Table of Contents

Annexure- 1: Ambient Air Quality Standards

Sl. No.	Pollutant	Time-weighted average	Concentration in ambient air		
			Industrial, Residential, Rural and other areas	**Ecologically sensitive area**	**Method of Measurement**
1	SO_2, $\mu g/m^3$	Annual* 24hrs**	50 80	20 80	Improved West &Gaeke Ultraviolet fluorescence
2	NO_2, $\mu g/m^3$	Annual* 24hrs**	40 80	30 80	Modified Jacob &Hocheisser Chemiluminence
3	PM_{10} $\mu g/m^3$	Annual 24hrs	60 100	60 100	Gravimetric TOEM Beta attenuation
4	$PM_{2.5}$ $\mu g/m^3$	Annual* 24hrs**	40 60	40 60	Gravimetric TOEM Beta attenuation
5	O_3 $\mu g/m^3$	8hrs** 1hr**	100 180	100 180	UV Photometry Chemiluminescence Chemical method
6	Pb $\mu g/m^3$	Annual* 24hrs**	0.50 1.00	0.50 1.00	AAS/ICP method after sampling on EPM2000 ED-XRF using Teflon Filter
7	CO mg/m^3	8 hrs** 1hr.**	02 04	02 04	Non-dispersive Infra-red spectroscopy
8	Benzene$_{\mu g/m^3}$	Annual*	05	05	Gas chromatography based continuous analyser
9	BenzoPyrene, (Particulate phase only) ng/m^3	Annual*	01	01	Solvent extraction followed by HPLC/GC analysis
10	Arsenic ng/m^3	Annual*	06	06	AAS/ICP method after sampling on EPM 2000
11	Nickel $ng/^3$	Annual*	20	20	AAS/ICP method after sampling on EPM 2000
12	NH_3 $\mu g/m^3$	Annual* 24hrs**	100 400	100 400	Chmilumuminescence Indophenol blue method

**Annual arithmetic means of minimum 104 measurements in a year at a particular site taken twice a week 24 hrs at uniform intervals.*

*** 24hrs/08hrs/02 hourly monitored values as applicable, shall be complied with 98% of the time in a year. 2% of time they may exceed the limits but not on two consecutive days of monitoring.*

Annexure- 2: Ambient Noise Quality Standards

Sl. No.	Category of Area / Zone	Limits in dB(A) Leq*	
		Day Time	***Night Time***
A	Industrial area	75	70
B	Commercial area	65	55
C	Residential area	55	45
D	Silence Zone	50	40

Note:

1. *Day time shall mean from 6.00 a.m. to 10.00 p.m.*
2. *Night time shall mean from 10.00 p.m. to 6.00 a.m.*
3. *Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority.*
4. *Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.*

* *dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.*

A *"decibel" is a unit in which noise is measured.*

"A", *in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.*

Leq: *It is an energy mean of the noise level over a specified period.*

Annexure- 3: Sediment Quality Standard

Level of Pollution (mg./ kg. dry)	Cd.	Cr.	Cu.	Pb.	Zn.
Threshold Effect Level (TEL)	0.68	52.3	18.7	30.2	124
Probable Effect Level (PEL)	4.2	160.4	108.2	112.2	271
Non-Polluted	-	<25	<25	<40	<90
Moderate Polluted	>6	>75	>50	>60	>200
Heavily Polluted	>6	>75	>50	>60	>200

Source: US-EPA

Note: Probable Effect Level (PTL) i.e. the values above which adverse biological affected would frequency occur
Threshold Effect Level (TEL) is the value below which adverse biological effects would be infrequently expect

Annexure- 4: Water Quality Criteria

General Standards for discharge of environment Pollutants Part-A: Effluents					
SN	**Parameter**	**Standards**			
		Inland Surface Water	**Public Sewers**	**Land for Irrigation**	**Marine Coastal Area**
1	Colour and Odour	5 to 25 Agreeable	-	5 to 25 Agreeable	5 to 25 Agreeable
2	Suspended Solids mg/l, Max.	100	600	200	(a) For process waste water-100
	(b) For Cooling water effluent 10 percent above total suspended matter of influent				
3	Particular size of suspended solids	Shall pass 850 microns IS Sieve	-	-	(a) Floatable solids, max. 3 mm
					(b) Settleable solids, max850 microns
4*	---	-	-	---	-
5	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
6	Temperature	Shall not exceed 5oC above the receiving water temperature	-	-	Shall not exceed 5oC above the receiving water temperature
7	Oil and grease (mg/L Max)	10	20	10	20
8	Total residual chlorine mg/1, Max	1	-	-	1
9	Ammonical nitrogen (as N), mg/1 max.	50	50	-	50
10	Total Kjeldhal nitrogen (as NH3) mg/l, Max	100	-	-	100
11	Free Ammonia (as NH3) mg/1, Max	5	-	-	5
12	Biochemical oxygen demand (5 days at 20oC), mg/1 Max)	30	350	100	100
13	Chemical Oxygen demand, mg/1 Max	250	-	-	250
14	Arsenic (as) mg/1 Max	0.2	0.2	0.2	0.2
15	Mercury (As Hg), mg/1 max)	0.01	0.01	-	0.01
16	Lead (as Pb) mg/L, Max	0.1	1	-	2
17	Cadmium (as Cd) mg/1, Max	2	1	-	2
18	Hexavalent chromium, (as Cr + 6) mg/1, Max	0.1	2	-	1
19	Total chromium (as Cr) mg/l, Max	2	2	-	2
20	Copper (as Cu) mg/l, Max	3	3	-	3
21	Zinc (as Zn) mg/l, Max	5	15	-	15
22	Selenium (as Se) mg/l, Max	0.05	0.05	-	0.05
23	Nickel (as Ni) mg/l, Max	3	3	-	5

General Standards for discharge of environment Pollutants Part-A: Effluents					
SN	**Parameter**	**Standards**			
		Inland Surface Water	**Public Sewers**	**Land for Irrigation**	**Marine Coastal Area**
24*	-	-	-	-	
25*	-	-	-	-	-
26	-	-	-	-	-
27	Cyanide (as CN), mg/l Max	0.2	2	0.2	0.2
28*	-	-	-	-	-
29	Fluoride (as F) mg/l Max	2	15	-	15
30	Dissolved Phosphates (as p), mg/l Max	5	-	-	-
31*	-	-	-	-	-
32	Sulphide (as S) mg/l Max	2	-	-	5
33	Phenolic Compounds (as C6H5OH) mg/l Max	1	5	-	5
34	Radioactive materials:				
	(a) Alpha emitter micro curie/ml	10-7	10-7	10-8	10-7
	(b) Beta emitter micro curie/ml)	10-6	10-6	10-7	10-6
35	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
36	Manganese (as Mn)	2 mg/l	2 mg/l	-	2 mg/l
37	Iron (as Fe)	3 mg/l	3 mg/l		3 mg/l
38	Vanadium (as V)	0.2 mg/l	0.2 mg/l		0.2 mg/l
39	Nitrate Nitrogen	10 mg/l	-	-	20 mg/l
40	-	-	-	-	-

Annexure- 5: Noise standard for the construction vehicle

Sl. No.	Equipment	Noise Level (in dB)
1	Tractor-scraper	93
2	Rock drill	87
3	Unmuffled concrete breaker	85
4	Hand-held tree saw	82
5	Large rotary diesel compressor	80
6	1 ½ tonne dumper truck diesel	75
7	Concrete mixture	75

Source: The Noise pollution (Regulation & Control) Rules, 2000

Annexure- 6: Emission Standards for Construction Equipment Vehicles

Bharat (CEV) Stage II - III emission standards for diesel construction machinery

Engine Power	CO	HC	HC+NOx	NOx	PM
kW	g/kWh				
Bharat (CEV) Stage II					
P < 8	8.0	1.3	-	9.2	1.00
8 ≤ P < 19	6.6	1.3	-	9.2	0.85
19 ≤ P < 37	6.5	1.3	-	9.2	0.85
37 ≤ P < 75	6.5	1.3	-	9.2	0.85
75 ≤ P < 130	5.0	1.3	-	9.2	0.70
130 ≤ P < 560	5.0	1.3	-	9.2	0.54
Bharat (CEV) Stage III					
P < 8	8.0	-	7.5	-	0.80
8 ≤ P < 19	6.6	-	7.5	-	0.80
19 ≤ P < 37	5.5	-	7.5	-	0.60
37 ≤ P < 75	5.0	-	4.7	-	0.40
75 ≤ P < 130	5.0	-	4.0	-	0.30
130 ≤ P < 560	3.5	-	4.0	-	0.20

Bharat (CEV) Stage III Useful Life Periods

Power Rating		**Useful Life Period (**hours)
< 19 kW		3000
19-37 kW	Constant speed	3000
	Variable speed	5000
> 37 kW		8000

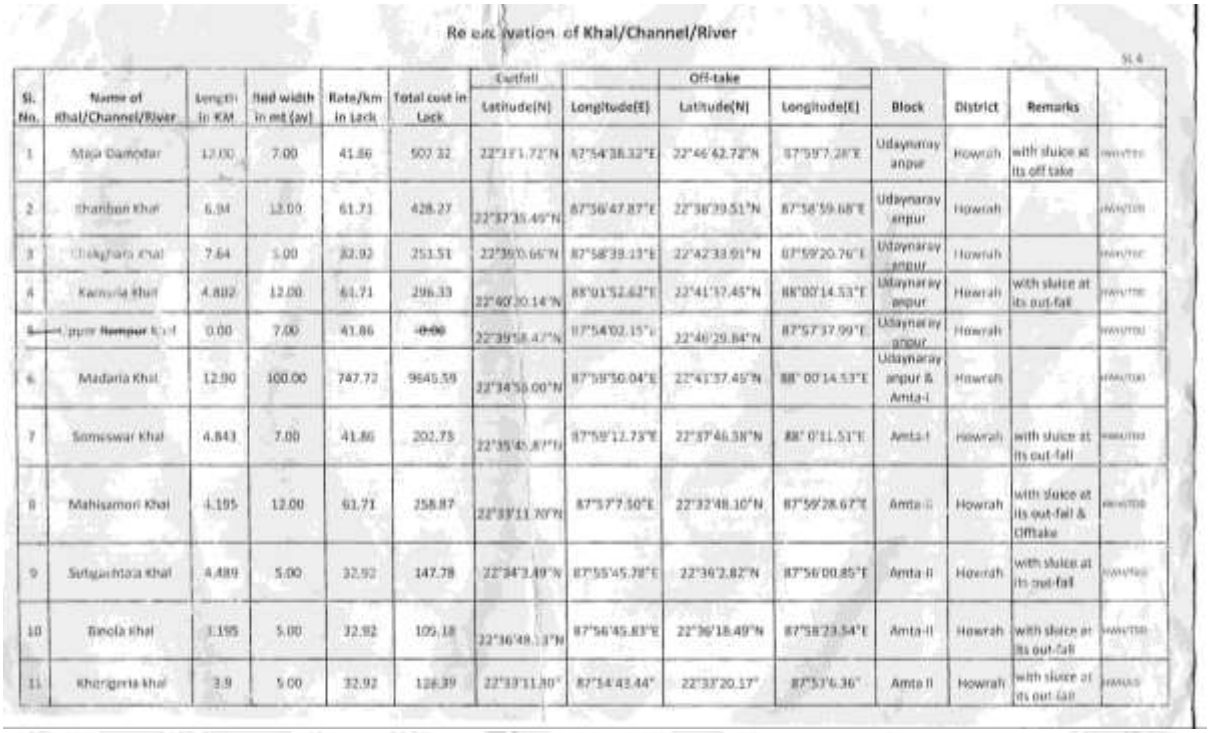
Bharat (CEV/Trem) Stage IV - V emission standards

Engine Power	CO	HC	NOx	PM	PN	Test Cycle
kW	g/kWh				1/kWh	
Bharat (CEV/Trem) Stage IV						
37 ≤ P < 56	5.0	4.7*		0.025	-	NRSC and NRTC
56 ≤ P < 130	5.0	0.19	0.4	0.025	-	
130 ≤ P < 560	3.5	0.19	0.4	0.025	-	
Bharat (CEV/Trem) Stage V						
P < 8	8.0	7.5*		0.4	-	NRSC
8 ≤ P < 19	6.6	7.5*		0.4	-	
19 ≤ P < 37	5.0	4.7*		0.015	1×10^{12}	NRSC and NRTC
37 ≤ P < 56	5.0	4.7*		0.015	1×10^{12}	
56 ≤ P < 130	5.0	0.19	0.4	0.015	1×10^{12}	
130 ≤ P < 560	3.5	0.19	0.4	0.015	1×10^{12}	
P ≥ 560	3.5	0.19	3.5	0.045	-	NRSC

