
Volume of NaOCI Solution	=	45 / (1 X 1000 )	
	=	0.050	m3
No. of Dosing Tanks provided	=	1	Nos.
Volume of each Dosing Tank	=	0.05 / 1	
	=	0.05	m3
	=	100	Litres
	=		
No. of Working NaOCI Dosing Pump provided	_	1	No.
Capacity of each NaOCI Dosing Pump required	_	Total Volume of NaOCI Solution / (I	No. of Dosing
r ump roquirou		0.05 / (1 X 16)	
	=	0.003	m3/hr
	=	3.00	LPH
Capacity of each NaOCI Dosing	=	3.00	LPH
Pump provided  No. of Standby NaOCI Dosing Pump provided	=	1	No.

# SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 1500 KLD CAPACITY

S I.	Unit name	N o	Leng th	Widt h		Height		So	oling	P(	cc	Ra	oft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	CIIK	+bk		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	4.0	0.5	0.3	1.0	1.3	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	5.0	1.3	0.8	1.3	2.1	0.2	0.3	0.1	0.1	0.2	0.2	0.1			80
3	Raw Sewage Sump	1	7.1	7.1	2.5	1.3	3.8	0.2	0.3	0.1	0.1	0.2	0.4	0.3		0.2	100
4	TBF Bed 50 KLD	3	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	6.5	6.5	2.5	0.5	3.0	0.2	0.3	0.1	0.1	0.2	0.4	0.3		0.2	100
6	Filter Platform	1	8.0	4.4				0.2	0.3	0.1	0.1	0.2	0.1				80

#### Assumptions

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound		soil	Muru	Soft roc	har d	Tota
0.0 to 1.5 m	=	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

# TIGER BIO FILTER OF 1500 KLD CAPACITY BILL OF QUANTITIES

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
1	Excavation for foundation / pipe trenches in earth, soils of all types, sand, gravel and soft murum, including removing the excavated material upto a distance of 50 metres and lifts as below, stacking and spreading as directed, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-				
	1/259)				
	0.0 to 1.5 m	370.28	Cum	150.00	55,542.00
	1.5 to 3.0 m 3.0 to 4.5 m	80.50	Cum	164.00	13,202.00
	4.5 to 6.0 m	54.93 2.17	Cum Cum	178.00 192.00	9,777.60 416.70
	MJP/ SSR/ 2021-22 / Section E / Excavation Item No.1/ Page no. 42	2.17	Culli	192.00	410.70
2	Excavation for foundation / pipe trenches in hard murum and boulders, W.B.M. road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking and spreading as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-3/259)			8.00	
	0.0 to 1.5 m	370.28	Cum	192.00	71,093.80
	1.5 to 3.0 m	80.50	Cum	206.00	16,583.00
	3.0 to 4.5 m	54.93	Cum	220.00	12,084.60
	4.5 to 6.0 m MJP/ SSR/ 2021-22/ Section E/ Excavation Item No.3, Page no. 42	2.17	Cum	234.00	507.80
3	Excavation for foundation / pipe trenches in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A- 4/259)				
	0.0 to 1.5 m	370.28	Cum	572.00	211,800.20
	1.5 to 3.0 m	80.50	Cum	597.00	48,058.50
	3.0 to 4.5 m	54.93	Cum	622.00	34,166.50
	4.5 to 6.0 m  MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.5, Page no. 42	2.17	Cum	647.00	1,404.00
	Ţ.				

No.  4 Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or	
by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, excluding backfilling, etc. complete by all means. (Bd-A-6/259)	
0.0 to 1.5 m 370.28 Cum 1,017.00	376,574.80
1.5 to 3.0 m 80.50 Cum 1,042.00	83,881.00
3.0 to 4.5 m 54.93 Cum 1,067.00	58,610.40
4.5 to 6.0 m 2.17 Cum 1,092.00	2,369.70
MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43	
Froviding dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264) 674.01 Cum 1,175.00 MJP/ SSR/ 2021-22 / Section E/ Excavat	791,961.80
6 Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38  202.60 Cum 5,640.00	1,142,664.00
MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.1, Page no.49	
7 Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)  230.17 Cum 7,448.00	1,714,306.20
MJP/ SSR/ 2021-22 / SECTION - G : PLAIN	1,714,300.20
REINFORCED CEMENT CONCRETE, READY MIX CONCRETE/ Item No.2, Page no. 49	

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)				
	For Beams / Braces / Lintels In RCC M-300	4.90	Cum	8,624.00	42,257.60
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50				
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	20.73	Cum	9,247.00	191,690.40
	Slabs / Landings / Vertical Walls / Waist	20.10	Juili	0,E17.00	101,000.70
	Slabs / Steps for Staircase In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.)				
	(Excluding M.S. or Tor reinforcement)  Chajjas / Parapets / Curtain Walls	65.19	Cum	9,218.00	600,921.50
	/Partition Walls / Pardies In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN				
	REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)				
	c) Corrosion Resistant Steel (Fe 500) MJP/ SSR/ 2021-22 / SECTION - G : PLAIN	25.08	MT	70,658.00	1,772,102.70
	REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.8 / Page no. 52				
12	Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U- 1/537)  MJP/ SSR/ 2021-22 / SECTION - F: IRON	17.21	Sqm	1,895.00	32,613.00
	AND STRUCTURAL STEEL WORK Item No.1 / Page				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-incharge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C- 3/275)  MJP/ SSR/ 2021-22 / SECTION - F :: IRON AND STRUCTURAL STEEL WORK Item	22.41	MT	71,286.00	1,597,604.90
	No.3,				
14	Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sq.m.).	2262.00	Sqm	777.00	1,757,574.00
	PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224	2202.00	Oqiii	777.00	1,707,07 1.00
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete  PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by engineer incharge and BDG- 2 and 5 Item	446.10	Cum	6,305.00	2,812,660.50
	No.893, Page no. 190				
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference No. Bd. L.2 Page No. 368 Item No.950, Page no. 201	2449.50	Sqm	257.00	629,521.50
	<del>-</del>				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding				
	and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201	1425.00	Sqm	529.00	753,825.00
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.	1425.00	Sqm	10.00	14,250.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411				,
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.	1425.00	Sam	9.00	11 400 00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412	1425.00	Sqm	8.00	11,400.00
20	Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)	200.00	HP/ Hr.	77.00	15,400.00
	MJP/ SSR/ 2021-22 / Section E/ Excava				
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.	535.61	Cum	84.00	44,991.30
	MJP/ SSR/ 2021-22 / Section E/ Excava				
22	Transportation as per STATEMENT VI Including loading, unloading and stacking Earth (4.8 Cum) lead 15 Km	2093.75	Cum	604.45	1,265,567.20

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
23	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50				
	mm of 90 degree bend.	0.90	Sqm	35,000.00	31,500.00
24	Grit pump				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below				
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.8 m length				
	1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00
25	Davi Caviana Direct				
23	Raw Sewage Pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	15 HP (Up to 132000 LPH)	2.00	Nos	184,154.00	368,308.00
	,			,	·
26	TTU Feed pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	15 HP (Up to 132000 LPH)	2.00	Nos	184,154.00	368,308.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.6 m x 2 m minimum height	4.00	Nos	454,000.00	1,816,000.00
	5			,	,= =,,,====

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
28	Activated Carbon Filter of FRP / MSEP vessel				
	with suitable thickness to withstand a water pressure including MPV or 5 Valve system				
	and PVC / UPVC / MSEP interconnecting				
	and underdrain piping including fittings, with				
	standard filter media layer with minimum				
	depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should				
	provide sufficient pressure for backwash				
	operations and avoid loss of Activated carbon				
	during backwash operation. Suitable				
	openings to be provided to ease addition and  Dia 1.6 m x 2 m minimum height	4.00	Noo	454 000 00	4 040 000 00
	Dia 1.6 iii x z iii miinimum neigni	4.00	Nos	454,000.00	1,816,000.00
29	NaOCI Chlorinator				
	Pump Diaphragm Type / peristaltic				
	type / Solenoid Max Flow Rate Upto				
	10LPH Power Source				
	Electric Phase Single				
	Material PP /				
	PTFE(Teflon) Voltage				
	230 Volt Frequency Mixing Tank of 100 Ltrs capacity	100.00	Ltrs	8.00	800.00
	Dosing Pump	2.00	Nos	15,000.00	30,000.00
30	Control Panel				
	Design, Supply, Installing, Commissioning &				
	Testing of Master PLC control monitoring and communication panel as per IEC 61131				
	at Pure Water Sump suitable for monitoring				
	and control of pure water Pumps. Pressure				
	Transmitters, Level Transmitter, PH				
	Transmitter, Turbidity Transmitter ,for all	4.00	NI-	50.044.00	50.044.00
	pumps installed.  MJP/ MECH/ ELECT / SSR/ 2021-22/	1.00	No	50,041.00	50,041.00
	SECTION 19 - SA [ SCADA &				
	AUTOMATION ]				
0.4	Complaine and areating Fully Automatic Co				
31	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage				
	induction motor working on 380- 440 Volt, 3				
	phase, 50 Hz with no volt coil, over load				
	element, and ON - OFF push buttons, with				
	necessary material and connected to supply, etc complete. Starter with original sheet steel				
	encloser.				
	> 12.5 HP & Up to 20 HP	6.00	nos	8,696.00	52,176.00
	•				-

Sr.				ı	1
No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP /MECH/ ELECT/ SSR/ 2021-22				
	SECTION 10 - LG [L.T. SWITCHGEAR AND				
	PROTECTION] Item no. LG 3 Page no. 27				
32	Main power supply cable				
	3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable				
	Supplying and erecting, Flat flexible				
	submersible cable with, Copper Conductor,				
	PVC insulated, and PVC sheathed.	10.00		5.40.00	04.000.00
	3 core 16 sq mm	40.00	m	549.00	21,960.00
33	Power cables				
	Aluminium conductor 4 Core, XLPE /				
	PVC insulated & armoured cable				
	Supplying and erecting, XLPE / PVC				
	insulated, armoured cable 1100 V grade with				
	ISI mark Four core, solid / stranded				
	aluminium conductor with 6 mm thick 25 mm width M.S. spacer with				
	G.I. Earth wire 6 sq mm, complete erected				
	on wall / on pole with 25 X 3 mm M.S.				
	clamps or in provided trench in an approved				
	4 Core 6 sq mm	200.00	m	137.00	27,400.00
	MJP MECH/ ELECT/ SSR/ 2021-22				
	SECTION				
	12 - CB [ L.T. CABLE ] Item no. CB 6 Page				
34	Control Cables				
	Copper conductor PVC insulated,				
	Unarmoured control cable				
	Supplying and erecting Un-armoured control				
	cable with ISI mark stranded / solid copper				
	conductor 1.1 kV grade complete erected on				
	wall / panel or in provided trench in an approved manner.				
	4 core 2.5 sq mm	200.00	m	137.00	27,400.00
	MJP MECH/ ELECT/ SSR/ 2021-22/	200.00		107.00	21,400.00
	SECTION 12 - CB [ L.T. CABLE ] Item no. CB				
	8-				

	Plumbing Items				
Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
35	Providing and supplying in standard lengths				
	ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent				
	cement joints including cost of couplers, as				
	per IS specification no. 4985 / 1988				
	excluding GST levied by GOI and GOM in all				
	respect, including transportation, freight				
	charges, inspection charges, loading, unloading, conveyance to the departmental				
	stores and stacking the same in closed shed				
	duly protected from sun rays and rains				
	including cost of jointing material i.e. solvent				
	cement, etc. complete (selffit type to be				
	jointed with cement solvent).				
	1) 10% of cost of pipes shall be considered				
	for cost of PVC specials for estimate purpose only.				
	One coupler and required cement solvent				
	shall be provided with each full length pipe				
	cost of which is included in rates below.				
	MID (2007 (2004 20 (2007)01) - 1/40 D. 1/40				
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES, Page no.77				
1	Raw Sewage pump to TBF Distribution				
а	Main header				
	200 mm.	85.00	m	1,544.00	131,240.00
	PVC Specials- 10%				13,124.00
b	Distribution				
	140 mm.	120.00	m	693.00	83,160.00
	PVC Specials- 10%				8,316.00
2	TBF collection to FFT (gravity)				
а	Main header	220.00		602.00	150 200 00
	140 mm. PVC Specials- 10%	230.00	m	693.00	159,390.00 15,939.00
					10,000.00
b	collection tributory				
	75 mm.	55.00	m	211.00	11,605.00
	PVC Specials- 10%				1,160.50
3	TTU Plumbing				
	180 mm.	35.00	m	1,249.00	43,715.00
	PVC Specials- 10%			-	4,371.50
4	TBF distribution	450.00	100	044.00	04.050.00
	75 mm. PVC Specials- 10%	150.00	m	211.00	31,650.00 3,165.00
	r vo specials- 10%				ა, 100.00
36	Labour				
	Plumber	40.00	days	641.00	25,640.00
	Helper	100.00	days	579.00	57,900.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / SECTION - B LABOUR & MACHINERY , Page no. 14				
37	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.				
	Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump	0.00	Niss	40.504.00	27.400.00
	200 mm. Filter Feed Pump	2.00	Nos	18,581.00	37,162.00
	200 mm.	2.00	Nos	18,581.00	37,162.00
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132	2.00	1105	18,361.00	37,102.00
38	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)				
	Without by pass arrangement -PN -1				
	Raw Sewage pump				
	200 mm.	2.00	Nos	17,751.00	35,502.00
	Filter Feed Pump				
	200 mm.  MJP/ SSR/ 2021-22 / SECTION - I(XII):  PIPES APPURTENANCES, Page no. 131	2.00	Nos	17,751.00	35,502.00
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc. complete.	2160.00	Nos	4,750.00	10,260,000.00
	Market rate	2100.00	1403	7,7 00.00	10,200,000.00
40	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan,	205.46	Cum	1,730.00	355,445.80
	MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	200.40	Cuili	1,730.00	300,440.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
41	Trasnsportation Godhara to Pune distance by Road 660 Km.	205.46	Cum	11,031.37	2,266,505.30
	MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.				
42	Stone Aggregate 20 mm MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	205.46	Cum	900.00	184,914.00
43	Transportation as per STATEMENT VI Including loading, unloading and stacking				
	Manure or sludge (5.52 Cum) lead 25 Km MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.	793.50	Cum	747.48	593,125.40
			NET TOTAL Rs.		35,261,625.70

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				2.70		
Α	0.0 to 1.5 m	1	8.30	3.60	1.5	44.82	Cum
	soil					11.21	Cum
	Murum					11.21	Cum
	Soft rock					11.21	Cum
	hard rock					11.21	Cum
В	1.5 to 3.0 m	1	8.3	3.60	1.2	35.86	Cum
	soil					8.97	Cum
	Murum					8.97	Cum
	Soft rock					8.97	Cum
	hard rock					8.97	Cum
С	3.0 to 4.5 m	1	7.2	2.10	0	0	Cum
U	soil	1	7.3	3.10	0	0	Cum
	Murum					0	Cum Cum
	Soft rock	+				0	Cum
	hard rock					0	Cum
	TIAIU TOCK					0	Cuiii
D	4.5 to 6.0 m	1	7.3	3.10	0	0	Cum
	soil	'	7.0	3.10	0	0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock	+				0	Cum
2	Soling						
	Screen	1	5.30	1.30	0.30	2.07	Cum
	Grit	1	6.30	1.30	0.30	2.46	Cum
	extra for grit chamber	1	1.00	0.65	0.30	0.2	
	<u> </u>			Total for gri		2.66	Cum
3	PCC M20						
	Screen	1	4.90	1.10	0.10	0.54	Cum
	Grit	1	5.90	1.30	0.10	0.77	Cum
		1	1.00	0.45	0.20	0.09	Cum
	Internal slope	1	Area	0.40	1.30	0.52	Cum
	Internal slope	1	Area	0.20	1.30	0.26	Cum
				Total for gri	t	1.64	Cum
	-						
4	Raft M30						
	Screen	1	4.70	1.00	0.15	0.71	Cum
	Grit	1	5.70	1.30	0.20	1.49	Cum
		1	1.00	0.35	0.20	0.07	Cum
	DOO W. II			Total for gri	t	1.56	Cum
5	RCC Wall						
	Screen		4.00	0.45	4.50	4.04	
	Long Wall	2	4.30	0.15	1.50	1.94	Cum

Sr.	Hom Decemention	Naa	1 ()	D (m)	11 (***)	Overetites	11:0:4
No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Short Wall	2	0.80	0.15	1.50	0.36	Cum
				Total for so	reen	2.3	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	1.00	0.15	2.30	0.35	Cum
	Short Wall	2	1.30	0.15	2.30	0.9	Cum
				Total for gr	it	1.25	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	80	Cum	5.82	0.47	MT
7	Fabrication work in Frame and Grating for Access						
	Screen	1	4.30	0.80		3.44	Sqm
	Grit	1	5.30	1.45		7.69	Sqm
					Total	11.13	Sqm
8	Removing excess exacavated material out of site						
	Screen chamber	1	4.30	0.80	1.30	4.48	Cum
	Grit Chamber	1	5.30	1.30	2.10	14.47	Cum
	soling, PCC, Raft volume					8.4	Cum
	Total Volume					27.35	Cum
	bulkage @ 40%					38.29	Cum
		$\perp$					
9	Refilling and compaction						
	Total Excavation					80.68	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					27.35	Cum
	Refilling and compaction volume					53.33	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				4.60		
Α	0.0 to 1.5 m	1	11.3	11.30	1.5	191.54	Cum
	soil					47.89	Cum
	Murum					47.89	Cum
	Soft rock					47.89	Cum
	hard rock					47.89	Cum
В	1.5 to 3.0 m	1	10.30	10.30	1.5	159.14	Cum
	soil					39.79	Cum
	Murum					39.79	Cum
	Soft rock					39.79	Cum
	hard rock					39.79	Cum
С	3.0 to 4.5 m	1	10.30	10.30	1.5	159.14	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					39.79	Cum
	Murum					39.79	Cum
	Soft rock					39.79	Cum
	hard rock					39.79	Cum
D	4.5 to 6.0 m	1	9.30	9.30	0.1	8.65	Cum
	soil					2.17	Cum
	Murum					2.17	Cum
	Soft rock					2.17	Cum
	hard rock					2.17	Cum
2	Soling						
	RSS	1	8.70	8.70	0.30	22.71	Cum
	100	<u> </u>	0.70	0.70	0.50	22.71	Cum
3	PCC M20						
	RSS	1	8.30	8.30	0.10	6.89	Cum
		† †	3.00	5.00	3.10	3.00	20111
4	Raft M30						
	RSS	1	8.10	8.10	0.40	26.25	Cum
5	RCC Wall						
	Long Wall	2	7.70	0.30	4.00	18.48	Cum
	Short Wall	2	7.10	0.30	4.00	17.04	Cum
					Total	35.52	Cum
6	Beams						
	Beam 1	3	7.10	0.2	0.3	1.28	Cum
	Beam 2	3	7.10	0.2	0.3	1.28	Cum
					Total	2.56	Cum
	Olal	4	7.70	7.70	2.2	44.00	
7	Slab	1	7.70	7.70	0.2	11.86	Cum
	Deduction for manhole	-2	2.20	1.00	0.2 Total	-0.88	Cum
					Total	10.98	Cum
	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
8	Steel - HORW / CRS & Rg/Culli	um	100	Cum	75.31	7.54	MT
		dill	100	Odili	70.01	7.04	1011
	Fabrication work in Frame and						
9	Grating for Access						
	RSS	2	2.20	1.00		4.4	Sqm
			-				,
40	Removing excess exacavated						
10	material out of site						
	RSS	1	7.70	7.70	3.80	225.31	Cum
	soling, PCC, Raft volume					55.85	Cum
	Total Volume					281.16	Cum
	bulkage @ 40%					393.63	Cum
11	Refilling and compaction						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					518.47	Cum
	Deduction for tank volume, soling, PCC, Raft					281.16	Cum
	Refilling and compaction volume					237.31	Cum
12	Dewatering						
	25 Days x 4 hours/day	days	25	hours / day	4	100	Hrs

