

# Initial Environmental Examination Report

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**PUBLIC**

Project Number: 56344-001  
Draft  
November 2023

## Bangladesh: Paramount Solar Power Project

### PART 10: Annexure

Prepared by Dynamic Sun Energy Private Limited for the Asian Development Bank (ADB).

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## **Annexure – 8 (b)**

### **Ground Water Quality Test Reports**



## **AECL LABORATORY ANALYSIS REPORT** **GROUND WATER QUALITY TEST REPORT**

**Project Name** : ESIA of 100 MW ac Solar Power Plant Project, Pabna  
**Project Location** : Bhabanipur, Hemayetpur, Pabna Sadar, Pabna

.....  
**Description of Sample** : Ground/Drinking Water  
**Sample Collector** : AECL Monitoring Team  
**Sampling date** : 14<sup>th</sup> April, 2023  
**Reporting date** : 25<sup>th</sup> April, 2023  
.....

### **Description of analysis**

Name of the Parameter	Concentration present		DoE (Bangladesh) Standard *	WHO Standard	Unit	Method of analysis
	GW 1 (23°58'2.51"N, 89°10'9.16"E)	GWQ2 (23°57'52.98N, 89°9'23.24"E)				
Temperature	22	23	20-30	-	°C	Mercury filled thermometer
pH	7.0	7.1	6.5-8.5	6.5-9.5	-	pH Meter
TDS	372	353	1000	1000	mg/l	TDS Meter

**Comment:** All the parameters do conform to the standards.

**Md. Faisal Bin Mahmud**  
Sr. Chemist

**Md. Saiful Islam**  
Chief Operating Officer



Test Report

Number: BGD23058255

Date: 21 May, 2023

Factory/ Applicant:

Factory/ Applicant Name : ADROIT ENVIRONMENT CONSULTANTS LTD.  
Address : HOUSE-01, ROAD-16, SECTOR-07, UTTARA-1230, DHAKA, BANGLADESH

ATTN: : MR. FAISAL MAHAMUD

Sample Description: : Two (02) Bottles of Submitted Samples Said to be (A) GW1 (Ground Water) &amp; (B) GW2 (Ground Water)

No. Of Sample : 02

Reference No. : AECL\_100MW\_SOLAR/2023/05/11

Date Of Sampling/Time : 14<sup>th</sup> April 2023

Discharge Type: : -

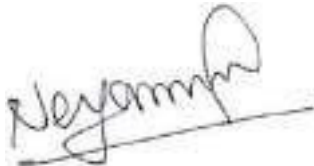
Sample : (A) GW1 (Ground Water) &  
(B) GW2 (Ground Water)Ref : - Factory Location: Pabna Sadar, Pabna  
- Factor Name: Dynamic Sun Energy Private Ltd.  
- Address: Pabna Sadar, PabnaSample Received/Test : 11 May, 2023  
Started

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Remark:  
Sample Collection (Sampling) Done By The Factory / Applicant.

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Authorized By  
For ITS Labtest Bangladesh Ltd.



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Mohammad Neyamul Hasan  
Country Business Line Leader, Softlines

**ITS Labtest Bangladesh Ltd.**

Intertek House Bangladesh, Phoenix Tower (2<sup>nd</sup> & 3<sup>rd</sup> Floor), 407 Tejgaon I/A, Dhaka-1208, Bangladesh  
Telephone: +880 2 815 6226-28, 815 6579-80, Fax: +880 2 912 5866, Hotline No.: +880 9666776669  
[www.intertek.com](http://www.intertek.com)

Test Report

Number: BGD23058255

## Conclusion:

Requirements OnResult

	Sample (A)	Sample (B)
Total Coliform	*	*
Phosphate	*	*
Fecal Coliform	*	*
Nickel (Ni)	*	*
Iron (Fe)	*	*
Aluminium (Al)	*	*

Note : M = Meet Applicant Requirement  
# = No Comment  
N/A = Not Applicable  
C = Conform Label

F = Exceeded Applicant Requirement  
- = Did Not Perform  
\* = See Result

Test Report

Number: BGD23058255

Tests Conducted (As Requested By The Applicant)

Sl. No.	Parameters	Test method	Reporting Limit	Unit	Result	
					Sample (A)	Sample (B)
1	Total Coliform	ISO 9308-1 :2014, USEPA 9132 :1986	1	CFU/ 100 mL	Absent	Absent
2	Phosphate	USEPA 365.2 :1978, USEPA 365.3 :1978, SM 4500-P E (23rd Edition)	3	mg/L	ND	ND
3	Fecal Coliform	SM 9222 (23rd Edition), Membrane Filtration	1	CFU/100 mL	Absent	Absent
4	Nickel (Ni)	USEPA 200.8 :1994, ISO 17294-2 :2016, ISO 1185 :2007	0.1	mg/L	ND	ND
5	Iron (Fe)		0.1	mg/L	ND	ND
6	Aluminium (Al)		0.1	mg/L	ND	ND

Remark:

mg/L = milligram per litre  
 µS/cm = microSiemens per centimetre  
 CFU/mL= Colony Forming Unit per milliLitre  
 ND = Not Detected (less than reporting limit)  
 N/A = Not Applicable

## Test Report

Number: BGD23058255

### PICTURE



==== END OF THE TEST REPORT ====

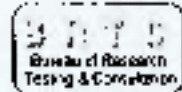
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**ITS Labtest Bangladesh Ltd.**

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**BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)**  
**DEPARTMENT OF CIVIL ENGINEERING**  
 Mobile: 01819 567 964. FAX: 55 157 100 Ext. 7229; <http://brtcslab.ce.buet.ac.bd/>  
**ENVIRONMENTAL ENGINEERING LABORATORY**



**BRTC No. :** 1102-91241 /22-23/CE; Dt: 16/5/2023

**Ref No. :** AECU.Lab/2023/06070, Dt: 15/5/2023

**Sent by :** Shahriar Elun Basher, Assistant Consultant (EIA)

**Company Address :** Adroit Environment Consultants Ltd, House # 1, 2nd Floor, Road # 16, Sector # 7, Jhara, Dhaka-1230

**Project :** NA

**Sample ID :** GW-1

**Location:** Heriakhon, Pabna Sadar, Pabna

**Date of Test:** 16/5/2023 - 27/5/2023

**Source:** Ground Water

**TEST REPORT (PHYSICAL, CHEMICAL, BACTERIOLOGICAL ANALYSIS OF WATER SAMPLE)**

Sl. No.	Water Quality Parameters	Unit	Concentration Present	Bangladesh Standard for Drinking Water (BS 2500)	WHO Guideline Values, 2004	Method of analysis	Minimum Detection Limit (MDL)
1	Arsenic (As)	mg/l	<MDL	0.05	0.01	SM 3113 B	0.001
2	Total Hardness (as CaCO <sub>3</sub> )	mg/l	140	600	500	SM 2540 C	0.2
3	Total Alkalinity (as CaCO <sub>3</sub> )	mg/l	393	...	...	SM 2320 B	1
4	Sulphate (SO <sub>4</sub> )	mg/l	45	250	250	SM 4900-SO4 F	2
5	Nitrate - Nitrogen (NO <sub>3</sub> - N)	mg/l	3.2	45	50	SM 4500-NO3-N E	0.1
6	Chromium (Cr)	mg/l	<MDL	0.05	0.05	SM 3111 B	0.001
7	Lead (Pb)	mg/l	0.027	0.05	0.01	SM 3111 B	0.01
8	Cadmium (Cd)	mg/l	0.01	0.03	0.03	SM 3111 B	0.001
9	Zinc (Zn)	mg/l	0.04	5	3-5	SM 3111 B	0.02
10	Copper (Cu)	mg/l	<MDL	1.5	2	SM 3111 B	0.014

a. Health based guideline; b. Guideline based on other considerations

**Comments :**  
 1. Sample was supplied by CLIENT  
 2. Sample was received in unsealed condition.

**Important Note:** Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples received. It is recommended that samples are sent in a secure and sealed cover/pack.

**Countersigned by:**

**Prof. Dr. Harib Mohammod Ahsan**  
 Test-In-Charge, Dept. of Civil Engineering, BUET



RBAGK4gD4

**Test Performed by:**

*Roushan Maitra*  
 28/5/23

**Dr. Roushan Maitra**  
 Professor, Dept. of Civil Engineering, BUET

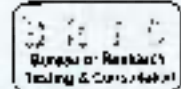


BUETCE 0412202





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**ENVIRONMENTAL ENGINEERING LABORATORY**



BUETCE 01818 557 964

BRTC No. : 1102/91241/22-23/CE; Dt: 16/5/2023

Ref. No.: AECL/1402/056/70, Dt. 15/5/2023

Sent by : Shahmar Ebn Basher, Assistant Consultant (EIP)

Company Address : Adroit Environment Consultants Ltd., House # 1, 2nd Floor, Road # 16, Sector # 7, Uttara, Dhaka-1230

Project : NA

Sample Id : GW-2

Location: Harnaysipur, Patna-Sadar, Patna

Date of Test : 16/5/2023 - 27/5/2023

Source: Ground Water

**TEST REPORT (PHYSICAL, CHEMICAL, BACTERIOLOGICAL ANALYSIS OF WATER SAMPLE)**

Sl. No.	Water Quality Parameters	Unit	Concentration Present	Bangladesh Standard for Drinking Water (BCR 23)	WHO Guideline Values, 2004	Method of analysis	Minimum Detection Limit (MDL)
1	Arsenic (As)	mg/l	<MDL	0.05	1.0	SM 3113 E	0.001
2	Total Hardness (as CaCO <sub>3</sub> )	mg/l	160	500	500	SM 2340 C	0.2
3	Total Alkalinity (as CaCO <sub>3</sub> )	mg/l	88	—	—	SM 2320 B	—
4	Sulphate (SO <sub>4</sub> )	mg/l	<MDL	250	250	SM 4500-SO <sub>4</sub> E	7
5	Nitrate - Nitrogen (NO <sub>3</sub> -N)	mg/l	28	45	50	SM 4500-NO <sub>3</sub> -N E	0.1
6	Chromium (Cr)	mg/l	<MDL	0.05	0.05	SM 3111 B	0.001
7	Lead (Pb)	mg/l	<MDL	0.01	0.01	SM 3111 B	0.01
8	Calcium (Ca)	mg/l	0.01	0.005	0.003	SM 3111 B	0.001
9	Zinc (Zn)	mg/l	0.09	5	3-5	SM 3111 B	0.02
10	Copper (Cu)	mg/l	<MDL	1.5	2	SM 3111 B	0.04

a: Health based guideline, b: Guideline based on other considerations

- Comments :
1. Sample was supplied by CLIENT
  2. Sample was received in unsealed condition.

**Important Notice:** Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples received or analyzed. It is recommended that samples are sent in a secure and sealed coverpack.

Countersigned by:

Prof. Dr. Hasib Mohammed Ahsan  
 Test-In-Charge, Dept. of Civil Engineering, BUET



1j2N67CwC

Test Performed by:  
 Rowshan Maitaz  
 28/5/23  
 Dr. Rowshan Maitaz  
 Professor, Dept. of Civil Engineering, BUET



## **Annexure – 8 (c)**

### **Ambient Air Quality Test Report**



### AECL LABORATORY ANALYSIS REPORT AMBIENT AIR QUALITY TEST REPORT

**Project Name** : ESIA of 100 MW ac Solar Power Plant Project, Pabna  
**Project Location** : Bhabanipur, Hemayetpur, Pabna Sadar, Pabna

.....  
**Description of Sample** : Ambient Air  
**Sample Collector** : Adroit Environment Consultants Ltd. (Monitoring team).  
**Sampling date** : 15th – 16th April, 2023  
**Reporting date** : 25th April, 2023  
.....

#### Description of analysis

S N	Param eters	Method	Test Duration (hours)	Unit	23°57'	23°58'	23°57'	23°57'	24°	24°	Bangladesh (DoE) Standard	IFC /World Bank Standard
					48.2"N 89°10' 39.9"E (L1)	2.89"N 89°10' 4.99"E (L2)	'58.9" N 89°09' '30.5" E (L3)	'34.86 "N 89° 9'38.8 9"E (L4)	1'14.6 2"N 89° 4'43.2 8"E (L5)	5'21.83" N89° 5'25.96" E (L6)		
1	PM <sub>2.5</sub>	Gravi metric	24	µg/m <sup>3</sup>	31.11	33.52	32.72	28.41	27.61	25.73	65	75
2	PM <sub>10</sub>	Gravi metric	24	µg/m <sup>3</sup>	65.73	61.66	64.68	52.39	50.33	51.48	150	150
3	SPM	Gravi metric	8	µg/m <sup>3</sup>	105.84	105.18	103.4	87.8	82.94	80.21	200	NF
4	SO <sub>2</sub>	West- Geake	24	µg/m <sup>3</sup>	12.44	13.83	10.20	8.73	7.12	6.36	365	125
5	NO <sub>x</sub>	Jacob and Hochh eiser	1	µg/m <sup>3</sup>	10.83	11.49	9.15	6.53	5.35	5.09	NF	200
6	CO	CO/O <sub>3</sub> Meter	1	ppm	1	1	2	1	1	1	35	NF

(NF – not found, DoE – Department of Environment.), \*1-hour standard Not Found

**Note:** This monitoring report was usually accomplished by - Respirable Dust Sampler (Model-Envirotech India APM-460BL) and Fine Particulate Sampler (Model- Envirotech India AAS-127BL).

- |  |   |
|--|---|
| 1. Fine Particulate Matter (PM <sub>2.5</sub> ). | 4. Oxides of Nitrogen (NO <sub>x</sub> ). |
| 2. Respirable Dust Content (PM <sub>10</sub> ).  | 5. Oxides of Sulfur (SO <sub>2</sub> ).   |
| 3. Suspended Particulate Matter (SPM).           | 6. Carbone Mono-Oxide (CO).               |

**Comment:** From the aforementioned results it is discernible that, all the parameters are inside the allowable limits.

**Md. Faisal Bin Mahmud**  
Sr. Chemist

**Md. Saiful Islam**  
Chief Operating Officer



## **Annexure – 8 (d)**

### **Ambient Noise Quality Test Report**



### AECL LABORATORY ANALYSIS REPORT AMBIENT NOISE QUALITY TEST REPORT

**Project Name** : ESIA of 100 MW ac Solar Power Plant Project, Pabna  
**Project Location** : Bhabanipur, Hemayetpur, Pabna Sadar, Pabna

.....  
**Description of Sample** : Ambient Noise  
**Sample Collector** : Adroit Environment Consultants Ltd. (Monitoring team)  
**Sampling date** : 15<sup>th</sup> - 16<sup>th</sup> April, 2023  
**Reporting date** : 29<sup>th</sup> April, 2023  
.....

#### Description of analysis

SN.	Site Location	Site Condition	Concentration present (LA <sub>eq</sub> ) dBA.			
			Day Time		Night Time	
			Minimum	Maximum	Minimum	Maximum
01	East side of the site, (Location # 01) 23°57'44.76"N 89°10'41.40"E	Pre-construction Stage	36.6	40.7	27.5	31.6
02	North side of the site, (Location # 02) 23°58'2.89"N 89°10'5.24"E	Pre-construction Stage	32.4	38.6	25.3	28.5
03	South side of the site, (Location # 03) 23°57'23.06"N 89° 9'57.29"E	Pre-construction Stage	30.9	33.4	25.4	26.9
04	West side of the site, (Location # 04) 23°57'55.02"N 89° 9'23.66"E	Pre-construction Stage	35.9	41.8	27.6	30.2
05	Near Dadapur Purba para, (Location # 04) 24° 1'14.57"N 89° 4'44.41"E	Pre-construction Stage	38.6	44.1	30.2	35.8
06	Residential area near Rajshahi-Kushtia Highway, (Location # 04) 24° 5'21.41"N 89° 5'25.46"E	Pre-construction Stage	30.2	36.3	25.3	28.7
<b>DoE (Bangladesh) Standard for Mixed area (mainly residential area, and also simultaneously used for commercial and industrial purposes)</b>			<b>60</b>		<b>50</b>	
<b>IFC/International Standard for Residential; institutional; educational</b>			<b>55</b>		<b>45</b>	

**Note:** This noise data was usually accomplished by – CEM Sound Level Meter (Model – DT 8850)

**Comment:** According to the Department of Environment (ECR'1997), the standard for ambient noise level in the industrial zone is 75 and 70 decibels at day & night time respectively. The results were found within the limit as per DoE Standards.