Bharat (CEV/Trem) Stage IV - V Useful Life Periods

Power Rating		**Useful Life Period (**hours)
≤ 37 kW	Constant speed	3000
	Variable speed	5000
> 37 kW		8000

Annexure- 7: 41 Nos. canal/ drainage channel proposed for desiltation



Re excavation of Khal/Channel/River

Sl. No.	Name of Khal/Channel/River	Length in KM	Bed width in mt (av)	Rate/km in Lack	Total cost in Lack	Outfall		Off-take		Block	District	Remarks	
						Latitude(N)	Longitude(E)	Latitude(N)	Longitude(E)				
1	Maja Damodar	12.00	7.00	41.86	502.32	22°31'1.72"N	87°54'38.32"E	22°46'42.72"N	87°59'7.28"E	Udaynaray anpur	Howrah	with sluice at its off take	
2	Chanban Khal	6.94	12.00	61.71	428.27	22°37'35.49"N	87°56'47.87"E	22°38'39.51"N	87°58'59.68"E	Udaynaray anpur	Howrah		
3	Chakghara Khal	7.64	5.00	32.92	251.51	22°39'0.66"N	87°58'39.13"E	22°42'38.91"N	87°59'20.76"E	Udaynaray anpur	Howrah		
4	Kamrola Khal	4.802	12.00	61.71	296.33	22°40'20.14"N	88°01'52.62"E	22°41'17.45"N	88°00'14.53"E	Udaynaray anpur	Howrah	with sluice at its out-fall	
5	Rampur Khal	0.00	7.00	41.86	0.00	22°39'58.47"N	87°54'02.15"E	22°40'29.84"N	87°57'37.99"E	Udaynaray anpur	Howrah		
6	Madaria Khal	12.90	100.00	747.72	9645.59	22°34'56.00"N	87°59'50.04"E	22°41'37.45"N	88° 00'14.53"E	Udaynaray anpur & Amta-I	Howrah		
7	Someswar Khal	4.843	7.00	41.86	202.75	22°35'45.87"N	87°59'12.73"E	22°37'46.38"N	88° 0'11.51"E	Amta-I	Howrah	with sluice at its out-fall	
8	Mahisamori Khal	4.195	12.00	61.71	258.87	22°33'11.70"N	87°57'7.50"E	22°32'48.10"N	87°59'28.67"E	Amta-II	Howrah	with sluice at its out-fall & Offtake	
9	Satgachhia Khal	4.489	5.00	32.92	147.78	22°34'3.49"N	87°55'45.78"E	22°36'2.82"N	87°56'00.85"E	Amta-II	Howrah	with sluice at its out-fall	
10	Bicola Khal	1.195	5.00	32.92	105.18	22°36'48.13"N	87°56'45.83"E	22°36'18.49"N	87°58'23.54"E	Amta-II	Howrah	with sluice at its out-fall	
11	Khorigeria khal	3.9	5.00	32.92	128.39	22°33'11.30"	87°54'43.44"	22°33'20.17"	87°53'6.36"	Amta II	Howrah	with sluice at its out-fall	

Re excavation of Khal/Channel/River

Sl. No.	Name of Khal/Channel/River	Length in KM	Bed width in mt (av)	Rate/km in Lack	Total cost in Lack	Outfall		Off-take		Block	District	Remarks	
						Latitude(N)	Longitude(E)	Latitude(N)	Longitude(E)				
12	Bankura khal	2.58	7.00	41.86	108.00	22°30'42.92"	87°57'23.67"	22°31'41.59"	87°57'29.75"	Amta II	Howrah	with sluice at its out-fall	
13	Chitnan to Bhoumikpara	0.95	7.00	41.86	39.77	22°32'43.64"	87°52'49.57"	22°32'17.35"	87°52'45.45"	Amta II	Howrah		
14	Chitnan to Bhoumikpara	0.276	7.00	41.86	11.55	22°32'26.71"	87°52'43.33"	22°32'28.79"	87°52'35.28"	Amta II	Howrah		
15	Mirgram to beral	3.013	7.00	41.86	126.12	22°32'45.81"	87°52'48.78"	22°32'38.62"	87°50'11.85"	Amta II	Howrah		
16	Hatgachia Khal	1.587	7.00	41.86	66.43	22°32'43.32"	87°51'23.41"	22°33'26.16"	87°51'44.93"	Amta II	Howrah		
17	Kula Khal	1.95	5.00	32.92	64.19	22°33'04.78"	87°52'15.61"	22°33'44.90"	87°51'22.32"	Amta II	Howrah		
18	Ghoraberia Khal	1.038	5.00	32.92	34.17	22°33'50.14"	87°52'02.16"	22°34'11.41"	87°51'35.35"	Amta II	Howrah		
19	Gorupara	1.928	5.00	32.92	63.47	22°35'57.18"	87°52'30.89"	22°36'23.01"	87°53'1.15"	Amta II	Howrah	With sluice at its out-fall	
20	Kashmoli Khal	4.002	5.00	32.92	134.71	22°33'22.52"	87°52'22.13"	22°34'31.93"	87°53'48.12"	Amta II	Howrah	with sluice at its out-fall	
21	Mellock Diversion Khal	10.50	5.00	32.92	345.66	22° 27' 59.96"	87° 53' 53.11"	22° 27' 58.99"	87° 54' 47.02"	Bagnan-I	Howrah		
22	Kolatola Khal	4.839	5.00	32.92	159.3	22°27'23.61"N	88° 0'13.22"E	22°27'8.25"N	87°57'58.75"E	Bagnan-I	Howrah	with sluice at its out-fall	HWH/SJ
23	Mahadevpur Khal	1.752	5.00	32.92	57.68	22°27'54.12"N	87°59'41.23"E	22°27'41.64"N	87°58'59.12"E	Bagnan-I	Howrah	with sluice at its out-fall	HWH/SJ
24	Mankur khal	1.88	5.00	32.92	61.89	22°30'46.40"	87°53'46.52"	22°30'48.64"	87°54'37.02"	Bagnan I	Howrah	with sluice at its out-fall	HWH/LD
25	Gopalpur Khal	1.42	5.00	32.92	46.75	22°28'50.73"	87°57'51.88"	22°28'51.18"	87°57'14.94"	Bagnan I	Howrah	with sluice at its out-fall	HWH/LD
26	Kona Birumpur Drainage channel	9.75	5.00	32.92	320.97	22° 28' 52.52"	87° 54' 19.87"	22° 31' 14.35"	87° 56' 17.46"	Bainan-I	Howrah		LDC/LDSD III
27	Jagorampur khal	3.90	5.00	32.92	128.39	22° 31' 26.57"	88° 03' 24.64"	22° 31' 26.75"	88°3' 20.93"	Ulubaria-II	Howrah		LDC/LDSD III

Re excavation of Khal/Channel/River

Sl. 4

Sl. No.	Name of Khal/Channel/River	Length in KM	Bed width in mt (av)	Rate/km in Lack	Total cost in Lack	Outlet		Off-take		Block	District	Remarks	
						Latitude(N)	Longitude(E)	Latitude(N)	Longitude(E)				
28	Kamer Khali khal	5.00	5.00	32.92	164.6	22° 29'16.89"	88° 05' 57.73"	22° 29'27.94"	88°05' 57.57"				
29	Chackbagobotipur khal	5.00	5.00	32.92	164.6	22° 29'46.13"	88° 01' 29.84"	22° 29'53.48"	88°01' 29.02"				
30	Matur Hana khal	3.00	5.00	32.92	98.76	22° 28'19.45"	88° 06' 23.72"	22° 28'19.01"	88°06' 21.79"				
31	Banitala Abadi Khal	4.50	5.00	32.92	148.14	22° 29'7.12"	88° 05' 53.80"	22° 29'5.71"	88°05' 53.03"				
32	Latibpur Khal	4.00	5.00	32.92	131.68	22° 28'41.39"	88° 06' 4.08"	22° 28'33.9"	88°05' 53.24"				
33	Mallka khal	3.50	5.00	32.92	115.22	22° 29'12.56"	88° 06' 32.28"	22° 29'15.17"	88°06' 3.12"				
34	Kataberia khal	6.00	5.00	32.92	197.52	22° 29'37.01"	88° 04' 48.48"	22° 29'40.35"	88°04' 48.48"				
35	Mohinguha	3.00	5.00	32.92	98.76	22° 34'57.10"	88° 02' 50.81"	22° 35'32.11"	88°02' 54.36"				
36	Rajapur khal	3.50	5.00	32.92	115.22	22° 29'33.14"	88° 05' 23.93"	22° 29'29.18"	88°05' 17.21"				
37	Siber Hana khal	3.00	5.00	32.92	98.76	22° 31'51.77"	88° 03' 27.27"	22° 31'53.11"	88°03' 19.48"				
38	Dhakin Ramchandrapur-1	3.50	5.00	32.92	115.22	22° 34'30.30"	88° 03' 0.77"	22°34'28.19"	88°02' 38.59"				
39	Tatiberia khal	3.00	5.00	32.92	98.76	22° 29'2.14"	88° 06' 7.92"	22°29'1.49"	88°06' 7.75"				
40	Majukhatra-2	4.00	5.00	32.92	131.68	22° 33'2.80"	88° 02' 7.5"	22°33'5.63"	88°02' 5.30"				
40 ~~41~~	Purona Khal	14.00	12.00	61.71	863.94	22° 34'31.47"	88° 03' 3.74"	22°28'14.39"	88°06' 35.97"				
	Total	181.36	KM		16,278.88	Laks							

Earlier 17881.51 Lakh Incl. upper Ramnagar

* *Roner khal to be included with this list of drainage channel proposed for desiltation*

Annexure- 8: Block wise ST population percentage in project district

Bankura		**Purba Bardhaman**		**Paschim Bardhaman**		**Howrah**		**Hooghly**	
Block	**% of ST Population**	**Block**	**% of ST Population**	**Block**	**% of ST Population**	**Block**	**% of ST Population**	**Block**	**% of ST Population**
Barjora	1.64	Katwa - II	1.44	Faridpur Durgapur	6.96	Uluberia - II	0.04	Khanakul - II	0.02
Indus	1.85	Katwa - I	1.45	Kanksa	10.24	Shyampur - II	0.06	Chanditala - I	0.16
Patrasayer	3.01	Khandaghosh	2.29			Uluberia - I	0.07	Khanakul - I	0.30
Sonamukhi	3.50	Mangolkote	2.83			Bagnan - I	0.12	Pursura	0.48
		Manteswar	2.93			Amta - II	0.14	Chanditala - II	1.00
		Raina - II	4.00			Amta - I	0.15	Arambag	1.46
		Galsi - I	4.08			Shyampur - I	0.16	Singur	1.47
		Bardhaman - I	5.62			Udaynarayanpur	0.19	Chinsurah - Magra	3.64
		Raina - I	5.80			Domjur	0.42	Jangipara	4.61
		Galsi - II	6.83			Bagnan - II	0.48	Tarakeswar	5.04
		Bhatar	9.74			Jagatballavpur	1.04	Haripal	6.70
		Kalna - I	10.13					Balagarh	9.23
		Bardhaman - II	11.93					Polba - Dadpur	11.47
		Ausgram - I	13.05					Dhaniakhali	14.26
		Ausgram - II	14.42					Pandua	15.36
		Jamalpur	15.18						
		Memari - I	15.78						
		Kalna - II	17.29						
		Memari - II	18.42						
Average	*2.50*		*8.59*		*8.60*		*0.26*		*5.01*