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
2	Soling						
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
	TBF	1	12.06	5.06	0.10	6.11	Cum
A	Doff MOO						
4	Raft M30	4	44.00	4.00	0.10	r 77	Cura
	TBF	1	11.86	4.86	0.10	5.77	Cum
5	Brick Wall						
5	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
	Orace Support Wall		11.00	0.20	Total for	T 14.87	Cum
					1 otal 101	1 14.07	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	
	Short Wall	2	4.00		1.20	9.6	Sqm
					Total	81.65	Sqm
	External						
	Long Wall	2	11.46		1.20	27.51	Sqm
	Short Wall	2	4.46		1.20	10.71	Sqm
	Wall Top	1	30.92	0.3		9.28	Sqm
					Total	47.50	Sqm
	Fortonia I code!					47.50	
7	External-white-wash	1				47.50	Sqm
8	External colour wash	1				47 FO	Sam
0	External-colour-wash					47.50	Sqm
9	Stool HCDM / CDC @ V-/C	Kg/C	00	Cure	F 77	0.05	N 4∓
	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	5.77	0.35	MT
10	Removing excess exacavated						
-	material out of site					00.00	
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m x		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

#### MEASUREMENT SHEET - FILTER FEED TANK

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				3.80		
Α	0.0 to 1.5 m	1	9.7	9.70	1.5	141.14	Cum
	soil					35.29	Cum
	Murum					35.29	Cum
	Soft rock					35.29	Cum
	hard rock					35.29	Cum
В	1.5 to 3.0 m	1	9.20	9.20	1.5	126.96	Cum
	soil					31.74	Cum
	Murum					31.74	Cum
	Soft rock					31.74	Cum
	hard rock					31.74	Cum
С	3.0 to 4.5 m	1	8.70	8.70	0.8	60.56	Cum
	soil					15.14	Cum
	Murum					15.14	Cum
	Soft rock					15.14	Cum
	hard rock					15.14	Cum
	45.00		0.70	0.70			0
D	4.5 to 6.0 m	1	8.70	8.70	0	0	Cum
	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
2	Soling						
	FFT	1	8.10	8.10	0.30	19.69	Cum
3	PCC M20						
	FFT FT	1	7.70	7.70	0.10	5.93	Cum
		1	7.70	7.70	0.10	3.93	Cum
4	Raft M30						
	FFT	1	7.50	7.50	0.40	22.5	Cum
5	RCC Wall						
	Long Wall	2	7.10	0.30	3.20	13.64	Cum
	Short Wall	2	6.50	0.30	3.20	12.48	Cum
					Total	26.12	Cum
6	Page						
6	Beams	3	6.50	0.0	0.2	1 17	Cum
	Beam 1	3	6.50	0.2	0.3	1.17 1.17	Cum
	Beam 2	3	6.50	0.2	Total	2.34	Cum Cum
					ı Ulai	2.34	Culli
7	Slab	1	7.10	7.10	0.2	10.09	Cum
	Deduction for manhole		1.20	0.70	0.2	-0.34	Cum
	Doddon for marinoid		1.20	0.70	Total	9.75	Cum
					iolai	0.10	Jann

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	60.71	6.08	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	FFT	1	7.10	7.10	3.00	151.23	Cum
	soling, PCC, Raft volume					48.12	Cum
	Total Volume					199.35	Cum
	bulkage @ 40%					279.09	Cum
11	Refilling and compaction						
	Total Excavation					328.66	Cum
	Deduction for tank volume, soling, PCC, Raft					199.35	Cum
	Refilling and compaction volume					129.31	Cum
12	Dewatering						
	25 Days x 4 hours/day	days	25	hours/day	4	100	Hrs

#### **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	9.2	5.60	0.55	28.34	Cum
	soil					7.09	Cum
	Murum					7.09	Cum
	Soft rock					7.09	Cum
	hard rock					7.09	Cum
2	Soling						
	Filter Platform	1	9.00	5.40	0.30	14.58	Cum
3	PCC M20						
	Filter Platform	1	8.60	5.00	0.10	4.3	Cum
4	Raft M30						
	Filter Platform	1	8.40	4.80	0.15	6.05	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	80	Cum	6.05	0.49	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					18.88	Cum
	Total Volume					18.88	Cum
	bulkage @ 40%					26.44	Cum
7	Refilling and compaction	+ +					
	Total Excavation					28.34	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					18.88	Cum
	Refilling and compaction volume					9.46	Cum

#### **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.	2160				2160	Nos
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	2160	0.82	0.58	0.2	205.46	Cum
3	Trasnsportation Godhara to						
						205.46	Cum
4	Stone Aggregate 20 mm	2160	0.82	0.58	0.2	205.46	Cum
5	Transportation as per STATEMENT VI Including loading,						
	Manure or sludge (5.52 Cum) lead	2160	0.82	0.56	0.8	793.5	Cum

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr. No.	Item Description	Nos.	Unit
1	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.		
		1	No
2	Grit pump Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste		
	application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.8 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
3	Raw Sewage Pumps		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste		
	application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7	0	N.I.
	15 HP (Up to 132000 LPH)	2	Nos
4	TTU Feed pumps		
<u> </u>	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste		
	application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	15 HP (Up to 132000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.6 m x 2 m minimum height	4	Nos
	Astincted Control Eliter of EDD / MOED consolicits - 2011 4111 4111		
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.6 m x 2 m minimum height	4	Nos
7	PurAll Tablet Chlorinator + cartridge	0	nos

#### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr.	Item Description	Nos.	Unit
No.	•	1405.	Offic
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz		
а	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
	<b>y</b> 1		
8	Control Panel		
	Design, Supply, Installing, Commissioning & Testing of Master PLC control		
	monitoring and communication panel as per IEC 61131 at Pure Water Sump		
	suitable for monitoring and control of pure water Pumps. Pressure Transmitters,		
	Level Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed.		
	Martin DI O Baral	4	N 1
	Master PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		
	AUTOMATION ] Item no. 2.7 Page no. 72		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage		
	induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over		
	load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	Commonda to ouppry, one complication change in ginian officer change in		
	> 12.5 HP & Up to 20 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
10	Main power supply cable		
	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	Overalista and another Flat flowible subsequently subsequently with Overala Overalasta		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,		
	PVC insulated, and PVC sheathed.  3 core 16 sq mm	40	m
	S COIG TO SQ IIIIII	40	m
11	Power cables		
<del>-                                    </del>	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade		
	with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25		
	mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall /		
	on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	200	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		
	CB 6 Page no. 35		
12	Control Cables		
	Copper conductor PVC insulated, Unarmoured control cable		

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

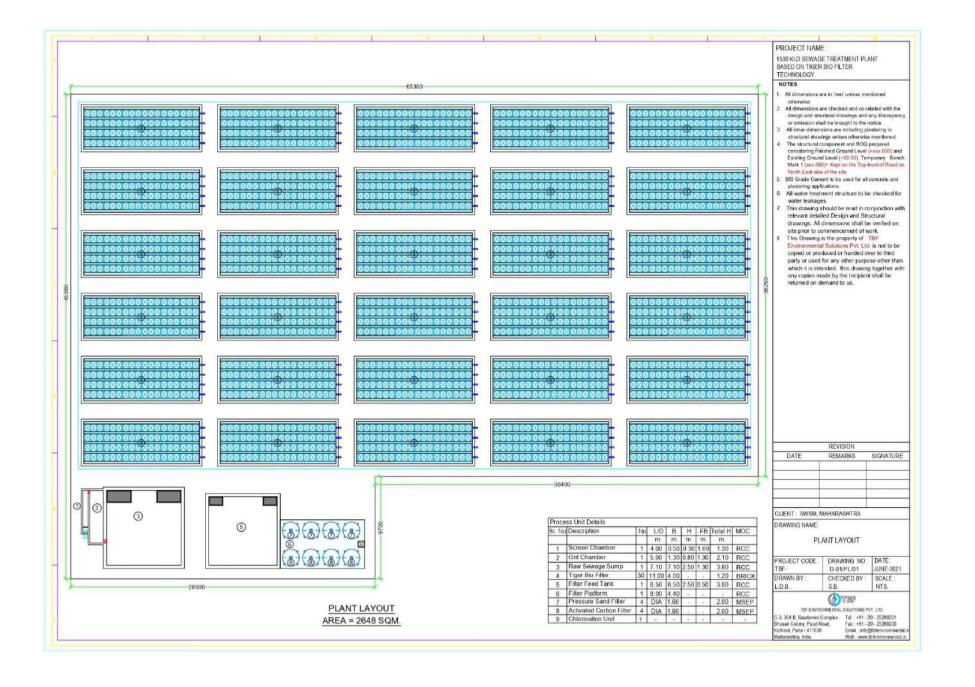
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	200	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

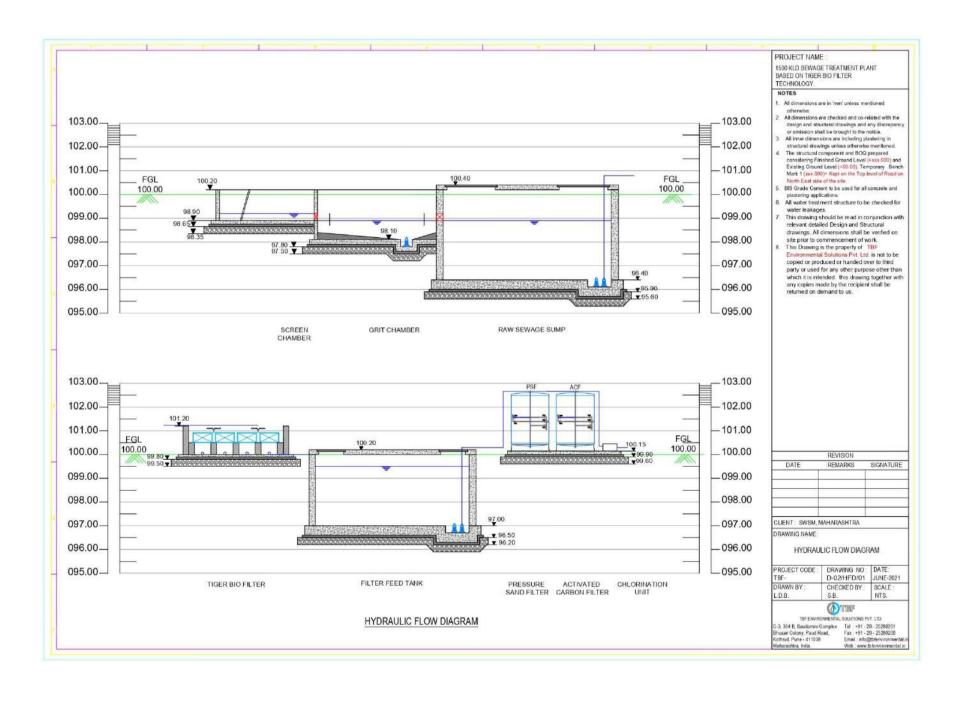
#### **MEASUREMENT SHEET - PLUMBING**

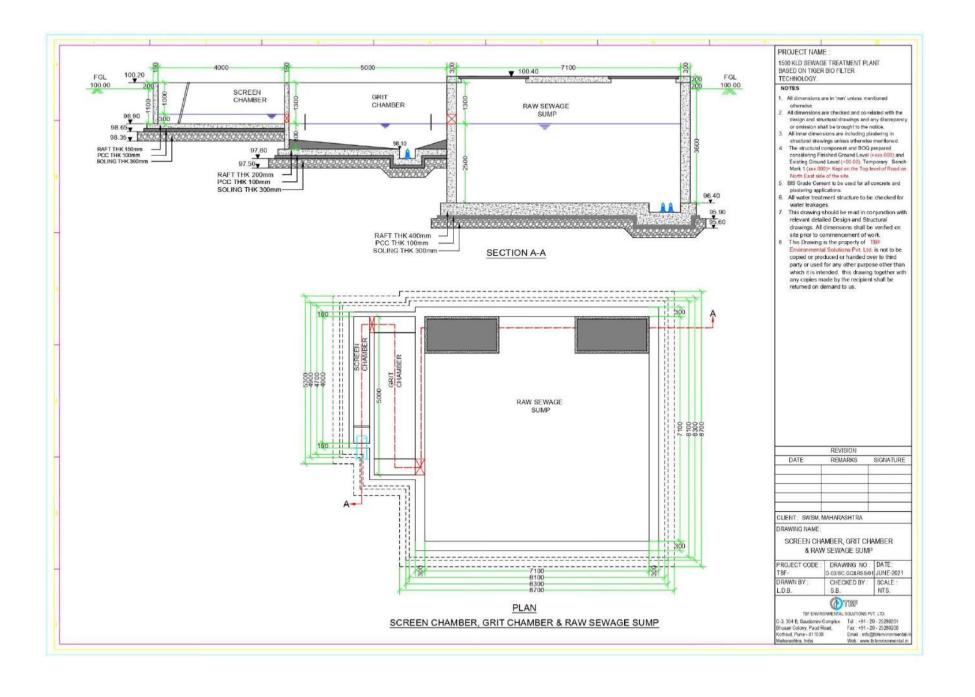
No.	Item Description	Nos.	L (m)	B (m)	Qua	ntity	Unit
	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges, inspection charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed shed duly protected from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit type to be jointed with cement solvent).			/ms			
	1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only. 2) One coupler and required cement solvent shall be provided with each full length pipe cost of which is included in rates below.  MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C.						
	PIPES,						
	Raw Sewage pump to TBF Distribution						
	Main header	Dia	200				
_	200 mm.	1	85			85	m
	PVC Specials- 10%						
b	Distribution						
	140 mm.	1	120			120	m
	PVC Specials- 10%	'	120			120	
2	TBF collection to FFT (gravity)						
а	Main header						
	140 mm.	1	230			230	m
	PVC Specials- 10%						
<del>                                     </del>	as Handley tellenters						
	collection tributory	4	FF			EE	m
<del>                                     </del>	75 mm. PVC Specials- 10%	1	55			55	m
<del>                                     </del>	1 V O OPCOIDIO- 10/0						
3	TTU Plumbing	Dia	180				
	180 mm.	1	35			35	m
	PVC Specials- 10%						
	TBF distribution			No. of b	oeds		
	75 mm.	1	5	30		150	m
<del>                                     </del>	PVC Specials- 10%						
	Lahaur	Niss	Davis				
	Labour	Nos	Days			40	deve
<b>-</b>	Plumber	4 10	10 10			40 100	days
<del>                                     </del>	Helper	10	10			100	days
6	Sluice valves						

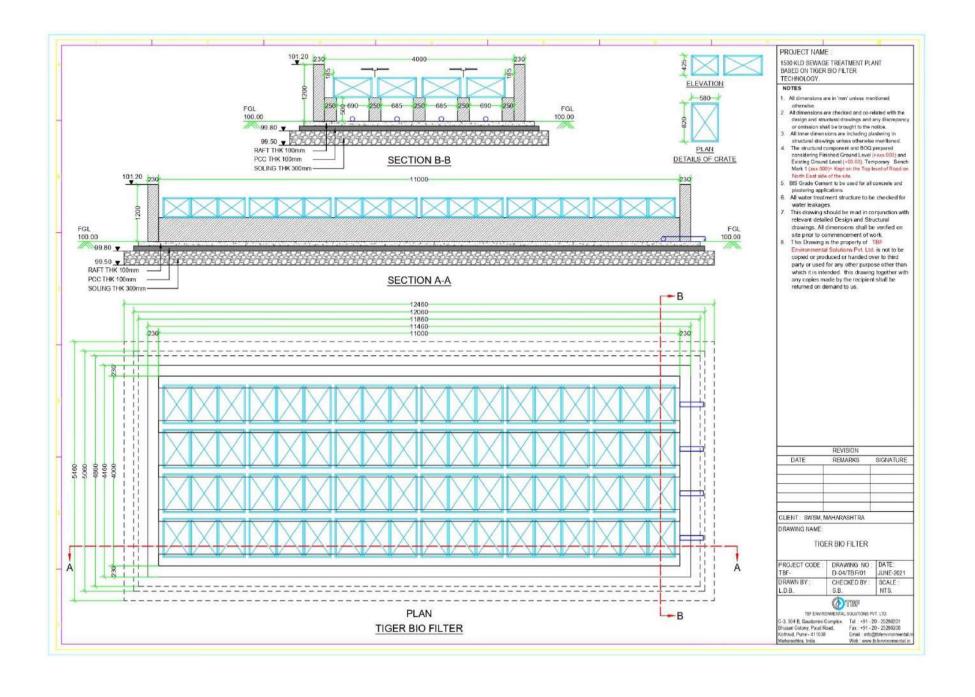
#### **MEASUREMENT SHEET - PLUMBING**

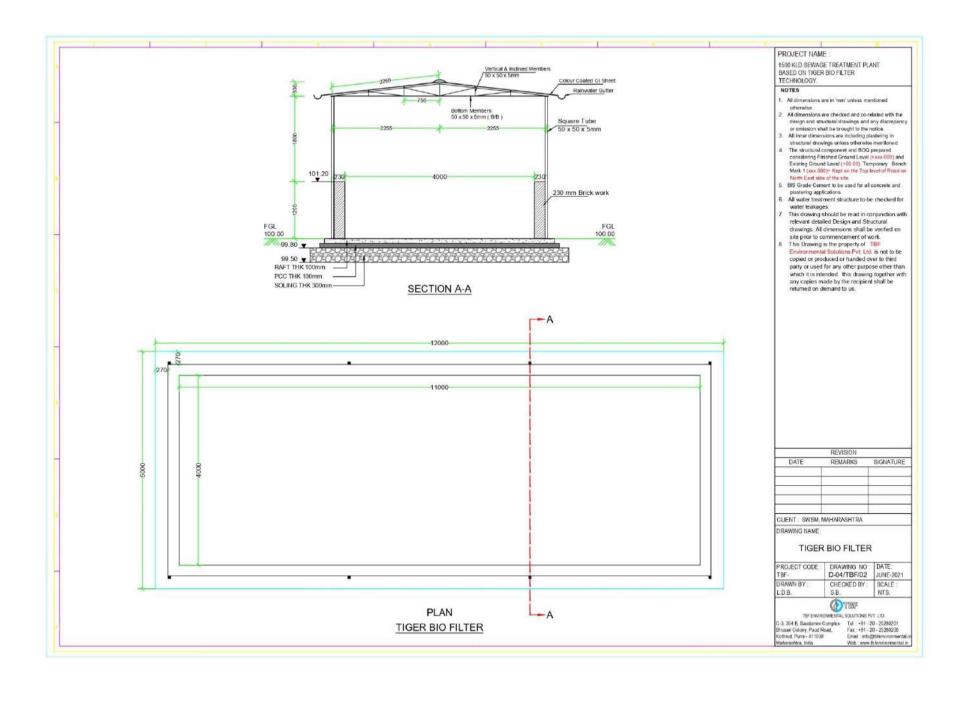
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.  MJP/ SSR/ 2021-22 / SECTION - I(XII):					
	PIPES APPURTENANCES , Page no. 132					
	Raw Sewage pump					NI -
	200 mm.	2			2	Nos
	Filter Feed Pump					
	200 mm.	2			2	Nos
	200 111111.					1403
7	Reflux valves (non-return valves )					
	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 131					
	Raw Sewage pump					
	200 mm.	2			2	Nos
	Filter Feed Pump					
	200 mm.	2			2	Nos