**Md. Faisal Bin Mahmud**  
Sr. Chemist

**Md. Saiful Islam**  
Chief Operating Officer



**Annexure – 8 (e)**  
**Soil Quality Test Report**

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার  
কৃষি মন্ত্রণালয়  
মৃত্তিকা সম্পদ উন্নয়ন ইনস্টিটিউট  
বিভাগীয় গবেষণাগার, ঢাকা  
মৃত্তিকা ভবন, কৃষি বামার সড়ক, ঢাকা-১২১৫

প্রাপকঃ

জনাব মোঃ মোছাফ্ফুর রহমান খান  
এক্সপেট এনভায়রনমেন্ট কন্সালটেন্ট  
হাউজ নং- ১, রোড- ১৬  
সেক্টর- ৭, উত্তরা, ঢাকা।

প্রেরিত মৃত্তিকা নমুনার বিশ্লেষিত ফলাফল

ক্রমিক নম্বর	ল্যাব নম্বর	উপাদানের নাম							
		পিএইচ (pH)	জিংক	কপার	লেড	ক্যাডমিয়াম	ক্রোমিয়াম	নিকেল	
			সহস্রভাগ		মোট				
			(ppm)						
১.	৭১৬২	৭.৫	০.৪০	২.০৪	১৭.১৪	০.১২	৪.২৬	১.৫৯	

*M. Masud*  
২৪/০৬/২০২৬  
(ড. মাসুদা বেগম)  
উর্ধ্বতন বৈজ্ঞানিক কর্মকর্তা  
ফোন : ০২-৪১০২৫০৬৬।

## **Annexure – 9**

### **Methodology of Identification and Prediction of Impacts**



## 1.1 PREDICTION OF IMPACTS

Prediction of impacts is essentially an objective exercise to determine what could potentially happen to the environment as a consequence of the project and its associated activities. The nature and types of impacts that has been addressed in this EIA is defined in the below.

### 1.1.1 Extent and location

This indicates the spatial area that may be affected by the project activities or its associated facilities.

**Table 1.1: Impact Extent from the project location**

Impact Elements	Criteria	Ranking
Extent	• Entire country	National
	• District level	Regional
	• Project site & its immediate vicinity (within 5 km radius)	Local

### 1.1.2 Duration

This measures the lifetime/ existence/ continuation of the impact.

**Table 1.2: Duration of Impact**

Impact Elements	Criteria	Ranking
Duration	• Spread over the lifecycle of the project	Long term
	• Spread across several phases of the project lifecycle	Medium term
	• Only during particular activities or a phase of the project lifecycle	Short term

### 1.1.3 Scale

3 type of scale of impact is considered i.e.; High/ Medium/ Low.

**Table 1.3: Scale of Impact**

Impact Elements	Criteria	Ranking
Scale	<ul style="list-style-type: none"> <li>• Irreversible damage to natural environment and/or likely difficult or may not to revert back to earlier stage with mitigation;</li> <li>• Major changes in comparison to baseline conditions and / or likely to regularly or continually exceed the standard;</li> </ul>	High
	<ul style="list-style-type: none"> <li>• Reversible damage to natural environment but likely to easily revert back to earlier stage with mitigation;</li> <li>• Perceptible change from baseline conditions but well within acceptable norms.</li> </ul>	Medium
	<ul style="list-style-type: none"> <li>• Effect is within the normal range of natural variation;</li> <li>• No perceptible or readily measurable change from baseline conditions;</li> </ul>	Low

#### 1.1.4 Magnitude:

This is calculated as extent + duration + Scale. The magnitude combines the impact characteristics of Extent, Duration and Scale and is a multiplicative factor of these three criteria set but mostly dependent on impact scale and extent. Sometimes the magnitude is determined based on consultant's previous experience.

**Table 1.4: Assessing Magnitude of Impact**

Extent	Duration	Impact Scale	Magnitude
Local	Short term	None	Negligible
Regional	Short term	None	Negligible
National	Short term	None	Negligible
Local	Medium term	None	Negligible
Regional	Medium term	None	Negligible
National	Medium term	None	Negligible
Local	Long term	None	Negligible
Regional	Long term	None	Negligible
National	Long term	None	Negligible
Local	Short term	Low	Minor
Regional	Short term	Low	Minor
Local	Medium term	Low	Minor
Local	Short term	Medium	Minor
National	Short term	Low	Minor
Local	Long term	Low	Minor
Local	Short term	High	Minor
Regional	Medium term	Low	Minor
Regional	Short term	Medium	Minor
Local	Medium term	Medium	Minor
National	Medium term	Low	Moderate
National	Short term	Medium	Moderate
Regional	Long term	Low	Moderate
Regional	Short term	High	Moderate
Local	Long term	Medium	Moderate
Local	Medium term	High	Moderate
Regional	Medium term	Medium	Moderate
National	Long term	Low	Moderate
National	Short term	High	Moderate
Local	Long term	High	Moderate
National	Medium term	Medium	Major
Regional	Long term	Medium	Major
Regional	Medium term	High	Major

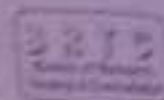
<b>Extent</b>	<b>Duration</b>	<b>Impact Scale</b>	<b>Magnitude</b>
National	Long term	Medium	Major
National	Medium term	High	Major
Regional	Long term	High	Major
National	Long term	High	Major

## **Annexure - 10**

### **Drinking Water Quality Test Report of Submersible Pump System**



**BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)**  
**DEPARTMENT OF CIVIL ENGINEERING**  
 Mirin: 01819387 804, PAIX: 05167100 Ext. 7225 <http://buet.ac.bd>  
**ENVIRONMENTAL ENGINEERING LABORATORY**



BUET/EE/EN/13/010

BETC No. : 1102-28435 (23-24)CE, Dt: 31/8/2023

Ref. No.: Letter, Dt: 31/8/2023

Sent by : Mr. Abdul Aziz, DGM, Head of Civil & Compliance, Dynamic Sun Energy (Pvt.) Limited

Project : Bhabanipur, Hemayetpur, Patna

Sample ID : Testing of Water - Sample

Sample No. : -

Location : Bhabanipur, Hemayetpur, Patna

Date of Test : 31/8/2023 - 4/9/2023

Source : Drinking Water

**TEST REPORT (ROUTINE DRINKING WATER PARAMETERS)**

Sl. No.	Water Quality Parameters	Unit	Concentration Present	Bangladesh Standard for Drinking Water (ECR'23)	WHO Guidelines Values - 2004	Method of analysis	Maximum Contamination Level (MCL)
1	pH		6.50	6.5-8.5	6.5-8.5	SM 4555 (A)-B	0
2	Color	Pl-Co	2	15	15	SM 2123 C	150
3	Turbidity	NTU	0.14	5	=	SM 2131 E	100
4	Total Hardness as CaCO <sub>3</sub>	mg/L	14	500	200	SM 2250 C	100
5	Chloride (Cl)	mg/L	5	250	250	SM 4555 (C)-B	1
6	Total Dissolved Solids (TDS)	mg/L	25	1000	1000	SM 2540 C	5
7	Manganese (Mn)	mg/L	<MDL	0.4	0.4 or 0.10	PAN Method	1000
8	Arsenic (As)	mg/L	<MDL	0.05	0.01	SM 3113 B	1000
9	Iron (Fe)	mg/L	<MDL	0.3-1.0	0.3	SM 3111 B	0.30
10	Total Coliform (TC)	CFU/100 ml	0	0	0	SM 9221 E	0
11	Fecal Coliform (FC)	CFU/100 ml	0	0	0	SM 9222 D	0

4. Total Dissolved Solids (TDS) : 25 mg/L (within acceptable limits)

Comments : 1. The routine parameters analyzed are within the acceptable limits set for drinking water in ECR-2023 and the supplied sample may be considered suitable for drinking purpose.

2. Sample was supplied by CLIENT

3. Sample was received in unsealed condition.

Countersigned by:

Prof. Dr. Hasib Mohammed Ahsan

Test-In-Charge, Dept. of Civil Engineering, BUET



Test Performed by:

*Signature* 09/09/23

Dr. Md. Abdul Jafri

Professor, Dept. of Civil Engineering, BUET



Reported Note: Samples as supplied to us have been tested in our laboratory. BUET does not have any responsibility for the results. In order to avoid any dispute, it is recommended that all test reports are collected by duly authorized persons, and not by the Contractor/Supplier.

**BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)**  
**DEPARTMENT OF CIVIL ENGINEERING**

Mobile: +8801819 557 964;

PABX: +8802-55167100 Ext. 7226;

www.buet.ac.bd/ce/

**ENVIRONMENTAL ENGINEERING LABORATORY**



BUETCE 0460524

**BRTC No. :** 1103-03363 /23-24/CE; Dt: 17/10/2023

**Ref. No.:** Letter; Dt: 16/10/2023

**Sent by :** Md. Abdul Alim, DGM (Head of Civil & Compliance)

**Company Address :** Dynamic Sun Energy (Pvt.) Ltd., Bhabanipur, Hemayetpur, Pabna

**Project :** Dynamic Sun Energy (Pvt.) Ltd., Bhabanipur, Hemayetpur, Pabna

**Sample Id :** DY 01 **Location:** Bhabanipur, Hemayetpur, Pabna

**Source:** Not Mentioned

**Date of Test :** 17/10/2023 - 4/11/2023

**TEST REPORT (PHYSICAL/ CHEMICAL/ BACTERIOLOGICAL ANALYSIS OF WATER SAMPLE)**

Sl. No.	Water Quality Parameters	Unit	Concentration Present	Bangladesh Standard for Drinking Water (ECR 2023)	WHO Guideline Values, 2022	Method of analysis	Minimum Detection Limit (MDL)
1	pH	---	6.71	6.5-8.5	6.5-8.5	SM 4500-H+ B	0
2	Color	Pt-Co	3	15	15	SM 2120 C	0.01
3	Turbidity	NTU	0.23	5	5	SM 2130 B	0.01
4	Total Hardness (as CaCO <sub>3</sub> )	mg/l	1	500	500	SM 2340 C	0.2
5	Chloride (Cl <sup>-</sup> )	mg/l	10	250 (1000 Coastal Area)	250	SM 4500-Cl-	1
6	Total Dissolved Solids (TDS)	mg/l	10	1000	1000	SM 2540 B - D	5
7	Manganese (Mn)	mg/l	<MDL	0.4	0.4	PAN Method	0.005
8	Arsenic (As)	mg/l	0.002	0.05	0.01	SM 3113 B	0.001
9	Iron (Fe)	mg/l	<MDL	0.3-1.0	0.3	SM 3111 B	0.02
10	Total Coliform(TC)	CFU/100ml	0	0	0	SM 9221 E	0

a. Health based guideline, b. Guideline based on other considerations

**Comments :** 1. Sample was supplied by CLIENT  
 2. Sample was received in unsealed condition.

**Important Notes:** Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that samples are sent in a secure and sealed cover/pack

Countersigned by:

Dr. Hasib Mohammed Ahsan  
 Professor, Dept. of Civil Engg.



Rmf22fLBm

Test Performed by:

Dr. A. B. M. Badruzzaman  
 Professor, Dept. of Civil Engineering.



# BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY (BUET)

## DEPARTMENT OF CIVIL ENGINEERING

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PABX: +8802-55167100 Ext. 7226;

www.buet.ac.bd/ce/

### ENVIRONMENTAL ENGINEERING LABORATORY



BUETCE 0460522

**BRTC No. :** 1103-03363 /23-24/CE; Dt: 17/10/2023

**Ref. No.:** Letter; Dt: 16/10/2023

**Sent by :** Md. Abdul Alim, DGM (Head of Civil & Compliance)

**Company Address :** Dynamic Sun Energy (Pvt.) Ltd., Bhabanipur, Hemayetpur, Pabna

**Project :** Dynamic Sun Energy (Pvt.) Ltd., Bhabanipur, Hemayetpur, Pabna

**Sample Id :** DY 01

**Location:** Bhabanipur, Hemayetpur, Pabna

**Source:** Not Mentioned

**Date of Test :** 17/10/2023 - 4/11/2023

#### TEST REPORT (PHYSICAL/ CHEMICAL/ BACTERIOLOGICAL ANALYSIS OF WATER SAMPLE)


Sl. No.	Water Quality Parameters	Unit	Concentration Present	Bangladesh Standard for Drinking Water (ECR 2023)	WHO Guideline Values, 2022	Method of analysis	Minimum Detection Limit (MDL)
11	Fecal Coliform (FC)	CFU/100ml	0	0	0	SM 9222 G	0
12	Total Alkalinity (as CaCO <sub>3</sub> )	mg/l	13	---	---	SM 2320B	1
13	Sulphate (SO <sub>4</sub> )	mg/l	<MDL	250	250	SM 4500-SO <sub>4</sub>	7
14	Nitrate - Nitrogen (NO <sub>3</sub> - N)	mg/l	0.3	45	50	SM 4500-NO <sub>3</sub> -N-F	0.1
15	Chromium (Cr)	mg/l	<MDL	0.05	0.05	SM 3111 B	0.001
16	Lead (Pb)	mg/l	<MDL	0.01	0.01	SM 3111 B	0.01
17	Cadmium (Cd)	mg/l	<MDL	0.003	0.003	SM 3113 B	0.001
18	Zinc (Zn)	mg/l	0.11	5	3-5	SM 3111 B	0.02
19	Copper (Cu)	mg/l	<MDL	1.5	2	USEPA 200.9; SM 3111 B	0.014
20	---	---	---	---	---	---	---

a. Health based guideline, b. Guideline based on other considerations

**Comments :** 1. Sample was supplied by CLIENT  
2. Sample was received in unsealed condition.

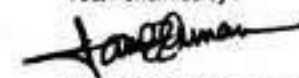
**Important Notes:** Samples as supplied to us have been tested in our laboratory. BRTC does not have any responsibility as to the representative character of the samples required to be tested. It is recommended that samples are sent in a secure and sealed cover/pack

Countersigned by:

  
Dr. Haib Mohammed Ahsan  
Professor, Dept. of Civil Engg.



Test Performed by:



Dr. A. B. M. Badruzzaman  
Professor, Dept. of Civil Engineering



**Annexure – 11**  
**Detail of Septic Tank**



**Dynamic Sun Energy Private Limited**  
**Bhabanipur, Hemayetpur, Pabna Sadar, Pabna**

**Design of Septic & Soak Well for 100 MW (ac) Solar Power Plant at Pabna**

<b>Assumptions from Available Data:</b>			
1	Water Supply	180.00	Litr/day/person
2	No. of Persons	150.00	Nos
3	Sewage Generation	80.00	%
4	Detention Period	18.00	Hours
5	Cleaning Period	1.00	Year
6	Length: Width	4:01	Ratio
7	Depth of Liquid	1.80	Mtr
8	Sludge Deposit	30.00	Ltr/person/year
9	Minimum Free Board	300.00	mm

<b>Septic Tank Calculation:</b>			
1	Total Waste Entering Septic Tank	21,600.00	Litr/day
2	Detention Period	18	Hours
3	Capacity of Tank Required	16,200.00	Litrs
4	Capacity Required for Sludge Accumulation	4,500.00	Litr/year
5	Total Capacity Required	20,700.00	Litrs
6	Plan Area of Septic Tank	11.50	Sq. Mtr
7	Width of Tank	2.30	Mtr
8	Length of Tank	5.00	Mtr
9	Total Depth of Tank +0.5mtr Excluding the slope	2.30	Mtr

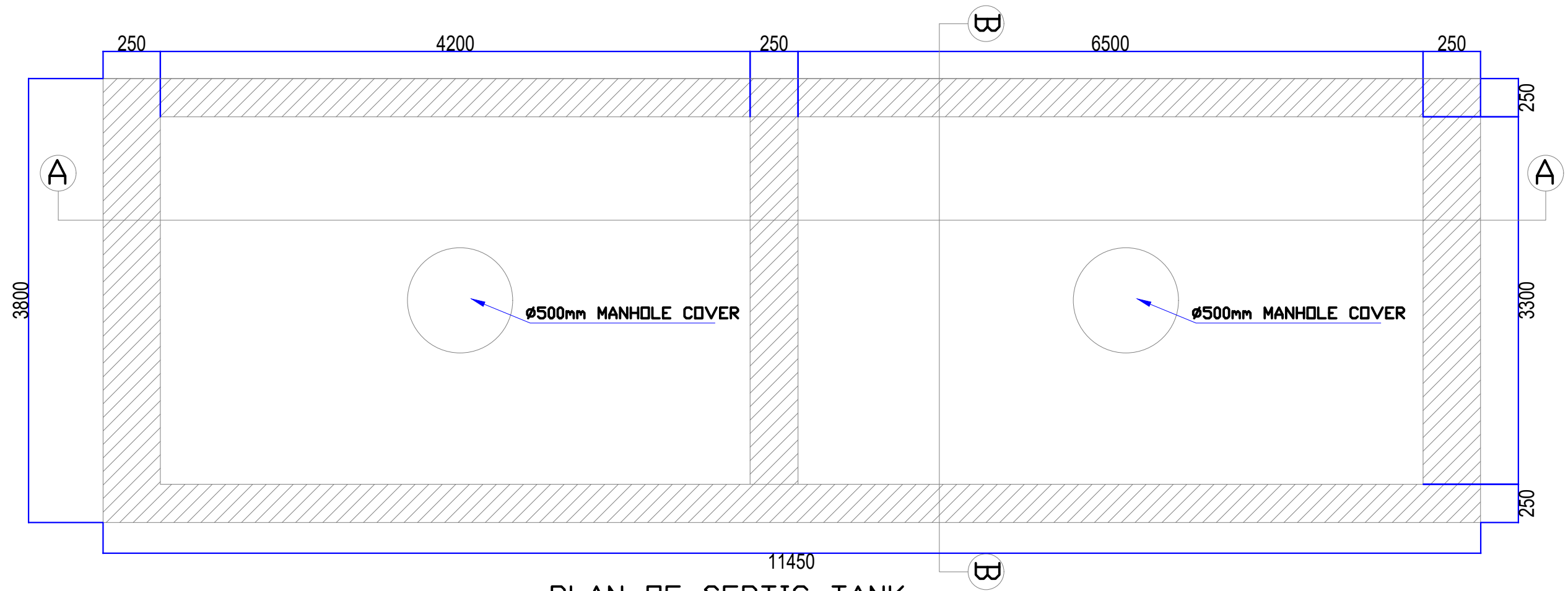
<b>Soak Pit Design Calculation:</b>			
1	Waste Water Discharge from Septic Tank	21,600.00	Litr/day
2	Percolation Rate	6,210.00	Litr/Cu Mtr/day
3	Vol of Filter Media	3.48	Cu Mtr
4	Depth Taken	3.50	Mtr
5	Area of Soak Pit	0.99	Mtr
6	Dia of Soak Well Required	1.04	Mtr

We are doubling the capacity of Septic Tank since we cannot have soak pit in the present soil conditions at site.