Annexure- 9: Environmental and Social Screening Report

Screening report of Mundeswari River

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km	Left/ Right	Lat	Long	Location Name
Physical Environment							
	Natural Drain	Akhabari Khal Raner Khal Kable Khal	1.14 Km 2.5 Km 0 Km	Left Left Right	22.908 22.981 22.86	87.935 87.985 87.89	Pursura Block Jamalpur Block Arambag Block
	Standing water bodies (ponds, lakes, etc.)	Tajpur Munsi Pukur	1.5 Km	Right	22°49'24.74"N	87°53'44.10"E	
	Flowing water bodies (rivers, rivulets, streams, canals, etc.)	Harinkhloa Nuna	0 Km 0 Km	Left Right	22.888 22.989	87.911 87.944	Pursura Block Jamalpur & Raina-II Block
	Ground water sources (open wells, bore wells, etc.)						
	Meandering River						
	Erosion prone stretches						
	Areas with high slope (higher than 15 percent)	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
	Landforms (hills, valleys)	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
	Sand Mine						
	Coal Mine	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Biological Environment							
	National Park / Wildlife Sanctuary	Garchumuk Deer Park	55.1	Right	22°20'58.29"N	88° 4'19.91"E	
	Reserved Forests	Chandur Forest	15	Right	22°54'38.43"N	87°46'6.09"E	
		Golakderyama Forest	45.34	Left	22°42'10.75"N	87°28'18.74"E	
		Dhamkura Scrub Forest	42.99	Left	22°45'11.81"N	87°29'10.39"E	
		Amlagora Forest Range	56.6	Left	22°49'59.70"N	87°20'55.58"E	
		Chondrakona Forest	55.52	Left	22°50'21.33"N	87°21'10.01"E	
		Bhuban Danga Forest	20.83	Left	23° 0'24.82"N	87°44'7.99"E	
	Community Forest						
	Large Trees / Woodland						
	Sacred Groves						
	Presence of endangered species / habitat areas						
	Migratory routes						
	Ecologically sensitive areas						
Human Environment							
	Settlements/Habitations	Bara Bainan Chack Narshinpur Singarpur Narshingpur Atapur Hodilpur Fatepur Purbbaharipur Bachhanari Tala Malaypur Chak Benshe Banamalipir Amgaon Chhandra	1.52 0.74 0 0 0 0 2.07 1.09 1.21 2.7 1.33 0 0.50 0.30 0.79	Right Right Right Right Right Right Right Right Right Right Right On middle of the river bed Right	23° 0'30.63"N 22°59'42.98"N 22°59'56.98"N 22°59'32.71"N 22°59'6.15"N 22°57'53.06"N 22°56'55.75"N 22°56'29.92"N 22°55'51.52"N 22°56'12.48"N 22°54'35.88"N 22°54'9.93"N 22°53'58.44"N 22°50'3.01"N 22°50'2.80"N	87°56'9.43"E 87°56'22.72"E 87°56'55.79"E 87°56'48.95"E 87°56'44.96"E 87°56'16.11"E 87°54'58.66"E 87°55'21.88"E 87°54'58.65"E 87°54'6.08"E 87°53'56.83"E 87°54'54.59"E 87°54'18.89"E 87°54'10.10"E 87°53'52.92"E	

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km	Left/ Right	Lat	Long	Location Name
		Shyamgram	0.88	Right	22°50'28.77"N	87°53'30.81"E	
		Dakshin Rasulpur	2.46	Right	22°50'44.32"N	87°52'33.09"E	
		Sarati	2.5	Right	22°51'15.86"N	87°52'15.31"E	
		Madhurpur	1.26	Right	22°51'53.87"N	87°52'55.07"E	
		Mazaffarpur	0	Right	22°51'59.85"N	87°53'34.83"E	
		Ashanpur	1.62	Right	22°52'36.53"N	87°52'37.73"E	
		Keshabpur	0.26	Right	22°53'9.74"N	87°53'56.87"E	
		Kadipur	0.23	Right	22°49'41.18"N	87°54'36.85"E	
		Saota	0.90	Right	22°50'8.41"N	87°54'58.64"E	
		Rautara	2.46	Left	22°50'9.82"N	87°55'51.52"E	
		Golami Chak	0.34	Left	22°50'34.69"N	87°54'19.07"E	
		Saidpur	2.8	Left	22°50'32.95"N	87°55'54.09"E	
		Masinan	2.42	Left	22°50'56.87"N	87°55'29.90"E	
		Purba Krishnapur	1	Left	22°51'33.70"N	87°54'23.42"E	
		Paschimpara	3.8	Left	22°52'18.02"N	87°55'51.49"E	
		Harinakhali	3.6	Left	22°52'38.77"N	87°55'52.33"E	
		Baitha	0.95	Left	22°53'26.51"N	87°55'20.66"E	
		Krishnabati	1.20	Left	22°53'48.99"N	87°55'56.16"E	
		Muidipur	0	Left	23° 0'10.65"N	87°57'37.75"E	
		Nandanpur	1.30	Left	22°59'50.25"N	87°58'28.87"E	
		Reshalatpur	0.90	Left	22°59'28.63"N	87°57'37.52"E	
		Sahapur	1.28	Left	22°57'2.98"N	87°57'6.63"E	
		Bonogram	1.85		22°56'49.71"N	87°57'26.59"E	
		Fulbagan	0.85		22°56'38.65"N	87°57'4.50"E	
		Soaluk	1.55		22°55'31.67"N	87°56'42.82"E	
	Sensitive Receptors						
	School	Dakhin Rosulpur High School Kabikankan Mukundram Mahavidalaya	2.67 Km 1.40	Right Right	22°50'56.08"N 22°53'29.57"N	87°52'21.16"E 87°53'28.70"E	Daksin Raulpur
	Hospital						
	Drinking water sources						
	Utility lines like electricity lines, pipelines for gas, etc						
	Physical cultural resources – ,						
	Protected monuments						
	Historical sites, etc.						
	Physical cultural resources –						
	Mandir						
	Masque						
	Burning Ghat						
	Bedi						
	Agricultural land						
	Defence Installations / Airports						
	National highway						
	State highway / Roads	Kabikankan Road Kabikankan-Mukundpur Road Ahilyabai Holkar Road Champadanga - Jamalpur Road Khusigaunj Road Keshabpur Road	1.05 0.60 0.85 2.19 0.40 0.50	Right Right Left Left Left Left	22°51'56.52"N 22°54'21.45"N 23° 0'15.17"N 22°53'19.66"N 22°51'39.88"N 22°51'39.88"N	87°53'6.29"E 87°54'20.20"E 87°58'10.02"E 87°56'27.84"E 87°54'2.70"E 87°54'2.70"E	
	Heavy polluting Industry	Nirmola Industry	12.9	Right	22°44'59.75"N	88° 0'40.47"E	
	Water or Waste water Treatment Plant	Kolaghat Water Treatment Plant	40.83	Left	22°27'46.47"N	87°52'44.35"E	
		Barunda water treatment plant	39.57	Left	22°27'4.70"N	87°54'55.22"E	
		Aquamyle Mineral Water Plant	39.37	Left	22°27'54.94"N	87°58'48.12"E	

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km	Left/ Right	Lat	Long
Physical Environment						
	Natural Drain	Kamaria Khal	0.27	Right	22.687	88.003
	Standing water bodies (ponds, lakes, etc.)	Dighhi	1.65	Right	22°35'38.99"N	88° 0'40.43"E
	Flowing water bodies (rivers, rivulets, streams, canals, etc.)	Maja Damodar Madaria Khal	1.77 0 & 3	Left Right	22.661 22.582	87.972 87.997
	Ground water sources (open wells, bore wells, etc.)					
	Meandering River					
	Erosion prone stretches					
	Areas with high slope (higher than 15 percent)					
	Landforms (hills, valleys)					
	Sand Mine					
	Coal Mine					
Biological Environment						
	National Park / Wildlife Sanctuary	Garchumuk Deer Park	22.5	South / Right	22°20'58.29"N	88° 4'19.91"E
	Reserved Forests	Golakderyama Forest	50.4	Left	22°42'10.75"N	87°28'18.74"E
		Dhamkura Scrub Forest	50.24	Left	22°45'11.81"N	87°29'10.39"E
		Amlagora Forest Range	65.91	Left	22°49'59.70"N	87°20'55.58"E
		Chondrakona Forest	65.53	Left	22°50'21.33"N	87°21'10.01"E
		Bhuban Danga Forest	45.53	Left	23° 0'24.82"N	87°44'7.99"E
	Community Forest					
	Large Trees / Woodland					
	Sacred Groves					
	Presence of endangered species / habitat areas					
	Migratory routes					
	Ecologically sensitive areas					
Human Environment						
	Settlements/Habitations	Rajapur	2.4	Left	22°41'44.97"N	87°58'37.44"E
		Sonagachhi	0.64	Left	22°41'39.59"N	87°59'38.53"E
		Jonka	1.18	Left	22°41'21.23"N	87°59'18.37"E
		Kumirmora	2.02	Left	22°41'12.91"N	87°58'45.74"E
		Jagaldaha	1.02	Left	22°40'59.82"N	87°59'45.58"E
		Joynagar	0.35	Left	22°40'57.24"N	87°59'20.99"E
		Purpat	2.25	Left	22°40'37.60"N	87°58'35.01"E
		Naryanpur Chak	0.53	Left	22°40'16.58"N	87°59'27.48"E
		Ray Chak	2.9	Left	22°40'4.75"N	87°57'50.69"E
		Kanupat	2.15	Left	22°40'5.16"N	87°58'26.19"E
		monsuka	0.52	Left	22°39'50.08"N	87°59'41.11"E
		Debipur	2.38	Left	22°39'48.79"N	87°57'54.78"E
		Kumarchak	0.47	Left	22°39'22.70"N	87°59'1.36"E
		Garh Bhawanipur	1.50	Left	22°39'11.12"N	87°58'8.43"E
		Pathiagori	0.22	Left	22°39'4.46"N	87°58'54.55"E
		Sonatala	2.86	Left	22°39'5.62"N	87°57'19.57"E
		Kansona	0.15	Left	22°38'42.26"N	87°58'55.21"E
		Bhawanipur	1.19	Left	22°38'36.26"N	87°57'53.19"E
		Bidhichandrapur	2.81	Left	22°38'17.29"N	87°56'58.29"E
		Chitrasenpur	1.29	Left	22°38'18.17"N	87°58'8.49"E
		Bajeprotap	0.15	Left	22°38'4.96"N	87°58'45.67"E
		Raghunathpur	1.81	Left	22°37'44.54"N	87°57'15.69"E
		Ranjaybar	2.66	Left	22°37'39.00"N	87°56'44.33"E
		Pratapnaryanpur	0.18	Left	22°37'35.10"N	87°58'17.65"E
		Shaoraberia	1.66	Left	22°36'55.98"N	87°57'19.95"E
		Hanidhara	0.58	Left	22°36'44.52"N	87°58'6.60"E
		Binalakrishnabati	0.66	Left	22°36'19.40"N	87°57'59.26"E
		Nischintapur	1.44	Left	22°35'57.59"N	87°57'24.51"E
		Thaliya	0.59	Left	22°35'47.18"N	87°57'59.20"E
		Mainan	1.9	Left	22°35'27.04"N	87°58'44.04"E

