Meghalaya State Pollution Control Board
Forests & Environment Department, Government of Meghalaya
'ARDEN' Lumpyngngad, Shillong-793014
Website: http://megspcb.gov.in

No. MPCB/GEN-285(Annexed –IX)/2020-21/60 **Dated Shillong the 22nd Dec 2020**

To,

The Secretary
Government Of India
Ministry of Jal Shakti
Department of Water Resources ,River Development & Ganga Rejuvenation
Shram Shakti Bhawan
Rafi Marg,New Delhi -110001
(Email: ruby.raju@nmcg.nic.in)

Sub: Submission of Monthly Progress Report for ensuring compliance to the Hon'ble NGT matter OA No 673/2018 for the month of October 2020.

Sir,

With reference to the above enclosed please find herewith the Monthly Progress Report for the month of November & December 2020. This is for favour of your information & necessary action

Yours faithfully

Enclo: As stated

MEMBER SECRETARY
MSPCB, SHILLONG

Memo. No. MPCB/GEN-285/(Annexed –IX)/2020-21/60-A **Dated Shillong 22nd Dec 2020**

Copy to:-

1. Shri. A. Sudhakar, DH, WQM-I, Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar, Delhi – 110032 for kind information. Email: asudhakar.cpcb@nic.in/jcb.cpcb@nic.in
2. The Director of Urban Affairs cum Member Convener of the RRC ,Meghalaya, Shillong for information
3. Shri. M.B.K. Reddy ,IFS, Additional Principal Chief Conservator of Forest, Planning, Development and Legal matters, Meghalaya, Shillong, for information

MEMBER SECRETARY
MSPCB, SHILLONG

NATIONAL MISSION FOR CLEAN GANGA

FORMAT FOR SUBMISSION OF MONTHLY PROGRESS REPORT IN THE NGT MATTER OA NO.673 OF 2018 (IN COMPLIANCE TO NGT ORDER) DATED 24.09.2020 FOR THE MONTH OF NOVEMBER & DECEMBER 2020 FOR THE STATE OF MEGHALAYA

Overall status of the State:

I. Total Population: Urban Population & Rural Population : (5,95,450 & 23,71,439) 29,64,007

II. Estimated Sewage Generation (MLD)(2021) : 75 MLD in Urban areas

III. **Details of Sewage Treatment Plant** :

- Existing no of STPs and Treatment Capacity (MLD) : 8
- Capacity Utilization of existing STPs (MLD) : 1.829
- MLD of Sewage being treated through alternate technology : 22.8 (Considering treatment by septic tank)
- Gap in treatment Capacity in MLD : 50.37
- No of operational STPs : 8
- No of complying STPs : 8
- No of Non-complying STPs :

Details of Each Existing STP in the State

No.	Location	Existing STP Capacity MLD	Capacity being utilised MLD	Operational Status of STP	Compliance status of STP
1.	Residential colony of Meghalaya Cements Ltd., Thangskai, East Jaintia Hills District	0.1	0.06	Operational	Complying
2.	Residential colony of Star Cements Ltd., Lumshnong, East Jaintia Hills District	0.4	0.239	Operational	Complying
3.	North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences, Mawdiangdiang	1.0	1.0	Operational	Complying
4.	Residential colony of M/S Lafarge Umiam Mining Pvt. Ltd., Nongtrai	0.12	0.03	Operational	Complying
5.	Residential School –JNV, Mawphlang	0.1	0.02	Operational	Complying
6.	Polo Market , Shillong	0.05	0.05		

7.	Green valley industries Ltd ,Nongsning,EJH	0.03	0.03	Operational	
8.	Dalmia Cement (Bharat) Ltd,Thangskai,EJH	0.05	0.04	Operational	

Details of under construction STPs in the State

No.	Location	Capacity of the plant in MLD	Physical progress in %	Status of I&D or house sewer connections	Completion timeline
1.	Septage Treatment plant, Shillong	0.115	75 % civil work		March 2021

Details of proposed STPs in the State

No.	Location	Capacity of the STP proposed in MLD	Status of project(at DPR stage/under Tendering/work to be awarded)	Likely date of completion
1.	FSSM, Shillong	0.35	Tender for FSSM has been floated on the 8th December and tha last date for bid submission is on 13thJanuary 2021 &. Estimated amount for the project is Rs.51.09 crores	The completion period is estimated for 24 months
2.	5 nos of On-site treatment plant, Shillong	13.42	Land are being identified	
3.	STP, Eastern Air Command, Shillong	0.105		
4.	FSSM ,Jowai		DPR stage	

IV. **Details of Industrial Pollution**

- No. of industries in the State : **1559**
- No. of water polluting industries in the state : 260
- Quantity of effluent generated from the industries in MLD : **3.5**
- Quantity of hazardous sludge generated from the industries in TPD : **1.3105**
- No. of industrial units having ETPs : **254**
- No of Industrial units connected to CETPs : **Nil**
- Compliance status of the ETPs : **Complying**
- No and total capacity of CETPs (details of existing/under construction /proposed) : **Nil**

Town	No of	Industrial	Status of ETPs	Status of CETPs (

	Industries	discharge (MLD)		existing, under construction &proposed)
Shillong	130	1.7585	Complying	-
Byrnihat	29	0.676	Complying	-
Nongstoin and Mairang	37	0.276	Complying	-
Ladrymbai & Khliehriat	12	0.029	Complying	-
Jowai	20	0.40	Complying	-
Khliehriat, Myndihati & Lumshnong	11	0.15	Complying	-
Tura	16	0.09	10 ETPS for servicing units under construction(capacity - 0.002 MLD each)	
Umiam	5	0.135	Complying	-

STATUS OF ULB WISE MANAGEMENT OF SOLID WASTE

V. <u>Solid Waste Management</u>

- Total number of Urban Local Bodies and their Population : **10 Nos , 3,75,930**
- Current Municipal Solid Waste Generation : 245 TPD
- Number, installed capacity and utilization of existing MSW processing facilities in TPD (bifurcated by type of processing eg. Waste to Energy (Tonnage and Power Output), Compost Plants (Windrow, Vermi, decentralized pit composting), biomethanation, MRF etc.: Action plan to bridge gap between Installed Capacity and Current Utilization of processing facilities (if Gap> 20%):

EXISTING SWM PLANTS IN MEGHALAYA						
SN	Town	Facility Type	Installed Capacity	Nos.	Utilization	Action Plan to utilise installed capacity
1	Shillong	Waste to Recovery centre	8 TPD	4	8.72 TDP (2.00 TPD Organic Compost + 6.72 Recyclables)	1 of the facilities is already functional at Marten while the other 3 have just been completed. Training of operators is being initiated and it is expected that the remaining 3 Centres will be functional by the end of 2020.
2.	Tura	Waste to Compost	50 TPD	1	0 TPD	The facility is 100% completed. Training of operators is yet to be initiated and is expected to

						be completed by the end of 2020.
3	Nongpoh	Waste to Compost	15 TPD	1	0 TPD	The facility is 100% completed. To be commissioned as training of operators is yet to be initiated and is expected to be completed by the end of 2020.