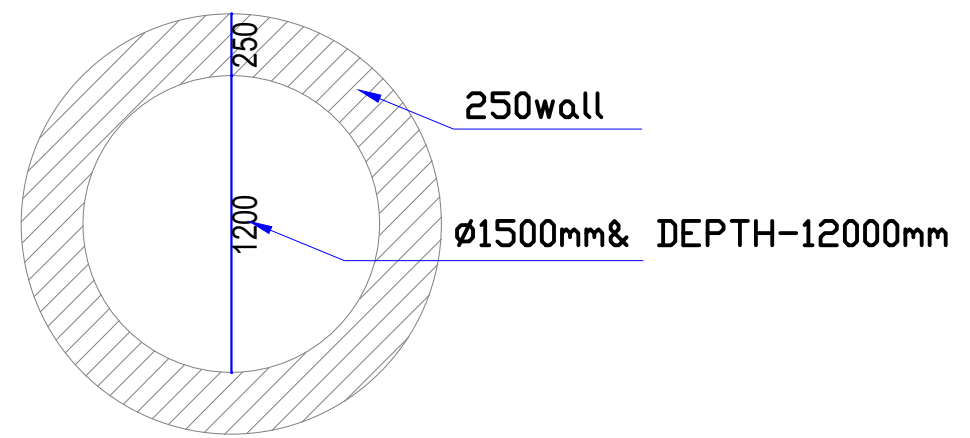
**As per IS: 2470 Part-1-1985**

Recommended size of septic tank for 100MW (ac) Solar Power Plant

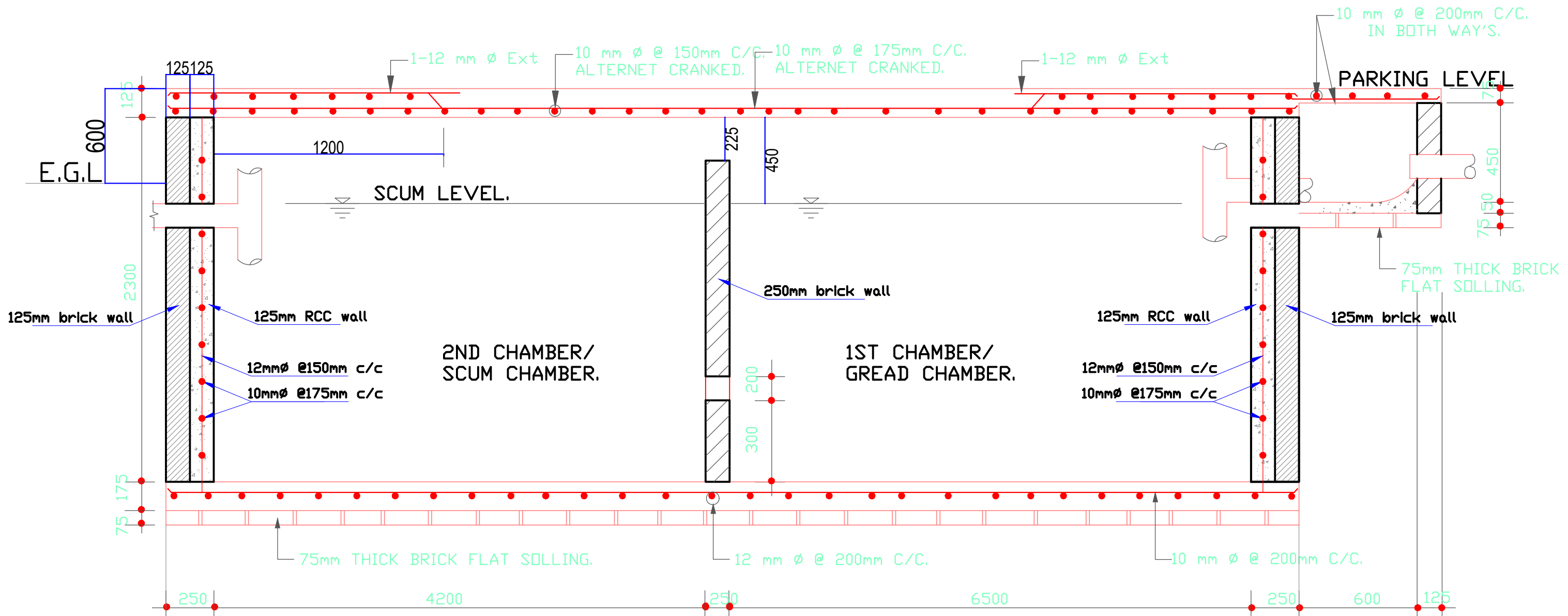
No. of User	Length	Width	Liquid Depth	Liquid Depth
Nos.	Mtr	Mtr	Mtr	Mtr
300	10.7	3.3	1.4	1.7
<b>Capacity in Litr</b>			<b>49434.00 Litr</b>	<b>60027.00 Litr</b>
			Sludge Withdrawl once in a Year	Sludge Withdrawl once in 2 Year



PLAN OF SEPTIC TANK



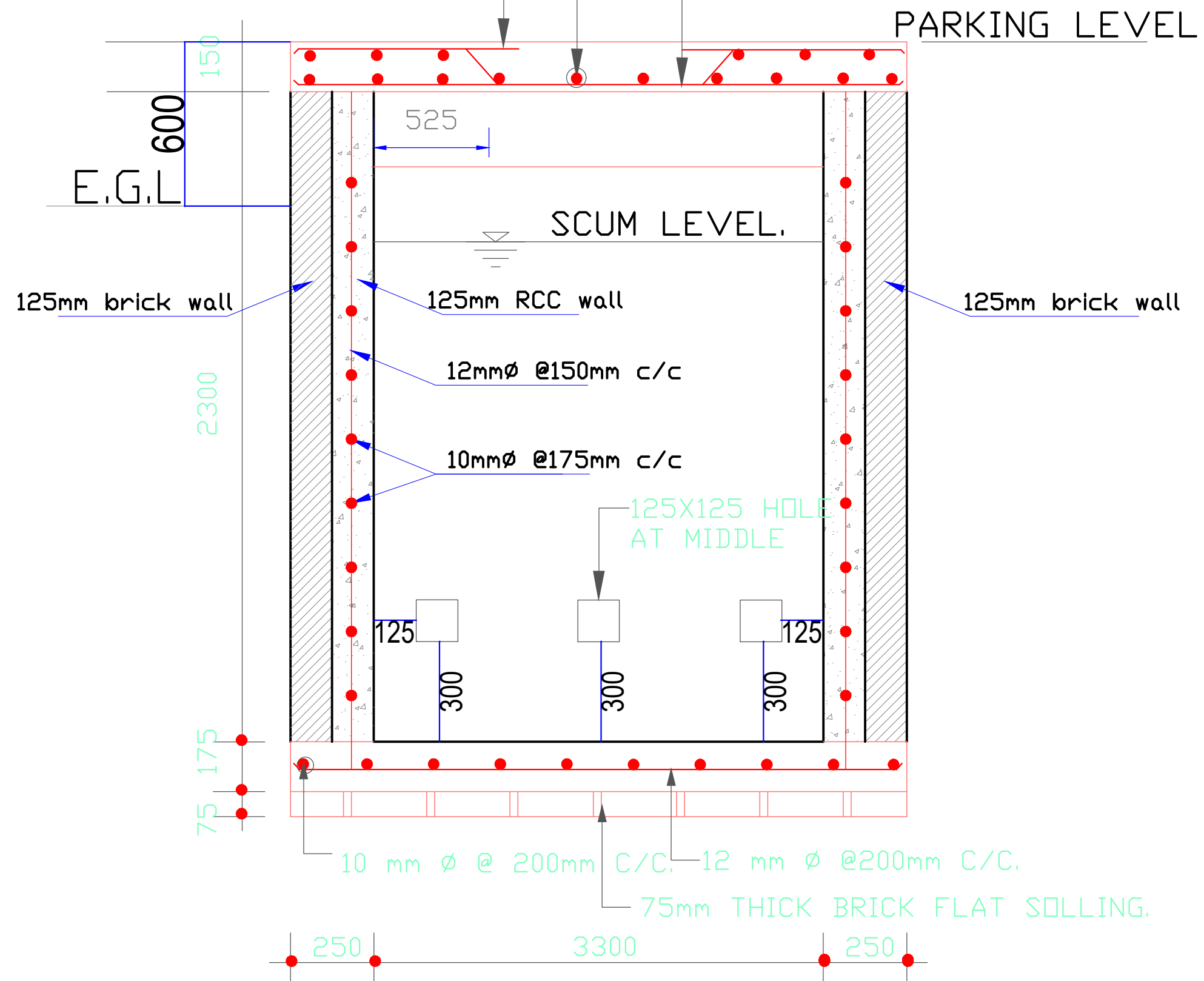
PLAN OF SOAKWEL



**LONG SECTION OF SEPTIC TANK (A-A)**

10 mm  $\phi$  @ 175mm C/C. ALTERNET CRANKED, 10 mm  $\phi$  @ 150mm C/C. ALTERNET CRANKED,

1-12 mm  $\phi$  Ext.



CROSS SECTION OF SEPTIC TANK (B-B)

## **Annexure – 12**

**Tube well Installation Permission from  
Upazila Office**

*Alhaj Md. Mosharraf Hossain*  
Chairman



Date :

Ref :

প্রাপক,

ব্যবস্থাপনা পরিচালক  
ভায়নামিক সান এনার্জি প্রাইভেট লিমিটেড  
ভবানীপুর, হিমায়েতপুর, পাবনা সদর, পাবনা।

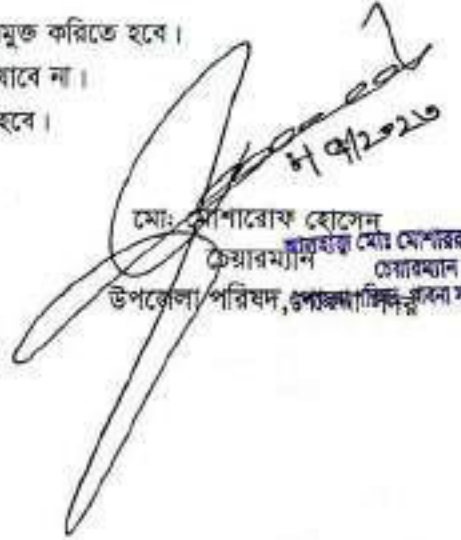
বিষয়: উপজেলা আইন মোতাবেক পানির উৎস/কূপ খনন/নলকূপ স্থাপনের অনুমতি প্রসঙ্গে।

সূত্র: আপনার আবেদন পত্র তাং- ০৭/০৫/২০২৩ইং।

উপর্যুক্ত বিষয় ও সূত্রের প্রেক্ষিতে উপজেলা পরিষদ আইন-২০০৯ এর আলোকে উপজেলা এলাকায় বানিজ্যিক উন্নয়ন ও অগ্রগতি বিবেচনা করে ভায়নামিক সান এনার্জি প্রাইভেট লিমিটেড প্রতিষ্ঠানটিকে ০-৪ (চার) ইঞ্চি ডায়পাইপের ০৫ (পাঁচ) টি নলকূপ ব্যবহারের জন্য নিম্ন বর্ণিত শর্তে অনুমোদন করা হলো।

শর্তাবলী:

- ❖ সরকারী বিধি বিধান অনুসরণ করে পানি উত্তোলন করিতে হবে।
- ❖ সর্বাধিক প্রতিষ্ঠানকে কর পরিশোধ করিতে হবে।
- ❖ উত্তোলিত পানি নিয়ম নীতি মোতাবেক ড্রেন/ক্যানালে অবমুক্ত করিতে হবে।
- ❖ জলাবদ্ধতা সৃষ্টি হয় এমন কোন কার্যক্রম পরিচালনা করা যাবে না।
- ❖ কোন শর্ত ভঙ্গ হলে এই অনুমিত পত্র বাতিল বলিয়া গন্য হবে।

  
মো: মোশাররফ হোসেন  
চেয়ারম্যান  
উপজেলা পরিষদ, পাবনা সদর, পাবনা।  
তারিখ: ০৭/০৫/২৩

## **Annexure – 13**

**MoU between DSEPL and Shimla Hospital &  
Diagnostic Center**



বছ ৭৯৯০০৯৫

## Agreement on Medical Service

*Quincy*  
*Shimla Hospital*

Dynamic Sun Energy Private Limited.

Bhabanipur, Hemaetpur, Pabna Sadar, Pabna..... 1<sup>st</sup> Party

Versus

Shimla Hospital and Diagnostic Center.

Shimla Tower, Thana More, Shalgaria, Pabna Sadar, Pabna .....2<sup>nd</sup> Party

The 1<sup>st</sup> party is a Solar Power Company who would like to provide proper medical facilities to its employees in case of emergencies. The 2<sup>nd</sup> party is registered non-government hospital who is providing medical service to the peoples of the country. The 1<sup>st</sup> party approaches to the 2<sup>nd</sup> party for emergency medical facilities for the employees of the factory.

**This agreement has been signed between the two parties on this terms and conditions:**

### Terms & Conditions:

1. That the 1<sup>st</sup> party will send its employee by a medical pass to the hospital and second will provide all necessary treatment to the employee.
2. The second party will provide all emergency medical services to the 1<sup>st</sup> party upon getting Information of any kind of industrial accident, fire accident, natural disaster etc.
3. That the 2<sup>nd</sup> party will provide ambulance to the 1<sup>st</sup> party end to pick up the 1<sup>st</sup> party employees in case of emergencies.
4. The 1<sup>st</sup> party can use hospital bed for the employees.
5. That the 2<sup>nd</sup> party will provide priority treatment to the 1<sup>st</sup> party employees.

“দেশপ্রেমের শপথ নিন, দুর্নীতিকে বিদায় দিন”





ক/ ৭৯৯৩৩৯৬

6. That the 2<sup>nd</sup> party will provide stretcher, Oxygen cylinder and other medical equipment if necessary to save lives of the 1<sup>st</sup> party.
7. That the 2<sup>nd</sup> party will submit actual bills to the 1<sup>st</sup> party of the service provides for.
8. That the 1<sup>st</sup> party generates a small quantity of medical wastes which requires disposal by a qualified waste disposer; in this case 2<sup>nd</sup> party offers medical waste disposal services and is qualified to dispose of the wastes generated by the 1<sup>st</sup> party.
9. All the treatment cost will base per attached price list and the 2<sup>nd</sup> party will provide the mentioned discount. Without x-ray. If there is any service need to provide by the 2<sup>nd</sup> party which is not available in the attached price list, 2<sup>nd</sup> party will negotiate the price with 1st party prior to provide the service.
10. This Type of services 2<sup>nd</sup> party will provide to 1<sup>st</sup> party those are listed below:  
(a) Outdoor service (b) Indoor service (c) Emergency service (d) Specialized Consultancy (e) Operation (f) Others service (g) Digital X-ray (h) All pathology Test (i) ECG (j) USG (Whole abdomen) (k) USG other to (l) Nebulization (m) Oxygen (n) Suction (o) Vaccination (p) Medical Check-up (q) Physiotherapy ( r) Laparoscopic (s) Baby Incubator (t) Dental unit (u) Endoscopy (v) Eye Unit (w) Hearing Aid Unit (x) EEG,ETT (y) Hormone Test (z) CT Scan (aa) MRI (ab) OPG (ac) Hemo Dialysis etc.
11. The discount opportunity of 2<sup>nd</sup> party according to this under flowing commandment:

“দেশপ্রেমের শপথ নিন, দুর্নীতিকে বিদায় দিন”



৳ ৭১১০০১৭

12. Special discount offers Dynamic Sun Energy Private Ltd. Employees (Local Patient).

SL No	Types of Service	Discount	Rate for Company
01	Medical officer Fee	30%	
01.2	(Not Applicable other Consultant)		
02	All Pathology Test	15% To 20%	
03	All Radiology Test	10% To 15%	
04	ECG/ETT/EEG	10% To 15%	
05	ECHO (Colour Doplar)	10% To 15%	
06	USG (4D Color)	10% To 15%	
07	Cabin/G-Bed Charge	10%	
08	Ambulance Service	10%	
09	Operation (Major/Minor)	Negotiable	

13. This agreement is signed on 15/05/2023 and will continue for a period up to 14/05/2025.

14. No discount will be applicable for the foreign services holders. The bill will increase by up to 25% in the case of treatment of foreign patients. As a reason for this increase, the company will provide services under special privileges in the treatment of foreign patients.