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km	Left/ Right	Lat	Long
		Khorop	1.24	Left	22°34'49.06"N	87°59'6.53"E
		Kalbansh	2.54	Left	22°34'32.66"N	87°58'25.65"E
		Betai	0.67	Left	22°34'33.12"N	87°59'27.52"E
		Bargazipur	2.57	Left	22°34'10.90"N	87°57'59.14"E
		Jayanti	0.46	Left	22°34'12.39"N	87°59'36.89"E
		Paschim Gazipur	2.81	Left	22°33'40.10"N	87°59'1.38"E
		Nawapara	0.63	Left	22°33'14.83"N	87°57'48.41"E
		Sirol	2.77		22°32'56.81"N	87°59'1.32"E
		Mahishamuri	0.71			
		Khasnan	0.43	Right	22°32'25.46"N	87°59'45.55"E
		Purba Gazipur	0.93	Right	22°32'46.66"N	88° 0'3.46"E
		Ranapara	0.57	Right	22°33'18.85"N	87°59'45.65"E
		Deora	0.54	Right	22°33'45.89"N	87°59'58.66"E
		Guzarpur	2.5	Right	22°33'47.45"N	88° 1'9.05"E
		Amta	1.03	Right	22°34'16.09"N	88° 0'32.26"E
		Serajbati	0.63	Right	22°34'45.22"N	88° 0'12.13"E
		Damodar Nadirchar	0.10	Right	22°34'58.56"N	87°59'52.44"E
		Madaria	0.76	Right	22°35'16.89"N	88° 0'11.99"E
		Jotkalyan	2.48	Right	22°35'6.78"N	88° 1'13.42"E
		Mallagram	2.7	Right	22°35'25.34"N	88° 1'10.93"E
		Sameshwar	0.85	Right	22°35'53.69"N	87°59'40.77"E
		Kalitala	0.60	Right	22°35'58.38"N	87°59'1.00"E
		Kotalpara	2.95	Right	22°36'19.07"N	88° 0'35.87"E
		Rashpur	0.39	Right	22°36'6.67"N	87°58'38.36"E
		Kumaria	1.84	Right	22°36'37.35"N	87°59'41.14"E
		Putkhali	2.9	Right	22°36'42.98"N	88° 0'20.87"E
		Bhojan	0.85	Right	22°36'58.28"N	87°58'48.68"E
		Sarpai	1.79	Right	22°37'19.26"N	87°59'24.04"E
		Khaira	2.96	Right	22°37'26.13"N	88° 0'12.14"E
		Begua	0.51	Right	22°37'35.15"N	87°58'52.80"E
		Purba Bajepratap	0.37	Right	22°38'8.15"N	87°59'10.10"E
		Balichak	0.48	Right	22°38'40.22"N	87°59'19.13"E
		Peruhareshpur	2.9	Right	22°38'46.29"N	88° 0'51.64"E
		Dhurkhali	1.6	Right	22°38'51.35"N	88° 0'2.68"E
		Krishnachak	1.89	Right	22°39'2.09"N	88° 0'21.11"E
		Thakuranichak	0.63	Right	22°39'12.88"N	87°59'45.35"E
		Narikelberia	0.41	Right	22°39'42.43"N	88° 0'27.10"E
		Nazarkhan	1.66	Right	22°39'48.27"N	88° 1'2.74"E
		Khila	1.23	Right	22°40'6.88"N	88° 0'29.52"E
		Nayachak	0.35	Right	22°40'8.96"N	88° 0'1.01"E
		Benupalchak	2.07	Right	22°40'20.36"N	88° 1'7.03"E
		gourangachak	0.24	Right	22°40'35.73"N	88° 0'5.45"E
		boruipur	1.16	Right	22°40'38.94"N	88° 0'38.19"E
		Shibnarayanachak	1.90	Right	22°40'38.74"N	88° 1'4.69"E
		dongajal	0.90	Right	22°41'2.63"N	88° 0'31.50"E
	Sensitive Receptors					
	School	Indira Gandhi Memorial B.ED College	2.32	Right	22°39'16.01"N	87°57'42.36"E
			2.4	Left	22°33'48.68"N	87°58'38.67"E
			3.74	Left	22°36'20.92"N	87°56'21.10"E
		Gazipur Girls	3.72	Right	22°40'41.11"N	88° 2'7.08"E
		Joypur Panchana roy College	1	Left	22°43'12.39"N	87°59'16.34"E
			0.33	Right	22°34'31.11"N	88° 0'5.57"E
		Puras-Kanpur	1.7	Right	22°34'23.27"N	88° 0'53.38"E
		Haridas Nandi Mahavidyalaya			22°34'30.17"N	88° 0'4.66"E
					22°34'22.64"N	88° 0'53.03"E
		Udaynarayanpur Madhabilata Mahavidyalaya	2.87	Right	22°38'45.88"N	88° 0'46.41"E
		Ramsaday College				
		Amta Pitambar high school				
		Harishpur Board Pimary School				
	Hospital	Senha Nurshing Home	1.4	Right	22°34'6.86"N	88° 0'45.71"E
	Drinking water sources					
	Utility lines like electricity lines, pipelines for gas, etc					
	Physical cultural resources – ,					
	Protected monuments					

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km	Left/ Right	Lat	Long
	Historical sites, etc.					
	Physical cultural resources –					
	Mandir					
	Masque	Barasat Masjid	2.42	Right	22°38'55.75"N	87°57'33.50"E
	Burning Ghat					
	Bedi					
	Agricultural land					
	Defence Installations / Airports					
	National highway	NH 6	7.26	Right	22°28'18.02"N	88° 0'10.76"E
	State highway	Bagnan - Amta Road Amta-Udayanarayanpur Road udayanaryanapur Road	1.38 1.9	right Left Both Right & Left	22°33'17.71"N 22°35'8.07"N 22°39'22.03"N / 22°41'14.46"N	88° 0'9.83"E 87°58'13.03"E 88° 1'0.22"E / 87°58'52.23"E
	Heavy polluting Industry	Nirmola Industry	3.87	Right	22°44'59.75"N	88° 0'40.47"E
	Water or Waste water Treatment Plant	Kolaghat Water Treatment Plant	13.51	Left	22°27'46.47"N	87°52'44.35"E
		Barunda water treatment plant	12.61	Left	22°27'4.70"N	87°54'55.22"E
		Aquamyle Mineral Water Plant	7.49	Left	22°27'54.94"N	87°58'48.12"E

Environmental Screening of Uppper Rampur Khal

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km	Left/ Right	Lat	Long
Physical Environment						
	Natural Drain	Akhabari Khal Khanakhul Khal	0 1.36	Right Right	22.84 22.678	87.959 87.888
	Standing water bodies (ponds, lakes, etc.)					
	Flowing water bodies (rivers, rivulets, streams, canals, etc.)	D1 Canals Amta River Champadanga Hurhura Harinkhola-2 Mundeswari	2 2 0.86 1.5 0, 2.4, 2 3, 1.29	Left Left Left Left Right Right	22.831 22.805 22.857 22.665 22.717 22.768	87.976 87.969 87.946 87.902 87.917 87.932
	Ground water sources (open wells, bore wells, etc.)					
	Meandering River					
	Erosion prone stretches					
	Areas with high slope (higher than 15 percent)					
	Landforms (hills, valleys)					
	Sand Mine					
	Coal Mine	Not Available	Not Available	Not Available	Not Available	Not Available
Biological Environment						
	National Park / Wildlife Sanctuary	Chiladangi Park Garchumuk Deer Park	1.7 39.3	Right Right	22°48'19.89"N 22°20'58.29"N	87°56'39.39"E 88° 4'19.91"E
	Reserved Forests	Chandur Forest		Right	22°54'39.95"N	87°46'5.59"E
		Golakderyama Forest	43.7	Left	22°42'10.75"N	87°28'18.74"E
		Dhamkura Scrub Forest	47.18	Left	22°45'11.81"N	87°29'10.39"E
		Amlagora Forest Range	61.9	Left	22°49'59.70"N	87°20'55.58"E
		Chondrakona Forest	61.1	Left	22°50'21.33"N	87°21'10.01"E
		Bhuban Danga Forest	27.69	Left	23° 0'24.82"N	87°44'7.99"E
	Community Forest					
	Large Trees / Woodland					
	Sacred Groves					
	Presence of endangered species / habitat areas					
	Migratory routes					
	Ecologically sensitive areas					
Human Environment						
	Settlements/Habitations	Jungle Para Nimdangi Saidpur Rautara Shrirampur Hati Samaspur Parul Balarampur Sundarush Chiladangi Harua Gopimohanpur Ghoi Diguri Neota Panthahari Udna Balipur Kanakpur Purbba Radhanagar Daspur Chhatrashali Garbere Arunda Bandaipur	1.6 3 2.89 2.54 0.40 2.28 3.59 2.08 1.32 0 1.60 2.20 3.00 2.34 1.48 0.25 2.28 0.96 1.78 1.90 0.44 2.29 0.58 1.85 0.34	Right Right	22°51'41.39"N 22°51'29.41"N 22°50'33.29"N 22°50'8.98"N 22°49'32.36"N 22°49'26.39"N 22°49'9.68"N 22°48'59.64"N 22°49'0.43"N 22°48'44.48"N 22°48'17.16"N 22°48'6.20"N 22°48'0.07"N 22°47'17.58"N 22°46'40.78"N 22°45'58.32"N 22°45'51.95"N 22°45'20.23"N 22°45'3.79"N 22°44'25.98"N 22°44'5.21"N 22°43'42.47"N 22°43'35.13"N 22°43'35.43"N 22°42'55.16"N	87°57'6.91"E 87°55'56.44"E 87°55'53.71"E 87°55'51.39"E 87°56'58.17"E 87°55'51.86"E 87°55'30.08"E 87°56'13.94"E 87°56'40.72"E 87°57'19.85"E 87°56'23.04"E 87°56'4.96"E 87°55'34.17"E 87°56'9.20"E 87°56'40.05"E 87°56'49.25"E 87°55'34.22"E 87°56'18.47"E 87°55'47.29"E 87°55'51.93"E 87°56'26.97"E 87°55'16.25"E 87°56'15.88"E 87°56'15.90"E 87°56'22.45"E

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km	Left/ Right	Lat	Long
		Kabilpur	1.96	Right	22°41'54.47"N	87°53'48.47"E
		Jayram Chak	2.88	Right	22°41'58.93"N	87°52'59.46"E
		Sola Asta	0.62	Right	22°41'36.19"N	87°54'31.17"E
		Uttar Sudam Chak	1.38	Right	22°41'17.00"N	87°53'52.58"E
		Jugikundu	1.19	Right	22°41'16.26"N	87°54'9.32"E
		Malancha	0.39	Right	22°41'17.46"N	87°54'36.51"E
		Balaichak	0.51	Left	22°41'15.69"N	87°55'5.49"E
		Subalchak	0.81	Left	22°41'7.72"N	87°55'38.22"E
		Kakraipota	1.58	Left	22°41'13.41"N	87°56'9.87"E
		Nabinchak	1.19	Left	22°40'45.83"N	87°55'20.78"E
		Ambagan	1.74	Left	22°40'43.21"N	87°55'40.72"E
		Chinra	1.43	Left	22°40'18.92"N	87°55'8.03"E
		Uttar Manasri	2.94	Left	22°40'9.04"N	87°56'9.49"E
		Santoschak	2.80	Left	22°40'57.44"N	87°56'49.40"E
		Ramsharan Chak	0.9	Left	22°41'46.52"N	87°55'50.45"E
		Harishpur	1.04	Left	22°41'37.97"N	87°56'51.51"E
		Pancharul	0.64	Left	22°42'1.98"N	87°56'40.28"E
		Uttar Harishpur	2.08	Left	22°42'2.74"N	87°57'33.32"E
		Khorda Etarai	0.36	Left	22°42'52.75"N	87°56'46.59"E
		Etarai	1.66	Left	22°42'45.55"N	87°57'33.34"E
		Sibpur	2.86	Left	22°42'41.45"N	87°58'12.85"E
		Goja	1.29	Left	22°43'22.96"N	87°57'20.10"E
		Piarapur	0.82	Left	22°43'49.69"N	87°57'6.65"E
		Harali	0.43	Left	22°44'42.15"N	87°57'6.11"E
		Sultanpur	1.24	Left	22°44'6.07"N	87°57'37.65"E
		Pratap Chak	2.63	Left	22°44'2.12"N	87°58'26.48"E
		Sitapur	2.41	Left	22°44'30.92"N	87°58'14.16"E
		Khempur	2.55	Left	22°44'54.39"N	87°58'17.41"E
		Dakshin Rampur	1.54	Left	22°45'5.40"N	87°57'42.33"E
		Pursura	0.20	Left	22°50'10.81"N	87°57'37.55"E
		Harihar	0.33	Left	22°49'54.10"N	87°57'32.93"E
		Champadanga	1.46	Left	22°50'16.33"N	87°58'25.45"E
		Moktarpur	2.42	Left	22°50'33.24"N	87°59'5.84"E
		Fatehpur	1.90		22°48'1.70"N	87°57'54.89"E
		Binogram	1.98		22°48'27.46"N	87°58'29.27"E
		Bhawanipur	0.86		22°46'57.79"N	87°57'55.40"E
		Kotalpara	1.48		22°46'52.48"N	87°58'17.29"E
		Par Bhurshitta	1.05		22°46'30.99"N	87°58'8.47"E
		Dihbhurust	2.07		22°46'15.74"N	87°58'48.00"E
		Ashanda	1.57		22°45'53.43"N	87°58'12.76"E
	Sensitive Receptors					
	School	Vidyasagar Institute of Education Technology and Research, College, Pursura, West Bengal	0.83	Left	22°50'30.38"N	87°58'6.77"E
		Rabindra Mahavidalaya	1.80	Left	22°49'34.40"N	87°58'37.08"E
	Hospital	Natibpur Hospital	2.75	Left	22°39'25.36"N	87°53'18.39"E
	Drinking water sources					
	Utility lines like electricity lines, pipelines for gas, etc					
	Physical cultural resources – ,					
	Protected monuments					
	Historical sites, etc.					
	Physical cultural resources –					
	Mandir					
	Masque	Purbapara Majsid	5.36	Right	22°38'58.54"N	87°51'33.51"E
	Burning Ghat					
	Bedi					
	Agricultural land					
	Defence Installations / Airports					
	National highway	Ahiliyabai-holkar Road	0,3	Both Left & Right	22°50'22.45"N	87°57'42.13"E
		Champadanga road	1.18	Left	22°50'32.41"N	87°58'22.05"E
	State highway	Purusura - Amanpur Road	0.20, 1.10	Left	22°50'45.94"N	87°58'12.67"E
			1.9	Left	22°50'20.18"N	87°58'18.29"E
			0, 3	Right	22°48'41.93"N	87°56'24.90"E