- No. And capacity of C & D waste processing plants in TPD (Existing, proposed and under construction): **None**
- Total no. Of wards, having door to door collection service, no. Of wards practicing segregation at source: **73**
- Details of MSW treatment facilities proposed and under construction (no. Capacity, and technology):

Under Construction SWM PLANTS IN MEGHALAYA

SN	Town	Facility Type	Installed Capacity	Nos.	Utilization	Action Plan to utilise installed capacity
1.	Shillong	Waste to Compost	170 TPD	1		The plant is awaiting the delivery of the final piece of equipment .The implementing agency, SIPMIU is expediting the same. The plant is likely to be commissioned by 1st week of December2020

PROPOSED SWM PLANTS IN MEGHALAYA				
SN	Town	Facility type	Proposed capacity	Nos.
1.	Shillong	Waste to Energy	100 TPD	1
2.	Tura	Waste to Energy	50 TPD	1
		Waste Recovery Centre	2 TPD	1
3.	Nongpoh	Waste Recovery Centre	2 TPD	1
4.	Jowai	Waste Recovery Centre	2 TPD	1
5.	Williamnagar	Waste Recovery Centre	2 TPD	1
6.	Baghmara	Waste to Recovery Centre	2 TPD	1
7.	Resubelpara	Waste to Recovery Centre	2 TPD	1
8.	Nongstoin	Waste to Recovery Centre	2 TPD	1
9.	Mairang	Waste to Recovery Centre	2 TPD	1

- No. And area (in acres) of uncontrolled garbage dumpsites and Sanitary Landfills:
- No. and area (in acres) of legacy waste within 1km buffer of both side of the rivers: **8.94 acres (a MOU has been signed with CHAMHANA GW INDIA PVT.LTD on 22nd June 2020 which will include the setting up of waste to Energy plant at Tura and Shillong of 50TPD and 100 TPD capacities respectively. These plants will remediate the existing legacy waste at the present dumping grounds)**
- No. Of drains falling into rivers and no. Of drains having floating racks/screens installed to prevent solid waste from falling into the rivers: **Garbage traps have been installed in 6 nos of drains connecting to the rivers and one oil grease trap of 5 Kld installed in one drain of Umkhrah river in Shillong City**

VI. Bio-medical Waste Management:

- Total Bio-medical generation: **1276.24 Kg/day**
- No. of Hospitals and Health Care Facilities: **554**
- Status of Treatment Facility/CBMWTF:

a) The Urban Affairs Department had floated a Notice for expression of Interest for setting up of Common Bio-Medical waste treatment and Disposal Facilities at Shillong and Tura on the 24th April, 2020 wherein 4 (four) participating firms submitted proposals and a letter of acceptance was awarded to S. M. Enterprise to carry out the work required on 19th May, 2020. The work to be carried out includes the installation of the following:

- **Incinerator of 100kg/hour capacity**
- **Continuous stack monitoring device**
- **Autoclave of 100kg/hour capacity**
- **Shredder of 100kg/hour capacity**
- **Effluent Treatment Plant**
- **Other ancillaries to support the facility**

b) **The Urban Affairs has procured three Bio-medical Wastes vehicles solely for transport of Bio-medical Wastes**

VII. Hazardous Waste Management:

- Total Hazardous Waste generation: **498.4434 KL/annum**
- No. of Industries generating Hazardous waste: **19 (Nineteen)**
- Treatment Capacity of all TSDF's: **Not available**
- Avg. Quantity of Hazardous waste reaching the TSDF's and Treated **: Nil**
- Details of on-going or proposed TSDF: **None**

VIII. Plastic Waste Management:

- Total Plastic Waste generation: **9.16 TPD**
- Treatment/Measures adopted for reduction or management of plastic waste:

(a) **The plastic wastes are collected as municipal waste. The plastic waste was segregated from the dry waste at the dumpsite and collected for compaction and bailing and send to Cement Plants for co-processing to be used as Fuel.**

(b) **Used for road making in some parts of Tura, and Nongstoin.**

IX. Details of Alternate Treatment Technology being adopted by the State/UT:

X. Identification of polluting sources including drains contributing to river pollution and action as per NGT order on insitu treatment:

XI. Details of Nodal Officer appointed by Chief Secretary in the State/UT: **The Government has constituted a Monitoring Committee under the chairmanship of the Principal Secretary to the Govt. of Meghalaya, Forests & Environment Department vide no.ENV.4/2018/426 Dated Shillong the 19th June 2020**

XII. Details of meetings carried under the Chairmanship Chief of Secretary in the State/UT:

XIII. Latest water quality of polluted river, its tributaries, drains with flow details and ground water quality in the catchment of polluted river: **Enclosed as II A to Annexure IX B**

XIV. Ground water regulation:**For Domestic purpose –District Level Committee Ground Water Resource(Deputy commissioner of respective District as Chairman and official of Water resources as Member Secretary) looks after it and grant NOC For Commercial purpose - State Level Committee Ground Water Resource(Commissioner & Secretary, Water Resources as Chairman and Regional Director, CGWB, NER, as Member Convener) looks after it and grant NOC**

XV. Good irrigation practices being adopted by the State: **Traditional Bamboo Drip Irrigation**

XVI. Rain Water Harvesting **:(a) Rain water harvesting implemented for Schools and government buildings.(b) Incorporated as one of the condition while giving permission for any house construction**

XVII. Demarcation of Floodplain and removal of illegal encroachments: **RFP for engaging of consultancy for flood plains Zonation in identified river stretches sent to the NPMU NHP,MOJS has been approved(Due to technical reasons FPZ is being proposed only at Umkhrah, Nonbah , Umtrew and Myntdu as other rivers flow through deep gorges) . Proposal for setting up of HO stations sent to Govt. for availing sanction**