15. Additional service:

- 24 hours Hospital Open.
- 24 hours Pharmacy Open.
- 24 hours Ambulance service.

<p>Signature of 1<sup>st</sup> Party</p>  <p>MD. ROBIUL ISLAM General Manager</p> 	<p>Signature of 2<sup>nd</sup> Party</p>  <p>(Md. Abul Hossain) Chairman, Shimla Hospital and Diagnostic Center.</p> 
--	---

“দেশপ্রেমের শপথ নিন, দুর্নীতিকে বিদায় দিন”

## **Annexure – 14**

### **Detail of STP**

DESIGN CALCULATION  
FOR PSTP of  
'DYNAMIC SUN ENERGY  
PRIVATE LIMITED  
Capacity = 15 KLD

PROCESS: BIOLOGICAL STP BY MBBR  
TECHNOLOGY



**Corporate Office:**

House B/113, Mosque Road,  
Mohakhali DOHS, Dhaka-1206, Bangladesh.

Email: [karim@greengenesisd.com](mailto:karim@greengenesisd.com), IP: +8809 638 00 9255

Web: [www.greengenesisd.com](http://www.greengenesisd.com), Hotline: +880 1700 665555

In the beginning there was the water. No water, no life.

**Mirpur Office:**

House 6, Boundary Road 3,  
Block-Ka, Sector 6, Mirpur,  
Dhaka-1212, Bangladesh.

**Warehouse:**

Aragoon Road,  
Belma, Ashulia-1341,  
Dhaka, Bangladesh.



ISO 9001 : 2015 CERTIFIED



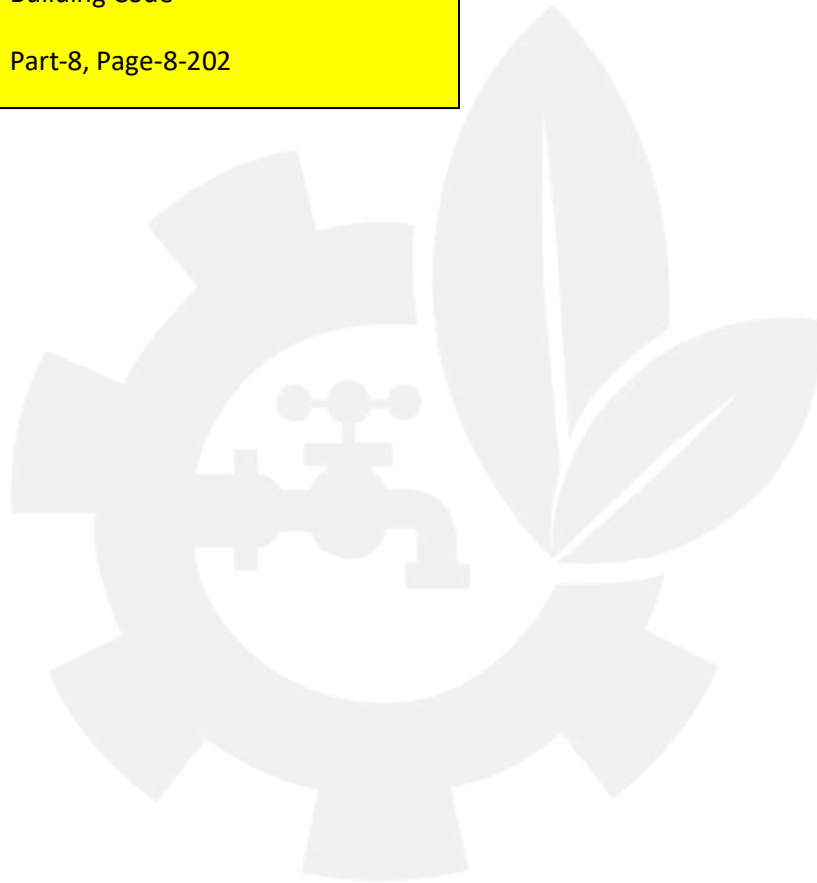
## 1. WASTEWATER GENERATION CALCULATION

S/L No.	Total Manpower (Person)	Wastewater Generation (L/ Capita/Day)	Wastewater Generation (Litre / Day)	Waste Water Generation (m <sup>3</sup> / Day)	Designed STP Capacity- 10% Safety (m <sup>3</sup> /day)
1.	300	40	12000	12	15



As per "Bangladesh National Building Code"

Part-8, Page-8-202



In the beginning there was the water. No water, no life.



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Email: karim@greengenesisd.com, IP: +8809 638 00 9255  
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**Mirpur Office:**

House 6, Boundary Road 3,  
Block-Ka, Sector 6, Mirpur,  
Dhaka-1212, Bangladesh.

**Warehouse:**

Aragoon Road,  
Belma, Ashulia-1341,  
Dhaka, Bangladesh.



ISO 9001 : 2015 CERTIFIED





## 2. INLET AND OUTLET WATER PARAMEMETERS

S/L No.	Water Quality Parameters	Unit	Inlet Water Considered Pollution Load	Outlet Parameters
1.	pH	-	6-9	6.5-8.5
2.	Chemical Oxygen Demand (COD)	mg/l	850	<100
3.	Biochemical Oxygen Demand (BOD)	mg/l	300	<30
4.	Total Suspended Solid (TSS)	mg/l	200	<50
5.	Nitrate	mg/l	100	<50
6.	Phosphate	mg/l	150	<15

### ECR -2023 Standard:

তফসিল-৩  
পান্ননির্গমন মানসূত্র  
(বিধি ৩২ প্রকৃষ্ণ)

ক্রমিক নং	স্থিতিমাপ	একক	উপস্থিতির সর্বোচ্চ সীমা পিএইচ ব্যতীত
(১)	(২)	(৩)	(৪)
১।	উষ্ণতা (Temp)	ডিগ্রি সেন্টিগ্রেড	৩০
২।	পিএইচ (pH)	-	৬-৯
৩।	বিগড়িত, ২০° সেন্টিগ্রেড (BOD <sub>5</sub> at 20°C)	মি.গ্রা./লি.	৩০
৪।	নিগড়িত (COD)	মি.গ্রা./লি.	১২৫
৫।	প্ৰলম্বিত কঠিন বস্তু (SS)	মি.গ্রা./লি.	১০০
৬।	তৈল ও গ্রিচ (Oil & Grease)	মি.গ্রা./লি.	১০
৭।	নাইট্রট (NO <sub>3</sub> )	মি.গ্রা./লি.	৫০
৮।	ফসফেট (PO <sub>4</sub> )	মি.গ্রা./লি.	১৫
৯।	সর্বিক কলিফর্ম (Total Coliform)	সিএমইউ/১০০ মি. লি.	১০০০

In the beginning there was the water. No water, no life.



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Web: www.greengenesisd.com, Hotline: +880 1700 665555

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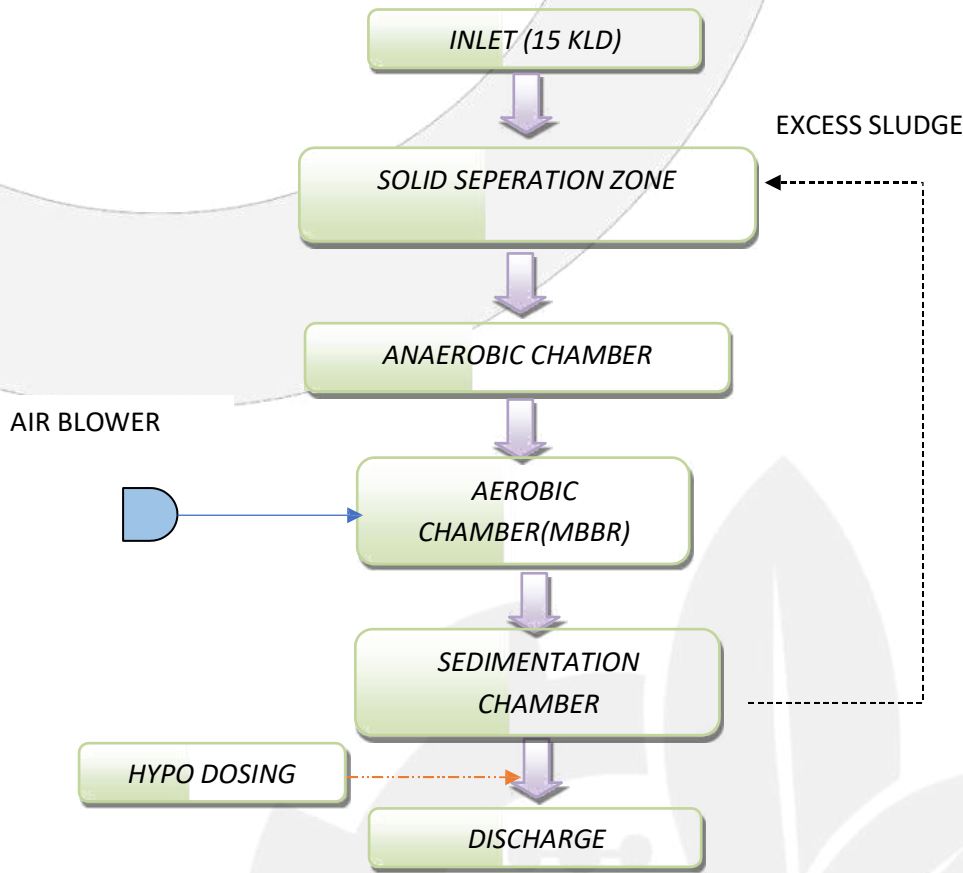
#### Warehouse:

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### 3. PROCESS CHART



In the beginning there was the water. No water, no life.



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## SOLID SEPERATION CHAMBER SIZING

Solid Separation Chamber Sizing, (D×H) = (2 m × 1.7 m)

### Design Basis:

$$\begin{aligned}\text{Volume of the chamber} &= (0.785 \times 2^2 \text{ m} \times 1.7 \text{ m}) \\ &= 5.34 \text{ m}^3\end{aligned}$$

$$\begin{aligned}\text{Retention Time (RT)} &= (5.34 \text{ m}^3 \div 15 \text{ m}^3/\text{day}) \\ &= 0.356 \text{ day} = 8.5 \text{ hr}\end{aligned}$$

$$\text{Free Board} = 0.3 \text{ m}$$

## ANAEROBIC CHAMBER SIZING

Anaerobic Chamber Sizing, (D×H) = (2 m × 1.5 m)

### Design Basis:

$$\begin{aligned}\text{Volume of the chamber} &= (0.785 \times 2^2 \text{ m} \times 1.5 \text{ m}) \\ &= 4.71 \text{ m}^3\end{aligned}$$

$$\begin{aligned}\text{Liquid Retention Time (RT)} &= (4.71 \text{ m}^3 \div 15 \text{ m}^3/\text{day}) \\ &= 0.314 \text{ day} = 7.5 \text{ hr}\end{aligned}$$

$$\text{Freeboard} = 0.3 \text{ m}$$

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#### Corporate Office:

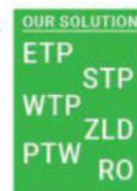
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**BIOLOGICAL OXIDATION (MBBR):**

型号 / Model		XLB-01(P60)	XLB-02(P60)	XLB-03(P60)	XLB-04(P65)	XLB-05(P65)	XLB-06(P65)
直径 (diameter)	mm	φ12.7	φ12.7	φ12.7	φ10.1	φ12.7	φ12.7
孔数 (Hole Number)	PCS	4	4	5	6	19	29
有效表面积 (Effective surface)	m <sup>2</sup> /m <sup>3</sup>	>800	>900	>1000	>800	>650	>650
比重 (Density)	g/cm <sup>3</sup>	0.96-0.98	0.96-0.98	0.96-0.98	0.96-0.98	0.96-0.98	1.02-1.05
填充个数 (Package number)	pcs/m <sup>3</sup>	>43000	>43000	>53000	>26500	>9700	>9700
孔隙率 (Porosity)	%	>65	>65	>65	>65	>60	>60
填充密度 (Loading rate)	%	15-61	15-68	15-70	15-64	15-45	15-61
挂膜时间 (Attachment time)	day	3-35	3-35	3-15	3-15	3-15	3-15
硝化效率 (Nitrification efficiency)	gNH <sub>4</sub> -N/m <sup>3</sup> d	400-1200	400-1200	400-1200	400-1200	400-1200	400-1200
好氧氧化效率 (COD <sub>o</sub> oxidator efficiency)	gBOD <sub>5</sub> /m <sup>3</sup> d	2000-10000	2000-10000	2000-10000	2000-10000	2000-10000	2000-10000
COD氧化效率 (COD oxidator efficiency)	gCOD/m <sup>3</sup> d	2000-10000	2000-10000	2000-10000	2000-10000	2000-10000	2000-10000
适用温度 (Applicable temperature)	°C	3-40	3-40	3-40	3-40	3-40	3-40
使用寿命 (Life span)	year	>15	>15	>15	>15	>15	>15

**MBBR TANK VOLUME:**

Where,

MBBR Media Specific Surface Area: 650 m<sup>2</sup>/m<sup>3</sup>

MBBR Size: 12 mm × 25 mm

Void: 80%

Fill: 15%-65%

**BOD LOADING RATE AT MBBR TANK:**

BOD Loading Rate: = Q × S<sub>o</sub>

= 15 m<sup>3</sup>/day × (240 g/m<sup>3</sup>) (20% BOD removal by anaerobic treatment)

**= 3,600 g/day**

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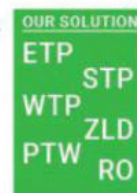
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### REQUIRED MBBR MEDIA TOTAL SURFACE AREA:

Considering BOD Removal 90 %, SALR = 7.5 g/m<sup>2</sup>/Day

Required Media Surface Area= BOD Loading Rate / SALR

$$= 3,600 \text{ g/day} \div 7.5 \text{ g/m}^2/\text{Day}$$

$$= \mathbf{480 \text{ m}^2}$$

### TOTAL VOLUME OF MBBR MEDIA:

MBBR Media Specific Surface Area = 650 m<sup>2</sup>/m<sup>3</sup>

Total Volume of MBBR Media = (Required MBBR Media Total Surface Area) ÷ (Media Specific Surface Area)

$$= 480 \text{ m}^2 \div 650 \text{ m}^2/\text{m}^3$$

$$= \mathbf{0.74 \text{ m}^3 \approx 0.8 \text{ m}^3}$$

### REQUIRED MBBR TANK VOLUME:

Required Tank Volume = (Total Volume of MBBR Media) ÷ (Carrier Fill %)

$$= 0.8 \text{ m}^3 \div 19 \%$$

$$= 0.8 \text{ m}^3 \div 0.19$$

$$= \mathbf{4.21 \text{ m}^3}$$



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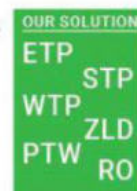
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## LIQUID VOLUME IN TANK:

Liquid Volume in Tank = Required Tank Volume - [Required Carrier Volume × (1 - Carrier % Void Space)]

$$= 4.21 \text{ m}^3 - [0.8 \text{ m}^3 \times (1-81\%)]$$

$$= 4.21 \text{ m}^3 - [0.8 \text{ m}^3 \times (1-0.81)]$$

$$= 4.21 \text{ m}^3 - [0.8 \text{ m}^3 \times 0.19]$$

$$= 4.21 \text{ m}^3 - 0.15 \text{ m}^3$$

$$= \mathbf{4.06 \text{ m}^3}$$

## AEROBIC CHAMBER SIZING

Aerobic Chamber Sizing, (D×H) = (2 m × 1.3 m)

### Design Basis:

$$\begin{aligned} \text{Volume of the chamber} &= (0.785 \times 2^2 \text{ m} \times 1.3 \text{ m}) \\ &= 4.08 \text{ m}^3 \end{aligned}$$

## HYDRAULIC RETENTION TIME (HRT) OF MBBR TANK:

MBBR Tank HRT = (Liquid Volume in Tank m<sup>3</sup>) ÷ (Flow Rate, Q)

$$= 4.08 \text{ m}^3 \div 15 \text{ m}^3/\text{day}$$

$$= \mathbf{0.27 \text{ day} = 6.5 \text{ hr}}$$



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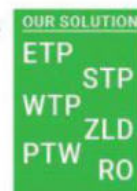
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STANDARD NAME	STANDARD VALUE	DESIGN VALUE	DESIGN CONFORMITY	REMARKS
“Waste Water Engineering Treatment & Reuse” by Metcalf & Eddy (Fourth Edition) Page - 955	3.5 – 4.5 hr	6.5 hr	Yes	