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km	Left/ Right	Lat	Long
		State Highway 15 Samanta road				
	Heavy polluting Industry	Nirmola Industry	5.8	Right	22°44'59.75"N	88° 0'40.47"E
	Water or Waste water Treatment Plant	Kolaghat Water Treatment Plant	24.09	Right	22°27'46.47"N	87°52'44.35"E
		Barunda water treatment plant	22.39	Right	22°27'4.70"N	87°54'55.22"E
		Aquamyle Mineral Water Plant	22.8	Right	22°27'54.94"N	87°58'48.12"E

Environmental Screening of Hurhura Khal

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km	Left/ Right	Lat	Long
Physical Environment						
	Natural Drain	Upper Rampur Channel	1.6	Right	22.68	87.906
	Standing water bodies (ponds, lakes, etc.)					
	Flowing water bodies (rivers, rivulets, streams, canals, etc.)	Rupnaryan Upper Mundeswari Kata Khal Maja Damodar	1.8 0.69 1.9 2.28	Right Right Right Right	22.57 22.62 22.651 22.597	87.85 87.87 87.884 87.891
	Ground water sources (open wells, bore wells, etc.)					
	Meandering River					
	Erosion prone stretches					
	Areas with high slope (higher than 15 percent)					
	Landforms (hills, valleys)					
	Sand Mine					
	Coal Mine	Not Available	Not Available	Not Available	Not Available	Not Available
Biological Environment						
	National Park / Wildlife Sanctuary	Garchumuk Deer Park	30.16	Right	22°20'58.29"N	88° 4'19.91"E
	Reserved Forests	Golakderyama Forest	42	Left	22°42'10.75"N	87°28'18.74"E
		Dhamkura Scrub Forest	42.5	Left	22°45'11.81"N	87°29'10.39"E
		Amlagora Forest Range	59.2	Left	22°49'59.70"N	87°20'55.58"E
		Chondrakona Forest	58.5	Left	22°50'21.33"N	87°21'10.01"E
		Bhuban Danga Forest	41.2	Left	23° 0'24.82"N	87°44'7.99"E
	Community Forest					
	Large Trees / Woodland					
	Sacred Groves					
	Presence of endangered species / habitat areas					
	Migratory routes					
	Ecologically sensitive areas					
Human Environment						
	Settlements/Habitations	Jayarampur Natibpur Chinra Mostafpur Palashpai Chanpanagari Boalia Katashia Jhikhira Ghardubra Mansuka Bhairabpur chingrajola Hayatpur Mahishnala Damkunda Shibgachhia Uttar Bhatora Solbaga Kamar Khola Kasmali Nignan Takipara Ajangachhi Balpai Harischak Sabalsinghpur Dakshin Sudam Chak Khunechak Narendrapur Sasapota Hanua	2.64 1.16 1.83 0.33 0.73 1.43 2.56 2.09 2.22 2.27 0.16 1.4 2.88 1.28 0.04 2.4 00 0.9 2.67 1.8 2.10 .20 0.79 0.48 2.7 2.7 1.50 1.10 0.32 0.8 2.18	Right Right Left Left Left Left Left Left Left Left Left Left Left Left Left Left Left Left Left Left Left Left Left Right Right Right Right Right Right Right Right	22°40'32.49"N 22°39'45.19"N 22°40'18.90"N 22°39'2.99"N 22°37'53.59"N 22°37'50.94"N 22°37'43.49"N 22°38'16.08"N 22°37'22.00"N 22°37'10.75"N 22°37'30.63"N 22°37'31.14"N 22°36'57.35"N 22°36'53.88"N 22°36'28.91"N 22°36'11.16"N 22°35'26.92"N 22°35'27.07"N 22°35'1.20"N 22°34'23.78"N 22°33'24.82"N 22°32'57.67"N 22°32'52.23"N 22°39'2.68"N 22°38'45.51"N 22°38'39.96"N 22°37'56.78"N 22°38'25.39"N 22°38'3.61"N 22°37'30.01"N 22°37'19.31"N	87°52'15.09"E 87°53'30.56"E 87°55'8.08"E 87°54'24.49"E 87°54'19.23"E 87°54'51.86"E 87°55'38.28"E 87°55'47.26"E 87°55'3.68"E 87°54'36.80"E 87°52'42.11"E 87°53'35.01"E 87°54'26.27"E 87°53'12.95"E 87°52'22.39"E 87°53'30.42"E 87°52'2.17"E 87°52'37.09"E 87°53'34.75"E 87°53'13.29"E 87°53'34.79"E 87°52'55.35"E 87°53'17.01"E 87°53'48.38"E 87°52'15.58"E 87°51'26.83"E 87°51'44.80"E 87°53'26.58"E 87°53'26.18"E 87°51'58.20"E 87°51'13.42"E

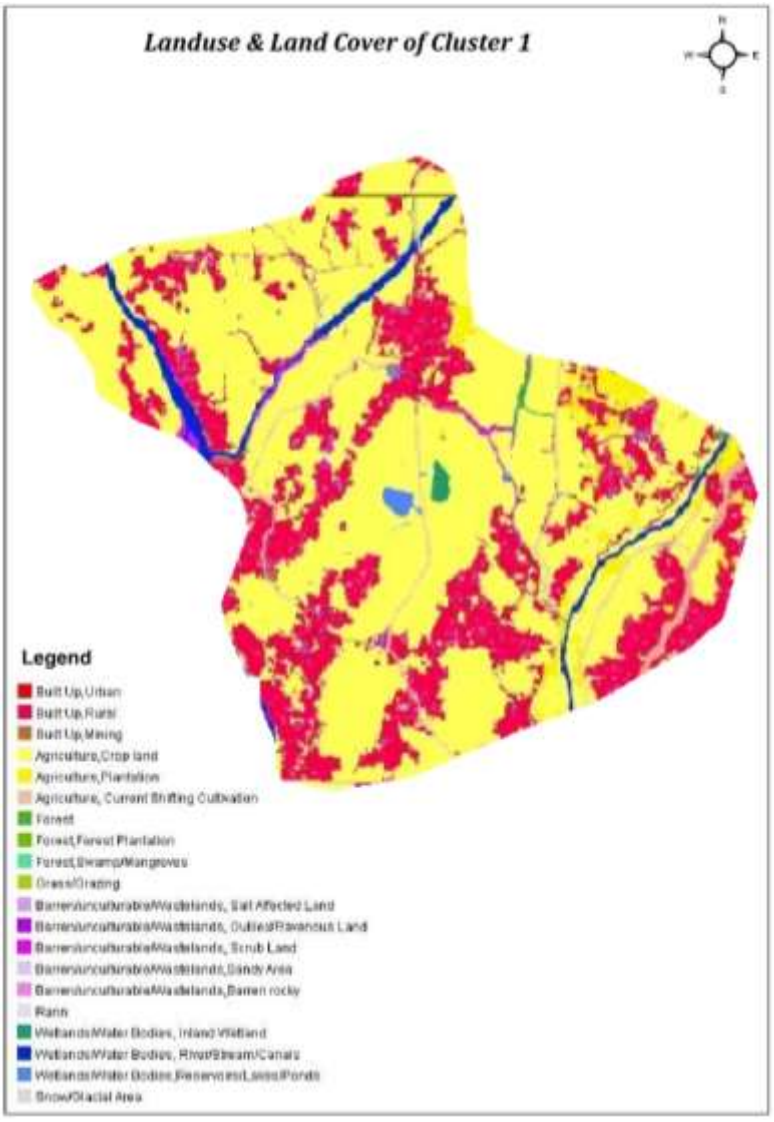
S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km	Left/ Right	Lat	Long
		Kamdeb Chak	.052	Right	22°36'57.92"N	87°52'6.02"E
		Joariachak	0.89	Right	22°36'47.58"N	87°51'49.02"E
		Manikdwip	1.80	Right	22°36'28.00"N	87°51'11.83"E
		Marokhana	0.91	Right	22°36'25.42"N	87°51'39.82"E
		Kaijuri	2.58	Right	22°35'47.81"N	87°50'33.70"E
		Benai	2.4	Right	22°34'21.30"N	87°50'33.93"E
		Dakshin Bhatora	1.4	right	22°34'0.25"N	87°51'9.08"E
		Ghoraberia	0.38	right	22°34'0.74"N	87°51'45.22"E
		Kulia	0.16	Right	22°33'34.70"N	87°52'6.65"E
		Mirgram	0.56	Right	22°32'56.97"N	87°52'19.52"E
		Hatgachha	1.86		22°33'1.80"N	87°51'22.57"E
	Sensitive Receptors	16				
	School	Indira Gandhi Memorial	6.9	Right	22°39'15.97"N	87°57'42.12"E
		BED college	6.63	Right	22°36'20.92"N	87°56'21.10"E
		Joypur Panchana roy College	6.44	Left	22°34'12.39"N	87°48'21.23"E
		Chaipat SPB Mahavidalaya				
	Hospital	Natibpur Hospital	1.49	Right	22°39'25.75"N	87°53'18.86"E
	Drinking water sources					
	Utility lines like electricity lines, pipelines for gas, etc					
	Physical cultural resources – ,					
	Protected monuments					
	Historical sites, etc.					
	Physical cultural resources –					
	Mandir					
	Masque	Purba Para Majsid	2.89	Right	22°38'59.26"N	87°51'34.74"E
		Bitulaha	5	Right	22°36'8.32"N	87°55'14.27"E
	Burning Ghat					
	Bedi					
	Agricultural land					
	Defence Installations / Airports					
	National highway	NH 6	10.75	south	22°27'57.17"N	87°57'28.36"E
	State highway					
	Heavy polluting Industry	Nirmola Industry	13.9	Right	22°44'59.75"N	88° 0'40.47"E
	Water or Waste water Treatment Plant	Kolaghat Water Treatment Plant	12.5	Right	22°27'46.47"N	87°52'44.35"E
		Barunda water treatment plant	10.3	Right	22°27'4.70"N	87°54'55.22"E
		Aquamyle Mineral Water Plant	15.2	Right	22°27'54.94"N	87°58'48.12"E

All 41 canals proposed for desiltation are divided into two cluster. Cluster wise LULC map is given below.

Environmental Screening of Cluster 1 (For dredging of 41 canal)

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km radius	Left/ Right	Lat	Long
Physical Environment						
	Natural Drain					
	Standing water bodies (ponds, lakes, etc.)					
	Flowing water bodies (rivers, rivulets, streams, canals, etc.)	Gheshopatti Khal Gaighata Khal short-cut Channel Amta Channel	0.37 km from Mahisamori Khal Passing between Bankura Khal and Birampur Khal 0.52 from Maja Damodar 0 Km from Bankura Khal	Left Both Left & Right Left Left	22.554 22.514 22.541 22.504	87.955 87.955 87.911 87.961
	Ground water sources (open wells, bore wells, etc.)					
	Meandering River					
	Erosion prone stretches					
	Areas with high slope (higher than 15 percent)					
	Landforms (hills, valleys)					
	Sand Mine					
	Coal Mine	Not Available	Not Available	Not Available	Not Available	Not Available
Biological Environment						
	National Park / Wildlife Sanctuary	Not Available	Not Available	Not Available	Not Available	Not Available
	Reserved Forests	Not Available	Not Available	Not Available	Not Available	Not Available
	Community Forest	Not Available	Not Available	Not Available	Not Available	Not Available
	Large Trees / Woodland	Not Available	Not Available	Not Available	Not Available	Not Available
	Sacred Groves	Not Available	Not Available	Not Available	Not Available	Not Available
	Presence of endangered species / habitat areas	Not Available	Not Available	Not Available	Not Available	Not Available
	Migratory routes	Not Available	Not Available	Not Available	Not Available	Not Available
	Ecologically sensitive areas	Not Available	Not Available	Not Available	Not Available	Not Available
Human Environment						
	Settlements/Habitations	Birampu	0.17 km from birampur khal	Left	22°29'23.86"N	87°54'40.74"E
		Sabsit	1.14 km from birampur khal	Right	22°29'24.99"N	87°55'33.82"E
		Bagur	1.96 km from birampur khal	Right	22°29'30.54"N	87°56'13.76"E
		Amrajol	1.59 km from birampur khal	Left	22°30'1.65"N	87°54'19.02"E
		Kalyanpur	0.88 km from birampur khal	Left	22°30'10.98"N	87°54'43.14"E
		brahmangram	0.92 km from birampur khal	Right	22°30'13.74"N	87°55'46.99"E
		Manku	3 km from birampur khal	Left	22°30'54.80"N	87°53'52.22"E
		Chakur	0.38 km from birampur khal	Left	22°30'50.70"N	87°55'34.19"E
		Deulgram	2.12 km from birampur khal	Left	22°31'11.50"N	87°54'41.53"E
		Adul	1.55 km from birampur khal	Left	22°31'9.01"N	87°55'1.12"E
		Kajiberia	2.97 km from birampur khal	Left	22°31'29.82"N	87°54'12.45"E
		Malia	2.12 km from birampur khal	Left	22°31'38.47"N	87°54'45.21"E
		Bholsar	1.66 km from birampur khal	Left	22°31'38.99"N	87°55'3.49"E
		Kulepairi	0.55 km from birampur khal	Left	22°31'39.14"N	87°55'47.16"E
		Kasrakatai	2.91 km from birampur khal	Left	22°31'54.15"N	87°54'23.36"E
		Bankura	0.36 km from bankura khal	Right	22°30'57.63"N	87°57'41.89"E
		Pansila	0.32 km from bankura khal	Left	22°31'18.43"N	87°57'15.15"E
		Sital Chak	0.75 km from bankura khal	Right	22°31'19.33"N	87°57'51.19"E
		Sarda	1.37 km from bankura khal	Right	22°31'35.15"N	87°58'13.10"E
		Tajpur	0.87 km from mahisamori khal	Right	22°32'19.45"N	87°58'48.14"E