XVIII. Maintaining minimum e-flow of river: Perennial rivers

XIX. Plantation activities along the rivers: **Proposal have been submitted to CEO CAMPA for according sanction to an amount of Rs.27,17,440/- in 2021-2022 for treatment of 48.58 ha (preliminary works for creation of plantations and creation of 94.5 polypot nursery beds for future plantations.**

XX. Development of Biodiversity Park: **No proposal for setting due to non-availability of Government land.**

XXI. Reuse of Treated Water: **Stand-alone ETPs are operational in 260 number of hotels/guesthouse/health care centers /Industries and treated wastewater are reuse for gardening/cleaning purpose.**

XXII. Model River being adopted by the State & Action Proposed for achieving the bathing quality standards: Nonbah river

XXIII. Status of Preparation of Action Plan by the 13 Coastal States: **Not applicable to the State of Meghalaya**

XXIV. Regulation of Mining Activities in the State/UT: **Mining activities in the State is being regulated under the following acts and rules**

a) Mines and Minerals (Development and Regulation) Act 1957 and its subsequent amendments

b) EIA notification ,2006 and its subsequent amendments

c) Meghalaya Minor mineral Concession Rules 2016 and its subsequent amendments

d) **EP Acts, 1986**

e) The Air (Prevention and Control of Pollution) Act,1981 and the Water (Prevention and Control of Pollution) Act, 1974

XXV. Action against identified polluters, law violators and officers responsible for failure for vigorous monitoring:

a) Units which failed to comply to the consent conditions have been issued directions, show cause notice and closure notices

b) Units which have been operating without consent from the Pollution Control Board have been issued closure notices under relevant Acts and Rules

c) **Filing of Complaints to the District Courts**

POLLUTED RIVER STRETCHES

I.	**Total No. of Pollution River Stretches**	7 (Umkhrah & Umshyrpi river –Priority I:Umtrew, Nonbah & Kyrhukhla river –Priority IV: Myntdu & Lukha –Priority V)						
		Umkhrah	**Umshyrpi**	**Umtrew**	**Nonbah**	**Kyrhukhla**	**Myntdu**	**Lukha**
II.	**In-situ Bio-remediation**	PMC of Smart City has prepared the feasibility report for Nallah in-situ treatment for the drain falling within the ADB. The report was approved and accepted by the RRC.DPR to be ready by 10th January, 2021.Proposal sent to the Govt. to engage the same consultant for preparation of DPR for the bio-remediation of remaining drains was approved and the same has been communicated to the PMC for finalisation of terms & conditions.		DPR is completed and the Water Resources Department is seeking fund for implementing the same.				
III.	**Sewage Treatment Plant**							
	Total Sewage Generation (MLD)	33.52	15.47	0.36	3.10	0.8	3.07	0.5
	Total Existing Treatment Capacity (MLD)	0.05						
	Capacity Utilization							

Note: Garbage traps have been installed in 6 nos. of drains connecting to the rivers and one oil grease trap of 5kld installed in one drain of Umkhrah River.

Town	**Existing STP**	**Capacity Being Utilized**	**Whether Complying or not**	**STP Proposed if any**	**Status (DPR/tendering/under construction/ETC etc.)**
Shillong (catchment of Umkhrah & Umshyrpi river)	0.05 MLD	-	-	Faecal Sludge & Septage Management (FSSM) -0.35 MLD 5 On-site Treatment	a) Tender for FSSM has been floated on the 8th December and tha last date for bid submission is on 13thJanuary 2021 & and for On-site Treatment System land are being identified. Estimated

				System.- 13.42 MLD Total -13.935 MLD		amount for the project is Rs.51.09 crores and the completion period is estimated for 24 months. b) The 0.115 MLD Septage Treatment Plant which is under construction is 75 % completed.		
Jowai catchment of	-	-	-	FSSM		The Goverment has approved the proposal to change the STP project to that of FSSM.The Jowai Municipal Board has been directed to expedite the proposal for FSSM.		
Byrnihat(catchment of Umtrew river)						Safe sanitary latrine under Swachh Bharat mission (Gramin) for 364 households		
Nongstoin (catchment of Nonbah river)						Safe sanitary latrine under Swachh Bharat Mission (urban) for 424 households		
Khliehriat, Ladrymbai etc (catchment of Kyrhukhla river)						Safe sanitary latrine under Swachh Bharat mission (Gramin) for 220 households		
Myndihati, Khliehriat & Lumshnong etc (catchment of Lukha River)						Safe sanitary latrine under Swachh Bharat mission (Gramin) for 366 households.		
IV.	**Industrial**	**Umkhrah**	**Umshyrpi**	**Umtrew**	**Nonbah**	**Kyrhukhla**	**Myntdu**	**Lukha**
•	Total No. of industries/industrial estates	121	9	29	34	12	20	11
•	Total Industrial discharge	1.3035	0.455	0.676	0.276	0.029	0.40	0.15
•	Total No. of industries having ETPs	121	9	29	34	12	20	11
•	Total existing CETPs	None	None	None	None	None	None	None
•	Total No. of GPIs/SPIs	None	None	1	None	None	None	None

•	No. of industries having OCEMS	None	None	None	None	None	None	None

Town	Existing ETP Capacity(MLD)	Whether Complying or not	CETP Proposed if any	Status (DPR/tendering/under construction/ETC etc.)
Shillong	1.8	Complying	-	-
Byrnihat	1.0	Complying	-	-
Nongstoin	0.41	Complying	-	-
Ladrymbai & Khliehriat	0.1	Complying	-	-
Jowai	0.45	Complying	-	-
Khliehriat, Myndihati & Lumshnong	0.615	Complying	-	-

V.	**Solid Waste Management**	**Umkhrah**	**Umshyrpi**	**Umtrew**	**Nonbah**	**Kyrhukhla**	**Myntdu**	**Lukha**
	Total Municipal Solid Waste generation (TPD)	164.81		1.16	10.05	2.6	9.95	1.6
	Existing facilities (TPD)	8.72 (2.00 TPD Organic Compost + 6.72 Recyclables) a) Door to door collection is introduced in all wards and level of coverage is 100%.Segregation at source is in place and the level of		15.0	Collection, segregation and transportation of wastes has been done by the SLRM team under SBM (Urban) .In some	Waste management soak pit household waste water management & organic waste	Door to door collection and transportation coverage is being done by the Jowai Municipal Board. Segregation at	Waste management soak pit household waste water management & organic waste