As per “Waste Water Engineering Treatment and Reuse” by Metcalf & Eddy (Fourth Edition)  
Page – 955, Table 9-15



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## CALCULATED AIR

$$\text{Actual Oxygen Requirement} = \frac{\text{BOD} * \text{Flow rate} * 1.8}{1000}$$

$$\begin{aligned} \text{AOR} &= (240 \text{ g/m}^3 \times 15 \text{ m}^3/\text{day} \times 1.8) \div 1000 \\ &= 6480 \text{ g/day} \div 1000 \text{ Kg O}_2 / \text{day} \\ &= 6.48 \text{ Kg O}_2 / \text{day} \end{aligned}$$

$$\text{Standard Oxygen Requirement} = \frac{\text{AOR}}{0.50}$$

$$\begin{aligned} \text{Standard Oxygen Requirement SOR} &= (\text{AOR} \div 0.5) \text{ Kg O}_2 / \text{day} \\ &= 6.48 / 0.5 \text{ Kg O}_2 / \text{day} \\ &= 12.96 \text{ Kg O}_2 / \text{day} \end{aligned}$$

$$\text{SOTE} = 20 \%$$

$$\text{SOTE} = \left( \frac{\text{SOR}}{Q} \right) * \left( \frac{1}{\rho} \right) * \left( \frac{1}{23.17\%} \right)$$

$$20 \% = (12.96 \text{ kg/day} \div Q) \times (1 \div 1.27 \text{ Kg/m}^3) \times (1 \div 23.17 \%)$$

$$\text{Or } 0.2 = (12.96 \div Q) \times 0.787 \times 4.35 \text{ (kg/day} \div \text{Kg/m}^3)$$

$$\text{Or } Q = 221.83 \text{ m}^3/\text{day} \div 24 \text{ hr} / \text{day}$$

$$\text{Or } Q = 9.24 \text{ m}^3/\text{hr}$$

**Supplied Submersible Jet Aerator Capacity= 10 m<sup>3</sup>/hr (1W+1S)**



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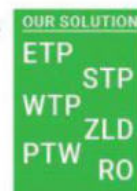
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### SEDIMENTATION CHAMBER (PLAIN TYPE):

Sedimentation chamber Sizing, (D×H) = (2 m × 1.5 m)

**Design Basis:**

$$\begin{aligned} \text{Volume of the chamber} &= (0.785 \times 2^2 \text{ m} \times 1.5 \text{ m}) \\ &= 4.71 \text{ m}^3 \end{aligned}$$

$$\begin{aligned} \text{Liquid Retention Time (RT)} &= (4.71 \text{ m}^3 \div 15 \text{ m}^3/\text{day}) \\ &= 0.314 \text{ day} = 7.5 \text{ hr} \end{aligned}$$

Freeboard = 0.3 m

### BIO SLUDGE LOADING IN CLARIFIER

$$\begin{aligned} \text{Sludge Loading Rate} &= \frac{3000 \frac{\text{g}}{\text{m}^3} \times 15 \frac{\text{m}^3}{\text{day}}}{1000 \frac{\text{g}}{\text{kg}}} \\ &= 45 \text{ Kg/day (100 \% Dry)} \end{aligned}$$

#### I. Surface overflow rate (SOR)

$$\begin{aligned} \text{SOR} &= 15 \text{ m}^3/\text{day} / 3.14 \text{ m}^2 \\ &= 4.77 \text{ m}^3/\text{m}^2/\text{day} \end{aligned}$$

STANDARD NAME	STANDARD VALUE	DESIGN VALUE	DESIGN CONFORMITY	REMARKS
“Waste Water Engineering Treatment & Reuse” by Metcalf & Eddy (Fourth Edition) Page - 398	24 – 32 m <sup>3</sup> /m <sup>2</sup> /day	4.77 m <sup>3</sup> /m <sup>2</sup> /day	Yes	

As per “Waste Water Engineering Treatment and Reuse” by Metcalf & Eddy (Fourth Edition)

Page – 398, Table 5-20



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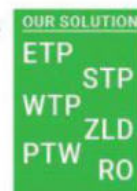
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## II. Hydraulic retention time (HRT)

$$\begin{aligned} \text{HRT} &= (0.785 \times 2^2 \text{ m} \times 1.5 \text{ m}) \div 15 \text{ m}^3/\text{day} \\ &= 4.71 \text{ m}^3 \div 15 \text{ m}^3/\text{day} \\ &= 0.314 \text{ day} = 7.5 \text{ hr} \end{aligned}$$

STANDARD NAME	STANDARD VALUE	DESIGN VALUE	DESIGN CONFORMITY	REMARKS
“Waste Water Engineering Treatment & Reuse” by Metcalf & Eddy (Fourth Edition) Page - 398	1.5 – 2.5 hr	7.5 hr	Yes	

As per “Waste Water Engineering Treatment and Reuse” by Metcalf & Eddy (Fourth Edition)  
Page – 398, Table 5-20

## SLUDGE MANAGEMENT

Plant Data:

STP Capacity: 15 KLD

BOD Load: 300 mg/L

**Sludge can be dewatered yearly or can be Cleaned Along with Septic Tank Seepage can be managed by sludge drying bed.**



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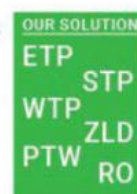
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## 1. PROCESS DESCRIPTION

### A. SCREENING

The principal role of screening is to remove the materials like plant, debris, fibre and other large particles from the flow stream that could damage subsequent process equipment, reduce overall treatment process reliability and effectiveness, or contaminate waterways. Coarse screen followed by fine screen are employed to remove different size of solid waste effectively.

### B. SEDIMENTATION AND SEPARATION CHAMBER:

- Separation chamber separates larger matter (like plastic pieces, sachets etc.)
- Heavier particles settle in the 1st chamber due to higher density.

### C. ANAEROBIC CHAMBER:

- The first stage of the biological process; consists of on which the anaerobic bacteria grow.
- Anaerobic bacteria decompose the organic matter (BOD & COD) – almost 50 to 60% degradation.
- Anaerobic bacteria do not require oxygen for their survival and growth (hence, no blower required).



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Cell- 01713 468048

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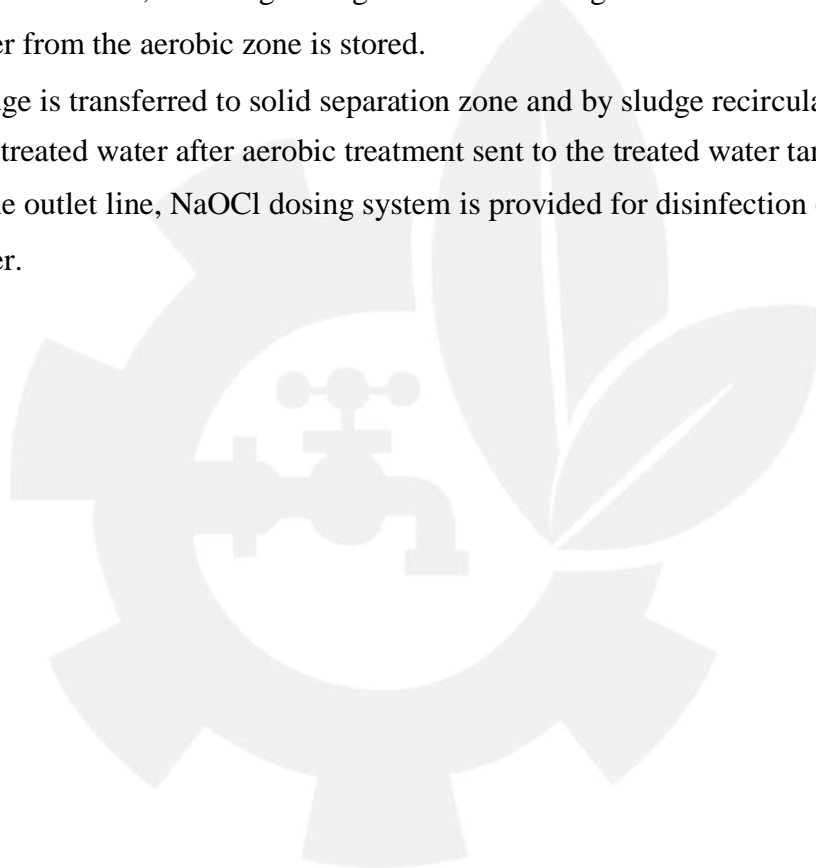


#### D. AEROBIC CHAMBER:

- The second stage of the biological process; consists of media on which the aerobic bacteria grow.
- Aerobic bacteria decompose the residual BOD & COD.
- Aerobic bacteria require oxygen (blower is provided).
- Air is supplied to the chamber by a diffuser for efficient oxygen transfer.

#### E. SEDIMENTATION CHAMBER

- In this chamber, the sludge along with the microorganism is settled down the treated water from the aerobic zone is stored.
- Sludge is transferred to solid separation zone and by sludge recirculation pump.
- The treated water after aerobic treatment sent to the treated water tank for discharge.
- In the outlet line, NaOCl dosing system is provided for disinfection of the treated water.



## 1. SCOPE OF SUPPLY-(SEWAGE TREATMENT PLANT- 15 KLD)

S/L. No	Items	Specification	Unit	Qty.
1.	<i>FRP Unit</i>	Capacity: 15 KLD Size: 2000 mm (D) x 6000 mm (L) MOC: FRP Brand: GGEL	set	1
2.	<i>Sewage Lifting Pump</i>	Capacity: 5 m <sup>3</sup> /hr Head: 7 m H Power: 0.5 HP/ 0.37 kW Brand: Grampus Origin: Taiwan	set	2
3.	<i>Sludge Transfer Pump</i>	Capacity: 5 m <sup>3</sup> /hr Head: 7 m H Power: 0.5 HP/ 0.37 kW Brand: Grampus Origin: Taiwan	set	1
4.	<i>Aeration System</i>	Per hr O <sub>2</sub> Capacity: 0.06 – 0.1 kg/hr Motor: 1 HP/0.75 kW Origin: China/Taiwan	set	2
5.	<i>MBBR Biochips</i>	MOC: HDPE/PP Diameter: 25 mm Length: 12 mm Brand: GGEL Origin: China	m <sup>3</sup>	0.8
6.	<i>Hypo Dosing pump</i>	Capacity: 5 LPH Pressure: 8 bar Power: 14 W Brand: Seko Origin: Italy Dosing Tank: 200 L MOC: Plastic	Set	1
7.	<i>Interconnecting Pipe and Fittings and Cables</i>	MOC: PVC/uPVC Cables as per design requirement	Lot	1
8.	<i>Control Panel</i>	Major Item Magnetic Contact Circuit Breaker Overload Relay Timer Major Equipment: Mitsubishi/Schneider/Siemens Assembling: GGEL	Lot	1