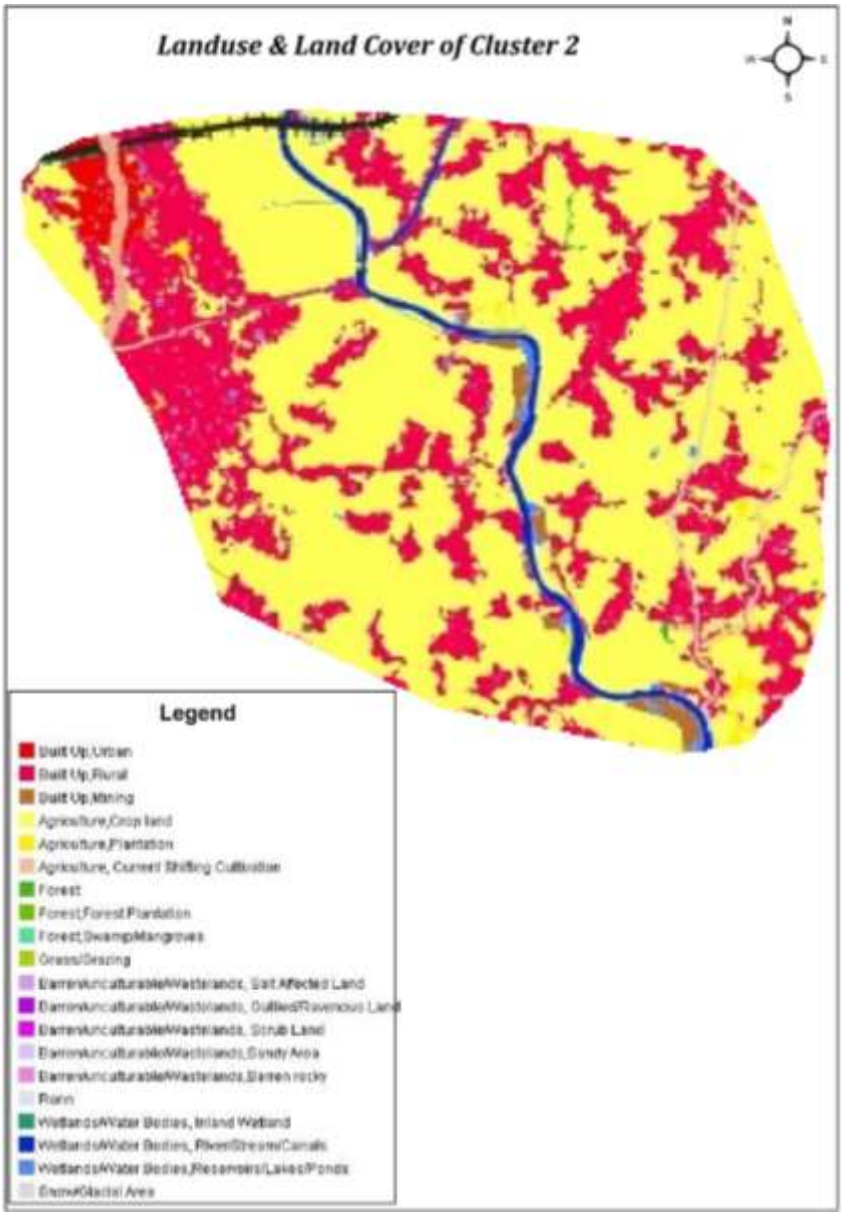
S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km radius	Left/ Right	Lat	Long
		Kusberia	0.81 km from mahisamori khal	Right	22°32'39.62"N	87°57'37.50"E
		Sirol	0.26 km from mahisamori khal	Left	22°33'14.52"N	87°57'48.42"E
		Mahishhamuri	0.31 km from mahisamori khal	Left	22°32'56.56"N	87°59'2.11"E
		Purbba Khalan	2.4 km from mahisamori khal	Right	22°32'38.87"N	87°56'44.77"E
		Nignan	0.1 km from Khorigeria Khal	right	22°33'25.09"N	87°53'34.83"E
		Khari Geria	0.53 Km from Khorigeria Khal	right	22°33'19.91"N	87°54'5.42"E
		Kasmali	0.2 from Kashmati khal	Left	22°34'23.17"N	87°53'13.17"E
		Jhamtia	0.88 from maja damodar	Right	22°34'24.20"N	87°54'41.19"E
		Chak janardan	0.27 kmfrom sabgachtala khala	Left	22°35'56.11"N	87°55'11.79"E
		Ghanshyam Chak	0.13 from maja damodar	Right	22°36'4.65"N	87°55'40.94"E
		Jaypur	0.36 from maja damodar	Right	22°35'18.82"N	87°55'42.68"E
		Khajur Daha	0.71 km from sabgachtala khal	Left	22°33'57.73"N	87°55'29.67"E
	Sensitive Receptors					
	School	Bainan Girl's High School Bainan Baman Das High School (H.S) Joypur Panchanan Roy College	1.15 Km from Bankura Khal 0.60 Km from Bakura Khal 0.68 from sabgachtla khal	Right Right Right	22°30'7.12"N 22°30'27.07"N 22°36'19.86"N	87°56'54.16"E 87°56'56.29"E 87°56'20.06"E
	Hospital					
	Drinking water sources					
	Utility lines like electricity lines, pipelines for gas, etc					
	Physical cultural resources – ,					
	Protected monuments	Not Available	Not Available	Not Available	Not Available	Not Available
	Historical sites, etc.	Not Available	Not Available	Not Available	Not Available	Not Available
	Physical cultural resources –					
	Mandir					
	Masque	Masjid a Alamin Hajrat Buropir Saheb Majar Sanglagna Masjid Baitullah	2.5 Km from Birampur Khal 0.50 km from Birampur khal 0.29 km from sabgachtla khal	Right Left Left	22°29'51.09"N 22°30'11.19"N 22°36'10.45"N	87°56'49.05"E 87°54'56.34"E 87°55'15.61"E
	Burning Ghat					
	Bedi					
	Agricultural land					
	Defence Installations / Airports	Not Available	Not Available	Not Available	Not Available	Not Available
	National highway	Not Available	Not Available	Not Available	Not Available	Not Available
	State highway / Roads	Mankur road Joypore Road Bagnan Amta Road	2.74 Km from Birampur Khal and also intersecting the Birramur khal 0.4 from Birampur Khal 2.6 km from bankura khal	Right Right right	22.505 22.504 22.516	87.921 87.925 87.971
	Heavy polluting Industry	Not Available	Not Available	Not Available	Not Available	Not Available
	Water or Waste water Treatment Plant	Not Available	Not Available	Not Available	Not Available	Not Available


Landuse & Land Cover of Cluster 1
Legend
Built Up,Urban
Built Up,Rural
Built Up,Mining
Agriculture,Crop land
Agriculture,Plantation
Agriculture, Current Shifting Cultivation
Forest
Forest,Forest Plantation
Forest,Swamp/Mangroves
Grass/Grazing
Barren/unculturable/Wastelands, Salt Affected Land
Barren/unculturable/Wastelands, Gullied/Ravenous Land
Barren/unculturable/Wastelands, Scrub Land
Barren/unculturable/Wastelands,Sandy Area
Barren/unculturable/Wastelands,Barren rocky
Rann
Wetlands/Water Bodies, Inland Wetland
Wetlands/Water Bodies, River/Stream/Canals
Wetlands/Water Bodies,Reservoirs/Lakes/Ponds
Snow/Glacial Area

Environmental Screening of Cluster 2 (Dredging of 41 Canal)

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km radius	Left/ Right	Lat	Long
Physical Environment	Natural Drain					
	Standing water bodies (ponds, lakes, etc.)					
	Flowing water bodies (rivers, rivulets, streams, canals, etc.)	Amta Channel Medinipur Khal	Passes through santoeshpur Khal, Kultipara Khal, Sasaberia Khal Tetua Khal, Naipukur Khal, Godakhali khal, boalia Khal from 0 to 1 Km 0.37 from santoshpur Khal	Both Left & Right Right	22.433 22.451	88.027 88.006
	Ground water sources (open wells, bore wells, etc.)					
	Meandering River					
	Erosion prone stretches					
	Areas with high slope (higher than 15 percent)					
	Landforms (hills, valleys)					
	Sand Mine					
	Coal Mine	Not Available	Not Available	Not Available	Not Available	Not Available
Biological Environment	National Park / Wildlife Sanctuary	Not Available	Not Available	Not Available	Not Available	Not Available
	Reserved Forests	Not Available	Not Available	Not Available	Not Available	Not Available
	Community Forest	Not Available	Not Available	Not Available	Not Available	Not Available
	Large Trees / Woodland	Not Available	Not Available	Not Available	Not Available	Not Available
	Sacred Groves	Not Available	Not Available	Not Available	Not Available	Not Available
	Presence of endangered species / habitat areas	Not Available	Not Available	Not Available	Not Available	Not Available
	Migratory routes	Not Available	Not Available	Not Available	Not Available	Not Available
	Ecologically sensitive areas	Not Available	Not Available	Not Available	Not Available	Not Available
Human Environment	Settlements/Habitations	Khalor	1.25 from Madhabpur Khal	Left	22°27'28.91"N	87°58'27.11"E
		Rasti	0.27 from santoshpur khal	Left	22°27'12.56"N	87°57'51.16"E
		Ramchandrapur	0.45 from Madhabpur Khal	Left	22°27'25.06"N	87°59'10.08"E
		Paikpari	0.10 from santoshpur khal	Left	22°27'13.88"N	87°59'27.27"E
		Antila	0.59 from santoshpur khal	Left	22°26'41.62"N	87°58'26.42"E
		Gunandapur	0.97 from kultipara khal	Left	22°26'41.30"N	87°58'52.35"E
		Sanstoshpur	0.29 from kultipara khal	Left	22°26'52.48"N	87°59'27.94"E
		Kultipara	0.27 from kultipara khal	Left	22°26'36.31"N	87°59'58.31"E
		Batul	2.11 from kultipara khal	Left	22°26'8.71"N	87°58'43.47"E
		Kanalpur	1.08 from kultipara khal	Left	22°25'58.68"N	87°59'36.56"E
		Mirjapur	0.65 from Tetua khal	Left	22°25'36.80"N	87°59'10.10"E
		Mugkalyan	1.12 from Tetua khal	Left	22°25'10.39"N	87°58'48.02"E
		Rabibhag	0.15 from Rabibhag khal	Left	22°25'54.15"N	88° 0'51.83"E
		Rupasgari	1.12 from Tetua khal	Left	22°25'11.18"N	87°59'59.02"E
		Panchani Guzrat	1.06 from Nalpur Khal	Left	22°24'55.29"N	88° 0'47.23"E
		Madanmohanpur	0.10 from Nalpur Khal	Left	22°24'33.42"N	87°59'53.93"E
		Chhayani Guzrat	0.39 from Nalpur Khal	Left	22°24'33.91"N	88° 0'56.19"E
		Halyan	1.12 from Nalpur Khal	Left	22°24'6.67"N	87°59'40.80"E