		compliance by the residential households is 85% ad by the commercial establishments about 45%.Chain link fencing has been installed at strategic garbage points. Penalty is imposed on habitual offenders. b) Additionally, Garbage traps have been installed in 6 nos of drains connecting to the rivers and one oil grease trap of 5 Kld installed in one drain of Umkhrah River. For treatment of the bio-degradable waste, a 170 TPD Compost Plant is under Construction at Marten, Shillong and the plant is awaiting the delivery of the final piece of equipment so commissioning can begin. The implementing agency, SIPMIU is expediting the same. For Scientific disposal of waste a 6500 sqm sanitary landfill at Marten, Shillong was commissioned in October 2017. An additional 8500 sqm sanitary landfill is also completed, 3 nos of decentralised compost plant are completed .Training		households the biodegradable wastes are treated by composting method in compost pit	compost for 175 households under SBM (G)	source is in place.	compost pit for 366 households under SBM (G)

		of operators is being initiated and it is expected that the remaining 3 Centres will be functional by the end of 2020.					
	Proposed	Waste to energy of 100 TPD capacity and the proposed investment is INR 24.5 crores. MoU has been signed on 22nd June 2020 between the Department of Urban Affairs ,Government of Meghalaya and CHAMHANA GW India Pvt .Ltd on a Build, Own and Operate (BOD) basis for a period of 25 years. There is however ,delay in starting the project due to ongoing pandemic for transportation of equipments and other related matters to human resources .	Proposed for soak pit household waste water management & organic waste compost for 112 households under SBM (G)	Land has been identified and a compost plan has been sanctioned under SBM (Urban)		Within the existing dumping site portion of land has been identified for indigenous compost plant and waste recovery. The work is to be started soon.	
	Latest water quality of polluted river, its tributaries, drains with flow details and ground water quality in the	Enclosed as annexure II					

	catchment of polluted river	

VI.	**Bio-medical/Hazardous/Plastic Waste Management(in TPD)**	**Umkhrah**	**Umshyrpi**	**Umtrew**	**Nonbah**	**Kyrhukhla**	**Myntdu**	**Lukha**
	Total Bio-medical Waste generation	1.0597		0.0021	0.029	0.00608	0.41	Nil
	Total Bio-medical Waste Treatment	1.0597		0.0021	0.029	0.00608	0.41	Nil
	Bio-Medical Treatment facilities	a) The Urban Affairs Department had floated a Notice for expression of Interest for setting up of Common Bio-Medical waste treatment and Disposal Facilities at Shillong on the 24th April, 2020 wherein 4 (four) participating firms submitted proposals and a letter of acceptance was awarded to S. M. Enterprise to carry out the work required on 19th May, 2020. The work to be carried out includes the installation of the following: ➢ Incinerator of 100kg/hour capacity ➢ Continuous stack monitoring device ➢ Autoclave of 100kg/hour capacity ➢ Shredder of 100kg/hour capacity ➢ Effluent Treatment Plant ➢ Other ancillaries to support the facility b) The Urban Affairs has procured three Bio-medical Wastes vehicles solely for transport of Bio-medical Wastes.						
	Hazardous Waste generation	Nil	Nil	1.17	Nil	Nil	Nil	0.1405

	Hazardous Waste Treatment	-	-	1.135	-	-	-	0.1405
	Plastic Waste generation	0.230 -		-	-	-	-	
	Plastic Waste processing	(a) The plastic Waste was collected as municipal waste into dry waste and wet waste. The plastic waste was segregated from the dry waste at the dumpsite and collected for compaction and bailing and send to Cement plants for co-processing to be used as Fuel. (b) Used for road making in some parts of Nongstoin						
	Total No. of Hospital and bio-medical waste generation/treatment	6	2	None	2	None	2	None
	Total of units generating Hazardous waste/treatment facility			6				11

		Umkhrah	**Umshyrpi**	**Umtrew**	**Nonbah**	**Myntdu**	**Kyrhukhla**	**Lukha**
VII.	Ground water regulation	For Domestic purpose –District Level Committee Ground Water Resource (Deputy commissioner of respective District as Chairman and official of Water resources as Member Secretary) looks after it and grant NOC. For Commercial purpose - State Level Committee Ground Water Resource(Commissioner & Secretary, Water Resources as Chairman and Regional Director, CGWB, NER, as Member Convener) looks after it and grant NOC						
VIII.	Maintaining minimum e-flow of river	Perennial						
IX.	Protection and management of Flood Plain Zones	1. RFP for engaging of consultant for Flood Plain zonation in identified river stretches sent to NPMU,NHP, MOJS has been floated Date of opening of technical report is on the 16th Dec 2020.(Due to technical reasons FPZ is being proposed only at Umkhrah, Nonbah, Umtrew and Myntdu as other rivers flow through deep gorges).						

	(FPZ)	2. Proposal for setting up of HO stations sent to Govt. for availing sanction.		
X.	Rain water harvesting	i. Rain water harvesting implemented for Schools and government buildings ii. Incorporated as one of the condition while giving permission for any house construction		
XI.	Plantation along river	Proposal have been submitted to CEO CAMPA for according sanction to an amount of Rs.27,17,440/- in 2021-2022 for treatment of 48.58 ha (preliminary works for creation of plantations and creation of 94.5 polypot nursery beds for future plantations.		No proposal was made since there is a Reserve Forest and green cover on both sides of the river
XII.	Development of biodiversity park on flood plains by removing encroachment	Matter of encroachment is pending in the Supreme Court .Biodiversity parks in existence.	No proposal for setting up of Bio-Diversity Park due to non-availability of Government land.	
XIII.	Reuse of Waste water	Treated wastewater are reuse for gardening/cleaning purpose		

Annexure II A

WATER QUALITY DATA OF POLLUTED RIVER STRETCHES – NOVEMBER 2020

Stations→ Parameters↓	Umshyrpi		Umkhrah				Umtrew at Byrnihat	Nonbah at Nongstoin	Myntdu at Jowai	Lunar River (Tributary of Lukha River) at Myndihati	Kyrhuhkhla
	Near Law College	Umshyrpi Bridge	Demthring	Umkaliar	Near Slaughter House	Mawpdang					
pH	7.0	7.1	6.9	7.0	7.1	7.1	7.1	6.9	6.8	3.0	3.6
Dissolved Oxygen(mg/l)	3.5	6.0	4.8	6.3	4.2	4.3	7.8	7.9	7.7	7.6	7.5
Bio-chemical Oxygen Demand (mg/l)	20.0	7.5	12.0	6.2	14.5	13.0	2.2	2.2	2.3	2.4	2.3
Faecal Coliform (MPN/100ml)	11000	3300	3800	3100	8400	7900	240	170	330	<1.8	<1.8
Total Coliform (MPN/100ml)	40000	7900	12000	7900	41000	34000	1100	630	700	<1.8	<1.8
Faecal Streptococci (MPN/100m	2300	790	1100	700	2100	1400	33	21	24	<1.8	<1.8