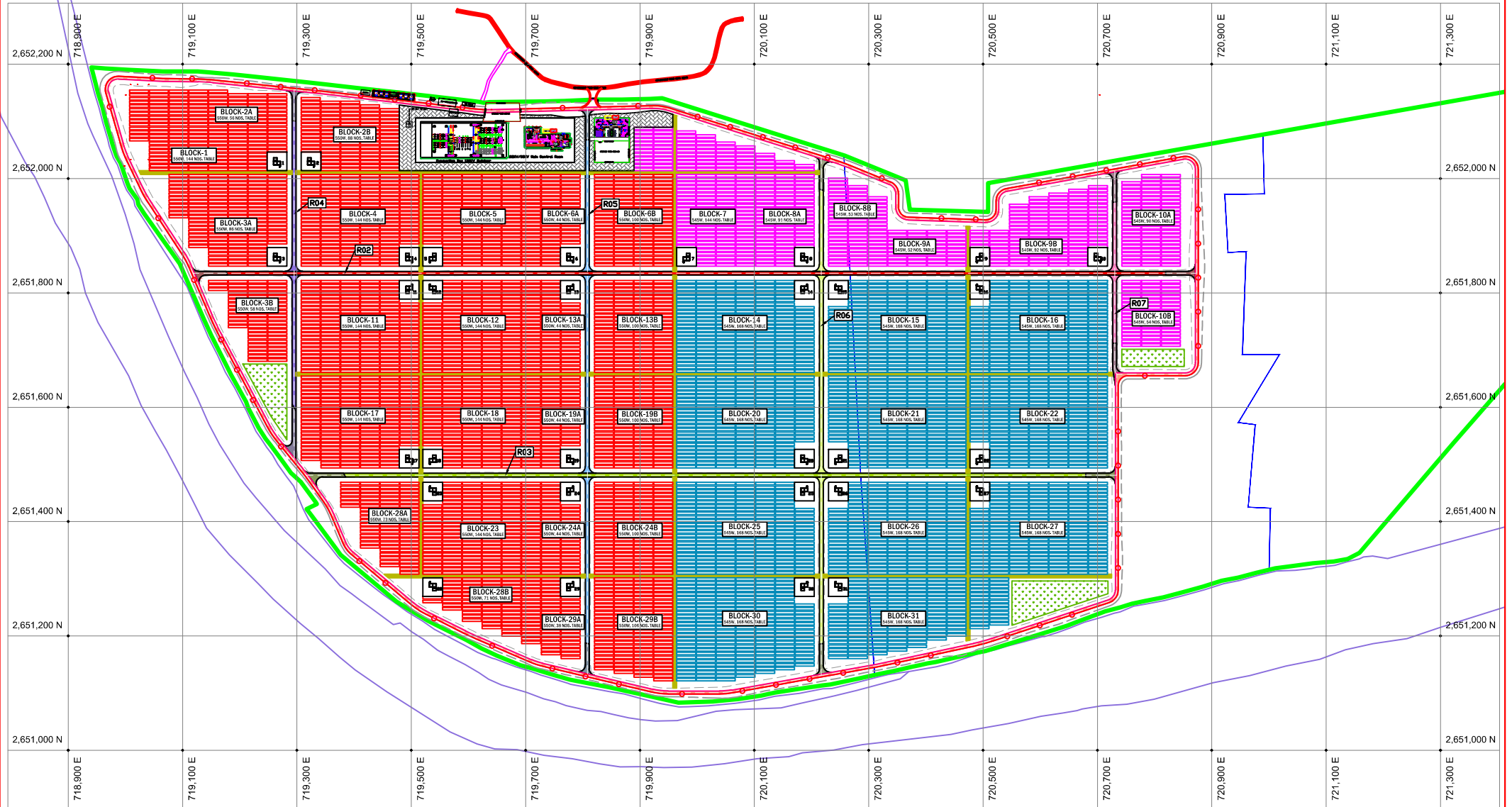
15 KLD SEWERAGE TREATMENT TANK  
DRAWING & DESIGN CALCULATION

FOR

**DYNAMIC SUN ENERGY PRIVATE LTD.**

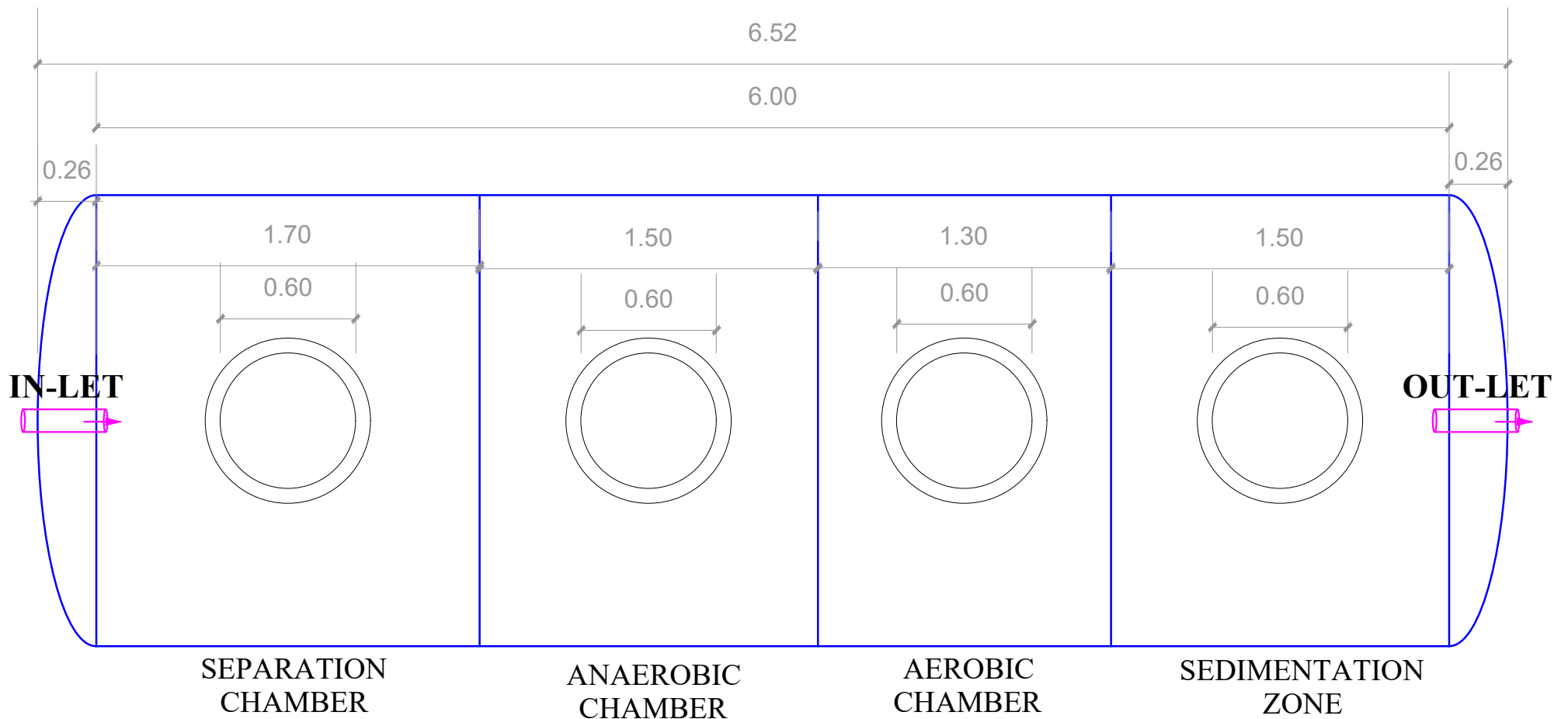
SUBMITTED BY

GREEN GENESIS ENGINEERS LIMITED

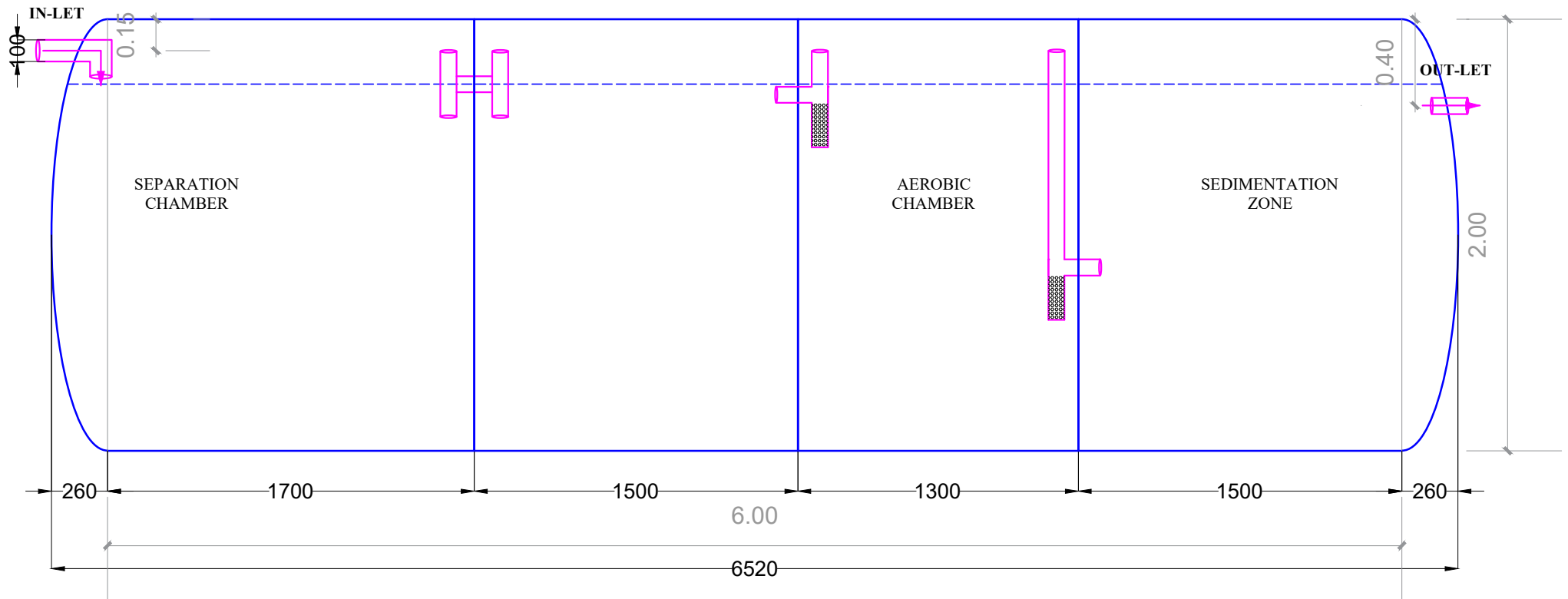



**MASTER SEPTIC TANK & SOAK WEL LAYOUT PLAN OF DYNAMIC SUN ENERGY PRIVATE LTD.**

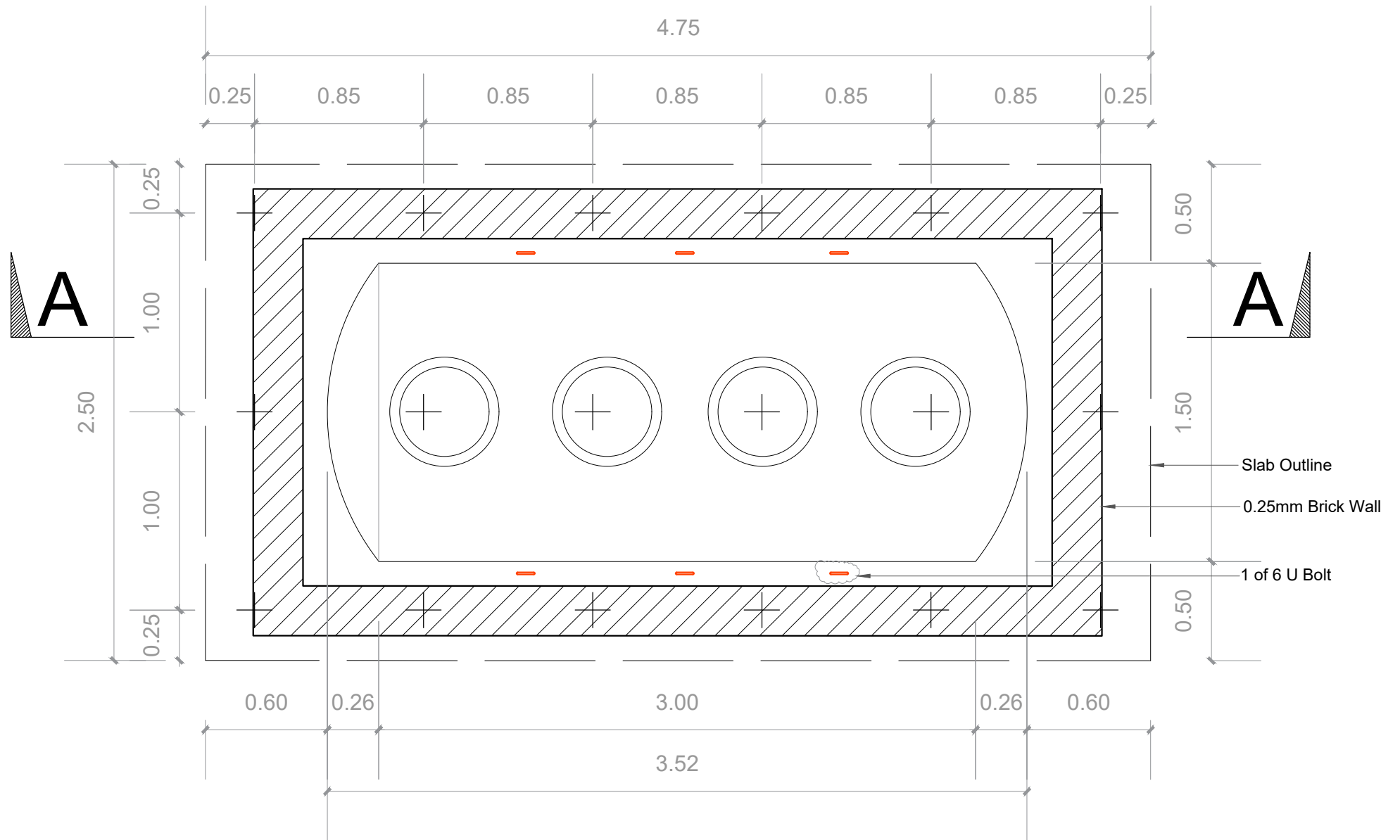
<p><b>PROJECT NAME :</b> CAPACITY: 15 KLD SEWAGE TREATMENT PLANT (PACKAGE-STP)</p>	<p><b>CONSULTANT :</b> <b>GREEN GENESIS ENGINEERING LTD</b> Address: HOUSE B174,Road 23 DOSH,MOHAKHALI, Dhaka-1212, BANGLADESH. Tel : 01765829951, 01678797924. E-MAIL: support08@greengenesisbd.com</p> <p><b>G G E L</b></p>	<p><b>CLIENT NAME :</b> <b>DYNAMIC SUN ENERGY PRIVATE LTD.</b></p>	<p><b>OWNER SIGN :</b></p>	<p><b>DESIGN BY :</b>  MAHMUD AL HASAN B.S.C ENGINEER (CHEMICAL) GENERAL MANAGER.</p>	<p><b>DRAWING PREPARED BY :</b>  MD.MAHBUBUL ALAM (CIVIL ENGINEER)</p>	<p><b>DRAWING TITLE :</b>  MASTER PLAN</p> <p>SHEET NO : 01      DATE : 20-Feb-23</p>	<p><b>NOTES :</b></p> <p>REVISION : 00      SCALE : MM</p>
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<b>PROJECT NAME :</b> CAPACITY: 15 KLD SEWAGE TREATMENT PLANT (PACKAGE-STP)	<b>CONSULTANT :</b>  <i>GREEN GENESIS ENGINEERING LTD</i> Address: HOUSE B174, Road 23 DOSH, MOHAKHALI. Dhaka-1212, BANGLADESH. Tel : 01765829951, 01678797924. E-MAIL: support08@greengenesisd.com <b>G G E L</b>	<b>CLIENT NAME :</b> DYNAMIC SUN ENERGY PRIVATE LTD.	<b>OWNER SIGN :</b>	<b>DESIGN BY :</b>  MAHMUD AL HASAN B.SC. ENGINEER (CHEMICAL) GENERAL MANAGER.	<b>DRAWING PREPARED BY :</b>  MD. MAHBUBUL ALAM (CIVIL ENGINEER)	<b>DRAWING TITLE :</b>  <b>LAY OUT PLAN</b>	<b>NOTES :</b>
				SHEET NO : 02		DATE : 20-Feb-23	REVISION : 00   SCALE : MM

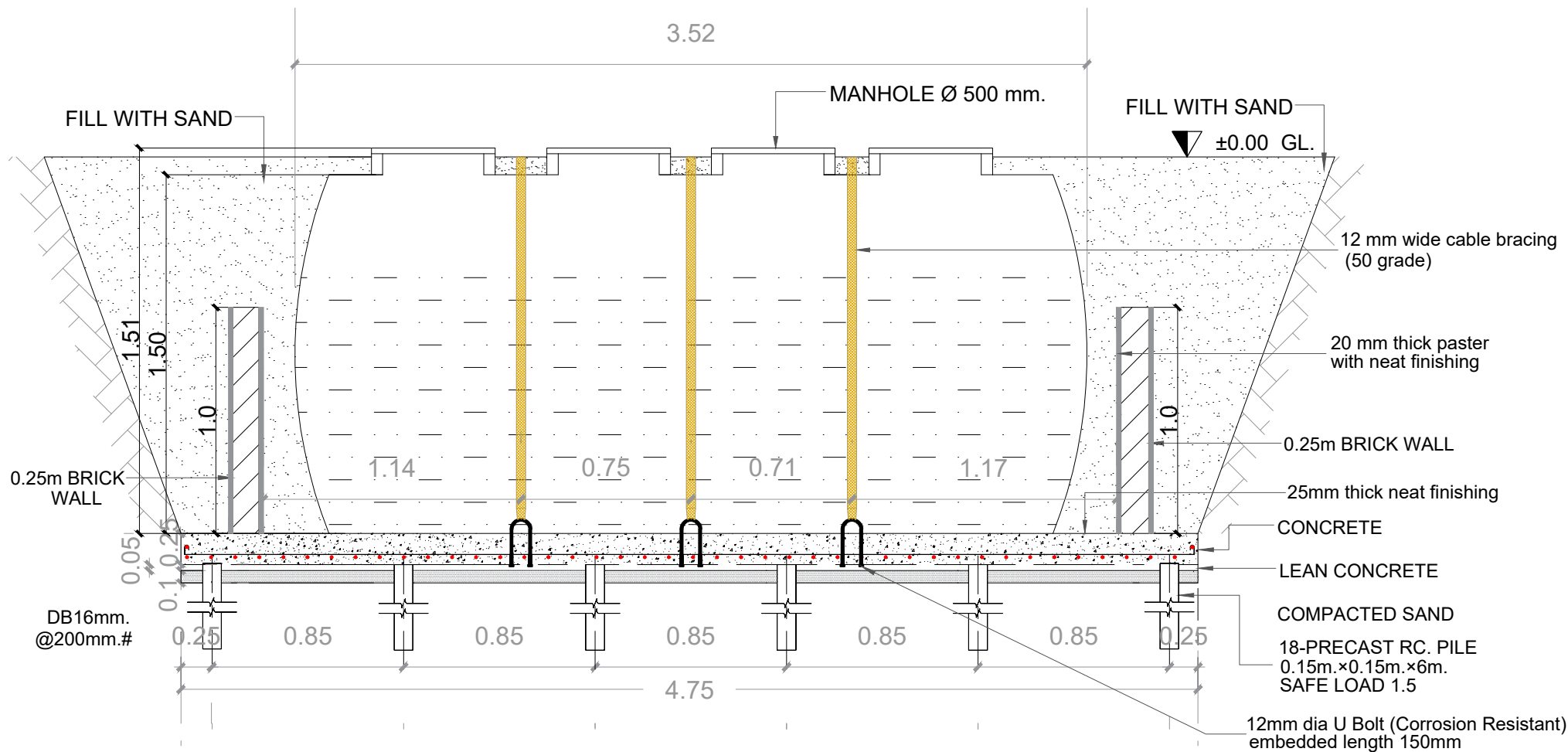


<b>PROJECT NAME :</b>	<b>CONSULTANT :</b>	<b>CLIENT NAME :</b>	<b>OWNER SIGN :</b>	<b>DESIGN BY :</b>	<b>DRAWING PREPARED BY :</b>	<b>DRAWING TITLE :</b>	<b>NOTES :</b>
CAPACITY: 15 KLD SEWAGE TREATMENT PLANT (PACKAGE-STP)	<b>GREEN GENESIS ENGINEERING LTD</b> Address: HOUSE B174, Road 23 DOSH, MOHAKHALI, Dhaka-1212, BANGLADESH. Tel : 01765829951, 01678797924. E-MAIL: <a href="mailto:support08@greengenesistbd.com">support08@greengenesistbd.com</a> 	DYNAMIC SUN ENERGY PRIVATE LTD.		MAHMUD AL HASAN B.SC. ENGINEER (CHEMICAL) GENERAL MANAGER.	MD.MAHBUBUL ALAM (CIVIL ENGINEER)	<b>SECTION PLAN</b> SHEET NO : 03    DATE : 20-Feb-23	REVISION : 00    SCALE : MM