S. No.	Environmental & Social Features	Name of Establishment/ Description	Status / Availability within 3 km radius	Left/ Right	Lat	Long
		Duaniguzrat	0.55 from Nalpur Khal	Left	22°24'7.48"N	88° 1'26.55"E
		Basudebpur	1.19 from Nalpur Khal	Left	22°23'50.62"N	88° 0'11.47"E
		Raynagar	1.38 from Nalpur Khal	Left	22°23'40.08"N	88° 0'38.30"E
		Naoda	1.82 from Nalpur Khal	Left	22°23'24.71"N	88° 1'9.12"E
		Bauria	0.47 from Boalia Khal	Right	22°23'42.68"N	88° 3'16.58"E
		Amtala	0.10 from Boalia Khal	Right	22°24'3.71"N	88° 3'16.97"E
		Beraberia	1.12 from Boalia Khal	Right	22°24'8.42"N	88° 2'19.63"E
		Gadaipur	0.05 from Godakhali Khal	Right	22°24'51.70"N	88° 2'2.47"E
		Samruk	0.05 from Godakhali Khal	Right	22°24'52.18"N	88° 3'12.07"E
		Dahuka Nischindipur	0.69 from Godakhali Khal	Right	22°24'57.07"N	88° 2'32.27"E
		Hatgachha	0.70 from Godakhali Khal	Right	22°25'10.98"N	88° 2'59.80"E
		Mongrajpur	0.72 from Godakhali Khal	Right	22°25'17.49"N	88° 2'6.15"E
		Bar Mongrajpur	0.71 from kharia Moyanpur Khal	Right	22°25'33.56"N	88° 1'43.86"E
		Kharia	0.17 from kharia Moyanpur Khal	Right	22°25'52.70"N	88° 2'4.21"E
		Kansona	0.06 from kharia Moyanpur Khal	Right	22°25'50.26"N	88° 2'32.80"E
		Mayanapur	0.50 from Sasaberia Khal	Right	22°26'22.04"N	88° 1'48.61"E
		Lalitgagari	0.95 from Sasaberia Khal	Right	22°26'22.68"N	88° 2'41.75"E
		Panchberia Barberia Balarampur	0.39 from Sasaberia Khal	Right	22°26'54.29"N	88° 2'15.09"E
		Barmouberia	0.08 from Sasaberia Khal	Right	22°27'15.72"N	88° 2'6.32"E
		Uttar Ramchandrapur	0.88 from Sasaberia Khal	Right	22°27'26.96"N	88° 2'32.84"E
		Jayrampur	1.12 from Sasaberia Khal	Right	22°26'53.82"N	88° 1'4.75"E
		Prasadpur	0.63 from kultipara khal	Right	22°26'58.61"N	88° 0'33.87"E
		Janbar	0.76 from mahadevpur	Right	22°27'46.65"N	88° 0'11.59"E
	Sensitive Receptors					
	School	Bagnan College	1.36 from Mahadevpur	Left	22°27'27.44"N	87°58'16.35"E
	Hospital					
	Drinking water sources					
	Utility lines like electricity lines, pipelines for gas, etc					
	Physical cultural resources – ,					
	Protected monuments	Not Available	Not Available	Not Available	Not Available	Not Available
	Historical sites, etc.	Not Available	Not Available	Not Available	Not Available	Not Available
	Physical cultural resources –					
	Mandir	Uttar Benapur Soni Mandir	3.4 from Nupurkhal	Left	22°24'22.03"N	87°57'17.00"E
	Masque					
	Burning Ghat					
	Bedi					
	Agricultural land					
	Defence Installations / Airports	Not Available	Not Available	Not Available	Not Available	Not Available
	National highway	Not Available	Not Available	Not Available	Not Available	Not Available
	State highway / Roads	Bagnan Road Boaliya Road	2.34 from kultipara khal 0.49 from Godakhali khal	Left Right	22.44 22.415	87.973 88.045
	Heavy polluting Industry	Not Available	Not Available	Not Available	Not Available	Not Available
	Water or Waste water Treatment Plant	Not Available	Not Available	Not Available	Not Available	Not Available


Landuse & Land Cover of Cluster 2
N
W
E
S
Legend
Built Up,Urban
Built Up,Rural
Built Up,Mining
Agriculture,Crop land
Agriculture,Plantation
Agriculture, Current Shifting Cultivation
Forest
Forest,Forest Plantation
Forest,Swamp/Mangroves
Grass/Grazing
Barren/unculturable/Wastelands, Salt Affected Land
Barren/unculturable/Wastelands, Gullied/Ravenous Land
Barren/unculturable/Wastelands, Scrub Land
Barren/unculturable/Wastelands,Sandy Area
Barren/unculturable/Wastelands,Barren rocky
Rann
Wetlands/Water Bodies, Inland Wetland
Wetlands/Water Bodies, River/Stream/Canals
Wetlands/Water Bodies,Reservoirs/Lakes/Ponds
Snow/Glacial Area

Annexure- 10: Environmental & Social features within 500m, 3km and 10 Km. periphery

Environmental features within 500m, 3km and 10 km. buffer area of Mundeswari river

Type of Structure	Utility / Structure	Within 500 m radius of Mundeswari River				Within 3 Km radius of Mundeswari River				Within 10 Km. radius of Mundeswari River			
		Left / Right	Distance	Lat	Long	Left / Right	Distance	Lat	Long	Left / Right	Distance	Lat	Long
Masque	Jasar Majid					Left	1.01	22.800321	87.911037				
Temple	Shiv Temple					Left	2.01	22.807356	87.896796				
Post Office	Ragpur Post Office					Left	1	22.812442	87.896669				
Sangha	Sri Ramkrishna Sarada Vivekanada Sangha					Left	930 Meter	22.828094	87.897401				
Temple	Gobra Kali Mandir					Left	1.81	22.809593	87.897137				
Temple	Khanachandi Maa Mandir					Left	2.36	22.815336	87.872579				
Masque	Masque	Left	111.56 m	22.836077	87.902838								
Bank	State Bank of india, Harinkhola Branch	Left	366.3 m	22.836639	87.899519								
Temple	Damodar temple					Left	1.66	22.830599	87.894976				
Temple	Kali Mandir					Left	1.15	22.83513	87.88903				
Bank	State Bank of india, Kable Branch					Left	2.6	22.840014	87.875816				
Masque	Shyamgram Jannatul					Left	1.02	22.844762	87.88931				
Temple	Ramkrishna Matha Siriti					Left	2.61	22.856299	87.868851				
Temple	Durga Temple	Left	282.8 m	22.860471	87.893327								
Post Office	Purbakrishna Post Office	Right	104.22 m	22.856851	87.897067								
Railway Station	Mayapur Railway Station					Left	2.47	22.868355	87.867678				
Post Office	Madhurpur Post Office					Left	736.31 Meter	22.86776	87.885129				
School	Madhurpur high School					Left	645.45 Meter	22.867847	87.8858				
Temple	Barabainan Kali Mandir					Left	980.82 m	22.992953	87.935991				
Temple	Singerpur Mahadev Temple	Left	146.96 m	22.985896	87.941458								
Bank	Bandhan Bank					Left	2.5	22.992368	87.920037				
Bank	State bank of India Bataspur Branch					Left	2.97	22.977435	87.911704				
Temple	Maa Mangala Chandi Mandir					Left	2.69	22.972894	87.914799				

Type of Structure	Utility / Structure	Within 500 m radius of Mundeswari River				Within 3 Km radius of Mundeswari River				Within 10 Km. radius of Mundeswari River			
		Left / Right	Distance	Lat	Long	Left / Right	Distance	Lat	Long	Left / Right	Distance	Lat	Long
Masque	Narasinghapur Jame Majisd	Left	205.83 m	22.984083	87.940969								
School	Aacharya Sukumar Sen Mahavidyalaya Gotan					Left	1.82	22.969107	87.922322				
Masque	Gotan Bazar Jame Masjid					Left	2.46	22.969170,	87.916394				
Post Office	Gotan Post office					Left	2.1	22.96494	87.918931				
Temple	Pataleswar Temple					Left	2.61	22.963511	87.9135				
Temple	Gotan purbapalli sarbojonin durga mandir					Left	2.04	22.962479	87.918894				
Temple	Gotan Kali Mandir					Left	2.62	22.958588,	87.91243				
Temple	Haldipur Maa Kali Temple	Left	33.55 m	22.96751	87.939583								
Market Place	Daminya (k.k.) Market					Left	2.11	22.942163	87.911199				
Bank	Paschis Gramin Bank					Left	797.42 m	22.928373	87.915459				
Temple	Malaypur Bagmara Kali Temple					Left	2.27	22.917946	87.89507				
Temple	Maa Durga Mandir					Left	1.69	22.911505	87.897073				
Market Place	Malayour Bazar					Left	762.2 m	22.906008	87.904196				
Bank	Paschim Banga Gramin Bank					Left	860.03 m	22.902573	87.902357				
Masque	Chakbenshia masjid					Left	274.27 m	22.905533	87.909043				
GP office	Moloypur-II Gram Panchayat					Left	1.18	22.890154	87.89347				
Temple	Maa Kali Mandir					Left	680.05 m	22.888978	87.899				
Temple	Keshabpur Majumdar Barir Mandir					Left	736.24 m	22.891942	87.89839				
Post office	Sonargora Post Office					Right	836.11 m	23.002156	87.968022				
Temple	Muidipur Kali Mandir					Right	772.98 m	22.993236	87.960438				
Temple	Par Ujir Pur Kali Mandir					Right	1.47	23.002488	87.946849				
Post Office	Amarpur Branch Post Office					Right	2.34	22.980207	87.973581				
Mosque	Mathsheali Jame Masjid	Right	257.21 m										
Temple	Temple					Right	2.64	22.936543	87.968134				
Temple	Soaluk Radha Gopinath Temple					Right	2.79	22.926131	87.959555				

Type of Structure	Utility / Structure	Within 500 m radius of Mundeswari River				Within 3 Km radius of Mundeswari River				Within 10 Km. radius of Mundeswari River			
		Left / Right	Distance	Lat	Long	Left / Right	Distance	Lat	Long	Left / Right	Distance	Lat	Long
Mosque	Mosque					Right	1.94	22.918749	87.945648				
Mosque	Kelepara Notun Masjid					Right	2.46	22.915336	87.947106				
Temple	Dulalbati Tarun Sangha Durga Mandir					Right	1.13	22.911923	87.933503				
Bank	Canara Bank					Right	1.34	22.895434	87.930134				
Temple	Kali Mandir					Right	1.17	22.888899	87.925695				
Temple	Mandal Para Kali Temple					Right	2.89	22.879586,	87.93835				
Electical Substation	Panchanan Tala Electrical Substation					Right	2.66	22.894359,	87.942537				
Playground	Football Play ground									Right	3.22	22.837304	87.93868
Bank	State Bank of India Chiladangi Branch					Right	2.1	22.809834,	87.937503				
Temple	Harua Mela Tala Temple					Right	1.12	22.803617	87.931504				

Figure 1: Environmental & social features within and outside of 3 km. influence zone of Mundeswari River

Environmental features within 500m, 3km and 10 Km. radius of Damodar left and Right Embankment