WATER QUALITY DATA OF POLLUTED RIVER STRETCHES – DECEMBER 2020 **Annexure II B**

Stations→ Parameters↓	Umshyrpi		Umkhrah				Umtrew at Byrnihat	Nonbah at Nongstoin	Myntdu at Jowai	Lunar River (Tributary of Lukha River) at Myndihati	Kyrhuhkhla
	Near Law College	Umshyrpi Bridge	Demthring	Umkaliar	Near Slaughter House	Mawpdang					
pH	7.1	7.2	7.1	7.2	7.5	7.5	7.4	7.1	7.1	2.9	3.5
Dissolved Oxygen(mg/l)	3.3	6.1	4.3	5.9	4.0	4.1	7.5	7.7	7.6	7.5	7.3
Bio-chemical Oxygen Demand (mg/l)	21.0	7.8	16.0	7.0	15.2	14.8	2.4	2.5	2.4	2.6	2.7
Faecal Coliform (MPN/100ml)	17000	3600	4900	3800	4000	12000	280	270	340	<1.8	<1.8
Total Coliform (MPN/100ml)	49000	8400	17000	11000	49000	44000	1300	940	840	<1.8	<1.8
Faecal Streptococci (MPN/100m	2700	840	400	840	2400	1700	41	24	31	<1.8	<1.8

BIOMONITORING OF POLLUTED RIVER STRETCHES – NOVEMBER 2020 **Annexure II C**

Stations→ Parameters↓	Umshyrpi		Umkhrah				Umtrew at Byrnihat	Nonbah at Nongstoin	Myntdu at Jowai	Lunar River (Tributary of Lukha River) at Myndihati	Kyrhuhkhla
	Near Law College	Umshyrpi Bridge	Demthring	Umkaliar	Near Slaughter House	Mawpdang					
Saprobic score	2.0	2.5	2.0	2.5	2.0	2.0	4.8	5.5	6.1	6.0	3.5
Diversity Index	0.33	0.4	0.35	0.42	0.34	0.3	0.41	0.33	0.45	0.55	0.51

BIOMONITORING OF POLLUTED RIVER STRETCHES – NOVEMBER 2020 **Annexure II D**

Stations→ Parameters↓	Umshyrpi		Umkhrah				Umtrew at Byrnihat	Nonbah at Nongstoin	Myntdu at Jowai	Lunar River (Tributary of Lukha River) at Myndihati	Kyrhuhkhla
	Near Law College	Umshyrpi Bridge	Demthring	Umkaliar	Near Slaughter House	Mawpdang					
Saprobic score	2.3	2.7	2.2	2.8	2.1	2.0	4.6	5.8	6.5	5.5	3.3
Diversity Index	0.35	0.38	0.31	0.4	0.36	0.32	0.44	0.36	0.55	0.48	0.47

Annexure III A

WATER QUALITY DATA OF DRAINS DISCHARGING INTO THE UMKHRAH RIVER

Parameters→ Stream/Drain ↓	**Flow (MLD)**	**Ph**	**Dissolved Oxygen(mg/l)**	**BOD(mg/l)**	**Total Coliform(mg/l)**	**Faecal Coliform(mg/l)**	**Zn(mg/l)**	**Cr(mg/l)**	**Ni(mg/l)**	**Cu(mg/l)**	**As(mg/l)**
Wah Demthring Source - Demthring, Nongthymmai, Madanriting	1.4	6.8	6.1	3.9	12000	7900	BDL	BDL	BDL	BDL	BDL
Lapalang stream - near bridge	12.7	7.1	5.5	4.5	9400	5800	BDL	BDL	BDL	BDL	BDL
Lapalang stream	4.8	7.2	5.8	4.6	11000	6300	BDL	BDL	BDL	BDL	BDL
Umpling Drain	0.5	6.9	6.0	3.4	4900	2500	BDL	BDL	BDL	BDL	BDL
Umpling stream	0.5	7.1	5.5	4.0	4800	2500	BDL	BDL	BDL	BDL	BDL
Goraline Stream (Laitumkhrah, Nongrim Hills)	2.4	6.9	2.2	18.0	30000	15000	BDL	BDL	BDL	BDL	BDL
Wah Kdait Drain Mawpat,	3.5	7.0	5.8	4.1	8400	2700	BDL	BDL	BDL	BDL	BDL

Nongmynsong											
Wah Thangsniang Stream Lawjynriew, Lumpyngngad, Jingkieng, Nongthymmai, Nongrim Hills, MES, Nongrimbah, Nongrimmaw, Demsieniong	6.2	7.2	4.0	10.5	27000	13000	BDL	BDL	BDL	BDL	BDL
Pomdngiew stream Laitumkhrah Lower Lachumiere, Laitumkhrah	9.2	7.1	4.5	9.0	17000	12000	BDL	BDL	BDL	BDL	BDL
Oakland Drain Botanical Garden, Ward's Lake, Oakland, Jail Road Bazar	0.95	7.4	1.0	44.0	54000	28000	BDL	BDL	BDL	BDL	BDL
Wahingdoh Raimohan Drain Keating Road,	2.6	7.3	2.4	30.0	45000	24000	BDL	BDL	BDL	BDL	BDL

Mawlonghat, Bara Bazar (Motphran), Mawkhar, Police Bazar,Umsohsun, Jail Road, Wahiingdoh											
Lawmali Drain Ganesh Das Hospital, Pasteur Institute	12.4	7.1	2.0	20.0	25000	14000	BDL	BDL	BDL	BDL	BDL
Raitsamthiah Wahiingdoh Drain	1.72	7.1	2.7	27.0	30000	20000	BDL	BDL	BDL	BDL	BDL
Jaiaw Drain Raitsamthiah	2.4	7.3	2.0	30.0	33000	18000	BDL	BDL	BDL	BDL	BDL
Mawlai Stream Mawlai Phudmawri, Nongmali	0.86	7.4	3.0	20.0	18000	10000	BDL	BDL	BDL	BDL	BDL
Mawlai Phudmawri Drain- Mawlai Phudmawri,	1.9	7.3	2.5	24.0	33000	18000	BDL	BDL	BDL	BDL	BDL
Jaiaw lumsyntiew drain K.J.P Synod Hospital, Jaiaw	0.35	7.3	2.7	25.0	25000	15000	BDL	BDL	BDL	BDL	BDL