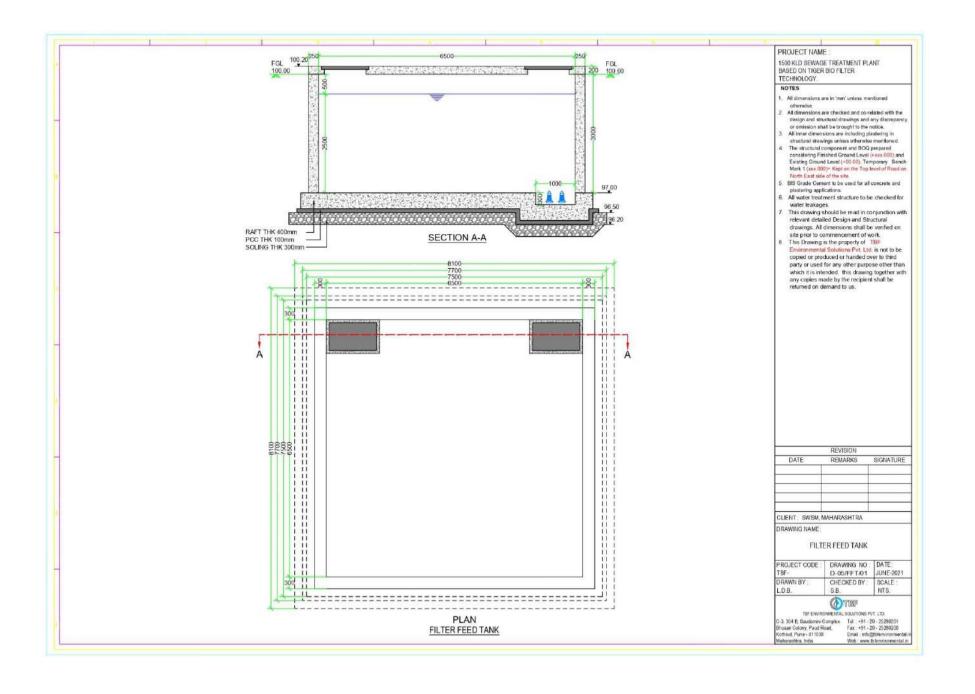


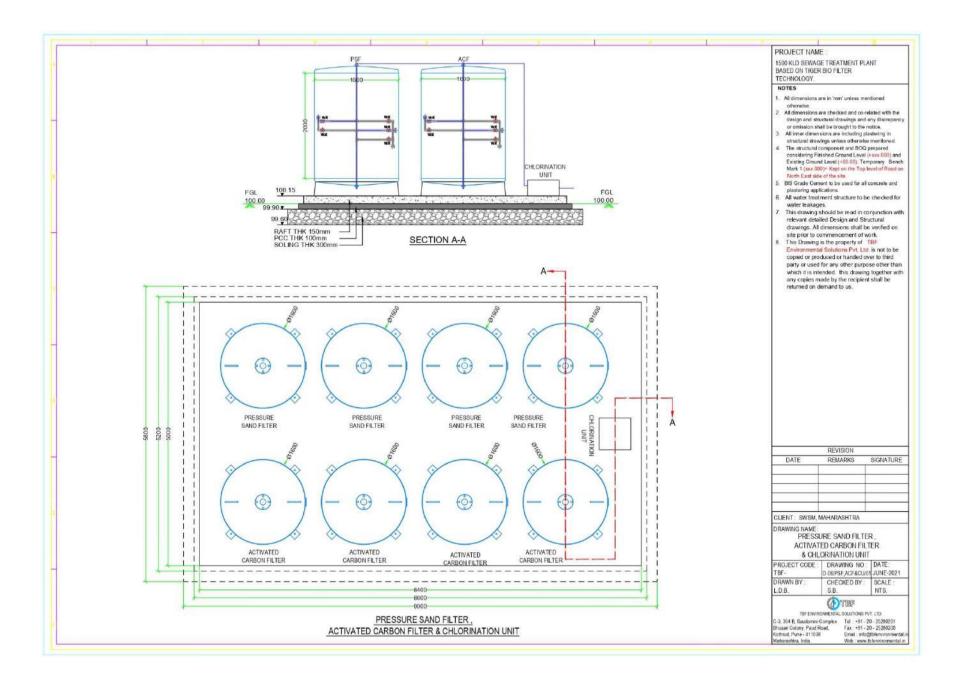












# 1750 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 1750 KLD CAPACITY

Design flow	=	<b>1750.00</b> 1.750	KLD MLD
Peak flow factor	=	3.00	
1 SCREEN CHANNELS: MANUAL No. of Manual Screen Average Flow Peak Flow Factor	= = =	1 1.75 3.00	No. MLD
Design Flow	= = =	Peak Flow 5.25 218.75 0.061	MLD m³/hr m³/sec
Average Flow	= = =	1.75 72.917 0.020	MLD m³/hr m³/sec
Design Flow in each Screen	=	0.061 1	m³/sec No.
	=	0.061	m³/sec
Average Flow in each Screen	=	0.020 1	m³/sec No.
	=	0.020	m³/sec
Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
Clear Area of Opening through Screen for Peak Flow	=	0.061 1.2	m³/sec m/sec
	=	0.051	$m^2$
Clear Area of Opening through Screen for Average Flow	=	0.020 0.6	m³/sec m/sec
	=	0.033	$m^2$
Considering maximum Area of Opening through Screen Clear Spacing of Bars	=	0.051 10	m² mm

Thickness of Bars	=	5	mm
Gross Area of Screen	=	0.051x(10+5)/10	_
	=	0.077	m²
Assuming Depth of Screen Channel	=	300.00	mm
Gross Width of Screen	=	0.077/0.3	
	=	0.257	m
No. of Bars	=	(Gross Width of Screen / Center	
No. of Baro	=	0.25666666666666667/((10+5)/10	
	=	16.1	Nos.
Say	=	17	Nos.
Width of Screen provided	=	(Number of Bars+1) x Clear Spa Thickness)	
	=	(17+1)x10+(17x5)	
	=	265	mm
Width Say		0.50	
Liquid Depth of Screen Channel	=		m
provided L:B	=	0.30 10.00	m
	=		
Length of Screen Channel provided	=	5.00	m
Freeboard provided	=	1.00	Invert Dep m of incomin sewer
Total Depth of Screen Chamber	=	1.30	m
Velocity in Channel at Average Flow	=	Average Flow / Cross Sectional 0.02/((0.5x0.3)/1000x1000)	Area of Screen Channel
	=	0.133	m/sec
	>	0.300	m/sec
Head Loss across Screen			
Head Loss across Screen	=	$0.0728 (V^2 - v^2)$	
V = Velocity through Screen at Peak Flow	=	•	nnel / Clear Area of Opening throu Screen
	=	1.130	m/sec
v = Velocity in approach Channel at Peak Flow	=		nnel / Cross Sectional Area of Scre Channel
	=	0.8	m/sec
Head Loss across Screen at Peak Flow	=	0.047	m
Head Loss across Screen at 50% Clogged Condition			
Velocity through Screen at 50% Clogged Condition at Peak Flow	=	2.259	m/sec
Head Loss across screen at 50%	_	0.336	m
Clogged Condition at Peak Flow	=	0.326	m 
	>	0.300	m/sec <b>OK</b>
CONVENTIONAL GRIT CHAMBER:	MA	NUAL	
No. of Grit Chamber	=	1	
Average Flow	=	1.75	MLD
<del>-</del>			

Peak Flow Factor	=	3.00		
Design Flow	=	Peak Flow		
Peak Flow	=	5.25	MLD	
	=	5250	m³/day	
	=	219	m³/hr	
	=	0.061	m³/sec	
Design Flow to each Grit Chamber	=	5250/1		
	=	5250	m³/day	
	=	219	m³/hr	
	=	0.061	m³/sec	
According to CPHEEO Manual				
Particle Size	=	0.15	mm	
Specific Gravity	=	2.65		
Surface Overflow Rate for 100% removal efficiency in an ideal Grit Chamber	=	Settling Velocity of the minimum	um size of Particles to be remov	/ed
	=	1.5	m/s	
	=	1296	m³/m²/day	
Considering Efficiency of removal of			•	
desired Particles, η = 75%	=	75%		
and Measure of Settling Basin Performance,		0.125		
n = 1/8 for very good performance	=	0.125		
Design Overflow Rate	_	857	m <sup>3</sup> /m <sup>2</sup> /day	
Design Overnow Rate	=	657	III /III /day	
Surface Overflow Rate for 0.15 mm				
dia. Particle Size with Specific	=	1555	m³/m²/day	
Gravity S <sub>s</sub> > 2.65 Table 5.6				
Considering Design Overflow Rate	=	960	m <sup>3</sup> /m <sup>2</sup> /day	
0 0			•	
Area of Grit Chamber required	=	5250	m³/day	
		960	m³/m²/day	
	=	5.47	$m^2$	
L:B ratio	=	4		
Length of Chamber provided	=	6.00	m	
Width of Chamber provided	=	1.20	m	
·				
Hydraulic Retention Time (HRT) in	=	60	sec	
Grit Chamber at Peak Flow	_	00	Sec	
Volume of Grit Chamber required	=	0.061x60		
	=	3.66	$m^3$	
Double required to 0 to 0.		0.00 / (0.4.0)		
Depth required in Grit Chamber	=	3.66 / (6x1.2)		
0.50	=	0.51	m	
Say	=	0.60	m	
Grit Storage Depth	=	0.30	m	
Total Liquid Depth required	=	0.90	m	

	Length of Grit Pit Width of Grit Pit Depth of Grit Pit Free Board	= = =	0.50 0.50 0.30 1.30	m m m m
3	RAW SEWAGE SUMP (WET WELL) No. of Units Average Flow	= = =	<b>1</b> 1.75 72.917 0.0203	No. MLD m³/hr m3/sec
	Peak Flow Factor	=	3.00	
	Design Flow	= = =	Peak Flow 5.25 219 0.061	MLD m³/hr m³/sec
	Hydraulic Retention Time (HRT) at Average Flow Volume required	= =	<b>120</b> 0.0203 x 120 x 60 146	min m³
	Hydraulic Retention Time (HRT) at Peak Flow	= = <	Volume / Average Flow 40 30	min min
	Total Volume of Wet Well	=	146	m³
	Side Water Depth (SWD) provided Plan Area of Wet Well Length/width of Sump required Length/width of Sump provided Volume of Sump provided Length of Pump Pit Width of Pump Pit Depth of Pump Pit Free Board	= = = = =	3.00 48.72 6.98 7.00 147.00 2.00 0.80 0.30 1.30	m m² m m m³ m m
3.1	DESIGN STATEMENT-RSS E&M			
	Design Considerations Design flow Peak flow factor	= =	<b>1.75</b> 1750.00 3.00	MLD Cum/Day
	Pumping machinery Friction factor for Fittings in Pressure Mains Elbow 90 degrees	=	35	

Friction Factor for each	=	1		
Friction factor for all	=	35		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	20		
Friction Factor for each	=	0.3		
Friction factor for all	=	6		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	43.9		
Stage		low	ave	peak
Average flow, cum / day	=		1750.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	1050	1750	3500
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0304	0.0304	0.0405
Dia needed, m	=	0.197	0.197	0.227
Dia needed, mm	=	197	197	227
Dia provided, mm (User)	=	225	225	225
Radius, m	=	0.113	0.113	0.113
Radius power 0.63	=	0.252	0.252	0.252
S power 0.54	=	0.020	0.033	0.050
S	=	0.001	0.002	0.004
Slope 1 in	=	1398.1	542.9	256.2
length, m	=	95	95	95
Friction in pipeline, m	=	0.1	0.2	0.4
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	43.9	43.9	43.9
Friction in fittings, m	=	0.8	2.2	5.0
Static lift, m	=	5.0	5.0	5.0
Total head, m	=	5.8	7.2	10.0
Efficiency of pumpset	=	0.8	0.8	8.0
Discharge, lps	=	18.2	30.4	60.8
Discharge, Cum/Hr	=	65.6	109.4	218.8
Kw required	=	2.821	4.705	9.409
HP required	=	4.0	6.5	13.0
Number of Pumps	=	2	2	2

#### **TIGER BIO FILTER DESIGN STATEMENT-TBF1-50 KLD**

5

5.1

Number of pumping hours	=	16	Hrs	
Number of BMF tanks provided	=	35	Nos	
Design flow to each tank	=	50.00	Cum/day	
	=	3.13	Cum/ Hr for 16	Hr
	=	0.87	lps	
Inlet BOD	=	250.00	mg/l	
Inlet TSS	=	400.00	mg/l	
BOD load applied	=	12.5	kg/day	
BOD uptake rate	=	0.1	Kg of BOD / Kg of worms	(0.5 - 1.0)
Worms required	=	125	Kg worms	
Sewage application rate	=	1.85	Cum/Sqm/day	(1 - 2 Cum/Sqm/da
Area required	=	27.03	Sqm	
Area Provided	=	28	Sqm	
Area of each crate	=	0.4	Sqm	
Number of crates	=	70	Nos	
say	=	72	Nos	
Crate in longitudinal direction	=	18	Nos	
Crate in travers direction	=	4	Nos	
crates provided	=	72	Nos	OK
Width provided	=	4.00	m	
Length required	=	11.00	m	
Depth provided	=	1.2	m	
TERTIARY TREATMENT UNIT				
Design Considerations				
Design flow	=	1.75	MLD	
	=	1750.00	Cum/Day	
Peak flow factor	=	3.00		
FILTER FEED TANK				
Number of FFT provided	=	1	Nos	
Number of operating hours	=	16	Hrs	
Design flow	=	1750.00	Cum/Day	
	=	109.38	Cum/Hr	
	=	0.03038	Cum/Sec	
Hydraulic Retention time	=	60	min	
Volume required	=	109.38	Cum	
Depth	=	3.00	m	
Civil Tanks				
Area	=	36.46	Sqm	
Length/Width required	=	6.04	m	
Length/Width provided	=	6.50	m	
Freeboard provided	=	0.50	m	
Volume Provided		126.75	Cum	

#### **DESIGN STATEMENT-TTU E&M**

Design Considerations				
Design flow	=	1.75	MLD	
Design now	=	1750.00	Cum/Day	
Peak flow factor	=	3.00	Outil/Day	
Peak now factor	_	0.00		
Pumping machinery				
Friction factor for Fittings in Pressure				
Mains				
Elbow 90 degrees	=	10		
Friction Factor for each	=	1		
Friction factor for all	=	10		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	10		
Friction Factor for each	=	0.3		
Friction factor for all	=	3		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	15.9		
Stage		low	ave	peak
Average flow, cum / day	=		1750.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	1050	1750	3500
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.8	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0228	0.0304	0.0405
Dia needed, m	=	0.170	0.197	0.227
Dia needed, mm	=	170	197	227
Dia provided, mm (User)	=	200	200	200
Radius, m	=	0.100	0.100	0.100
Radius power 0.63	=	0.234	0.234	0.234
S power 0.54	=	0.029	0.036	0.054
S	=	0.001	0.002	0.004
Slope 1 in	=	715.3	473.2	223.3
length, m	=	40	40	40
Friction in pipeline, m	=	0.1	0.1	0.2

	Velocity head, m	=	0.033	0.051
	Frction factor in fittings	=	15.9	15.9
	Friction in fittings, m	=	0.5	0.8
	Static lift, m	=	12.0	12.0
	Total head, m	=	12.5	12.8
	Efficiency of pumpset	=	0.8	0.8
	Discharge, lps	=	18.2	30.4
	Discharge, Cum/Hr	=	65.6	109.4
	Kw required	=	4.836	8.065
	HP provided	=	6.5	11.0
	Number of Pumps	=	2	2
	rames or amps		_	_
5.2	PRESSURE SAND FILTER			
	Number of unit provided	=	4	Nos.
	Designed @ 16 hrs working for flow	_	•	1400.
	of	=	27.34	m3/h
	Loading rate	=	12.00	m3/m2/h
	Area of DMF	=	2.28	m2
	Dia of DMF	=	1.70	m
	Provided	=	1.800	m
	Backwash water			
	Backwash velocity	=	15.00	m/hr
	backwash flowrate	=	36.10	m3/h
	Backwash volume for 20 mins	=	12.03	m3
	Backwach Volame for 20 mino	_	12.00	1110
5.3	ACTIVATED CARBON FILTER			
	Number of unit provided Designed @ 16 hrs working for flow	=	4	Nos.
	of	=	27.34	m3/h
	Loading rate	=	12.00	m3/m2/h
	Area of ACF	=	2.28	m2
	Dia of ACF	=	1.70	m
	Provided	=	1.800	m
	Backwash water			
	Backwash velocity	=	15.00	m/hr
	backwash flowrate	=	36.10	m3/h
	Backwash volume for 20 mins	=	12.03	m3
5.4	CHLORINE DOSING SYSTEM NaOCI DOSING SYSTEM			
	Average Flow		109.38	m3/hr
		=		
	Design Chlorine Dosage (Max)		3	mg/l
	Concentration of Chlorine in	=	10%	
	commercially available NaOCl	=	1076	
	Design NaOCI Dosage	_	30	mg/l
	Dosign Nacol Dosage	=	30	1119/1
	Operating hours		16.0	hr
		=		
	Quantity of NaOCI required		109.375 X 30 X 16 / 10	000

0.115 15.9 1.8 12.0 13.8 0.8 60.8 218.8 16.130 22.0 2

	=	52.50	Kg/day		
	=	52.50	Ng/day		
Design Strength of NaOCI Solution		100%			
Volume of NaOCI Solution	=	52.5 / (1 X 1000 )			
	=	0.060	m3		
No. of Dosing Tanks provided	=	1	Nos.		
Volume of each Dosing Tank	=	0.06 / 1			
	=	0.06	m3		
	=	100	Litres		
	=				
No. of Working NaOCI Dosing Pump provided	=	1	No.		
Capacity of each NaOCI Dosing Pump required	apacity of each NaOCI Dosing		Total Volume of NaOCl Solution / (No. of Dosing pumps)		
Tump roquirou		0.06 / (1 X 16)			
	=	0.004	m3/hr		
	=	4.00	LPH		
Capacity of each NaOCI Dosing	=	4.00	LPH		
Pump provided  No. of Standby NaOCI Dosing Pump provided	=	1	No.		

## SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 1750 KLD CAPACITY

S I.	Unit name	N o	Leng th	Widt h		Height		So	oling	P(	cc	Ra	oft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	<b>5</b>	+bk		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	5.0	0.5	0.3	1.0	1.3	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	6.0	1.2	0.9	1.3	2.2	0.2	0.3	0.1	0.1	0.2	0.2	0.1			80
3	Raw Sewage Sump	1	7.0	7.0	3.0	1.3	4.3	0.2	0.3	0.1	0.1	0.2	0.4	0.3		0.2	100
4	TBF Bed 50 KLD	3	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	6.5	6.5	3.0	0.5	3.5	0.2	0.3	0.1	0.1	0.2	0.4	0.3		0.2	100
6	Filter Platform	1	8.8	4.8				0.2	0.3	0.1	0.1	0.2	0.1				80

#### Assumptions

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound		soil	Muru	Soft roc	har d	Tota I
0.0 to 1.5 m	=	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

## TIGER BIO FILTER OF 1750 KLD CAPACITY BILL OF QUANTITIES

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
1	Excavation for foundation / pipe trenches in earth, soils of all types, sand, gravel and soft murum, including removing the excavated material upto a distance of 50 metres and lifts as below, stacking and spreading as directed, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-1/259)				
	0.0 to 1.5 m	416.39	Cum	150.00	62,458.50
	1.5 to 3.0 m	81.34	Cum	164.00	13,339.80
	3.0 to 4.5 m	63.62	Cum	178.00	11,324.40
	4.5 to 6.0 m	12.70	Cum	192.00	2,438.40
	MJP/ SSR/ 2021-22 / Section E / Excavation Item No.1/ Page no. 42				
2	Excavation for foundation / pipe trenches in hard murum and boulders, W.B.M. road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking and spreading as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A-3/259)			8.00	
	0.0 to 1.5 m	416.39	Cum	192.00	79,946.90
	1.5 to 3.0 m	81.34	Cum	206.00	16,756.10
	3.0 to 4.5 m	63.62	Cum	220.00	13,996.40
	4.5 to 6.0 m MJP/ SSR/ 2021-22/ Section E/ Excavation Item No.3, Page no. 42	12.70	Cum	234.00	2,971.80
3	Excavation for foundation / pipe trenches in soft rock and old cement and lime masonry foundation asphalt road including removing the excavated material upto a distance of 50 M beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, preparing the bed for foundation and excluding backfilling, etc. complete. (Bd-A- 4/259)				
	0.0 to 1.5 m	416.39	Cum	572.00	238,175.10
	1.5 to 3.0 m	81.34	Cum	597.00	48,560.00
	3.0 to 4.5 m	63.62	Cum	622.00	39,571.70
	4.5 to 6.0 m	12.70	Cum	647.00	8,216.90
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.5, Page no. 42				
	LACAVALIOIT ILEITI NO.3, FAGE 110. 42				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, excluding backfilling, etc.				
	complete by all means. (Bd-A-6/259) 0.0 to 1.5 m	416.39	Cum	1,017.00	423,468.70
	1.5 to 3.0 m	81.34	Cum	1,017.00	84,756.30
	3.0 to 4.5 m	63.62	Cum	1,067.00	67,882.60
	4.5 to 6.0 m	12.70	Cum	1,092.00	13,868.40
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43j				
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)  MJP/ SSR/ 2021-22 / Section E/ Excavat	778.58	Cum	1,175.00	914,831.50
6	Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN	234.15	Cum	5,640.00	1,320,606.00
	REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.1, Page no.49				
7	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	259.77	Cum	7,448.00	1,934,767.00
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY	203.11	Juili	7,440.00	1,304,101.00
	MIX CONCRETE/ Item No.2, Page no. 49				
	-				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
8	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)				
	For Beams / Braces / Lintels In RCC M-300	4.86	Cum	8,624.00	41,912.70
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50				
9	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	20.43	Cum	9,247.00	188,916.30
	Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300			2,200	123,010.00
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.)				
	(Excluding M.S. or Tor reinforcement)  Chajjas / Parapets / Curtain Walls	73.60	Cum	9,218.00	678,444.80
	/Partition Walls / Pardies In RCC M-300 MJP/ SSR/ 2021-22 / SECTION - G : PLAIN				
	REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar				
	reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)	27.67	MT	70.659.00	1.055.106.00
	c) Corrosion Resistant Steel (Fe 500) MJP/ SSR/ 2021-22 / SECTION - G : PLAIN	27.67	MT	70,658.00	1,955,106.90
	REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.8 / Page no. 52				
12	Providing and fixing mild steel grill work for				
12	windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U- 1/537)  MJP/ SSR/ 2021-22 / SECTION - F: IRON AND STRUCTURAL STEEL WORK Item No.1 / Page	18.83	Sqm	1,895.00	35,682.90

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-incharge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C- 3/275)	26.15	ΜT	71,286.00	1,863,872.30
	MJP/ SSR/ 2021-22 / SECTION - F :: IRON AND STRUCTURAL STEEL WORK Item No.3,	20.10	1011	71,200.00	1,000,072.00
14	Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sq.m.).	2639.00	Sqm	777.00	2,050,503.00
	PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224				
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete  PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by engineer incharge and BDG- 2 and 5 Item No.893, Page no. 190	520.45	Cum	6,305.00	3,281,437.30
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference No. Bd. L.2 Page No. 368 Item No.950, Page no. 201	2857.75	Sqm	257.00	734,441.80

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
17	Providing rough cast cement plaster externally in two coats to concrete, brick or stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding				
	and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201	1662.50	Sqm	529.00	879,462.50
18	Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.	1662.50	Sqm	10.00	16,625.00
	PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411	1002.00	Oqiii	10.00	10,020.00
19	Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats				
	of white wash) etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412	1662.50	Sqm	8.00	13,300.00
20	Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)	240.00	HP/ Hr.	77.00	18,480.00
	MJP/ SSR/ 2021-22 / Section E/ Excava	2 10.00		77100	76, 166166
21	Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.	584.47	Cum	84.00	49,095.50
	MJP/ SSR/ 2021-22 / Section E/ Excava				
22	Transportation as per STATEMENT VI Including loading, unloading and stacking Earth (4.8 Cum) lead 15 Km	2395.98	Cum	604.45	1,448,250.20

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
23	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50				
	mm of 90 degree bend.	0.90	Sqm	35,000.00	31,500.00
24	Grit pump				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION -				
	Pumps, Page no. 6, 7of size 1.8 m length  1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00
25	Raw Sewage Pumps				
25	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION -				
	15 HP (Up to 132000 LPH)	2.00	Nos	184,154.00	368,308.00
26	TTU Feed pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	15 HP (Up to 132000 LPH)	2.00	Nos	184,154.00	368,308.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.8 m x 2 m minimum height	4.00	Nos	620,000.00	2,480,000.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
28	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash				
	operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and				
	Dia 1.8 m x 2 m minimum height	4.00	Nos	620,000.00	2,480,000.00
29	NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency				
	Mixing Tank of 100 Ltrs capacity	100.00	Ltrs	8.00	800.00
	Dosing Pump	2.00	Nos	15,000.00	30,000.00
30	Control Panel				
	Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter ,for all pumps installed.	1.00	No	50,041.00	50,041.00
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION]	1.00	110	00,011.00	00,011.00
	AOTOMATION J				
31	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.	6.00	nos	8 696 00	52 176 00
	> 12.5 HP & Up to 20 HP	6.00	nos	8,696.00	52,176.00

Sr.			Ι		1
No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP /MECH/ ELECT/ SSR/ 2021-22				
	SECTION 10 - LG [L.T. SWITCHGEAR AND				
	PROTECTION] Item no. LG 3 Page no. 27				
32	Main power supply cable				
	3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable				
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,				
	PVC insulated, and PVC sheathed.				
	3 core 16 sq mm	40.00	m	549.00	21,960.00
	·				, = = = = =
33	Power cables				
	Aluminium conductor 4 Core, XLPE /				
	PVC insulated & armoured cable  Supplying and erecting, XLPE / PVC				
	insulated, armoured cable 1100 V grade with				
	ISI mark Four core, solid / stranded				
	aluminium conductor with 6 mm thick 25 mm				
	width M.S. spacer with				
	G.I. Earth wire 6 sq mm, complete erected on wall / on pole with 25 X 3 mm M.S.				
	clamps or in provided trench in an approved				
	4 Core 6 sq mm	220.00	m	137.00	30,140.00
	MJP MECH/ ELECT/ SSR/ 2021-22			101100	
	SECTION				
	12 - CB [ L.T. CABLE ] Item no. CB 6 Page				
24	Control Cables				
34	Copper conductor PVC insulated,				
	Unarmoured control cable				
	Supplying and erecting Un-armoured control				
	cable with ISI mark stranded / solid copper				
	conductor 1.1 kV grade complete erected on				
	wall / panel or in provided trench in an approved manner.				
	4 core 2.5 sq mm	220.00	m	137.00	30,140.00
	MJP MECH/ ELECT/ SSR/ 2021-22/	220.00		707.00	30,110.00
	SECTION 12 - CB [ L.T. CABLE ] Item no. CB				
	8-				

	Plumbing Items				
Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
35	Providing and supplying in standard lengths				
	ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent				
	cement joints including cost of couplers, as				
	per IS specification no. 4985 / 1988				
	excluding GST levied by GOI and GOM in all				
	respect, including transportation, freight				
	charges, inspection charges, loading,				
	unloading, conveyance to the departmental stores and stacking the same in closed shed				
	duly protected from sun rays and rains				
	including cost of jointing material i.e. solvent				
	cement, etc. complete (selffit type to be				
	jointed with cement solvent).				
	1) 10% of cost of pipes shall be considered				
	for cost of PVC specials for estimate				
	purpose only. 2) One coupler and required cement solvent				
	shall be provided with each full length pipe				
	cost of which is included in rates below.				
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C.				
1	PIPES, Page no.77				
а	Raw Sewage pump to TBF Distribution  Main header				
_ ŭ	225 mm.	95.00	m	1,969.00	187,055.00
	PVC Specials- 10%			,	18,705.50
b	Distribution	1.10.00		000.00	100 040 00
	160 mm. PVC Specials- 10%	140.00	m	906.00	126,840.00 12,684.00
	1 VO Opeciais 1070				12,004.00
2	TBF collection to FFT (gravity)				
а	Main header				
	160 mm.	250.00	m	906.00	226,500.00
	PVC Specials- 10%				22,650.00
b	collection tributory				
	75 mm.	65.00	m	211.00	13,715.00
	PVC Specials- 10%				1,371.50
3	TTU Plumbing	40.00	100	4.544.00	04 700 00
	200 mm. PVC Specials- 10%	40.00	m	1,544.00	61,760.00 6,176.00
	1 VO Specials- 10/0				0,170.00
4	TBF distribution				
	75 mm.	175.00	m	211.00	36,925.00
	PVC Specials- 10%				3,692.50
36	Labour	E0 00	dove	644.00	22.050.00
	Plumber Helper	50.00 100.00	days	641.00 579.00	32,050.00 57,900.00
	ι ισιραι	100.00	days	379.00	37,900.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / SECTION - B LABOUR & MACHINERY , Page no. 14				
37	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.				
	Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump	0.00	N.	00 707 00	57.454.00
	250 mm.	2.00	Nos	28,727.00	57,454.00
	Filter Feed Pump 200 mm.	2.00	Nos	18,581.00	37 162 00
	MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132	2.00	INOS	10,561.00	37,162.00
38	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)				
	Without by pass arrangement -PN -1				
	Raw Sewage pump				
	250 mm.	2.00	Nos	30,294.00	60,588.00
	Filter Feed Pump				
	200 mm.  MJP/ SSR/ 2021-22 / SECTION - I(XII):  PIPES APPURTENANCES, Page no. 131	2.00	Nos	17,751.00	35,502.00
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc. complete.	2520.00	Nec	4.750.00	11 070 000 00
	Market rate	2520.00	Nos	4,750.00	11,970,000.00
40	Rapid sand Gravity filter sand At				
"	Source (Godhara, Gokak, Kanhan,	239.71	Cum	1,730.00	414,698.30
	MJP/ SSR/ 2021-22 / SECTION- A MATERIALS			, 1010	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
41	Trasnsportation Godhara to Pune distance by Road 660 Km.	239.71	Cum	11,031.37	2,644,329.80
	MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.				
42	Stone Aggregate 20 mm  MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	239.71	Cum	900.00	215,739.00
43	Transportation as per STATEMENT VI Including loading, unloading and stacking				
	Manure or sludge (5.52 Cum) lead 25 Km MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.	925.75	Cum	747.48	691,979.70
			NET :	TOTAL Rs.	41,500,972.00

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				2.80		
Α	0.0 to 1.5 m	1	9.30	3.50	1.5	48.83	Cum
	soil					12.21	Cum
	Murum					12.21	Cum
	Soft rock					12.21	Cum
	hard rock					12.21	Cum
В	1.5 to 3.0 m	1	9.3	3.50	1.3	42.32	Cum
	soil					10.58	Cum
	Murum					10.58	Cum
	Soft rock					10.58	Cum
	hard rock					10.58	Cum
	0.01.15						
С	3.0 to 4.5 m	1	8.3	3.00	0	0	Cum
-	soil					0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
D	4.5 to 6.0 m	1	8.3	3.00	0	0	Cum
	soil		0.3	3.00	U	0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
	Tidia Took					0	Cum
2	Soling						
_	Screen	1	6.30	1.30	0.30	2.46	Cum
	Grit	1	7.30	1.20	0.30	2.63	Cum
	extra for grit chamber	1	1.00	0.65	0.30	0.2	Cum
	_ crace con garacteristics			Total for gri		2.83	Cum
					-		
3	PCC M20						
	Screen	1	5.90	1.10	0.10	0.65	Cum
	Grit	1	6.90	1.20	0.10	0.83	Cum
		1	1.00	0.45	0.20	0.09	Cum
	Internal slope	1	Area	0.55	1.20	0.66	Cum
	Internal slope	1	Area	0.28	1.20	0.33	Cum
				Total for gri	t	1.91	Cum
4	Raft M30						
	Screen	1	5.70	1.00	0.15	0.86	Cum
	Grit	1	6.70	1.20	0.20	1.61	Cum
		1	1.00	0.35	0.20	0.07	Cum
				Total for gri	t	1.68	Cum
5	RCC Wall						
	Screen						
	Long Wall	2	5.30	0.15	1.50	2.39	Cum

Sr.	Hom Decemention	Non	1 ()	D (m)	11 (20)	Overetites	11
No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Short Wall	2	0.80	0.15	1.50	0.36	Cum
				Total for so	reen	2.75	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	1.00	0.15	2.40	0.36	Cum
	Short Wall	2	1.20	0.15	2.40	0.87	Cum
				Total for gr	it	1.23	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	80	Cum	6.52	0.53	MT
7	Fabrication work in Frame and Grating for Access						
	Screen	1	5.30	0.80		4.24	Sqm
	Grit	1	6.30	1.35		8.51	Sqm
					Total	12.75	Sqm
							•
8	Removing excess exacavated material out of site						
	Screen chamber	1	5.30	0.80	1.30	5.52	Cum
	Grit Chamber	1	6.30	1.20	2.20	16.64	Cum
	soling, PCC, Raft volume	· ·	0.00	5	2.20	9.4	Cum
	Total Volume					31.56	Cum
	bulkage @ 40%	1				44.19	Cum
	<u> </u>						
9	Refilling and compaction						
	Total Excavation					91.15	Cum
	Deduction for tank volume,				_		
	soling, PCC, Raft					31.56	Cum
	Refilling and compaction volume					59.59	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				5.10		
Α	0.0 to 1.5 m	1	11.2	11.20	1.5	188.16	Cum
	soil					47.04	Cum
	Murum					47.04	Cum
	Soft rock					47.04	Cum
	hard rock					47.04	Cum
В	1.5 to 3.0 m	1	10.20	10.20	1.5	156.06	Cum
	soil					39.02	Cum
	Murum					39.02	Cum
	Soft rock					39.02	Cum
	hard rock					39.02	Cum
С	3.0 to 4.5 m	1	10.20	10.20	1.5	156.06	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					39.02	Cum
	Murum					39.02	Cum
	Soft rock					39.02	Cum
	hard rock					39.02	Cum
	45.00		0.00	0.00	0.0	50.70	
D	4.5 to 6.0 m	1	9.20	9.20	0.6	50.79	Cum
	soil					12.7	Cum
	Murum					12.7	Cum
	Soft rock hard rock					12.7	Cum
	nard rock					12.7	Cum
2	Soling						
	RSS	1	8.60	8.60	0.30	22.19	Cum
				0.00	0.00		
3	PCC M20						
	RSS	1	8.20	8.20	0.10	6.73	Cum
4	Raft M30						
	RSS	1	8.00	8.00	0.40	25.6	Cum
5	RCC Wall						
	Long Wall	2	7.60	0.30	4.50	20.52	Cum
	Short Wall	2	7.00	0.30	4.50	18.9	Cum
	CHOIL Wall		7.00	0.50	Total	39.42	Cum
					Total	00.12	Carri
6	Beams						
	Beam 1	3	7.00	0.2	0.3	1.26	Cum
	Beam 2	3	7.00	0.2	0.3	1.26	Cum
					Total	2.52	Cum
7	Slab	1	7.60	7.60	0.2	11.56	Cum
	Deduction for manhole	-2	2.20	1.00	0.2	-0.88	Cum
					Total	10.68	Cum
	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
8	Steel - HORW/ CRS & Rg/Cum	um	100	Cum	78.22	7.83	MT
		din	100	Ouiii	10.22	7.00	1011
	Fabrication work in Frame and						
9	Grating for Access						
	RSS	2	2.20	1.00		4.4	Sqm
10	Removing excess exacavated						
	material out of site						
	RSS	1	7.60	7.60	4.30	248.37	Cum
	soling, PCC, Raft volume					54.52	Cum
	Total Volume					302.89	Cum
	bulkage @ 40%					424.05	Cum
11	Refilling and compaction						
	Neilling and compaction						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					551.07	Cum
	Deduction for tank volume, soling, PCC, Raft					302.89	Cum
	Refilling and compaction volume					248.18	Cum
12	Dewatering						
	30 Days x 4 hours/day	days	30	hours / day	4	120	Hrs

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
2	Soling						
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
	TBF	1	12.06	5.06	0.10	6.11	Cum
A	Doff MOO						
4	Raft M30	4	44.00	4.00	0.10	r 77	Cura
	TBF	1	11.86	4.86	0.10	5.77	Cum
5	Brick Wall						
5	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
	Orace Support Wall		11.00	0.20	Total for	T 14.87	Cum
					1 otal 101	1 14.07	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	
	Short Wall	2	4.00		1.20	9.6	Sqm
					Total	81.65	Sqm
	External						
	Long Wall	2	11.46		1.20	27.51	Sqm
	Short Wall	2	4.46		1.20	10.71	Sqm
	Wall Top	1	30.92	0.3		9.28	Sqm
					Total	47.50	Sqm
	Fortonia I code!					47.50	
7	External-white-wash	1				47.50	Sqm
8	External colour wash	1				47 FO	Sam
0	External-colour-wash					47.50	Sqm
9	Stool HCDM / CDC @ V-/C	Kg/C	00	Cure	F 77	0.05	N 4∓
	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	5.77	0.35	MT
10	Removing excess exacavated						
-	material out of site					00.00	
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m x		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

#### MEASUREMENT SHEET - FILTER FEED TANK

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				4.30		
Α	0.0 to 1.5 m	1	9.7	9.70	1.5	141.14	Cum
	soil					35.29	Cum
	Murum					35.29	Cum
	Soft rock					35.29	Cum
	hard rock					35.29	Cum
В	1.5 to 3.0 m	1	9.20	9.20	1.5	126.96	Cum
	soil					31.74	Cum
	Murum					31.74	Cum
	Soft rock					31.74	Cum
	hard rock					31.74	Cum
С	3.0 to 4.5 m	1	8.70	8.70	1.3	98.4	Cum
	soil					24.6	Cum
	Murum					24.6	Cum
	Soft rock					24.6	Cum
	hard rock					24.6	Cum
	4.5 to C.O. m	1	0.70	0.70	0	0	Cum
D	4.5 to 6.0 m	1	8.70	8.70	0	0	Cum
	soil						Cum
	Murum					0	Cum
	Soft rock hard rock					0	Cum Cum
	TIAIU TOCK					U	Cum
2	Soling						
	FFT	1	8.10	8.10	0.30	19.69	Cum
3	PCC M20						
	FFT	1	7.70	7.70	0.10	5.93	Cum
4	Raft M30						
-4	FFT	1	7.50	7.50	0.40	22.5	Cum
	ГГІ		7.50	7.50	0.40	22.3	Cum
5	RCC Wall						
	Long Wall	2	7.10	0.30	3.70	15.77	Cum
	Short Wall	2	6.50	0.30	3.70	14.43	Cum
		_			Total	30.2	Cum
6	Beams						
	Beam 1	3	6.50	0.2	0.3	1.17	Cum
	Beam 2	3	6.50	0.2	0.3	1.17	Cum
					Total	2.34	Cum
7	Slab	1	7.10	7.10	0.2	10.09	Cum
	Deduction for manhole	-	1.20	0.70	0.2	-0.34	Cum
					Total	9.75	Cum

#### MEASUREMENT SHEET - FILTER FEED TANK

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	64.79	6.48	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	FFT	1	7.10	7.10	3.50	176.44	Cum
		1	7.10	7.10	3.30		
	soling, PCC, Raft volume					48.12	Cum
	Total Volume					224.56	Cum
	bulkage @ 40%					314.39	Cum
11	Refilling and compaction						
	Total Excavation					366.5	Cum
	Deduction for tank volume,						
	soling, PCC, Raft					224.56	Cum
	Refilling and compaction volume					141.94	Cum
12	Dewatering						
	30 Days x 4 hours/day	days	30	hours/day	4	120	Hrs

#### **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	10.0	6.00	0.55	33	Cum
	soil					8.25	Cum
	Murum					8.25	Cum
	Soft rock					8.25	Cum
	hard rock					8.25	Cum
2	Soling						
	Filter Platform	1	9.80	5.80	0.30	17.06	Cum
3	PCC M20						
	Filter Platform	1	9.40	5.40	0.10	5.08	Cum
4	Raft M30						
	Filter Platform	1	9.20	5.20	0.15	7.18	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	80	Cum	7.18	0.58	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					22.14	Cum
	Total Volume					22.14	Cum
	bulkage @ 40%					31	Cum
7	Refilling and compaction	+ +					
	Total Excavation					33	Cum
_	Deduction for tank volume,		_		_		
	soling, PCC, Raft					22.14	Cum
	Refilling and compaction volume					10.86	Cum