## PLAN - VIEW

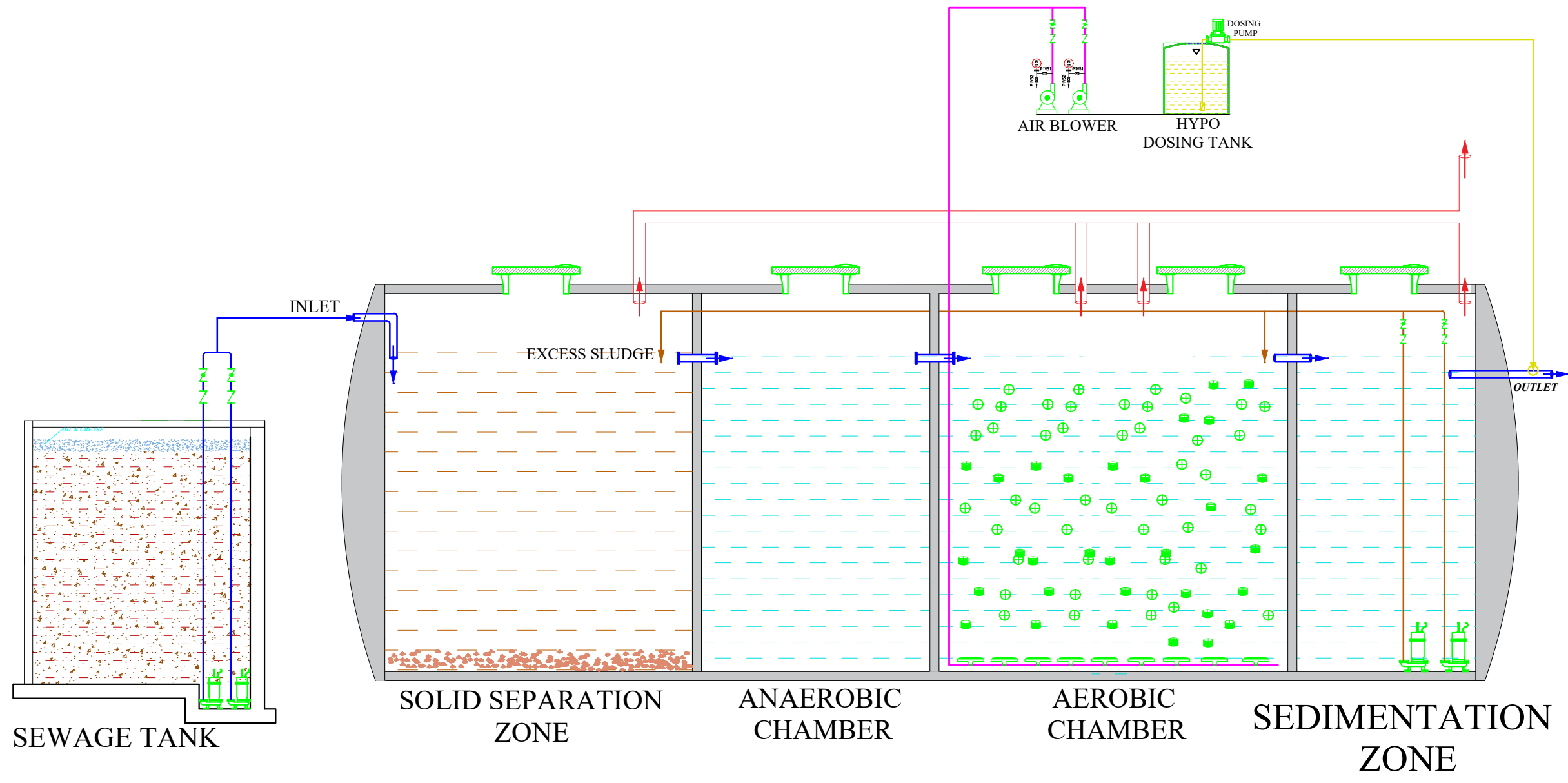
<b>PROJECT NAME :</b> CAPACITY: 15 KLD SEWAGE TREATMENT PLANT (PACKAGE-STP)	<b>CONSULTANT :</b>  GREEN GENESIS ENGINEERING LTD Address: HOUSE B174,Road 23 DOSH,MOHAKHALI, Dhaka-1212, BANGLADESH. Tel : 01765829951, 01678797924. E-MAIL: support08@greengenesisltd.com  GGEL	<b>CLIENT NAME :</b> DYNAMIC SUN ENERGY PRIVATE LTD.	<b>OWNER SIGN :</b>	<b>DESIGN BY :</b>  MAHMUD AL HASAN B.SC. ENGINEER (CHEMICAL) GENERAL MANAGER.	<b>DRAWING PREPARED BY :</b>  MD.MAHBUBUL ALAM (CIVIL ENGINEER)	<b>DRAWING TITLE :</b>  PLAN VIEW	<b>NOTES :</b>
				SHEET NO : 04		DATE : 20-Feb-23	REVISION : 00 SCALE : MM




# SECTION A-A

<b>PROJECT NAME :</b> CAPACITY: 15 KLD SEWAGE TREATMENT PLANT (PACKAGE-STP)	<b>CONSULTANT :</b>  GREEN GENESIS ENGINEERING LTD Address: HOUSE B174,Road 23 DOSH,MOHAKHALI Dhaka-1212, BANGLADESH. Tel : 01765829951, 01678797924. E-MAIL: support08@greengenesisbd.com  GGEL	<b>CLIENT NAME :</b> DYNAMIC SUN ENERGY PRIVATE LTD.	<b>OWNER SIGN :</b>	<b>DESIGN BY :</b>  MAHMUD AL HASAN B.SC. ENGINEER (CHEMICAL) GENERAL MANAGER.	<b>DRAWING PREPARED BY :</b>  MD.MAHBUBUL ALAM (CIVIL ENGINEER)	<b>DRAWING TITLE :</b>  SECTION A-A	<b>NOTES :</b>
SHEET NO : 05		DATE : 20-Feb-23		REVISION : 00		SCALE : MM	





<b>PROJECT NAME :</b> CAPACITY: <b>15 KLD SEWAGE TREATMENT PLANT (PACKAGE-STP)</b>	<b>CONSULTANT :</b> <b>GREEN GENESIS ENGINEERING LTD</b> Address: HOUSE B174,Road 23 DOSH,MOHAKHALI. Dhaka-1212, BANGLADESH. Tel : 01765829951, 01678797924. E-MAIL: <a href="mailto:support08@greengenesisd.com">support08@greengenesisd.com</a> 	<b>CLIENT NAME :</b> <b>DYNAMIC SUN ENERGY PRIVATE LTD.</b>	<b>OWNER SIGN :</b>  	<b>DESIGN BY :</b>  MAHMUD AL HASAN B.SC.ENGINEER (CHEMICAL) GENERAL MANAGER.	<b>DRAWING PREPARED BY :</b>  MD.MAHBUBUL ALAM (CIVIL ENGINEER)	<b>DRAWING TITLE :</b>  <b>PROCESS FLOW DIAGRAM</b> SHEET NO : o6      DATE : 20-Feb-23	<b>NOTES :</b>  REVISION : 00      SCALE : MM
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**Annexure – 15**  
**List of Contractors**

## **List of Contractors and Statement of Work (SoW)**

Sl. No.	Designated Contractor	Statement of Work
01	Active Construction Ltd.	Construction Work of Block Substation Building (2 Block SS Buildings)
02	M/S Altab Enterprise	Construction Work of Main Substation Building
03	OTIK Tekno Ltd.	Supply, Fabrication, Erection & Installation of Steel Building Structure of 31 nos. mini substation building and related works
04	M/S Saiful Traders	Construction Work of Block Substation Building (1 Block SS Buildings)
05	Tex-k-Mart	Construction Work of Block Substation Building (2 Block SS Buildings)
06	Trazz BD	Construction Work of Block Substation Building (1 Block SS Buildings)
07	TURBOMECH E&C Limited	SPC Pile Driving by hydraulic hammer or virbo hammer machine with all mobilization, fuel, fooding, carrying, loading-unloading at pile drive location point in site.
08	M/S Alom Trading	SPC Pile Driving by hydraulic hammer or virbo hammer machine with all mobilization, fuel, fooding, carrying, loading-unloading at pile drive location point in site.
09	Shohor Kutub Shah Amanat Enterprise	SPC Pile Driving by hydraulic hammer or virbo hammer machine with all mobilization, fuel, fooding, carrying, loading-unloading at pile drive location point in site.
10	DRS-EPBL-MUKTI(JV)	Clearance of RoW, Construction, Installation, Testing & Commissioning with achieving related approvals of the 132kV Double Circuit Power Evacuation Line on turnkey basis
11	SOUTH ASIA ERECTORS	Clearance of RoW, Construction, Installation, Testing & Commissioning with achieving related approvals of the 132kV Double Circuit Power Evacuation Line on turnkey basis
12	Xian Electric Engineering Co., Ltd. Sciencetech Engineering and Services	Design, Engineering, Procurement, Manufacturing, Supply, CFR Transportation up to Chattogram Port, Erection, Installation, Testing & Commissioning of 132 kV AIS (Air Insulated Switchgear) Substation on Turnkey Basis of Dynamic Sun Energy Private Limited 100 MW AC (150 MW DC) Grid Tied Solar Plant at Pabna, Bangladesh
13	PT. ELSEWEDY ELECTRIC INDONESIA	For the purposes of execution/implementation of the PROJECT, the SELLER undertakes to supply the Plant and also undertakes to complete the work as described in the attached schedule and mentioned in the Purchase Order (PO No. DSEPL/PTEEL/

Sl. No.	Designated Contractor	Statement of Work
		TRANSFORMER/0099/2023) for supplying & supervision of installation, testing & commissioning of Power Transformers, Distribution Transformer and Other Transformers.
14	HENGTONG OPTIC ELECTRIC CO. LTD.	<ul style="list-style-type: none"> <li>• DC Power Cable</li> <li>• AC Power Cable</li> <li>• Grounding Cable</li> <li>• FOC Cable</li> <li>• Communication Cable</li> <li>• C &amp; I Cable</li> </ul>
15	Changshu Fengfan Power Equipment Co., Ltd.	<p>Transmission Line Materials</p> <ul style="list-style-type: none"> <li>• Tower</li> <li>• Conductors &amp; OPGW</li> <li>• Hardware &amp; Fittings</li> <li>• Underground Cable &amp; Accessories</li> <li>• Necessary Other Materials</li> </ul>
16	PETERSON INNOTECH CO. LTD. (PICL)	<p>Engineering &amp; Procurement of</p> <ul style="list-style-type: none"> <li>• PV Module Mounting Structure,</li> <li>• PHC Pile,</li> <li>• PV Module,</li> <li>• Grid-Connected Solar Inverter.</li> </ul>
17	ELSEWEDY ELECTRIC	<p>Power Transformer:</p> <ul style="list-style-type: none"> <li>• 02 Nos. of 80/120MVA, 33/132kV</li> <li>• 32 Nos. of 6.5MVA, 0.8/33kV</li> <li>• 01 No. of 1.0 MVA, 33/0.415kV</li> </ul>
18	Power well	<ul style="list-style-type: none"> <li>• Switchgear Panel 33kV Sub Station (GIS) (At Main Control Room)</li> <li>• Plant Auxiliary Sub Station Equipment</li> </ul>
19	NR Electric	SCADA & PPC for Plant & Grid End

**Annexure – 16**  
**Application to BREC**



# Bangladesh Energy Regulatory Commission

TCB Building (3rd Floor) 1 Kawran Bazar, Dhaka-1215

Fax: +88-02-8155743, Website: www.berc.org.bd

Print Date: 10/04/2023

APPLICATION FORM NUMBER: POWER/2023/IPP-0007

## New Application Form for Independent Power Generation License (For Independent Power Producer [IPP] Plant)

[NOTE: WHERE THE RESPONSE TO A QUESTION REFLECTED IN AN ATTACHMENT, NUMBER THE ATTACHMENT AND LIST OPPOSITE THE RESPONSE ITEM] (Please sign all the sheets and attachments for authenticity)

1. **Name and Address of the Applicant**  
(Company name & address) : Dynamic Sun Energy Private Limited  
Navana Tower, Level-7-C, 45 Gulshan C/A, Gulshan-1, Dhaka-1212
2. **Government policy under which the Application is being submitted** :
3. **Service Commission Date**  
(a) Expected Commission Date : 23/03/2024
4. **Location (Site of the Plant)** :  
(A location map and documentary evidence of right for occupancy of the land shall be submitted.)  
(a) Area Map of the Land : 439 Acre  
(b) Type of Land : Non Agricultural land
5. **(a) Type of the Plant (Technology)**
  - i. Type (As RE, ST, SC GT, CCPP or others) : Solar
  - ii. Type of fuel to be used :
  - iii. How the fuel is managed :
  - iv. Capacity (Each RE & Total, CCPP, SC GT & ST) : 100 MW AC MW
  - v. Auxilliary Consumption in MW & % of Gross : 400 kw 0.4%
  - vi. Net Capacity : 100.00
  - vii. CV of Fuel :
  - viii. Fuel required per unit generation (l/Kwh) :
  - ix. Heat Rate : 0.00

(b) Solar Power Plant (Type & Technology)

(c) Wind Power Plant (Technology)

(d) Hydro Power Plant

  - i. Storage type or Run of River :
  - ii. Monthly average Inflow M<sup>3</sup>/S : 0.00



- iii. Effective Head in Meter :
- iv. Length of Penstock :
- v. Type of Turbine (Kaplan, Francis etc.) :

**(e) Other Types of Plant (not included above)**

- i. Primary fuel (if required) :
- ii. Type :
- iii. Model :
- iv. Describe Energy Conversion Process :Solar Energy (DC) Convert to (AC) Power
- v. Name the equipment associated :Solar PV Model, Inverter, Power Plant Controller, SCADA, Sub Station
- vi. Life span of the Plant :20 years
- vii. Capacity of Unit Transformer in KVA :6,500.00
- viii. No. of Unit Transformer & Voltage level :2 & 0.00
- ix. Type of Generator & Gen. Voltage :& 0.00

Mention data which is essential but not asking :

**6. Power Evacuation**

Provide details of power evacuation of electricity from the plant, including the location of substation and connection to the dispatch point

- i. Delivery Point (at which voltage level the power is evacuated) :Ishurdi (PGCB)
- ii. Name of the Grid Sub-Station :ACSR (GROSBEAR)
- iii. Name of the Conductor & Size :

**7. Power Purchase Agreement (PPA)**

(Attach the document)

- i. Contractual Period :20 years
- ii. Contract Number :10638
- iii. Date of Contract :24/03/2022

**8. Physical Layout**

(Attach schematic diagram and layout plan for power plant)

:see attachments

**9. Earthing System**

(Attach the earthing diagram with resistance value)

:see attachments

**10. Protection Scheme**

(Mention the different types of protection system including firefighting and safety systems)

:see attachments

**11. Metering**

Attach schematic of metering systems

:see attachments

12. **Environmental Compliance Plan** :see attachments  
 (i) The project under which category designated by DoE  
 (Attach the clearance from DoE)
13. **Project Schedule** :see attachments  
 Attach a proposed schedule in bar chart format covering all the applicable major activities)
14. **Proposed Project Cost** :see attachments  
 (Attachment should include sources of finance)
15. **Tariff & Captive Charge** :see attachment  
 (As per PPA)
16. **A copy of the feasibility study based on which the relevant figures have been taken in the application, shall be attached** :see attachment
17. **List of Senior Management** :  
 (Name, Designation and address are to be mentioned)

Name	Designation	Address
------	-------------	---------

18. **Detail of Applicant and Directors who have interest: more than 10% of the company**  
 (List can be attached)

Name	Designation	Address	Interest Percent
------	-------------	---------	------------------

19. **Company Information**

- (a) TIN Number :539501904055
- (b) VAT Registration No. :0010119260101
- (c) Trade License No. & Validity :013  
 (Enclose copies & payment documents)

Attachments :



#	Title	Description	File Attached?
1	Clearance Certificate from Department of Environment		Yes
2	Fire License/Clearance Certificate (Updated)		Yes
3	Fuel Supply Agreement		No
4	Income Tax Certificate (Updated)		Yes
5	Incorporation Certificate		Yes
6	Layout Plan of Earthing with Earth Resistance Report		Yes
7	Layout Plan of Power Plant		Yes
8	NOC from the Department of Explosives (Updated)		No
9	Power Purchase Agreement		Yes
10	Single Line Diagram Showing Electricity Evacuation System of the Plant including the Location of Sub-station and Connection to the Dispatch Point		Yes
11	Specification of Generator/Engine/GT/ST/Solar Panel/ Wind Turbine etc.		Yes
12	Trade License (Updated)		Yes
13	VAT Registration Certificate		Yes

Dynamic Sun Energy Pvt. Ltd.

  
Managing Director

Signature, Name and Designation of the Applicant

Telephone Number (land set) : 55049833

Mobile Number : 01777709440

Telex Number :

Facsimile Number :

E-Mail Address :

investorrelation@paramountgroupbd.com



(Common Seal of the Company)



**\*\* Please Note :**

1. All enclosed papers/documents are to be signed and sealed by the signatory/applicant.
2. The Memorandum & Articles of Association, Certificate of Incorporation of the electricity generation company, Location Map of the Plant, Distribution Area Map, Project Cost Analysis Environment Clearance Certificate of Directorate of Environment, Commitment letter of loan (if any) Commitment letter fuel supplier, Feasibility Report,

শাহজালাল ইসলামী ব্যাংক লিমিটেড NOT OVER TK.=250,000 ONLY ORDER

Shahjalal Islami Bank Only  
Account Payee

শাহজালাল ইসলামী ব্যাংক



PO No. 4590412

Date: 

	1	0	0	4	2	0	2	3	
D	D	M	M	Y	Y	Y	Y	Y	

Shahjalal Islami Bank Tower Branch (190260871)

Pay to Bangladesh Energy Regulatory Commission (BERC)

Or Order

The Sum of Taka TWO LAC FIFTY THOUSAND ONLY

Tk. 250,000.00

On account of Dynamic Sun Energy private Limited.  
A/C No. 9020501000000

For Shahjalal Islami Bank Limited

Authorized Signature

Please Sign Above This Line

Authorized Signature

⑈4590412⑈ ⑈90260871⑈ 9020501000000⑈ 19

Bangladesh Energy Regulatory Commission  
Received  
10 APR 2023  
Content not verified  
Sign.....