Wah Disoi Drain Mawprem, Garikhana, Lama Villa, Jaiaw Langsning, Slaughter House Area, Naspatighari	6.2	7.3	2.2	27.5	35000	18000	BDL	BDL	BDL	BDL	BDL
Polo Drain 1	1.3	7.5	1.5	39.0	80000	40000	BDL	BDL	BDL	BDL	BDL
Polo drain 2	0.95	7.3	1.0	48.0	59000	30000	BDL	BDL	BDL	BDL	BDL

Annexure III B

GROUND WATER QUALITY IN THE CATCHMENT OF UMKHRAH RIVER, SHILLONG

Sampling Locations→ **Parameters ↓**	***Drinking WaterNorms as per IS 10500:2012***	**Borewell Wahingdoh**	**Deep Tube Well Dong Kamon, Nongmynsong**	**Well Forest Rest House, Forest Colony, Polo**
pH	6.5-8.5	6.1	6.5	6.3
Conductivity (mg/l)	-	180.0	120.0	115.0
Turbidity (NTU)	1.0	1.0	1.0	1.0
Chloride (mg/l)	250.0	23.0	16.0	23.0
Alkalinity (mg/l)	200.0	32.0	44.0	32.0
Total Hardness (mg/l)	200.0	60.0	52.0	62.0
Nitrate-N (mg/l)	45.0	3.8	2.0	7.0
Iron (mg/l)	0.3	1.0	0.34	0.36
Total Coliform (MPN/100ml)	Shall not be detectable	9	<1.8	430
Faecal Coliform (MPN/100ml)	Shall not be detectable	<1.8	<1.8	280
Zn (mg/l)	5.0 mg/l	BDL	BDL	BDL
Cr (mg/l)	0.05	BDL	BDL	BDL
Ni (mg/l)	0.02	BDL	BDL	BDL

Cu (mg/l)	0.05	BDL	BDL	BDL
As (mg/l)	0.01	BDL	BDL	BDL
Lead (mg/l)	0.01	BDL	BDL	BDL
Nickel (mg/l)	0.02	BDL	BDL	BDL
Cadmium(mg/l)	0.003	BDL	BDL	BDL
Manganese(mg/l)	0.1	BDL	BDL	BDL

Annexure –IV A

WATER QUALITY DATA OF DRAINS/STREAMS DISCHARGING INTO THE UMSHYRPI RIVER

Parameters→ Stream/Drain ↓	**FLOW(MLD)**	**pH**	**Dissolved oxygen (mg/l)**	**BOD (mg/l)**	**Total Coliform (MPN/100ml)**	**Feacal Coliform (MPN/100ml)**	**Zn (mg/l)**	**Cr (mg/l)**	**Ni (mg/l)**	**Cu (mg/l)**	**As (mg/l)**
Stream at Fish Dale(Drain from Fire Brigade & Streamlet behind Fishery Office -Fruit Garden)	2.6	7.3	5.0	15.2	6300	2400	BDL	BDL	BDL	BDL	BDL
Woodland Hospital drain from Laitumkhrah	3.5	7.4	3.0	24.0	79000	32000	BDL	BDL	BDL	BDL	BDL
Wahkdait at Malki	4.3	7.5	5.5	3.5	4000	2500	BDL	BDL	BDL	BDL	BDL
Malki stream near Seven Set school	1.72	7.3	5.8	3.4	12000	2700	BDL	BDL	BDL	BDL	BDL

(from RF-Malki Mission – Nongshilliang)											
Um Risa stream from RF-Nongmalki-Crinoline Falls	0.86	7.2	7.0	2.5	2400	1200	BDL	BDL	BDL	BDL	BDL
Umkynrud stream from Lumparing village	4.3	7.3	5.5	3.5	4200	1400	BDL	BDL	BDL	BDL	BDL
Umsohkhlur stream from Kench's Trace-Raid Laban	5.2	7.4	5.2	14.3	27000	12000	BDL	BDL	BDL	BDL	BDL
Ummawlong stream from Lawsohtun-Sericulture farm	0.86	7.1	6.3	3.6	2400	1300	BDL	BDL	BDL	BDL	BDL
Umjasai stream from Lawsohtun - Mahadev Khola (Defence land)	1.72	7.2	6.1	4.0	7900	2500	BDL	BDL	BDL	BDL	BDL
Stream from Lummawbah & Upper Shillong)	0.86	7.1	3.8	16.0	21000	10000	BDL	BDL	BDL	BDL	BDL
Mawprem Drain(Mawbah drain, Barapathar - Reid Chest Hospital	0.86	7.2	2.5	29.0	59000	30000	BDL	BDL	BDL	BDL	BDL

Annexure IV- B

GROUND WATER QUAKITY IN THE CATCHMENT OF UMSHYRPI RIVER AT, SHILLONG

Sampling Locations→ **Parameters ↓**	***Drinking Water Norms as per IS 10500:2012***	**Laban, Shillong Borewell**	**Deep Tube Well at Last Stop, Laban, Shillong**
pH	6.5-8.5	6.1	4.5
Conductivity (mg/l)	-	130	68.0
Turbidity (NTU)	1.0	2.1	1.8
Chloride (mg/l)	250.0	9.0	5.0
Alkalinity (mg/l)	200.0	16.0	18.0
Total Hardness (mg/l)	200.0	28.0	10.0
Nitrate-N (mg/l)	45.0	2.5	1.3
Iron (mg/l)	0.3	0.80	0.56
Total Coliform (MPN/100ml)	Shall not be detectable	4	<1.8
Faecal Coliform (MPN/100ml)	Shall not be detectable	<1.8	<1.8
Zn (mg/l)	5.0 mg/l	BDL	BDL
Cr (mg/l)	0.05	BDL	BDL
Ni (mg/l)	0.02	BDL	BDL

Cu (mg/l)	0.05	BDL	BDL
As (mg/l)	0.01	BDL	BDL
Lead (mg/l)	0.01	BDL	BDL
Nickel (mg/l)	0.02	BDL	BDL
Cadmium(mg/l)	0.003	BDL	BDL
Manganese(mg/l)	0.1	BDL	BDL