#### **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.	2520				2520	Nos
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	2520	0.82	0.58	0.2	239.71	Cum
3	Trasnsportation Godhara to					239.71	Cum
4	Stone Aggregate 20 mm	2520	0.82	0.58	0.2	239.71	Cum
5	Transportation as per STATEMENT VI Including loading,						
	Manure or sludge (5.52 Cum) lead	2520	0.82	0.56	0.8	925.75	Cum

#### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr.	Item Description	Nos.	Unit
<b>No.</b> 1	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	1	No
2	Grit pump		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size 1.8 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
3	Raw Sewage Pumps		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	15 HP (Up to 132000 LPH)	2	Nos
4	TTU Feed pumps		
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below		
	MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	15 HP (Up to 132000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.8 m x 2 m minimum height	4	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand		
	a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.8 m x 2 m minimum height	4	Nos
7	PurAll Tablet Chlorinator + cartridge	0	nos

#### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr.			
No.	Item Description	Nos.	Unit
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz		
а	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
8	Control Panel		
	Design, Supply, Installing, Commissioning & Testing of Master PLC control		
	monitoring and communication panel as per IEC 61131 at Pure Water Sump		
	suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter, for all pumps installed.		
	Level Hansimiller, FFF Hansimiller, Furbidity Hansimiller, 101 all pullips installed.		
	Master PLC Panel	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA &		- 10
	AUTOMATION ] Item no. 2.7 Page no. 72		
	•		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage		
	induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over		
	load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	> 12.5 HP & Up to 20 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
10	Main nauray augustu aabta		
10	Main power supply cable  3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	3 core PVC insulated, PVC sheathed copper conductor hat submersible cable		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor,		
	PVC insulated, and PVC sheathed.		
	3 core 16 sq mm	40	m
11	Power cables		
<u> </u>	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade		
	with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25 mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall /		
	on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	220	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		
	CB 6 Page no. 35		
12	Control Cables		
	Copper conductor PVC insulated, Unarmoured control cable		

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

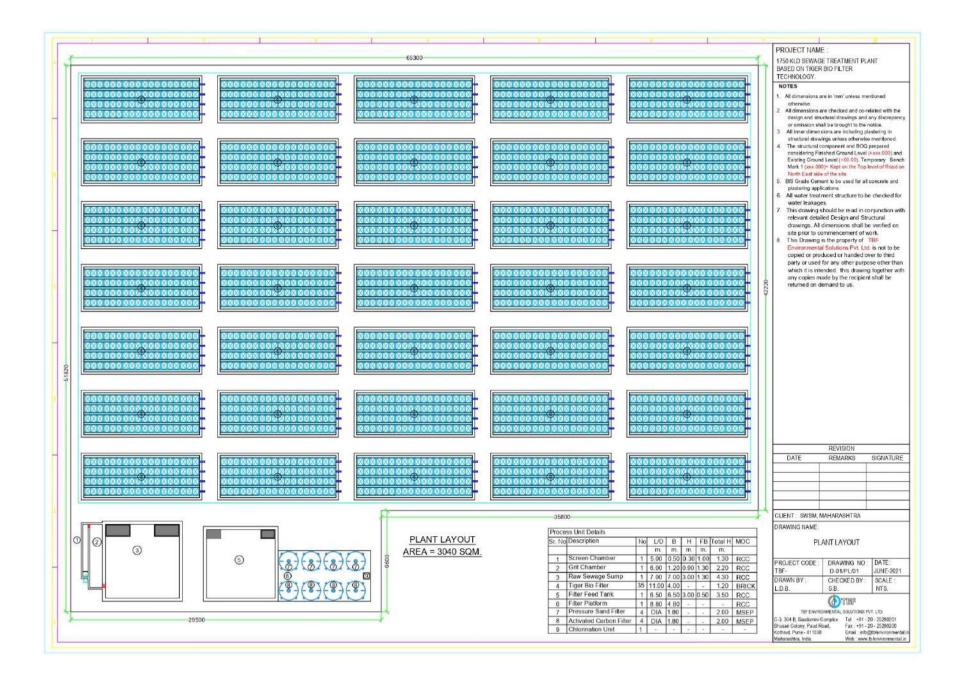
Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	220	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

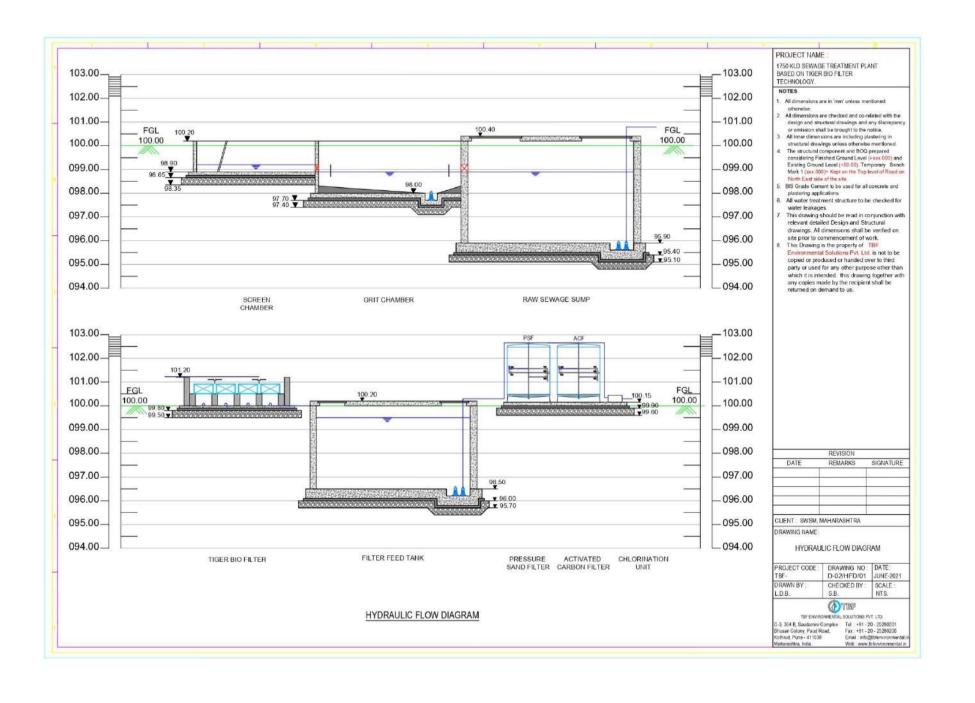
#### **MEASUREMENT SHEET - PLUMBING**

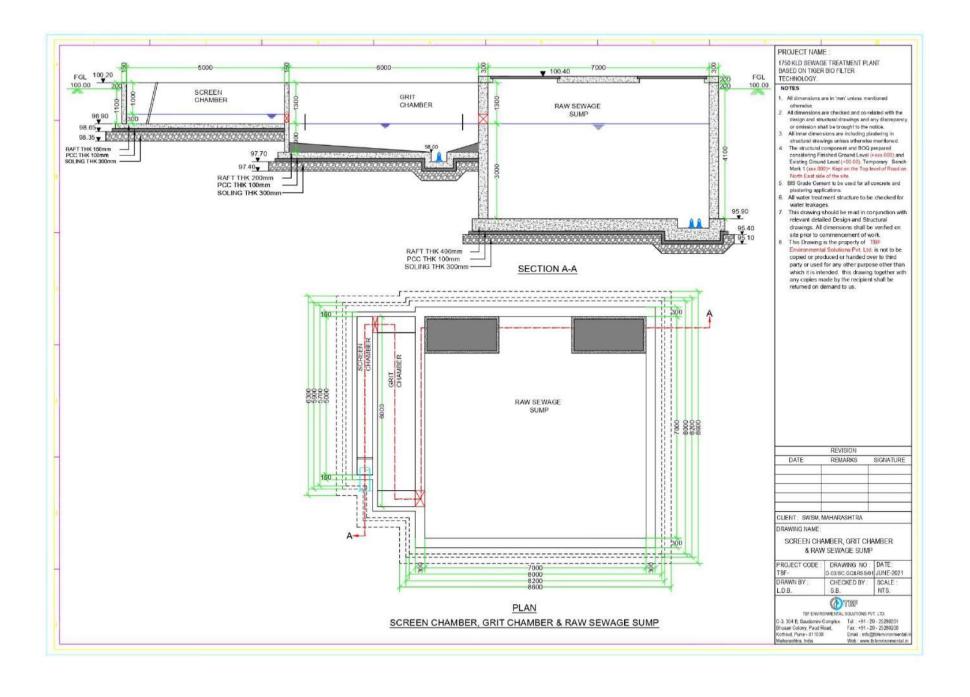
Sr. No.	Item Description	Nos.	L (m)	B (m)	Qua	ntity	Unit
	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges, inspection charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed shed duly protected from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit type to be jointed with cement solvent).			<i>i</i> ms			
	1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.  2) One coupler and required cement solvent shall be provided with each full length pipe cost of which is included in rates below.  MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C.						
	PIPES,						
1	Raw Sewage pump to TBF Distribution						
а	Main header	Dia	225				
	225 mm.	1	95			95	m
	PVC Specials- 10%						
b	Distribution						
	160 mm.	1	140			140	m
	PVC Specials- 10%						
	·						
2	TBF collection to FFT (gravity)						
а	Main header						
	160 mm.	1	250			250	m
	PVC Specials- 10%						
	and and are tellerations.						
b	collection tributory	4	C.E.			G.F.	m
	75 mm. PVC Specials- 10%	1	65			65	m
	1 VO Opcolais- 1070	<del> </del>					
3	TTU Plumbing	Dia	200				
	200 mm.	1	40			40	m
	PVC Specials- 10%						
4	TBF distribution			No. of b	oeds		
	75 mm.	1	5	35		175	m
	PVC Specials- 10%						
-	Labour	Nes	Dove				
5	Labour	Nos	Days			ΕO	deve
	Plumber	5 10	10 10			50 100	days
	Helper	10	10			100	days
6	Sluice valves	<del> </del>					
6	Sluice valves						

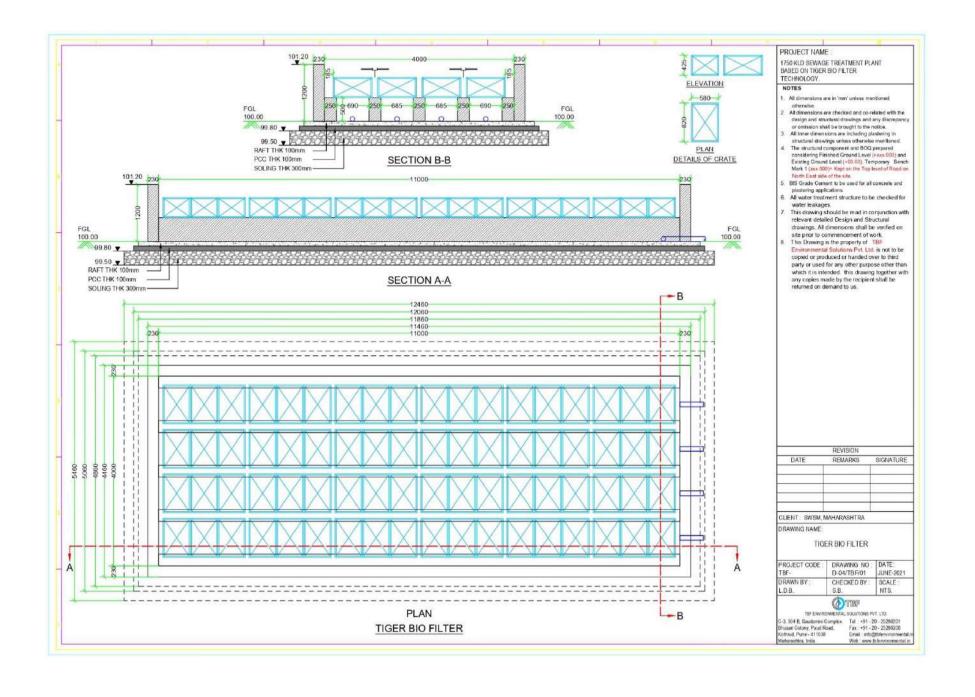
#### **MEASUREMENT SHEET - PLUMBING**

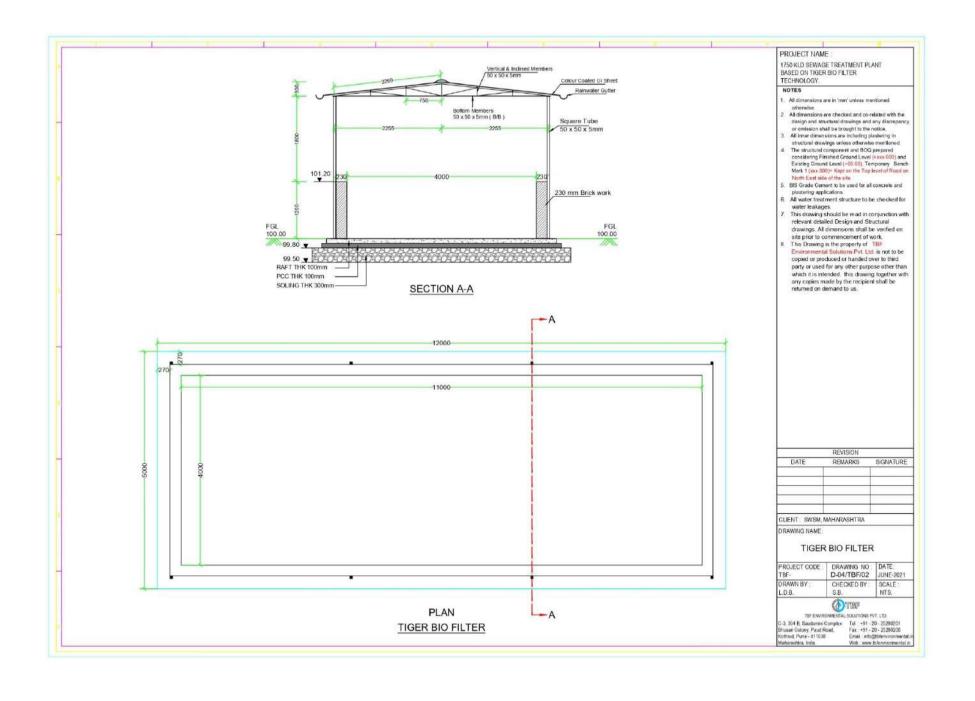
Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming					
	for IS- 14846 including worn gear arrangements					
	as per test pressure, stainless steel spindle, caps,					
	including inspection charges, transportation upto					
	departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc.					
	complete.					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES, Page no. 132					
	Raw Sewage pump					
	250 mm.	2			2	Nos
	Filter Feed Pump					
	200 mm.	2			2	Nos
7	Reflux valves (non-return valves )					
	Providing and supplying ISI mark CI jD/F reflux					
	valves (non-return valves ) of following dia					
	including railway freight, inspection charges,					
	unloading from railway wagon, loading into truck,					
	transportation upto departmental stores, unloading, stacking excluding GST levied by GOI					
	& GOM in all respect etc. complete. Reflux					
	valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES , Page no. 131					
	Raw Sewage pump					
	250 mm.	2			2	Nos
	Filter Feed Pump				_	
	200 mm.	2			2	Nos

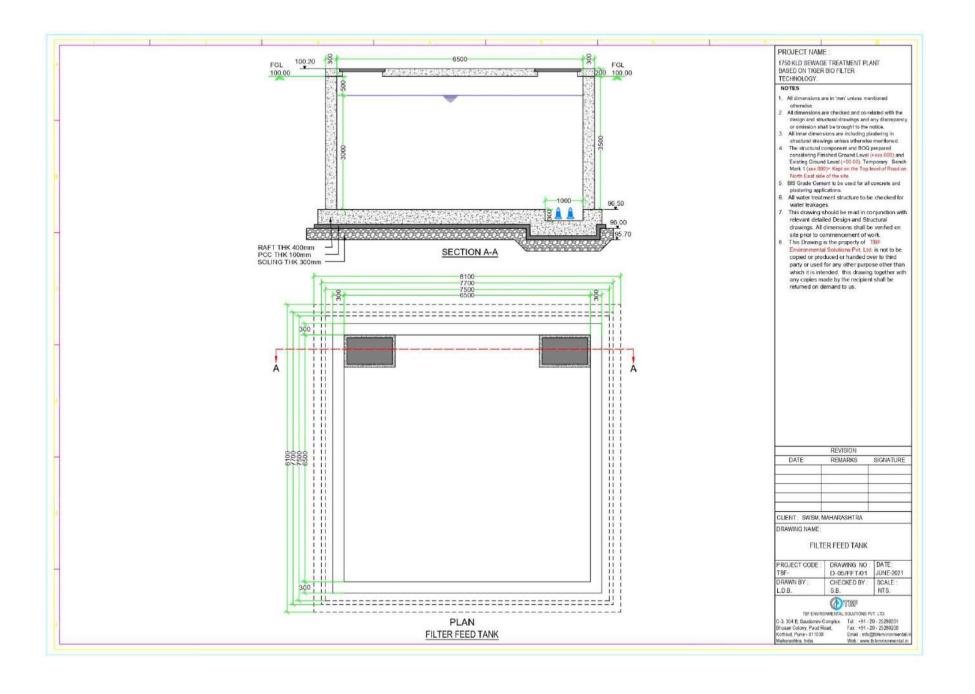


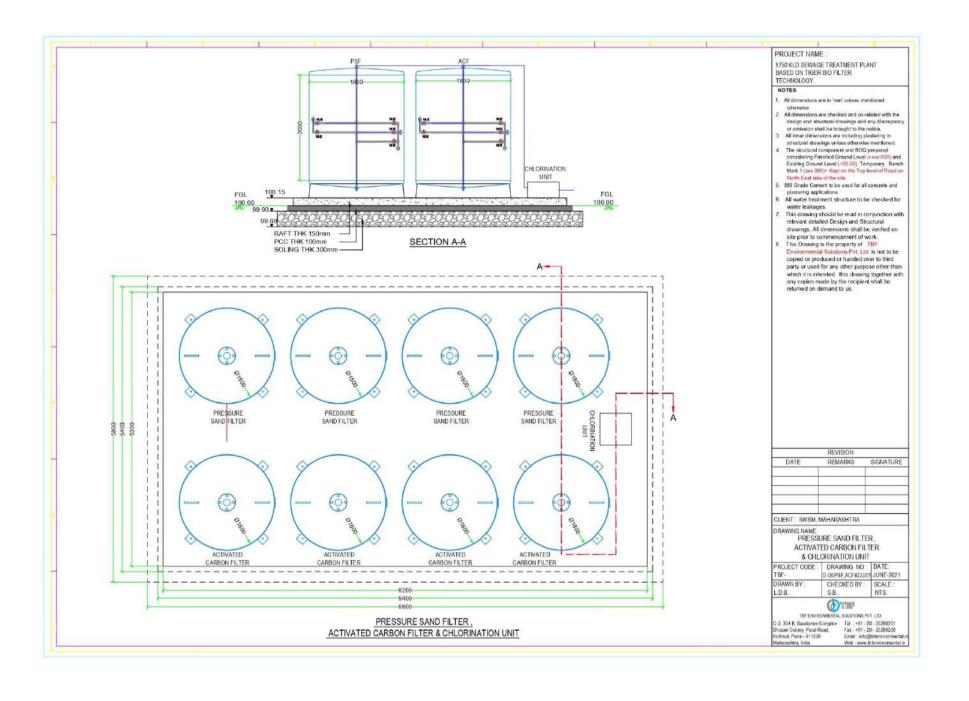












# 2000 KLD STP BASED ON TBF TECHNOLOGY

# PROCESS CALCULATIONS TIGER BIO FILTER OF 2000 KLD CAPACITY

	Design flow	=	2000.00	KLD
		=	2.000	MLD
	Peak flow factor	=	3.00	
1	SCREEN CHANNELS: MANUAL			
-	No. of Manual Screen	=	1	No.
	Average Flow	=	2.00	MLD
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
	· ·	=	6.00	MLD
		=	250.00	m³/hr
		=	0.069	m³/sec
	Average Flow	=	2.00	MLD
	-	=	83.333	m³/hr
			0.023	m³/sec
	Design Flow in each Screen	=	0.069	m³/sec
	· ·		1	No.
			0.069	m³/sec
	Average Flow in each Screen	=	0.023	m³/sec
			1	No.
		=	0.023	m³/sec
	Maximum Velocity through Screen at Peak Flow	=	1.2	m/sec
	Minimum Velocity through Screen at Average Flow	=	0.6	m/sec
	Clear Area of Opening through	=	0.069	m³/sec
	Screen for Peak Flow		1.0	m/sec
			1.2	m/sec
		=	0.058	m <sup>2</sup>
	Clear Area of Opening through Screen for Average Flow	=	0.023	m³/sec
	ŭ		0.6	m/sec
		=	0.038	$m^2$
	Considering maximum Area of Opening through Screen	=	0.058	$m^2$
	Clear Spacing of Bars	=	10	mm
	Cital Spacing of Dais		10	111111