## **Annexure – 17**

**Checklists and Forms for different hazards/Emergency Scenarios**

## **Attachment 1 - Incident Situation Update Procedure Checklist**

### **Incident Situation Update Procedure Checklist**

The EHS Manager should update on a regular interval all members of the ESMP implementation team.

Updates should normally be held once an hour. The ideal duration of an update should be no more than 10 minutes.

#### **Procedure**

- EHS Manager gives a 10-minute notice.
- All Medical, Fire Fighting & Rescue Team and Support personnel to attend.
- Inform ESMP Implementation Team of the update meeting.
- Commence update with operations brief on the latest state of incident.
- Follow with short statements from all the Fire Fighting & Rescue Team members giving the latest situation update and actions from their own area of responsibility.
- Clarification of points of fact, if required, following each statement.
- Update completed. Individual ERT members revert to carrying out their actions.
- Recorder to make a summary of the update / prepare and issue with copies to all EMP Implementation Team. One copy to be retained on the central incident log.

## Attachment 2 - Kidnap and Extortion Checklist

This checklist supplements the normal ERT checklists where Kidnap or other extortion is occurring or is possible.

Kidnap And Extortion Checklist	Responsibility
1. Call-out - EHS Manager - ERT - Human Resources Coordinator	Plant Manager
2. Establish secure communications link with ERT	EHS Manager
3. Ensure secure meeting room for ERT.	EHS Manager
4. Maintain effective logs	Fire Fighting & Rescue Team
5. Establish: - The current situation - The political and operational background - If any contacts or demands have been made by the instigators. - Who is aware of the incident? • Government • Security Forces/Police of country • Embassy/High Commission • Local employees • Relatives - What the country's policy is concerning negotiation with kidnapers etc.	EHS Manager
6. Notify Project Management and pass on details	Plant Manager
7. Consult with professional advisors/security consultants. Plant Manager to make final decision upon confirmation from DSEPL Authority.	Plant Manager
8. Consider the need to bring in other internal and external expertise, or reduce the team. In general, confine knowledge to minimum team.	ESMP Implementation Team
9. Evaluate the situation ▪ Is there positive evidence of kidnap? ▪ How reliable is the available information? ▪ Are the instigators known to be criminals, psychopaths or terrorists? ▪ What are the likely future actions of the instigators? - What is the risk? ▪ What threats have been made? Likely to be carried out? ▪ Is there a threat to life - hostage or others?	EHS Manager

Kidnap And Extortion Checklist	Responsibility
<ul style="list-style-type: none"> <li>▪ Are other employees/families at risk?</li> <li>▪ What is the business risk?</li> <li>▪ What is the local Government likely to do if you negotiate?</li> </ul>	
<p>10.</p> <ul style="list-style-type: none"> <li>- Need for containment of information</li> <li>- Is containment of information possible, likely to last and appropriate?</li> <li>- What time scale may the Company have to work to?</li> <li>- What is likelihood rescue?</li> <li>- What attitude is local Government likely to take?</li> <li>- What are the immediate implications on operations?</li> </ul>	<p>ESMP Implementation Team</p>
<p>11. Confirm Company objectives</p> <ul style="list-style-type: none"> <li>- Remove threat to life</li> <li>- Display Company's determinations to show firm resolves and remain a responsible corporate citizen</li> </ul>	<p>ESMP Implementation Team</p>
<p>12. Advise ERT on local laws and potential liabilities relating to communication and negotiation with kidnapers etc. and other liabilities.</p>	<p>Legal</p>
<p>13. Consider basic Company policies/strategies</p> <ul style="list-style-type: none"> <li>a. Response</li> <li>b. Control/secretcy</li> <li>c. Risk</li> </ul>	<p>Project Management</p>
<p>14. Confirm roles, powers and delegated authority of both the ERG and the ERT</p> <ul style="list-style-type: none"> <li>- Who is to be the ultimate Decision Maker?</li> <li>- Who is to conduct any negotiations?</li> <li>- Who will make up the Negotiating team locally?</li> <li>- Is additional support required in Country?</li> </ul>	<p>Project Management</p>
<p>15. Decide basic policies and initial way ahead. How much is to be proactive, and how much sit-and-wait?</p>	<p>Project Management</p>

## Attachment 3 – Government, key stakeholder & Media Holding Statement

Date:

Press Release No 1

Time:

DSEPL regrets to confirm that an incident – (describe in broadest terms) –

occurred at – (site/location) –

at – (time) –

Today/yesterday – (date)-

DSEPL have mobilized its Emergency Response Teams, and is working closely with the Local Emergency Services and has / is contacted / -ing the relevant authorities

Details of the incident are not yet confirmed, but every action is being taken to safeguard lives and the environment.

A further statement will be issued as soon as more information becomes available.

Direct enquiry lines have been established as follows:

Media \*\*\*\*

Relatives \*\*\*\*

Notes for Editors:

## Attachment 4 - Initial Statement to Staff

**Note:** To be sent by electronic mail to all within the Country office, and to all DSEPL locations and offices

From Managing Director, (name of location)

Date

Time

INCIDENT REPORT

All staff should be aware that an incident has occurred at (place) at (time)

Today/yesterday.

(Briefest description of incident, e.g. The Installation is on fire following an explosion).

The local Incident Response Team and the Emergency Response Group in (location name) are taking necessary action.

More information will be made communicated, as it becomes available. In the meantime, any staff member approached for information by outside sources should refer them to the ERT Media Information Group in (location tel. No. \*\*\*\*)

Plant Manager, (name of location)



## **Attachment 5 - Security and Reception Standing Instruction**

- Office Building Security staff to ascertain the identity of all personnel walking in/out of the office premises.
- Restrict all access to card / pass / permission holders.
- Always ensure tight security in all entry/exit points.
- Ensure availability of keys for all the areas.
- Update and maintain the keyboard status.
- Exercise extra caution during emergency situations.
- Always ensure company assets / personal property and valuables are secured and protected.
- Confidential things should be kept in a secured place.
- Visitors should be received at the reception.
- The reception on duty should inform to concern department to receive the visitor and inform the visitor to wait in the reception till a responsible person arrives.
- Reception to ensure that not to leave the visitors to wander on their own.
- The security / responsible person escort visitors.
- All the material in / out should be controlled through authorized gate passes.
- Identify strangers and report to Manager Administration.
- No media representatives to be admitted to any site.

## Attachment 6 - General Notification/Record keeping Form

<b>NOTIFY</b>	(Circle either notifying of, or Updating Emergency Information)										<b>UPDATE</b>	
Location				No:			Date:		Time:			
Priority	Urgent	<input type="checkbox"/>	Immediate			<input type="checkbox"/>	Standard		<input type="checkbox"/>			
Emergency	Medical	<input type="checkbox"/>	Fatality		<input type="checkbox"/>	Environment		<input type="checkbox"/>	Natural Disaster		<input type="checkbox"/>	
Oil Spill	<input type="checkbox"/>	Marine	<input type="checkbox"/>	Explosion	<input type="checkbox"/>	Fire	<input type="checkbox"/>	Aviation	<input type="checkbox"/>	Extortion	<input type="checkbox"/>	
Other												
Injuries	No. of Fatalities			No. of Serious Injuries			No. of Minor Injuries					
DO NOT LIST NAMES ON THIS FORM - Report names verbally to EHS Manager												
Injuries This Report:												
Updated Weather	Dry	<input type="checkbox"/>	Wet	<input type="checkbox"/>	Windy	<input type="checkbox"/>	Wind Direction		Wind Speed			
Forecast:	Other:											
Impact on Immediate Operations:												
External Assistance	Gov.	<input type="checkbox"/>	Mutual Aid	<input type="checkbox"/>	External Agency	<input type="checkbox"/>	Medical	<input type="checkbox"/>	Police	<input type="checkbox"/>	Fire	<input type="checkbox"/>
Mobilized:	Other:											
Forward Response Plan:												
Next 30 Mins:												
Next 6 hours:												
Next 12 hours:												

Last External Contact:								
Agency	Time	By	Agency	Time	By	Agency	Time	By
Aviation			Govt.					
Medical								
Police								
Response from different teams: (Role and Person)								
<u>Prepared by:</u>				<u>Approved by:</u>				



## **Attachment 8 - Bomb Threat Response Actions**

### ***CONTROL***

The Project Manager is responsible for directing the action to be taken in response to any bomb threat. Responsibilities include the following:

- ✓ Producing a risk assessment.
- ✓ Devising and maintaining a search plan of the office.
- ✓ Devising and maintaining an evacuation plan.
- ✓ Liaising with the responsible authorities.
- ✓ Arranging staff awareness and bomb threat practices.

### ***Bomb Threat***

The person receiving the call will:

- ✓ Activate recording equipment if fitted and the threat is received by telephone. This could be mobile phone and have telephone on speaker phone.
- ✓ Adopt helpful attitude and be conciliatory.
- ✓ Make written notes using guidelines issued for that purpose.
- ✓ Report immediately to Security Focal Point.
- ✓ The Project Director should inform project management who must assess the credibility of the threat and possible consequences and consider whether to:
  - ✓ Do nothing, evacuate or stay and search.
  - ✓ Notify law enforcement agencies/emergency services.
  - ✓ Alert neighboring business/residents.
  - ✓ Implement emergency shutdown procedures.

Search (only if search is not a Police responsibility)

Searches may be undertaken in response to a specific warning. Attention points:

- ✓ Know the police policy and role on search and evacuation.
- ✓ Prepare search plans in advance to ensure that premises are checked as quickly and effectively as possible.

- ✓ Divide the area into manageable-sized sectors
- ✓ Form search teams familiar with the area.
- ✓ Define search priorities.
- ✓ Search in a logical and thorough manner so that no part of the sector is left unchecked.

**"Do not touch or move any suspicious object"**

***Suspicious Object***

If a suspicious object is found:

- ✓ If possible, leave a marker near the device.
- ✓ Inform the Security Focal Point.
- ✓ Stay out of sight of the object at a safe distance (normally at least 25 meters) and report every possible detail to the Security Focal Point.

***Evacuation***

The decision to evacuate will be taken by management on the advice of the EHS Manager. The police will be consulted for advice:

- ✓ Evacuate as quickly and efficiently as possible using all available exits.
- ✓ Provide alternative routes to avoid the danger of passing close to any suspicious device.
- ✓ Consult neighboring premises and emergency services.
- ✓ Gather all people in pre-designated "Assembly Areas" taking personal belongings with them.
- ✓ Do not use the car park as an assembly area.
- ✓ Check that everyone has left the premises.

## Attachment 8A - Bomb Threat Checklist

- Switch on tape recorder (if connected)
- Tell the caller which town/district you are answering from
- Record the exact wording of the threat
- Ask these questions
  - Where is the bomb right now? .....
  - When is it going to explode? .....
  - What does it look like? .....
  - What kind of bomb is it? .....
  - What will cause it to explode? .....
  - Did you place the bomb? .....
  - Why? .....
  - What is your name? .....
  - What is your address? .....
  - What is your telephone number? .....
- Record time call completed.....
- Keep telephone line open
- Where automatic number reveal equipment is available record number
- Inform the security focal point

Time informed.....

This part should be completed once the caller has hung up and the security focal point has been informed

Time and date of call.....

Length of call.....

Number at which call is received (Your extension number) .....

- ABOUT THE CALLER

Sex of caller? ..... Male  Female

Nationality? ..... Age? .....

- THREAT LANGUAGE

Well Spoken  Irrational  Taped

Foul

Incoherent

Message read by threat-maker

• CALLER'S VOICE

- |          |                          |         |                          |                 |                          |
|----------|--------------------------|---------|--------------------------|-----------------|--------------------------|
| Calm     | <input type="checkbox"/> | Crying  | <input type="checkbox"/> | Clearing throat | <input type="checkbox"/> |
| Angry    | <input type="checkbox"/> | Nasal   | <input type="checkbox"/> | Slurred         | <input type="checkbox"/> |
| Excited  | <input type="checkbox"/> | Stutter | <input type="checkbox"/> | Disguised       | <input type="checkbox"/> |
| Slow     | <input type="checkbox"/> | Lisp    | <input type="checkbox"/> | Accent          | <input type="checkbox"/> |
| Rapid    | <input type="checkbox"/> | Deep    | <input type="checkbox"/> | Familiar        | <input type="checkbox"/> |
| Laughter | <input type="checkbox"/> | Hoarse  | <input type="checkbox"/> |                 |                          |

If the voice sounded familiar, who did it sound like?

.....

• BACKGROUND SOUNDS

- |                   |                          |                  |                          |        |                          |
|-------------------|--------------------------|------------------|--------------------------|--------|--------------------------|
| Street noises     | <input type="checkbox"/> | House noises     | <input type="checkbox"/> | Motor  | <input type="checkbox"/> |
| Animal noises     | <input type="checkbox"/> | Crockery         | <input type="checkbox"/> | Static | <input type="checkbox"/> |
| Clear             | <input type="checkbox"/> | Voices           | <input type="checkbox"/> | Music  | <input type="checkbox"/> |
| PA system         | <input type="checkbox"/> | Booth            | <input type="checkbox"/> |        |                          |
| Factory machinery | <input type="checkbox"/> | Office machinery | <input type="checkbox"/> |        |                          |

Other (specify).....

• REMARKS

.....  
.....  
.....

Signature.....

Date.....

This appendix may be freely photocopied

Letter and Parcel Bomb Recognition Points

- Foreign mail, air mail and special delivery
- Restrictive markings such as confidential, personal etc.
- Excessive postage



- Hand-written or poorly typed address
- Incorrect titles
- Titles but no names
- Miss-spellings of common words
- Oily stains or discolorations
- No return addresses
- Excessive weight
- Rigid envelope
- Lopsided or uneven envelope
- Protruding wires or tinfoil
- Excessive securing material such as making tape, string etc.
- Visual distractions

## **Attachment 9 - Terrorist threat or action against company Personnel or facilities**

Upon receipt of terrorist threat or action against company personnel or facilities, the senior company official will notify police/ RAB/ army for necessary actions. The following information can be used as a guide when reporting:

- a. Nature and circumstances of threat or incident including date, time, location, injuries and damages sustained.
- b. Fill data concerning affected employees including names and addresses of next of kin and whether they or other interested parties should be notified.
- c. Reports on contacts and assistance offers to next of kin, if made, if the next of kin is residing or located in the immediate area.
- d. If kidnapping/taking of hostages occurs, provide
  1. Location, number, and identity of victims
  2. Number and identity of terrorists involved, organizations, weapons used, other descriptive information.
  3. Terrorist demands or claims.
  4. The local assessment of the situation, including effect on business operations.
  5. Initial actions taken by host government to respond to terrorist threat/incident. If company personnel, dependents, and facilities are threatened or subjects of a terrorist attack describe efforts in arranging enhanced security, medical assistance with host country officials (police, foreign minister, etc.).
- e. Precautionary measures taken for other employees at the location of the incident and elsewhere in the host country.
- f. Name of person sending message along with complete address, telephone number, and telex number for future contacts.

### **Terrorist Incidents & Kidnappings**

#### **Immediate Action**

In the event of an actual or threatened terrorist incident or kidnapping, the Bangladesh Leadership Team shall be notified immediately. A sequence of events will occur at all locations; therefore, prompt detailed information is essential. The information above outlines what is needed in notification of this type of incident.

**Checklists**

Ransom Demand Telephone Checklist

Time of call: \_\_\_\_\_ Date: \_\_\_\_\_

Make every attempt to gain as much information from the caller as will furnish, but do not give the caller the impression you are reading questions from a checklist or that you are trying to keep him on the line so the call can be traced. Write down the responses of the caller word for word.

**If a Demand:**

Would you please repeat your statement?

\_\_\_\_\_

Who is making this demand?

\_\_\_\_\_

Why have you done this?

\_\_\_\_\_

**If a Kidnap:**

What is he/she wearing?

\_\_\_\_\_

Is he/she unharmed?

\_\_\_\_\_

Could you explain what you want?

\_\_\_\_\_

(Attempt to establish a time and date for next contact. Furnish a specific phone number.)

IF THE CALLER GETS INTO SPECIFICS ON PAYMENT, ASK:

What do you want?

\_\_\_\_\_

If money: What currency and how do you want it?

\_\_\_\_\_

Where and when should the ransom be delivered?

---

How should the payment be made?

---

End the call on a positive note by assuring the caller his demand will be communicated to the proper person in the company, as soon as possible. Leave the caller with the impression that his call has been understood and action will be taken. Make note of the following information.

Time call ended: \_\_\_\_\_

Background noises: \_\_\_\_\_

Sex of caller: \_\_\_\_\_

Approximate age: \_\_\_\_\_

Any accent: \_\_\_\_\_

What was the caller's attitude?

---

Was the caller sober?

---

Did the caller sound educated?

---

What did you notice about the call that you find unusual?

---

If the caller seemed familiar with the building or operation, indicate how:

---

---

Name of Person Receiving Call

---

Date

**IMPORTANT:** Pass this form to your supervisor immediately after completing call details.