Annexure V A

WATER QUALITY DATA OF DRAINS DISCHARGING INTO THE UMTREW RIVER

Parameters→ Stream/Drain ↓	**Flow(MLD)**	**pH**	**Dissolved oxygen (mg/l)**	**BOD (mg/l)**	**Total Coliform (MPN/100ml)**	**Feacal Coliform (MPN/100ml)**	**Zn (mg/l)**	**Cr (mg/l)**	**Ni (mg/l)**	**Cu (mg/l)**	**Mn (mg/l)**
Stream at Nongkylla Mikir, Byrnihat (coming from 18 miles,-NH)	12.1	7.4	6.2	2.2	910	580	BDL	BDL	BDL	BDL	BDL
Drain near Meghalaya Hume Pipe, Byrnihat (Amjok, Borbhuin, Nongkylla,)	13.82	7.2	Nil	15.5	5000	1400	BDL	BDL	BDL	BDL	BDL
Stream near Jai kamakhya alloy Pvt. Ltd, EPIP, Byrnihat, Upper Borbhuin	8.64	7.4	4.8	6.0	3000	1100	BDL	BDL	BDL	BDL	BDL
Stream at Jojwa ,EPIP, Byrnihat ,Jojwa	7.78	7.6	6.8	3.7	440	63	BDL	BDL	BDL	BDL	BDL
Byrnihat side-drain near petrol pump,way to EPIP- leading into Umtrew river (mid- stream).	9.5	6.8	7.0	3.7	920	150	0.06	BDL	BDL	BDL	0.11

Annexure V B

GROUND WATER QUALITY IN THE CATCHMENT OF UMTREW RIVER

Sampling Locations→ **Parameters ↓**	***Drinking Water Norms as per IS 10500:2012***	**Narbong Well**
pH	6.5-8.5	6.7
Conductivity (mg/l)	-	105.0
Chloride (mg/l)	250.0	7.0
Alkalinity (mg/l)	200.0	28.0
Total Hardness (mg/l)	200.0	30.0
Nitrate-N (mg/l)	45.0	0.38
Iron (mg/l)	0.3	0.34
Total Coliform (MPN/100ml)	Shall not be detectable	47
Faecal Coliform (MPN/100ml)	--	Not Detectable
Zn (mg/l)	5.0 mg/l	0.09
Cr (mg/l)	0.05	BDL
Ni (mg/l)	0.02	BDL

Cu (mg/l)	0.05	BDL
As (mg/l)	0.01	BDL
Lead (mg/l)	0.01	BDL
Cadmium (mg/l)	0.003	BDL
Manganese (mg/l)	0.1	BDL

Annexure VI A

WATER QUALITY DATA OF DRAINS DISCHARGING INTO THE KYRHUKHLA RIVER

Parameters→ Stream/Drain ↓	**Flow MLD**	**pH**	**Dissolved oxygen (mg/l)**	**BOD (mg/l)**	**Total Coliform (MPN/100ml)**	**Feacal Coliform (MPN/100ml)**	**Zn (mg/l)**	**Cr (mg/l)**	**Ni (mg/l)**	**Cu (mg/l)**	**Mn (mg/l)**
Wah Kajit	0.07	6.7	6.0	3.0	42	17	0.1	BDL	BDL	BDL	0.03
Wah Sadakha	0.10	4.1	7.1	2.9	11	<1.8	0.15	BDL	BDL	BDL	BDL

Annexure VI B

GROUND WATER QUALITY IN THE CATCHMENT OF KYRHUKHLA RIVER

Sampling Locations→ / **Parameters ↓**	***Drinking Water standards as per IS 10500:2012***	**Borewell at Good Shepherd Parish, Lad Rymbai**	**Dug Well Myntriang WSS**
pH	6.5-8.5	7.4	7.7
Conductivity (mg/l)	-	157.0	48.0

Turbidity (NTU)	1.0	1.0	1.0
Chloride (mg/l)	250.0	7.0	5.0
Alkalinity (mg/l)	200.0	60.0	12.0
Total Hardness (mg/l)	200.0	72.0	16.0
Nitrate-N (mg/l)	45.0	0.57	0.39
Iron (mg/l)	0.3	0.11	0.12
Total Coliform (MPN/100ml)	Shall not be detected	34	ND**
Faecal Coliform (MPN/100ml)	Shall not be detected	Not detected	Not detected
Zn (mg/l)	5.0 mg/l	0.02	BDL
Cr (mg/l)	0.05	BDL	BDL
Ni (mg/l)	0.02	BDL	BDL
Cu (mg/l)	0.05	BDL	BDL
As (mg/l)	0.01	BDL	BDL
Lead (mg/l)	0.01	BDL	BDL
Nickel (mg/l)	0.02	BDL	BDL
Cadmium(mg/l)	0.003	BDL	BDL

Manganese(mg/l)	0.1	BDL	BDL

Annexure VII A

WATER QUALITY DATA OF DRAINS DISCHARGING INTO THE NONBAH RIVER

Parameters→ Stream/Drain ↓	**Flow MLD**	**pH**	**Dissolved oxygen (mg/l)**	**BOD (mg/l)**	**Total Coliform (MPN/100ml)**	**Feacal Coliform (MPN/100ml)**	**Zn (mg/l)**	**Cr (mg/l)**	**Ni (mg/l)**	**Cu (mg/l)**	**Mn (mg/l)**
Drain near fish market	0.35	6.9	4.5	9.0	7900	2100	BDL	BDL	BDL	BDL	BDL
Drain near Market Complex	There is no flow in the Drain										
Drain near Govt.LP School	0.09	6.8	5.0	4.8	4400	1700	BDL	BDL	BDL	BDL	BDL
Drain at Dong SpengTthawlang Mlah	0.26	7.0	3.9	8.0	4600	1400	BDL	BDL	BDL	BDL	BDL
Stream near Bishop House	6.91	7.1	6.4	3.6	520	210	BDL	BDL	BDL	BDL	BDL

Annexure VII B

GROUND WATER QUALITY IN THE CATCHMENT OF NONBAH RIVER

Sampling Locations→ **Parameters ↓**	**Drinking Water Standards as per IS 10500:2012**	**Spring at Spengthawlang Mlah**	**Spring at lad Tihsaw**	**Spring near Nongstoin Market**
pH	6.5-8.5	6.8	7.5	6.5
Conductivity (mg/l)	-	85.0	50.0	101.0
Turbidity (NTU)	1.0	0.8	1.0	1.0
Chloride (mg/l)	250.0	10.0	10.0	17.0