Thickness of Bars	=	5	mm	
Gross Area of Screen	=	0.058x(10+5)/10 0.087	$m^2$	
Assuming Depth of Screen Channel	=	300.00	mm	
Gross Width of Screen	=	0.087/0.3		
	=	0.290	m	
No. of Bars	=	(Gross Width of Screen of Bars) - 1		Center Spacing
	=	0.29/((10+5)/1000) -1		
	=	18.3	Nos.	
Say	=	19	Nos.	
Width of Screen provided	=	(Number of Bars+1) x Bars x Bar Thickness)	•	g + (Number of
	=	(19+1)x10+(19x5)		
Miliately Cons	=	295	mm	
Width Say	=	0.50	m	
Liquid Depth of Screen Channel provided L:B	=	0.30 10.00	m	
	=	5.00	<b>m</b>	
Length of Screen Channel provided	=	5.00	m	Invert Depth
Freeboard provided	=	1.00	m	of incoming sewer
Total Depth of Screen Chamber	=	1.30	m	
Velocity in Channel at Average Flow	=	Average Flow / Cross Channel	Sectional Are	ea of Screen
	=	0.023/((0.5x0.3)/1000	x1000)	
	=	0.153	m/sec	
	>	0.300	m/sec	
Head Loss across Screen				
Head Loss across Screen	=	$0.0728 (V^2 - v^2)$		
V = Velocity through Screen at Peak Flow	=	· ·	g through Scr	
	=	1.150	m/sec	
v = Velocity in approach Channel at Peak Flow	=	Peak Flow through Sectional Are	a of Screen C	
	=	0.8	m/sec	
Head Loss across Screen at Peak Flow	=	0.050	m	
Head Loss across Screen at 50% Clogged Condition				
Velocity through Screen at 50% Clogged Condition at Peak Flow	=	2.300	m/sec	
Head Loss across screen at 50% Clogged Condition at Peak Flow	=	0.339	m	
	>	0.300	m/sec	OK

### 2 CONVENTIONAL GRIT CHAMBER: MANUAL

CONVENTIONAL GRIT CHAMBER	: IVI A	_	
No. of Grit Chamber	=	1	
Average Flow	=	2.00	MLD
Peak Flow Factor	=	3.00	
Design Flow	=	Peak Flow	
Peak Flow	=	6.00	MLD
	=	6000	m³/day
	=	250	m³/hr
	=	0.069	m³/sec
			,
Design Flow to each Grit Chamber	=	6000/1	
	=	6000	m³/day
	=	250	m³/hr
			m³/sec
	=	0.069	m /sec
According to CDHEEO Manual			
According to CPHEEO Manual Particle Size		0.15	mm
	=		mm
Specific Gravity	=	2.65	
Surface Overflow Rate for 100%			
removal efficiency in an ideal Grit	=	Settling Velocity of	of the minimum size of Particles to
Chamber			be removed
	=	1.5	m/s
	=	1296	m³/m²/day
Considering Efficiency of removal		750/	
of desired Particles, $\eta = 75\%$	=	75%	
and Measure of Settling Basin			
Performance,	=	0.125	
n = 1/8 for very good performance			
Design Overflow Rate	=	857	m³/m²/day
Surface Overflow Rate for 0.15 mm			
dia. Particle Size with Specific	=	1555	m³/m²/day
Gravity S <sub>s</sub> > 2.65 Table 5.6			
Considering Design Overflow Rate	=	960	m³/m²/day
Area of Grit Chamber required	=	6000	m³/day
·		960	m³/m²/day
			,
	=	6.25	$m^2$
L:B ratio	=	4	
Length of Chamber provided	=	6.00	m
Width of Chamber provided	=	1.30	m
200 20 200 20 p. 20 day			***
Hydraulic Retention Time (HRT) in		00	
Grit Chamber at Peak Flow	=	60	sec
Volume of Grit Chamber required	=	0.069x60	
•	=	4.14	$m^3$

Depth required in Grit Chamber = 4.14 / (6x1.3)

		=	0.53	m
	Say	=	0.60	m
	Grit Storage Depth	=	0.30	m
	Total Liquid Depth required	=	0.90	m
	Length of Grit Pit	=	0.50	m
	Width of Grit Pit	=	0.50	m
	Depth of Grit Pit	=	0.30	m
	Free Board	=	1.30	m
3	RAW SEWAGE SUMP (WET WELL	_)		
	No. of Units	-, =	1	No.
	Average Flow	=	2.00	MLD
	3 3 3	=	83.333	m³/hr
		=	0.0231	m3/sec
	Dools Flow Footon		2.00	
	Peak Flow Factor	=	3.00	
	Design Flow	=	Peak Flow	
		=	6.00	MLD
		=	250	m³/hr
		=	0.069	m³/sec
	Hydraulic Retention Time (HRT) at			
	Average Flow	=	120	min
	Volume required	=	0.0231 x 120 x 60	
	·	=	166	$m^3$
	Hydraulic Retention Time (HRT) at			
	Peak Flow	=	Volume / Average Flow	
		=	40	min
		<	30	min
	Total Volume of Wet Well	=	166	$m^3$
	Side Water Depth (SWD) provided	=	3.00	m
	Plan Area of Wet Well	=	55.44	$m^2$
	Length/width of Sump required	=	7.45	m
	Length/width of Sump provided	=	7.50	m
	Volume of Sump provided	=	168.75	$m^3$
	Length of Pump Pit	=	2.00	m
	Width of Pump Pit	=	0.80	m
	Depth of Pump Pit	=	0.30	m
	Free Board		1.30	m
3.1	DESIGN STATEMENT-RSS E&M			
	Design Considerations			

### 3

Design flow	=	2.00	MLD
	=	2000.00	Cum/Day
Peak flow factor	=	3.00	

### **Pumping machinery**

Friction	factor	for	<b>Fittings</b>	in
_			_	

**Pressure Mains** 

Pressure Mains		
Elbow 90 degrees	=	35
Friction Factor for each	=	1
Friction factor for all	=	35
Elbow 45 degrees	=	0
Friction Factor for each	=	0.75
Friction factor for all	=	0
Elbow 22 degrees	=	0
Friction Factor for each	=	0.5
Friction factor for all	=	0
Tee 90 degrees	=	0
Friction Factor for each	=	1.5
Friction factor for all	=	0
Tee in straight pipe	=	20
Friction Factor for each	=	0.3
Friction factor for all	=	6
Gate valve open	=	1
Friction Factor for each	=	0.4
Friction factor for all	=	0.4
Swing check	=	1
Friction Factor for each	=	2.5
Friction factor for all	=	2.5
Total friction factor	=	43.9

Total friction factor	=	43.9		
Stage		low	ave	peak
Average flow, cum / day	=		2000.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	1200	2000	4000
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	0.6	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0347	0.0347	0.0463
Dia needed, m	=	0.210	0.210	0.243
Dia needed, mm	=	210	210	243
Dia provided, mm (User)	=	225	225	225
Radius, m	=	0.113	0.113	0.113
Radius power 0.63	=	0.252	0.252	0.252
S power 0.54	=	0.020	0.033	0.050
S	=	0.001	0.002	0.004
Slope 1 in	=	1398.1	542.9	256.2
length, m	=	100	100	100
Friction in pipeline, m	=	0.1	0.2	0.4
Velocity head, m	=	0.018	0.051	0.115
Friction factor in fittings	=	43.9	43.9	43.9
Friction in fittings, m	=	8.0	2.2	5.0
Static lift, m	=	5.0	5.0	5.0
Total head, m	=	5.8	7.2	10.0
Efficiency of pumpset	=	8.0	8.0	0.8
Discharge, lps	=	20.8	34.7	69.4
Discharge, Cum/Hr	=	75.0	125.0	250.0

	Kw required	=	3.225	5.375	10.751
	HP required	=	4.5	7.5	14.5
	Number of Pumps	=	2	2	2
	·				
4	TIGER BIO FILTER				
	DESIGN STATEMENT-TBF1- 50	KLD			
	Number of pumping hours	=	16	Hrs	
	Number of BMF tanks provided	=	40	Nos	
	Design flow to each tank	=	50.00	Cum/day	
	C	=	3.13	Cum/ Hr for 16	Hr
		=	0.87	lps	
				·	
	Inlet BOD	=	250.00	mg/l	
	Inlet TSS	=	400.00	mg/l	
	BOD load applied	=	12.5	kg/day	
	BOD uptake rate	=	0.1	Kg of BOD / Kg of worms	(0.5 - 1.0)
	Worms required	=	125	Kg worms	
	Sewage application rate	=	1.85	Cum/Sqm/day	(1 - 2 Cum/Sqm/day)
	Area required	=	27.03	Sqm	
	Area Provided	=	28	Sqm	
	Area of each crate	=	0.4	Sqm	
	Number of crates	=	70	Nos	
	say	=	72	Nos	
	Crate in longitudinal direction	=	18	Nos	
	Crate in travers direction	=	4	Nos	
	crates provided	=	72	Nos	OK
	Width provided	=	4.00	m	
	Length required	=	11.00	m	
	Depth provided	=	1.2	m	
5	TERTIARY TREATMENT UNIT				
	Design Considerations				
	Design flow	=	2.00	MLD	
	2001g.i. ii.d.ii	=	2000.00	Cum/Day	
	Peak flow factor	=	3.00		
5.1	FILTER FEED TANK				
	Number of FFT provided	=	1	Nos	
	Number of operating hours	=	16	Hrs	
	Design flow	=	2000.00	Cum/Day	
		=	125.00	Cum/Hr	
		=	0.03472	Cum/Sec	
	Hydraulic Retention time	=	60	min	
	Volume required	=	125.00	Cum	
	Depth	=	3.00	m	
	Civil Tanks				
	Area	=	41.67	Sqm	

Length/Width required	=	6.46	m
Length/Width provided	=	6.50	m
Freeboard provided	=	0.50	m
Volume Provided		126.75	Cum

Dia needed, m

Radius, m

S power 0.54

Dia needed, mm

Radius power 0.63

Dia provided, mm (User)

DESIGN STATEMENT-TTU E&I	M			
Design Considerations				
Design flow	=	2.00	MLD	
-	=	2000.00	Cum/Day	
Peak flow factor	=	3.00	•	
Pumping machinery				
Friction factor for Fittings in Pressure Mains				
Elbow 90 degrees	=	10		
Friction Factor for each	=	1		
Friction factor for all	=	10		
Elbow 45 degrees	=	0		
Friction Factor for each	=	0.75		
Friction factor for all	=	0		
Elbow 22 degrees	=	0		
Friction Factor for each	=	0.5		
Friction factor for all	=	0		
Tee 90 degrees	=	0		
Friction Factor for each	=	1.5		
Friction factor for all	=	0		
Tee in straight pipe	=	10		
Friction Factor for each	=	0.3		
Friction factor for all	=	3		
Gate valve open	=	1		
Friction Factor for each	=	0.4		
Friction factor for all	=	0.4		
Swing check	=	1		
Friction Factor for each	=	2.5		
Friction factor for all	=	2.5		
Total friction factor	=	15.9		
Stage		low	ave	peak
Average flow, cum / day	=		2000.00	
Proportion	=	0.6	1	2
Design flow, cum / day	=	1200	2000	4000
Hazen Williams C	=	140	140	140
Desired velocity, m/s	=	8.0	1.0	1.5
Number of Pumping hours	=	16.0	16.0	16.0
Area needed, sqm	=	0.0260	0.0347	0.0463
		0.400		0 0 1 -

0.182

182

225

0.113

0.252

0.027

=

=

=

=

=

0.210

210

225

0.113

0.252

0.033

0.243

243

225

0.113

0.252

0.050

	S	=	0.001	0.002	0.004
	Slope 1 in	=	820.7	542.9	256.2
	length, m	=	45	45	45
	Friction in pipeline, m	=	0.1	0.1	0.2
	Velocity head, m	=	0.033	0.051	0.115
	Frction factor in fittings	=	15.9	15.9	15.9
	Friction in fittings, m	=	0.5	0.8	1.8
	Static lift, m	=	12.0	12.0	12.0
	Total head, m	=	12.5	12.8	13.8
	Efficiency of pumpset	=	0.8	0.8	0.8
	Discharge, lps	=	20.8	34.7	69.4
	Discharge, Cum/Hr	=	75.0	125.0	250.0
	Kw required	=	5.529	9.215	18.430
	HP provided	=	7.5	12.5	25.0
	Number of Pumps	=	2	2	2
	ramber of rampo	_	2	_	_
5.2	PRESSURE SAND FILTER				
	Number of unit provided	=	4	Nos.	
	Designed @ 16 hrs working for				
	flow of	=	31.25	m3/h	
	Loading rate	=	12.00	m3/m2/h	
	Area of DMF	=	2.60	m2	
	Dia of DMF	=	1.82	m	
	Provided	=	1.900	m	
	Backwash water				
	Backwash velocity	=	15.00	m/hr	
	backwash flowrate	=	40.74	m3/h	
	Backwash volume for 20 mins	=	13.58	m3	
5.3	ACTIVATED CARBON FILTER				
0.0	Number of unit provided	=	4	Nos.	
	Designed @ 16 hrs working for	_	7	NOS.	
	flow of	=	31.25	m3/h	
	Loading rate	=	12.00	m3/m2/h	
	Area of ACF	=	2.60	m2	
	Dia of ACF	=	1.82	m	
	Provided	=	1.900	m	
	Backwash water				
	Backwash velocity	=	15.00	m/hr	
	backwash flowrate	=	40.74	m3/h	
	Backwash volume for 20 mins	=	13.58	m3	
- 4					
5.4	CHLORINE DOSING SYSTEM				
	NaOCI DOSING SYSTEM		125.00	m3/hr	
	Average Flow	=	125.00	1113/111	
	Design Chlorine Dosage (Max)		3	mg/l	
	besign chilotine bosage (Max)	=	J	mg/i	
	Concentration of Chlorine in		10%		
	commercially available NaOCl	=			
	Design NaOCl Dosage		30	mg/l	
		=			

Operating hours	=	16.0	hr
Quantity of NaOCI required		125 X 30 X	16 / 1000
	=	60.00	Kg/day
Design Strength of NaOCI Solution		100%	
Volume of NaOCI Solution	=	60 / (1 X	1000)
	=	0.060	m3
No. of Dosing Tanks provided	=	1	Nos.
Volume of each Dosing Tank	=	0.06 / 1	
	=	0.06	m3
	=	100	Litres
No. of Working NaOCI Dosing Pump provided	=	1	No.
Capacity of each NaOCI Dosing Pump required	=	Total Volume of Na (No. of Dosin 0.06 / (1 X 16)	
	=	0.004	m3/hr
	=	4.00	LPH
Capacity of each NaOCI Dosing Pump provided	=	4.00	LPH
No. of Standby NaOCl Dosing Pump provided	=	1	No.

# SIZING DETAILS (CIVIL) TIGER BIO FILTER OF 2000 KLD CAPACITY

S I.	Unit name	N o	Leng th	Widt h		Height		So	oling	P(	cc	Ra	oft	RCC Wall thk	Bric k Wall	Slab Thk	Steel - HCR
0		S			SW	FB	Tota	offs	Thk	offs	Thk	offs	Thk	<b>5</b>	thk Wall		M/
		N	m	m	m	m	m	m	m	m	m	m	m	m	m	m	Kg/C
1	Screen Chamber	1	5.0	0.5	0.3	1.0	1.3	0.2	0.3	0.1	0.1	0.2	0.1	0.1			80
2	Grit Chamber	1	6.0	1.3	0.9	1.3	2.2	0.2	0.3	0.1	0.1	0.2	0.2	0.1			80
3	Raw Sewage Sump	1	7.5	7.5	3.0	1.3	4.3	0.2	0.3	0.1	0.1	0.2	0.4	0.3		0.2	100
4	TBF Bed 50 KLD	4	11.0	4.0			1.2	0.2	0.3	0.1	0.1	0.2	0.1		0.2		60
5	Filter Feed tank	1	6.5	6.5	3.0	0.5	3.5	0.2	0.3	0.1	0.1	0.2	0.4	0.3		0.2	100
6	Filter Platform	1	9.2	5.0				0.2	0.3	0.1	0.1	0.2	0.1				80

#### Assumptions

Incoming Sewer Invert 1.0 m Below Ground level
Method of excavation Mechanical means

Undergraound		soil	Muru	Soft roc	har d	Tota
0.0 to 1.5 m	=	25	25	25	25	100
1.5 m to 3.0 m	=	25	25	25	25	100
3.0 to 4.5 m	=	25	25	25	25	100
4.5 to 6.0	=	25	25	25	25	100

## TIGER BIO FILTER OF 2000 KLD CAPACITY BILL OF QUANTITIES

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
1	Excavation for foundation / pipe trenches in				
	earth, soils of all types, sand, gravel and				
	soft murum, including removing the				
	excavated material upto a distance of 50				
	metres and lifts as below, stacking and spreading as directed, normal dewatering,				
	preparing the bed for foundation and				
	excluding backfilling, etc. complete. (Bd-A-				
	1/259)				
	0.0 to 1.5 m	466.46	Cum	150.00	69,969.00
	1.5 to 3.0 m	85.57	Cum	164.00	14,033.50
	3.0 to 4.5 m	67.54	Cum	178.00	12,022.20
	4.5 to 6.0 m	14.12	Cum	192.00	2,711.10
	MJP/ SSR/ 2021-22 / Section E /				
	Excavation Item No.1/ Page no. 42				
2	Excavation for foundation / pipe trenches in				
_	hard murum and boulders, W.B.M. road				
	including removing the excavated material				
	upto a distance of 50 M beyond the area and				
	lifts as below, stacking and spreading as				
	directed by Engineer-in-charge, normal				
	dewatering, preparing the bed for foundation				
	and excluding backfilling, etc. complete. (Bd-A-3/259)			0.00	
	0.0 to 1.5 m	466.46	Cum	8.00 192.00	89,560.40
	1.5 to 3.0 m	85.57	Cum	206.00	17,627.50
	3.0 to 4.5 m	67.54	Cum	220.00	14,858.80
	4.5 to 6.0 m	14.12	Cum	234.00	3,304.10
	MJP/ SSR/ 2021-22/ Section E/ Excavation				
	Item No.3, Page no. 42				
3	Excavation for foundation / pipe trenches in				
3	soft rock and old cement and lime masonry				
	foundation asphalt road including removing				
	the excavated material upto a distance of 50				
	M beyond the area and lifts as below,				
	stacking as directed by Engineer-in-charge,				
	normal dewatering, preparing the bed for				
	foundation and excluding backfilling, etc. complete. (Bd-A- 4/259)				
	0.0 to 1.5 m	166.16	Cum	F72.00	266 945 20
	1.5 to 3.0 m	466.46 85.57	Cum Cum	572.00 597.00	266,815.20 51,085.30
	3.0 to 4.5 m	67.54	Cum	622.00	42,009.90
	4.5 to 6.0 m	14.12	Cum	647.00	9,135.70
	MJP/ SSR/ 2021-22 / Section E/				,
	Excavation Item No.5, Page no. 42				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
4	Excavation for foundation / pipe trenches in hard rock and concrete road by chiselling, wedging, line drilling by mechanical means or by all means other than blasting including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the area and lifts as below, stacking as directed by Engineer-in-charge, normal dewatering, excluding backfilling, etc.				
	complete by all means. (Bd-A-6/259)	400.40	Cum	4 047 00	474 200 00
	0.0 to 1.5 m 1.5 to 3.0 m	466.46 85.57	Cum Cum	1,017.00 1,042.00	474,389.90 89,164.00
	3.0 to 4.5 m	67.54	Cum	1,067.00	72,065.20
	4.5 to 6.0 m	14.12	Cum	1,092.00	15,419.10
	MJP/ SSR/ 2021-22 / Section E/ Excavation Item No.7, Page no. 43			,	-, -
5	Providing dry trap/ granite/ quartzite/ gneiss, rubble stone soling in 15 cm to 20 cm thick layers including hand packing and compacting, etc. complete. (Bd-A-12/264)  MJP/ SSR/ 2021-22 / Section E/ Excavat	884.81	Cum	1,175.00	1,039,651.80
_					
6	Providing and laying in situ Cement Concrete M- 15 of trap/ granite / quartzite / gneiss metal for foundation and bedding including bailing out water, form work, compaction, curing, etc. complete. (Cement 5.90 bags / cum) Spec. No Bd E /1 Page No. 287 and B- 7, Page No. 38	266.11	Cum	5,640.00	1,500,860.40
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.1, Page no.49				
7	Providing and laying in situ Cement Concrete of trap/ granite / quartzite / gneiss metal for RCC work in foundation like raft, grillage, strip foundation and footing of RCC columns and steel stanchions including normal dewatering, form work, compaction, finishing and curing, etc. complete. (By weigh batching and mix design for M250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	292.66	Cum	7,448.00	2,179,731.70
	MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY	202.00	Jann	7,770.00	2,110,101.10
	MIX CONCRETE/ Item No.2, Page no. 49				
	J				

Providing and casting in situ C.C. of trap /				
granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	5.04	CIE	8 624 00	43,465.00
For Beams / Braces / Lintels In RCC M-300	5.04	Cum	0,024.00	43,465.00
MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50				
Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)	22.00	Cum	9,247.00	203,434.00
Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300	22.00	Cuili	3,2 17.00	200, 10 1.00
MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.5, / Page no. 50				
	drawings and designs or as directed by Engineer-in-charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)  For Beams / Braces / Lintels In RCC M-300  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50  Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in-charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)  Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY	drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)  For Beams / Braces / Lintels In RCC M-300  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY MIX CONCRETE Item No.4, Page no. 50  Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)  Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY	drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)  For Beams / Braces / Lintels In RCC M-300  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY  MIX CONCRETE Item No.4, Page no. 50  Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)  Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY	drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)  For Beams / Braces / Lintels In RCC M-300  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY  MIX CONCRETE Item No.4, Page no. 50  Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.) (Excluding M.S. or Tor reinforcement)  Slabs / Landings / Vertical Walls / Waist Slabs / Steps for Staircase In RCC M-300  MJP/ SSR/ 2021-22 / SECTION - G: PLAIN REINFORCED CEMENT CONCRETE, READY

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
10	Providing and casting in situ C.C. of trap / granite/ quartzite / gneiss metal of approved quality for RCC works as per detailed drawings and designs or as directed by Engineer-in- charge including normal dewatering, centering, form work, compaction, finishing the formed surfaces with C.M. 1:3 of sufficient minimum thickness to give a smooth and even surface wherever necessary or roughening if special finish is to be provided and curing, etc. complete. (By weigh batching and mix design for M-250 and M-300 only. Use of L&T, A.C.C., Ambuja, Birla Gold, Manikgad, Rajashree, etc. cement is permitted.)				
	(Excluding M.S. or Tor reinforcement)  Chajjas / Parapets / Curtain Walls	76.37	Cum	9,218.00	703,978.70
	/Partition Walls / Pardies In RCC M-300  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY  MIX CONCRETE Item No.6 / Page no. 51				
11	Providing and fixing in position steel bar reinforcement of various diameters for RCC piles, caps, footings, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, copings, fins, arches, etc. as per detailed designs, drawings and schedules; including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required, etc. complete (including cost of binding wire). (Bd-F-17/306)				
	c) Corrosion Resistant Steel (Fe 500)  MJP/ SSR/ 2021-22 / SECTION - G : PLAIN REINFORCED CEMENT CONCRETE, READY  MIX CONCRETE Item No.8 / Page no. 52	30.25	MT	70,658.00	2,137,404.50
12	Providing and fixing mild steel grill work for windows/ ventilators of 20 Kg/Sqm. As per drawings including necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting, etc. complete. (Bd-U- 1/537)  MJP/ SSR/ 2021-22 / SECTION - F: IRON	19.46	Sqm	1,895.00	36,876.70
	AND STRUCTURAL STEEL WORK Item No.1 / Page				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
13	Providing structural steel work in rolled stanchions fixed with connecting plates or angle cleats as in main and cross beams, hip and jack rafters, purlins connecting to truss members and like as per detailed designs and drawings or as directed by Engineer-incharge including cutting, fabricating, hoisting, erecting, fixing in position, making riveted / bolted / welded connections and one coat of anticorrosive paint and over it two coats of oil painting, etc. complete. (Bd-C- 3/275)  MJP/ SSR/ 2021-22 / SECTION - F :: IRON AND STRUCTURAL STEEL WORK Item No.3,	29.88	MT	71,286.00	2,130,139.80
	•				
14	Providing and fixing corrugated galvanised iron sheets of 0.63 mm thick (24B .W .G.) for roofing without wind tiles including fastening with galvanised iron screws and bolts , lead and bitumen washers as per drawing etc. complete. (Weight of 5.5 kg/sq.m.).	3016.00	Sqm	777.00	2,343,432.00
	PWD / SSR 2020-21 / Roofing and Ceiling SSR Item No.38.04 Reference No. Bd.R.5, Page No. 453 Item No.1133, Page no. 224		•		
15	Providing fly ash brick masonry with conventional / I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete	594.80	Cum	6,305.00	3,750,214.00
	PWD / SSR 2020-21 / Brick Masonry SSR Item No.27.13 Reference No. As director by engineer incharge and BDG- 2 and 5 Item No.893, Page no. 190				
16	Providing internal cement plaster 12 mm thick in single coat in cement mortar 1:5 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.03 Reference No. Bd. L.2 Page No. 368 Item No.950, Page no. 201	3266.00	Sqm	257.00	839,362.00
	1 age 110. 201				

Providing rough cast cement plaster externally in two coats to concrete, brick or				Amount (Rs.)
stone masonry surfaces in all positions with base coat of 12 to 15 mm thick in C.M. 1:4 and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding				
and fourteen days curing complete.	1900.00	Sqm	529.00	1,005,100.00
Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201				
Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete	1900 00	Sam	10.00	19,000.00
PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411	1300.00	Oqiii	10.00	13,000.00
approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats	1900 00	Sam	8 00	15,200.00
PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412	1000.00	<u> </u>	0.00	10,200100
Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)	280.00	HP/ Hr.	77.00	21,560.00
MJP/ SSR/ 2021-22 / Section E/ Excava	200.00		77.00	21,000.00
Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/	617.37	Cum	84.00	51,859.10
Excava				
Transportation as per STATEMENT VI Including loading, unloading and stacking	2683.73	Cum	604.45	1,622,180.60
	and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201  Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411  Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412  Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)  MJP/ SSR/ 2021-22 / Section E/ Excava  Refilling the trenches with available excavated stuff with soft material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/ Excava	and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201  Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411  Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412  Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)  MJP/ SSR/ 2021-22 / Section E/ Excava  Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/ Excava  Transportation as per STATEMENT VI Including loading, unloading and stacking	and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201  Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411  Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412  Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)  MJP/ SSR/ 2021-22 / Section E/ Excava  Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete.  MJP/ SSR/ 2021-22 / Section E/ Excava  Transportation as per STATEMENT VI Including loading, unloading and stacking  2683.73 Cum	and rough cast treatment 12 mm thick in proportion 1:11 / 2:3 including scaffolding and fourteen days curing complete.  PWD / SSR 2020-21 / Plastering and Pointing SSR Item No. 32.12 Reference No. Bd.L.8 Page No. 370 Item No.957, Page no. 201  Providing and applying white-wash in two coats on old / new plastered or masonry surfaces and asbestos cement sheets including scaffolding and preparing the surface by brushing and brooming down etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item No. 36.03 Reference No. Bd. P. I Page No. 411  Providing and applying colour-wash of approved colour and shade in one coat to new surface including scaffolding, brushing and brooming down (excluding base coats of white wash) etc. complete.  PWD / SSR 2020-21 / Colouring SSR Item No. 36.04 Reference No. Bd. P.2 Page No. 412  Dewatering the excavated trenches and pools of water in the building trenches / pipeline trenches, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge (including cost of machinery, labour, fuel), etc. complete. (Bd-A-9/261)  MJP/ SSR/ 2021-22 / Section E/ Excava  Refilling the trenches with available excavated stuff with soft material first over pipeline and then hard material in 15 cm layers with all leads and lifts including consolidation, surcharging, etc. complete. 617.37 Cum 84.00  MJP/ SSR/ 2021-22 / Section E/ Excava  Transportation as per STATEMENT VI Including loading, unloading and stacking 2683.73 Cum 604.45

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
23	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50				
	mm of 90 degree bend.	0.90	Sqm	35,000.00	31,500.00
24	Grit pump				
	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION - Pumps, Page no. 6, 7of size 1.8 m length				
	1 HP (Up to 9000 LPH)	1.00	No	68,654.00	68,654.00
25	Raw Sewage Pumps				
20	Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22				
	SECTION -				
	15 HP (Up to 132000 LPH)	2.00	Nos	184,154.00	368,308.00
26	TTU Feed pumps Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION -				
	15 HP (Up to 132000 LPH)	2.00	Nos	184,154.00	368,308.00
27	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels.  The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.				
	Dia 1.9 m x 2 m minimum height	4.00	Nos	620,000.00	2,480,000.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
28	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable				
	openings to be provided to ease addition and				
	Dia 1.9 m x 2 m minimum height	4.00	Nos	620,000.00	2,480,000.00
29	NaOCI Chlorinator Pump Diaphragm Type / peristaltic type / Solenoid Max Flow Rate Upto 10LPH Power Source Electric Phase Single Material PP / PTFE(Teflon) Voltage 230 Volt Frequency				
	Mixing Tank of 100 Ltrs capacity	100.00	Ltrs	8.00	800.00
	Dosing Pump	2.00	Nos	15,000.00	30,000.00
30	Control Panel				
	Design, Supply, Installing, Commissioning & Testing of Master PLC control monitoring and communication panel as per IEC 61131 at Pure Water Sump suitable for monitoring and control of pure water Pumps. Pressure Transmitters, Level Transmitter, PH Transmitter, Turbidity Transmitter ,for all pumps installed.  MJP/ MECH/ ELECT / SSR/ 2021-22/	1.00	No	50,041.00	50,041.00
	SECTION 19 - SA [ SCADA & AUTOMATION]				
31	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over load element, and ON - OFF push buttons, with necessary material and connected to supply, etc complete. Starter with original sheet steel encloser.  > 12.5 HP & Up to 20 HP	6.00	nos	8,696.00	52,176.00
	/ 12.0 TIL & UP TO ZUTTE	0.00	1102	0,090.00	JZ, 170.00

Sr.				1	
No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP /MECH/ ELECT/ SSR/ 2021-22				
	SECTION 10 - LG [L.T. SWITCHGEAR AND				
	PROTECTION] Item no. LG 3 Page no. 27				
20	Main mayon ayanlı asılıla				
32	Main power supply cable 3 core PVC insulated, PVC sheathed				
	copper conductor flat submersible cable				
	Supplying and erecting, Flat flexible				
	submersible cable with, Copper Conductor,				
	PVC insulated, and PVC sheathed.				
	3 core 16 sq mm	40.00	m	549.00	21,960.00
				2.0.00	,
33	Power cables				
	Aluminium conductor 4 Core, XLPE /				
	PVC insulated & armoured cable				
	Supplying and erecting, XLPE / PVC				
	insulated, armoured cable 1100 V grade with				
	ISI mark Four core, solid / stranded				
	aluminium conductor with 6 mm thick 25 mm				
	width M.S. spacer with				
	G.I. Earth wire 6 sq mm, complete erected				
	on wall / on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved				
		240.00	m	137.00	32,880.00
	4 Core 6 sq mm  MJP MECH/ ELECT/ SSR/ 2021-22	∠40.00	m	137.00	32,000.00
	SECTION ELECTY SSR/ 2021-22				
	12 - CB [ L.T. CABLE ] Item no. CB 6 Page				
	12 [ 2 2				
34	Control Cables				
	Copper conductor PVC insulated,				
	Unarmoured control cable				
	Supplying and erecting Un-armoured control				
	cable with ISI mark stranded / solid copper				
	conductor 1.1 kV grade complete erected on				
	wall / panel or in provided trench in an				
	approved manner.	0.40.00		407.00	20.000.00
	4 core 2.5 sq mm MJP MECH/ ELECT/ SSR/ 2021-22/	240.00	m	137.00	32,880.00
	SECTION 12 - CB [ L.T. CABLE ] Item no. CB				
	8-				

	Plumbing Items				
Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
35	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges, inspection charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed shed duly protected from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit type to be jointed with cement solvent).				
	<ol> <li>1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only.</li> <li>2) One coupler and required cement solvent shall be provided with each full length pipe</li> </ol>				
	MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C. PIPES, Page no.77				
1	Raw Sewage pump to TBF Distribution				
а	Main header				
	225 mm.	100.00	m	1,969.00	196,900.00
	PVC Specials- 10%				19,690.00
b	Distribution				
	160 mm.	150.00	m	906.00	135,900.00
	PVC Specials- 10%			000.00	13,590.00
	•				,
2	TBF collection to FFT (gravity)				
а	Main header				
	160 mm.	275.00	m	906.00	249,150.00
	PVC Specials- 10%				24,915.00
b	collection tributory				
~	75 mm.	75.00	m	211.00	15,825.00
	PVC Specials- 10%				1,582.50
3	TTU Plumbing				
	225 mm.	45.00	m	1,969.00	88,605.00
	PVC Specials- 10%				8,860.50
4	TBF distribution				
-	75 mm.	200.00	m	211.00	42,200.00
	PVC Specials- 10%	100.00			4,220.00
	·				
36	Labour				
	Plumber	60.00	days	641.00	38,460.00
	Helper	120.00	days	579.00	69,480.00

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
	MJP/ SSR/ 2021-22 / SECTION - B LABOUR & MACHINERY , Page no. 14				
37	Providing double flange sluice valve confirming for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle, caps, including inspection charges, transportation upto departmental store, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete.				
	Sluice valves - PN -1 (Without by pass)				
	Raw Sewage pump	2.22			
	250 mm.	2.00	Nos	28,727.00	57,454.00
	Filter Feed Pump	2.00	Noo	20 727 00	E7 4E4 00
	250 mm.  MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 132	2.00	Nos	28,727.00	57,454.00
38	Providing and supplying ISI mark CI D/F reflux valves (non-return valves) of following dia including railway freight, inspection charges, unloading from railway wagon, loading into truck, transportation upto departmental stores, unloading, stacking excluding GST levied by GOI & GOM in all respect etc. complete. Reflux valves as per I.S.5312 Part I (1984)				
	Without by pass arrangement -PN -1				
	Raw Sewage pump				
	250 mm.	2.00	Nos	30,294.00	60,588.00
	Filter Feed Pump				
	250 mm.  MJP/ SSR/ 2021-22 / SECTION - I(XII) : PIPES APPURTENANCES , Page no. 131	2.00	Nos	30,294.00	60,588.00
	Bio media Items				
39	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation &				
	fixing in position as directed etc. complete.  Market rate	2880.00	Nos	4,750.00	13,680,000.00
4.5					
40	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, MJP/ SSR/ 2021-22 / SECTION- A	273.95	Cum	1,730.00	473,933.50
	MATERIALS				

Sr. No.	Item Description	Qty	Unit	Rate	Amount (Rs.)
41	Trasnsportation Godhara to Pune distance by Road 660 Km.	273.95	Cum	11,031.37	3,022,043.90
	MJP/ SSR/ 2021-22 / SECTION - C : TRANSPORTATION Page no.				
42	Stone Aggregate 20 mm  MJP/ SSR/ 2021-22 / SECTION- A MATERIALS	273.95	Cum	900.00	246,555.00
43	Transportation as per STATEMENT VI Including loading, unloading and stacking				
	Manure or sludge (5.52 Cum) lead 25 Km MJP/ SSR/ 2021-22 / SECTION - C: TRANSPORTATION Page no.	1058.00	Cum	747.48	790,833.90
			NET	TOTAL Rs.	46,263,956.50

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Screen And Grit chamber						
1	Excavation				2.80		
Α	0.0 to 1.5 m	1	9.30	3.60	1.5	50.22	Cum
	soil					12.56	Cum
	Murum					12.56	Cum
	Soft rock					12.56	Cum
	hard rock					12.56	Cum
1	15.00					10.50	
В	1.5 to 3.0 m	1	9.3	3.60	1.3	43.53	Cum
	soil					10.89	Cum
	Murum					10.89	Cum
	Soft rock					10.89	Cum
	hard rock					10.89	Cum
С	3.0 to 4.5 m	1	0.2	2.10	0	0	Cum
U	soil	1	8.3	3.10	0	0	Cum
	Murum					0	Cum Cum
	Soft rock	+				0	Cum
	hard rock	+ +				0	Cum
	TIAID TOCK					U	Culli
D	4.5 to 6.0 m	1	8.3	3.10	0	0	Cum
	soil	'	0.0	3.10	0	0	Cum
	Murum					0	Cum
	Soft rock					0	Cum
	hard rock					0	Cum
						-	
2	Soling						
	Screen	1	6.30	1.30	0.30	2.46	Cum
	Grit	1	7.30	1.30	0.30	2.85	Cum
	extra for grit chamber	1	1.00	0.65	0.30	0.2	
	<u> </u>			Total for gri		3.05	Cum
3	PCC M20						
	Screen	1	5.90	1.10	0.10	0.65	Cum
	Grit	1	6.90	1.30	0.10	0.9	Cum
		1	1.00	0.45	0.20	0.09	Cum
	Internal slope	1	Area	0.55	1.30	0.72	Cum
	Internal slope	1	Area	0.28	1.30	0.36	Cum
				Total for gri	t	2.07	Cum
	-						
4	Raft M30						
	Screen	1	5.70	1.00	0.15	0.86	Cum
	Grit	1	6.70	1.30	0.20	1.75	Cum
		1	1.00	0.35	0.20	0.07	Cum
	DOO W. II			Total for gri	t	1.82	Cum
5	RCC Wall						
	Screen		<b>5</b> 00	0.45	4.50	0.00	
	Long Wall	2	5.30	0.15	1.50	2.39	Cum

Sr.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
No.	item bescription	1405.	L (III)	D (III)	11 (111)	Quantity	Offic
	Short Wall	2	0.80	0.15	1.50	0.36	Cum
				Total for so	creen	2.75	Cum
	Grit						
	Long Wall (extra than screen						
	chamber)	1	1.00	0.15	2.40	0.36	Cum
	Short Wall	2	1.30	0.15	2.40	0.94	Cum
				Total for gr	it	1.3	Cum
6	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
		um	80	Cum	6.73	0.54	MT
7	Fabrication work in Frame and Grating for Access						
	Screen	1	5.30	0.80		4.24	Sqm
	Grit	1	6.30	1.45		9.14	Sqm
					Total	13.38	Sqm
8	Removing excess exacavated material out of site						
	Screen chamber	1	5.30	0.80	1.30	5.52	Cum
	Grit Chamber	1	6.30	1.30	2.20	18.02	Cum
	soling, PCC, Raft volume					9.83	Cum
	Total Volume					33.37	Cum
	bulkage @ 40%					46.72	Cum
9	Refilling and compaction						
	Total Excavation					93.75	Cum
	Deduction for tank volume,		_	_	_		
	soling, PCC, Raft					33.37	Cum
	Refilling and compaction volume					60.38	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Raw Sewage Sump						
1	Excavation				5.10		
Α	0.0 to 1.5 m	1	11.7	11.70	1.5	205.34	Cum
	soil					51.34	Cum
	Murum					51.34	Cum
	Soft rock					51.34	Cum
	hard rock					51.34	Cum
В	1.5 to 3.0 m	1	10.70	10.70	1.5	171.74	Cum
	soil					42.94	Cum
	Murum					42.94	Cum
	Soft rock					42.94	Cum
	hard rock					42.94	Cum
С	3.0 to 4.5 m	1	10.70	10.70	1.5	171.74	Cum