Alkalinity (mg/l)	200.0	26.0	24.0	32.0
Total Hardness(mg/l)	200.0	36.0	26.0	44.0
Nitrate-N (mg/l)	45.0	3.7	1.7	4.3
Iron (mg/l)	0.3	0.3	0.28	0.30
Total Coliform (MPN/100ml)	Shall not be detectable	Not Detectable	Not Detectable	Not Detectable
Faecal Coliform (MPN/100ml)	Shall not be detectable	Not Detectable	Not Detectable	Not detectable
Zn (mg/l)	5.0 mg/l	BDL	0.05	BDL
Cr (mg/l)	0.05	BDL	BDL	BDL
Ni (mg/l)	0.02	BDL	BDL	BDL
Cu (mg/l)	0.05	BDL	BDL	BDL
As (mg/l)	0.01	BDL	BDL	BDL
Lead (mg/l)	0.01	BDL	BDL	BDL
Nickel (mg/l)	0.02	BDL	BDL	BDL
Cadmium(mg/l)	0.003	BDL	BDL	BDL
Manganese(mg/l)	0.1	BDL	BDL	BDL

Annexure VIII A

WATER QUALITY DATA OF DRAINS DISCHARGING INTO THE MYNTDU RIVER

Parameters→ Stream/Drain ↓	**Flow (MLD)**	**pH**	**Dissolved oxygen (mg/l)**	**BOD (mg/l)**	**Total Coliform (MPN/100ml)**	**Feacal Coliform (MPN/100ml)**	**Zn (mg/l)**	**Cr (mg/l)**	**Ni (mg/l)**	**Cu (mg/l)**	**Mn (mg/l)**
Riatsiatsim	4.58	7.6	5.6	4.4	2300	910	BDL	BDL	BDL	BDL	BDL
Rampyrthal		6.8	3.4	10.0	7900	4900	BDL	BDL	BDL	BDL	BDL
Liar-Urkyrdeiñ		7.0	3.2	12.0	13000	9400	BDL	BDL	BDL	BDL	BDL
Myn'twa	28.0	7.4	5.5	3.4	490	94	BDL	BDL	BDL	BDL	BDL
Soomer and Niawmer	17.0	6.6	6.0	2.9	420	63	BDL	BDL	BDL	BDL	BDL

Annexure VIII B

GROUND WATER QUALITY IN THE CATCHMENT OF MYNTDU RIVER

Sampling Locations → / **Parameters ↓**	***Drinking Water Norms as per IS 10500:2012***	Dug Well, Riatsasim, Jowai	DTW, Thomas Jones Synod College, Iawmusiang	Dug well Mooralong, Ladthaboh	Borewell Khimusniang	Spring Chilliang Raij
pH	6.5-8.5	6.7	6.4	7.2	6.6	6.2
Conductivity (mg/l)	-	315.0	275.0	315.0	195.0	138.0
Turbidity (NTU)	1.0	0.65	1.8	1.0	7.2	1.0

Chloride (mg/l)	250.0	21.0	44.0	14.0	7.0	12.0
Alkalinity (mg/l)	200.0	82.0	16.0	122.0	58.0	42.0
Total Hardness (mg/l)	200.0	148.0	104.0	142.0	74.0	40.0
Nitrate-N (mg/l)	45.0	5.7	14.1	1.3	2.0	8.8
Iron (mg/l)	0.3	0.12	0.1	0.12		0.12
Total Coliform (MPN/100ml)	Shall not be detectable	10	8	12	28	ND
Faecal Coliform (MPN/100ml)	Shall not be detectable	ND	ND	ND	ND	ND
Zn (mg/l)	5.0 mg/l	BDL	BDL	BDL	BDL	BDL
Cr (mg/l)	0.05	BDL	BDL	BDL	BDL	BDL
Ni (mg/l)	0.02	BDL	BDL	BDL	BDL	BDL
Cu (mg/l)	0.05	BDL	BDL	BDL	BDL	BDL
As (mg/l)	0.01	BDL	BDL	BDL	BDL	BDL
Lead (mg/l)	0.01	BDL	BDL	BDL	BDL	BDL
Nickel (mg/l)	0.02	BDL	BDL	BDL	BDL	BDL
Cadmium(mg/l)	0.003	BDL	BDL	BDL	BDL	BDL

Manganese(mg/l)	0.1	BDL	BDL	BDL	BDL	BDL

Annexure IX A

WATER QUALITY DATA OF DRAINS DISCHARGING INTO THE LUKHA (LUNAR) RIVER

Parameters→ Stream/Drain ↓	**Flow (Cumec)**	**pH**	**Dissolved oxygen (mg/l)**	**BOD (mg/l)**	**Total Coliform (MPN/100ml)**	**Feacal Coliform (MPN/100ml)**	**Zn (mg/l)**	**Cr (mg/l)**	**Ni (mg/l)**	**Cu (mg/l)**	**Mn (mg/l)**
Mookympad stream	1.24	2.5	6.5	3.0	8	<1.8	BDL	BDL	BDL	BDL	BDL

Annexure IX B

GROUND WATER QUALITY IN THE CATCHMENT OF LUKHA RIVER

Sampling Locations→ **Parameters ↓**	***Drinking Water standards as per IS 10500:2012***	**Ringwell at Power Grid, Khliehriat**	**Borewell at Khliehwah Shasem A, Khliehriat**	**Borewell at Khliehwah Shasem B, Khliehriat**
pH	6.5-8.5	6.5	5.2	4.8
Conductivity (mg/l)	-	200.0	128.0	103.0
Turbidity (NTU)	1.0	2.5	1.5	1.4
Chloride (mg/l)	250.0	14.0	12.0	14.0
Alkalinity (mg/l)	200.0	44.0	10.0	8.0
Total Hardness (mg/l)	200.0	80.0	30.0	30.0
Nitrate-N (mg/l)	45.0	3.0	0.19	0.28
Iron (mg/l)	0.3	0.14	0.48	0.66
Total Coliform (MPN/100ml)	Shall not be detected	ND	42	11
Faecal Coliform (MPN/100ml)	Shall not be detected	ND	ND	ND
Zn (mg/l)	5.0 mg/l	BDL	BDL	BDL
Cr (mg/l)	0.05	BDL	BDL	BDL

Ni (mg/l)	0.02	BDL	BDL	BDL
Cu (mg/l)	0.05	BDL	BDL	BDL
As (mg/l)	0.01	BDL	BDL	BDL
Lead (mg/l)	0.01	BDL	BDL	BDL
Nickel (mg/l)	0.02	BDL	BDL	BDL
Cadmium(mg/l)	0.003	BDL	BDL	BDL
Manganese(mg/l)	0.1	BDL	BDL	BDL