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	soil					42.94	Cum
	Murum					42.94	Cum
	Soft rock					42.94	Cum
	hard rock					42.94	Cum
D	4.5 to 6.0 m	1	9.70	9.70	0.6	56.46	Cum
	soil					14.12	Cum
	Murum					14.12	Cum
	Soft rock					14.12	Cum
	hard rock					14.12	Cum
2	Soling						
	RSS	1	9.10	9.10	0.30	24.85	Cum
	1.00	'	0.10	0.10	0.00	24.00	Cum
3	PCC M20						
	RSS	1	8.70	8.70	0.10	7.57	Cum
4	Raft M30						
	RSS	1	8.50	8.50	0.40	28.9	Cum
5	RCC Wall						
	Long Wall	2	8.10	0.30	4.50	21.87	Cum
	Short Wall	2	7.50	0.30	4.50	20.25	Cum
					Total	42.12	Cum
	_						
6	Beams						
	Beam 1	3	7.50	0.2	0.3	1.35	Cum
	Beam 2	3	7.50	0.2	0.3	1.35	Cum
					Total	2.7	Cum
7	Slab	1	8.10	8.10	0.2	13.13	Cum
	Deduction for manhole	-2	2.20	1.00	0.2	-0.88	Cum
	Deddelleri for marmole		2.20	1.00	Total	12.25	Cum
					· otal	.2.20	- Cum
	Steel - HCRM / CRS @ Kg/Cum	Kg/C					
8	ğ	um	100	Cum	85.97	8.6	MT
9	Fabrication work in Frame and						
9	Grating for Access						
	RSS	2	2.20	1.00		4.4	Sqm
10	Removing excess exacavated						
	material out of site		0.10	0.40	4.00	000.10	_
	RSS	1	8.10	8.10	4.30	282.13	Cum
	soling, PCC, Raft volume					61.32	Cum
	Total Volume					343.45	Cum
	bulkage @ 40%					480.83	Cum
11	Refilling and compaction						
1.1	Neilling and compaction						

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	Total Excavation					605.28	Cum
	Deduction for tank volume, soling, PCC, Raft					343.45	Cum
	Refilling and compaction volume					261.83	Cum
12	Dewatering						
	35 Days x 4 hours/day	days	35	hours / day	4	140	Hrs

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	TIGER BIO FILTER						
1	Excavation				0.50		
Α	0.0 to 1.5 m	1	12.66	5.66	0.5	35.83	Cum
	soil					8.96	Cum
	Murum					8.96	Cum
	Soft rock					8.96	Cum
	hard rock					8.96	Cum
2	Soling	4	40.40	<b>5</b> 40	0.00	00.44	0
	TBF	1	12.46	5.46	0.30	20.41	Cum
3	PCC M20						
3	TBF	1	12.06	5.06	0.10	6.11	Cum
	IDF	'	12.00	5.06	0.10	0.11	Cum
4	Raft M30	1					
	TBF	1	11.86	4.86	0.10	5.77	Cum
		+ '	11.00	7.00	0.10	5.11	Juili
5	Brick Wall	+ +					
	TBF						
	Long Wall	2	11.46	0.23	1.20	6.33	Cum
	Short Wall	2	4.00	0.23	1.20	2.21	Cum
	Crate Support Wall	5	11.00	0.23	0.50	6.33	Cum
					Total for	T 14.87	Cum
6	Plaster						
	Internal						
	Crate Support Wall						
	Long Wall	6	11.00		0.50	33	Sqm
	Wall top	5	11.00		0.23	12.65	Sqm
	Long Wall	2	11.00		1.20	26.4	Sqm
	Short Wall	2	4.00		1.20	9.6	Sqm
	Enternal				Total	81.65	Sqm
	External		44.40		4.00	07.54	C
	Long Wall	2	11.46		1.20	27.51	Sqm
	Short Wall	2	4.46	0.0	1.20	10.71	Sqm
	Wall Top	1	30.92	0.3	Total	9.28 47.50	Sqm
		+ +			TUIAI	47.50	Sqm
7	External-white-wash	1				47.50	Sqm
	EAGITIAL WILLE-WASII	+ '				71.30	ЭЧП
8	External-colour-wash	1				47.50	Sqm
	External colour wash	† '				77.50	- Sqiii
		Kg/C					
9	Steel - HCRM / CRS @ Kg/Cum	um	60	Cum	5.77	0.35	MT
					<u> </u>	3.03	
40	Removing excess exacavated						
10	material out of site						
	soling, PCC, Raft volume					32.29	Cum
	Total Volume					32.29	Cum
	bulkage @ 40%					45.21	Cum

#### **MEASUREMENT SHEET - TIGER BIO FILTER**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
11	Refilling and compaction						
	Total Excavation					35.83	Cum
	Deduction for tank volume, soling, PCC, Raft					32.29	Cum
	Refilling and compaction volume					3.54	Cum
12	MS Fabricated Shed						
	TBF-II Shed in Fabrication work Shed Size-12 m X 5 m x		12.00	5.00	3.00		
	for column 50*50*5 Unit Weight 6.97 kg/m	10	3.00	6.97	kg/m	209.10	KG
	for truss 50*50*3 Unit Weight 3.71 kg/m	5	5.00	3.71	kg/m	92.75	KG
	for principle rafter 50*50*3 Unit Weight	10	2.90	3.71	kg/m	107.59	KG
	for strut rafter 50*50*3 Unit Weight 3.71 kg/m	10	0.20	3.71	kg/m	7.42	KG
	for central strut rafter 50*50*3 Unit Weight	5	0.30	3.71	kg/m	5.57	KG
	for bottom frame below truss 50*50*3 Unit Weight 3.71 kg/m	1	34.00	3.71	kg/m	126.14	KG
	for perlin 30*30*3 Unit Weight 2.51 kg/m	5	13.00	2.51	kg/m	163.15	KG
	for Base Plate 150*150*10 mm	20	0.15	0.15	0.010	35.33	KG
					Total Wei	747.04	Kg
						0.75	MT
13	corrugated galvanised iron sheets	2	13.00	2.90		75.4	Sqm

#### MEASUREMENT SHEET - FILTER FEED TANK

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER FEED TANK						
1	Excavation				4.30		
Α	0.0 to 1.5 m	1	9.7	9.70	1.5	141.14	Cum
	soil					35.29	Cum
	Murum					35.29	Cum
	Soft rock					35.29	Cum
	hard rock					35.29	Cum
В	1.5 to 3.0 m	1	9.20	9.20	1.5	126.96	Cum
	soil					31.74	Cum
	Murum					31.74	Cum
	Soft rock					31.74	Cum
	hard rock					31.74	Cum
С	3.0 to 4.5 m	1	8.70	8.70	1.3	98.4	Cum
	soil					24.6	Cum
	Murum					24.6	Cum
	Soft rock					24.6	Cum
	hard rock					24.6	Cum
	4.5 to C.O. m	1	0.70	0.70	0	0	Cum
D	4.5 to 6.0 m	1	8.70	8.70	0	0	Cum
	soil						Cum
	Murum					0	Cum
	Soft rock hard rock					0	Cum Cum
	TIAIU TOCK					U	Cum
2	Soling						
	FFT	1	8.10	8.10	0.30	19.69	Cum
3	PCC M20						
	FFT	1	7.70	7.70	0.10	5.93	Cum
4	Raft M30						
-4	FFT	1	7.50	7.50	0.40	22.5	Cum
	ГГІ		7.50	7.50	0.40	22.3	Cum
5	RCC Wall						
	Long Wall	2	7.10	0.30	3.70	15.77	Cum
	Short Wall	2	6.50	0.30	3.70	14.43	Cum
		_			Total	30.2	Cum
6	Beams						
	Beam 1	3	6.50	0.2	0.3	1.17	Cum
	Beam 2	3	6.50	0.2	0.3	1.17	Cum
					Total	2.34	Cum
7	Slab	1	7.10	7.10	0.2	10.09	Cum
	Deduction for manhole	-	1.20	0.70	0.2	-0.34	Cum
					Total	9.75	Cum

#### **MEASUREMENT SHEET - FILTER FEED TANK**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
8	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	100	Cum	64.79	6.48	MT
9	Fabrication work in Frame and Grating for Access						
	FFT	2	1.20	0.70		1.68	Sqm
10	Removing excess exacavated material out of site						
	FFT	1	7.10	7.10	3.50	176.44	Cum
	soling, PCC, Raft volume					48.12	Cum
	Total Volume					224.56	Cum
	bulkage @ 40%					314.39	Cum
11	Refilling and compaction						
	Total Excavation					366.5	Cum
	Deduction for tank volume, soling, PCC, Raft					224.56	Cum
	Refilling and compaction volume					141.94	Cum
12	Dewatering						
	35 Days x 4 hours/day	days	35	hours/day	4	140	Hrs

#### **MEASUREMENT SHEET - FILTER PLATFORM**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
	FILTER PLATFORM						
1	Excavation				0.55		
Α	0.0 to 1.5 m	1	10.4	6.20	0.55	35.47	Cum
	soil					8.87	Cum
	Murum					8.87	Cum
	Soft rock					8.87	Cum
	hard rock					8.87	Cum
2	Soling						
	Filter Platform	1	10.20	6.00	0.30	18.36	Cum
3	PCC M20						
	Filter Platform	1	9.80	5.60	0.10	5.49	Cum
4	Raft M30						
	Filter Platform	1	9.60	5.40	0.15	7.78	Cum
5	Steel - HCRM / CRS @ Kg/Cum	Kg/C um	80	Cum	7.78	0.63	MT
6	Removing excess exacavated material out of site						
	soling and PCC volume					23.85	Cum
	Total Volume					23.85	Cum
	bulkage @ 40%					33.39	Cum
7	Refilling and compaction	+ +					
	Total Excavation					35.47	Cum
	Deduction for tank volume, soling, PCC, Raft					23.85	Cum
	Refilling and compaction volume					11.62	Cum

#### **MEASUREMENT SHEET - BIO MEDIA**

Sr. No.	Item Description	Nos.	L (m)	B (m)	H (m)	Quantity	Unit
1	Supplying of Specially designed container for holding Filter media including Lightweight Expanded Clay Aggregates size (8-30 mm) and Bio media including mixture of woodchips Vermicompost, cocopeat and bacterial culture with special worms per designed quantity including transportation & fixing in position as directed etc.	2880				2880	Nos
2	Rapid sand Gravity filter sand At Source (Godhara, Gokak, Kanhan, Yesagi sand)	2880	0.82	0.58	0.2	273.95	Cum
3	Trasnsportation Godhara to					273.95	Cum
4	Stone Aggregate 20 mm	2880	0.82	0.58	0.2	273.95	Cum
5	Transportation as per STATEMENT VI Including loading,						
	Manure or sludge (5.52 Cum) lead	2880	0.82	0.56	0.8	1058	Cum

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr. No.	Item Description	Nos.	Unit
1	Screen (Manual) of size 1.8 m length x 0.5 m width of SS 304 MOC and Manual hand rake for cleaning screen of SS handle 1 m in length and cleaning area of 6 nos 5 mm SS rod of total length 200 mm straight and 50 mm of 90 degree bend.	1	No
2	Crit numn		
2	Grit pump  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7of size		
	1.8 m length x0.5 m width of SS304 MOC		
	1 HP (Up to 9000 LPH)	1	No
	David Carrier David		
3	Raw Sewage Pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	15 HP (Up to 132000 LPH)	2	Nos
4	TTU Feed pumps  Supplying Non-clog Submersible Pump suitable for sewage/ Liquid waste application with standard MOC and given duty points as below  MJP/ MECH/ ELECT/ SSR/ 2021-22 SECTION - Pumps, Page no. 6, 7		
	15 HP (Up to 132000 LPH)	2	Nos
5	Pressure Sand Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of filter sand 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of sand during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.9 m x 2 m minimum height	4	Nos
6	Activated Carbon Filter of FRP / MSEP vessel with suitable thickness to withstand a water pressure including MPV or 5 Valve system and PVC / UPVC / MSEP interconnecting and underdrain piping including fittings, with standard filter media layer with minimum depth of Activated Carbon 1.0 m supported by gravels. The piping arrangement should provide sufficient pressure for backwash operations and avoid loss of Activated carbon during backwash operation. Suitable openings to be provided to ease addition and removal the media.		
	Dia 1.9 m x 2 m minimum height	4	Nos
	Dura All Tablet Oblevington a contribut	^	
7	PurAll Tablet Chlorinator + cartridge	0	nos

#### **MEASUREMENT SHEET - ELECTROMECHANICAL WORKS**

Sr.	Item Description	Nos.	Unit
No.	·	1405.	Offic
7	NaOCI Chlorinator		
	Pump Diaphragm Type / peristaltic type / Solenoid		
	Max Flow Rate Upto 10LPH Power Source Electric		
	Phase Single		
	Material PP / PTFE(Teflon)		
	Voltage 230 Volt Frequency		
	50Hz		
а	Mixing Tank of 100 Ltrs capacity	1	Nos
b	Dosing Pump	2	Nos
8	Control Panel		
	Design, Supply, Installing, Commissioning & Testing of Master PLC control		
	monitoring and communication panel as per IEC 61131 at Pure Water Sump		
	suitable for monitoring and control of pure water Pumps. Pressure Transmitters,		
	Level Transmitter, PH Transmitter, Turbidity Transmitter ,for all pumps installed.		
	Mostor DLC Donal	4	NI-
	Master PLC Panel  MID/ MECH/ ELECT / SSB/ 2021-22/ SECTION 10 SA LSCADA 8	1	No
	MJP/ MECH/ ELECT / SSR/ 2021-22/ SECTION 19 - SA [ SCADA & AUTOMATION ] Item no. 2.7 Page no. 72		
	AUTOMATION   Item filo. 2.7 Fage filo. 72		
9	Supplying and erecting Fully Automatic Star Delta starter to operate squirrel cage		
	induction motor working on 380- 440 Volt, 3 phase, 50 Hz with no volt coil, over		
	load element, and ON - OFF push buttons, with necessary material and		
	connected to supply, etc complete. Starter with original sheet steel encloser.		
	> 12.5 HP & Up to 20 HP	6	nos
	1 nos extra starter considered as spare.		
	MJP /MECH/ ELECT/ SSR/ 2021-22 SECTION 10 - LG [L.T. SWITCHGEAR		
	AND PROTECTION] Item no. LG 3 Page no. 27		
10			
10	Main power supply cable		
	3 core PVC insulated, PVC sheathed copper conductor flat submersible cable		
	Supplying and procting. Flat flevible submersible cable with Copper Conductor		
	Supplying and erecting, Flat flexible submersible cable with, Copper Conductor, PVC insulated, and PVC sheathed.		
	3 core 16 sq mm	40	m
	0 00.0 10 04 mm	+0	
11	Power cables		
	Aluminium conductor 4 Core, XLPE / PVC insulated & armoured cable		
	Supplying and erecting, XLPE / PVC insulated, armoured cable 1100 V grade		
	with ISI mark Four core, solid / stranded aluminium conductor with 6 mm thick 25		
	mm width M.S. spacer with G.I. Earth wire 6 sq mm, complete erected on wall /		
	on pole with 25 X 3 mm M.S. clamps or in provided trench in an approved		
	manner.		
	4 Core 6 sq mm	240	m
	MJP MECH/ ELECT/ SSR/ 2021-22 SECTION 12 - CB [ L.T. CABLE ] Item no.		
	CB 6 Page no. 35		
40	Control Cables		
12			
	Copper conductor PVC insulated, Unarmoured control cable		

#### MEASUREMENT SHEET - ELECTROMECHANICAL WORKS

Sr. No.	Item Description	Nos.	Unit
	Supplying and erecting Un-armoured control cable with ISI mark stranded / solid copper conductor 1.1 kV grade complete erected on wall / panel or in provided trench in an approved manner.		
	4 core 2.5 sq mm	240	m
	MJP MECH/ ELECT/ SSR/ 2021-22/ SECTION 12 - CB [ L.T. CABLE ] Item no. CB 8-2 Page no. 36		

#### **MEASUREMENT SHEET - PLUMBING**

Sr. No.	Item Description	Nos.	L (m)	B (m)	Qua	ntity	Unit
	Providing and supplying in standard lengths ISI mark rigid unplasticised PVC pipes suitable for potable water with solvent cement joints including cost of couplers, as per IS specification no. 4985 / 1988 excluding GST levied by GOI and GOM in all respect, including transportation, freight charges, inspection charges, loading, unloading, conveyance to the departmental stores and stacking the same in closed shed duly protected from sun rays and rains including cost of jointing material i.e. solvent cement, etc. complete (selffit type to be jointed with cement solvent).			<i>i</i> m)			
	1) 10% of cost of pipes shall be considered for cost of PVC specials for estimate purpose only. 2) One coupler and required cement solvent shall be provided with each full length pipe cost of which is included in rates below.  MJP/ SSR/ 2021-22 / SECTION – I(II) P.V.C.						
	PIPES,						
1	Raw Sewage pump to TBF Distribution						
а	Main header	Dia	225			400	
	225 mm.	1	100			100	m
-	PVC Specials- 10%						
b	Distribution						
	160 mm.	1	150			150	m
	PVC Specials- 10%						
	·						
2	TBF collection to FFT (gravity)						
а	Main header						
	160 mm.	1	275			275	m
	PVC Specials- 10%						
L							
b	collection tributory 75 mm.	1	75			75	m
	PVC Specials- 10%	'	73			ıυ	m
	1 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	<del> </del>					
3	TTU Plumbing	Dia	225				
	225 mm.	1	45			45	m
	PVC Specials- 10%						
4	TBF distribution			No. of b	oeds		
	75 mm.	1	5	40		200	m
$\longmapsto$	PVC Specials- 10%						
<del>-</del>	Labarra	NI -	Davis				
5	Labour	Nos	Days			60	deve
$\vdash$	Plumber	6 12	10 10			60 120	days
$\vdash$	Helper	12	10			120	days
6	Sluice valves	<del> </del>					
6	Sluice valves						

#### **MEASUREMENT SHEET - PLUMBING**

Sr. No.	Item Description	Nos.	L (m)	B (m)	Quantity	Unit
	Providing double flange sluice valve confirming					
	for IS- 14846 including worn gear arrangements as per test pressure, stainless steel spindle,					
	caps, including inspection charges,					
	transportation upto departmental store,					
	unloading, stacking excluding GST levied by					
	GOI & GOM in all respect etc. complete.					
	MJP/ SSR/ 2021-22 / SECTION - I(XII) :					
	PIPES APPURTENANCES , Page no. 132					
	Raw Sewage pump 250 mm.	2			2	Noo
	250 11111.					Nos
	Filter Feed Pump					
	250 mm.	2			2	Nos
7	Reflux valves (non-return valves )					
	Providing and supplying ISI mark CI D/F reflux					
	valves (non-return valves ) of following dia					
	including railway freight, inspection charges, unloading from railway wagon, loading into					
	truck, transportation upto departmental stores,					
	unloading, stacking excluding GST levied by					
	GOI & GOM in all respect etc. complete. Reflux					
	valves as per I.S.5312 Part I (1984)					
	MJP/ SSR/ 2021-22 / SECTION - I(XII):					
	PIPES APPURTENANCES , Page no. 131					
	Raw Sewage pump				_	
	250 mm.	2			2	Nos
	Filter Feed Pump					
	250 mm.	2			2	Nos