Type of Structure	Utility / Structure	Left / Right	Within 500 m radius of Damodar			Within 3 Km. radius of Damodar			Within 10 Km. radius of Damodar		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Bank	syndicate Bank	Left				2.98 km	22.535136, 87.959162	87.959162			
Temple	Shyambhu Shiva Mandir	Left				1.79 Km	22.540566,	87.974372			
Temple	Radha Gobindo Mandir	Left				2.77 Km	22.548323,	87.964257			
Mosque	Masjid Madrasa	Left				2.24km	22.549075,	87.968539			
Temple	Dakshinpara Kalimandir	Left				1.52 km	22.551412,	87.975823			
Post Office	Nowpara Post Office	Left	209.40 m	22.558367,	87.986909						
Bank	Paschim Banga Grameen Bank	Right	256.06 m	22.534012,	87.988998						
Mosque	Khansan Jame Masjid	Right	378.07 m	22.542390,	87.995433						
Playground	Ranapara Football ground	Right	244.13 m	22.556599,	87.99254						
Playground	Kusberya Kali Mata Playground	Left				2.39 km	22.541778,	87.96782			
Market	Sonamui Bazar	Right				1.74 km	22.536744,	88.007678			
Mosque	Karim Molla Sahed Masjid	Right				902.97 km	22.534947,	87.998314			
Mosque	Tentuliapara Mosjid	Right				2.23 km	22.533861, 0	88.01084			
Temple	Sonamui Radhamadhob mandir	Right				1.08 km	22.539140,	88.002246			
Mosque	Purba Gazipur Jumma Masjid	Right				1.65 km	22.547205,	88.007781			
Park	Damodar Publick Park	Left	54.03 m	22.723106,	87.988942						
Police Station	Udaynarayanpur police station	Left				1.04 km	22.721461,	87.98037			
Hospital	Udaynarayanpur state general hospital	Left	282.64 m	22.720745,	87.988136						
Maath	Shibpur friends union club maath	Left				2.47 km	22.718254,	87.968905			
Temple	Shibpur baroaritala mandir	Left				2.30 km	22.712993,	87.972941			
School	School	Left				899.25 m					
Playground	Chakgarah jiban smriti vidya mandir playground	Left				1.31 km	22.699068,	87.983388			
Temple	Rajapur sitala mata mandir	Left				1.78 km	22.699494,	87.978162			
Temple	Singti barowari kali mandir	Left				2.91 km	22.693909,	87.971945			
Bank	Singti co-operative bank	Left				3.00 km	22.691528,	87.971278			
School	kumirmorah primary school	Left				2.59 km	22.688751,	87.975315			
Post Office	Joka Post office	Left				1.16 km	22.685901,	87.984446			
Post Office	Sonagachi post office	Left	432.29 m	22.691956,	87.99629						
School	sonagachi kailash primary school	Left				531.34 m	22.691834,	87.995403			
Playground	North paliarah playground	Right	238.78 m	22.687489,	88.003209						
Temple	Temple	Left				2.40 km	22.671850,	87.973583			
Libaray	Kanupat Harendra Libaray	Left				2.27 km	22.669085,	87.974465			
Mosque	Purpat jamma masjid	Left				1.95 km	22.676296,	87.97949			
Temple	Naranarayanchak monsa mondir	Left	406.92 m	22.672662,	87.993177						

Type of Structure	Utility / Structure	Left / Right	Within 500 m radius of Damodar			Within 3 Km. radius of Damodar			Within 10 Km. radius of Damodar		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Temple	Jaynagar hari mandir	Left	95.11 m	22.680483,	87.998022						
Post Office	Monsuka post office	Left	37.84 m	22.666545,	87.995083						
School	High School	Left	32.65 m	22.665562,	87.996938						
Mosque	Jumma Masjid	Left				1.42 kkm	22.657055,	87.975799			
Bank	Garhbhawanipur Bandhan bank DSC	Left				2.41 km	22.656487,	87.965714			
Bank	SBI Garhbhawanipur	Left				1.79 km	22.652378,	87.966869			
Bank	Allahabad Bank	Left				1.41 km	22.647963,	87.969856			
Temple	Sonatala Kalitala	Left				2.10 km	22.648385,	87.963087			
Mosque	Sonatala Masjid	Left				2.50 km	22.645898,	87.959239			
Temple	Gosh Para Durga Mandir	Left				1.68 km	22.645954,	87.967259			
Park	Kansona park	Right	53.06 m	22.643879,	87.984285						
Post Office	Balichak Post Office	Right	374.26 m	22.645532,	87.988094						
Playground	Barda Football ground	Left	112.71 m	22.623140,	87.96943						
Playground	Saroaberia Playground	Left	419.63 m	22.620457,	87.965496						
Temple	Sitaram Mandir	Left				1.47 km	22.626070,	87.958283			
Temple	Saroaberia shanti Ashram	Left				1.23 km	22.623978,	87.959373			
Temple	Hanidhara Hori Sabha	Left				796.06 m	22.612629,	87.965641			
Temple	Ganga Debi Tola	Left	156.06 m	22.612046,	87.971899						
Mosque	Ronjoybar Jammu Masjid	Left				1.94 km	22.623086,	87.951313			
Temple	Panchannanda Tala	Left				765.66 m	22.607074,	87.967631			
Temple	Kali Mandir	Left				1.07 km	22.602378,	87.961494			
Post Office	Thalia Post Office	Left	87.01 m	22.600911,	87.970698						
Temple	Hanidhara shib mandir	Left				678.75 m	22.609706,	87.968281			
Playground	Thalia Union Club Playground	Left	390.73 m	22.597415,	87.967775						
Temple	Murlidhar Temple	Left				760.14 m	22.595589,	87.966062			
Playground	Rashpur Play ground	Right	248.25 m	22.597296,	87.974773						
School	Rashpur high School	Right	391.68 m	22.598753,	87.97568						
Park	Eco Park	Right	188.69 m	22.587755,	87.997218						
Bank	UCO Bank	Left				954.06 m	22.584476,	87.986685			
Temple	Betali Samsan Kali Mandir	Left	111.74 m	22.574274,	87.996911						
Temple	Kali Temple	Left				1.61 km	22.585902,	87.980037			
School	Khroop High School	Left				1.11 km	22.579010,	87.986079			
Playground	Kalbansh Playground	Left				2.09 km	22.579292,	87.976853			
Playground	Bargazipur Playground	Left				2.86 km	22.573348,	87.970049			
Temple	Jagolgori Kali Mandir	Left				1.15 km	22.575792,	87.986617			
Post Office	Pashpur Post Office	Right				1.24 km	22.705152,	88.00413			
Temple	Ranjanapur Shitala Monosa Matar Mandir	Right				850.38 m	22.689661,	88.009511			
Temple	Kheypteswari Mandir	Right				523.87 m	22.683926,	88.00501			

Type of Structure	Utility / Structure	Left / Right	Within 500 m radius of Damodar			Within 3 Km. radius of Damodar			Within 10 Km. radius of Damodar		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Temple	Allahabad Bank	Right	136.06 m	22.679471,	88.001008						
Temple	Gangamata Mandir	Right	322.54 m	22.677871,	88.00279						
Temple	Annapurna Basanti Mandir	Right				1.93 km	22.679640,	88.018524			
Post Office	Khila Post Office	Right				903.38 m	22.666709,	88.0051			
Bank	Khila Branch, Allahabad Bank	Right				587.25 m	22.672137,	88.004231			
Temple	Monsha Tala Mandir	Right				791.21 m	22.663065,	88.010386			
Temple	Durga Mandir	Right				2.25 km	22.669231,	88.018283			
Maath	Ananda Matha	Right				1.82 km	22.591811,	88.011079			
Temple	Ram Mandir	Right				1.73 km	22.588933,	88.012252			
Temple	Kali Mandir	Right				1.43 km	22.586036,	88.010645			
Panchayat Office	Sirajbati Panchayat Office	Right				1.42 km	22.584033,	88.010543			
Bank	Amta Branch, SBI	Right				1.06 km	22.580546,	88.008068			
Post Office	Amta Post office	Right				502.65 m	22.579485,	88.002963			
Police Station	Amta Police station	Right	442.89 m	22.578020,	88.002101						
Collage	RamsadayCollage	Right	349.27 m	22.575546,	88.000847						
Bank	United Bank of india	Right				601.46 m	22.577690,	88.003376			
Bank	Axis Bank	Right				1.20 km	22.576819,	88.009858			
Hospital	Amta Rural Hospital	Right				1.62 km	22.575217,	88.014074			
Railway Station	Amta Station	Right				2.19 km	22.574390,	88.019427			
School	Amta Nityananda high School	Right				820.45 m	22.574249,	88.006511			
Mosque	Nutan Masjid	Right				2.80 km	22.570118,	88.026112			
Post Office	Deora Post Office	Right	52.80 m	22.564076,	87.995242						
Mosque	Deora Adi Masjid	Right	192.74 m	22.561888,	87.994625						
Temple	Nagmatha Temple	Right	273.17 m	22.558141,	87.992894						
Temple	Ranapara Baba Panchanand Tola Mandir	Right	364.58 m	22.555851,	87.993999						
Mosque	Ranapara Masjid Tala	Right	252.36 m	22.553345,	87.993383						
School	Purba Gazipur GKBR High School	Right				624.52 m	22.546109,	87.99774			
Market	sonamui Bazar	Right				1.68 km	22.537237,	88.008039			
School	Sonamui FN High School	Right				1.57 km	22.539058,	88.006912			
School	Gazhipur girls high school	Left				1.65 km	22°33'53.16"N	87°58'36.16"E			

Figure 2: Environmental & social features within and outside of 3 km. influence zone of Damodar Left & Right Embankment

Environmental features within 500m, 3km and 10 Km. Radius of Upper Rampur Khal

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km radios			Within 10 Km radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Temple	Graharaj Mandir	Left				2.75 km	22.685198,	87.863334			
Temple	Kali Mandir	Left				2.58 km	22.678207,	87.865131			
Mosque	Jayrampur Masjid	Left				1.77 km	22.669893,	87.870603			
hospital	Natibpur Block Primary Health Center	Right	345.16 m	22.665979,	87.891689						
Post office	Natibpur post office	Right	94.32	22.665537,	87.888398						
Bank	ADB SBI Branch, Jayrampur	Left				1.75 km	22.681307,	87.872373			
Playground	Jayrampur School Play ground	Left				1.56 km	22.680797,	87.87374			
School	Natibpur Budheb Vidyalaya	Right				700.86 m	22.665412,	87.89448			
Playground	Mostafapur National Play grund	Right				1.34 km	22.667505,	87.90253			
Playground	Football Ground	Right				1.56 km	22.663319,	87.902194			
Temple	Bankaroy Mandir	Right				1.66 km	22.666523,	87.904424			
Bus Stand	Chabbishpur Bus Stand	Left				1.67 km	22.710986,	87.924198			
Playground	Playground	Left	77.25 m	22.709993,	87.940354						
Math	Chabbishpur Math	Left	119.10 m	22.691505,	87.920669						
Market	Chabbishpur Market	Left	76.28 m	22.690189,	87.920209						
Temple	Jugikundu Maa Monosa Mandir	Left				1.89 km	22.690512,	87.903335			
Temple	Kali Temple	Left				2.89 km	22.689708,	87.906204			
Temple	Pirtala	Right				502.80 m	22.699612,	87.943276			
Post office	Pancharul Post Office	Right				735.04 m	22.699235,	87.944093			
Temple	Singti Mansa Temple	Right				2.39 km	22.693671,	87.961523			
Temple	shibpour Shitala Mata	Right				2.39 km	22.708577,	87.963366			
Bank	Singti Co-operative bank	Right				2.63 km	22.691407,	87.970877			
Temple	Seetala maa mandir	Right				2.48 km	22.708624,	87.963468			
Temple	Gaza Ramrajatala	Right				2.23 km	22.719887,	87.964342			
Police Station	Udaynarayanpur police Station	Right				3.78 km	22.721417,	87.980404			
Park	Damodar Public Park	Right							4.71 km	22.723476,	87.98856
Playground	Boropara Playground	Right				1.73 km	22.730148,	87.961702			
Temple	Modan Mohan Mandir	Right				1.75 km	22.734432,	87.965088			
Temple	Kali mandir	Right				3.62 km	22.733616,	87.984292			
Temple	Loknath Temple	Right				1.55 km	22.739333,	87.964268			
Temple	Khempur Shitala Mandir	Right				2.40 km	22.743958,	87.973602			
Post office	Nimdangi Post Office					1.34 km	22.854068,	87.934026			
Bank	SBI, Pursurah branch					1.44 km	22.842747,	87.927858			
Temple	Mahaprabhu Mandir	Right	234.49 m	22.851687,	87.948155						
Office	Pursura BDO Office	Right				1.22 km	22.842162,	87.954068			
Temple	Temple	Left	186.91 m	22.851789,	87.943152						
Post office	Muktarpur Post office	Right				3.00km	22.846876,	87.97604			

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km radios			Within 10 Km radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Temple	Durga Mandir	Right				2.30 km	22.853582,	87.969399			
Police Station	Pursurah Police Station	Right				2.52 km	22.838034,	87.965917			
Hospital	Pursuraha PHC	Right	10.28 m	22.825256,	87.954478						
Temple	Vishnu Mandir	Right	11.26 m	22.808056,	87.956271						
Temple	Kali Temple	Right	9.26 m	22.806108,	87.956002						
Post office	Binagram Post office	Right				1.26 km	22.813790,	87.970291			
Temple	Gopinath Mandir	Right				1.22 km	22.815976,	87.969973			
Temple	Dhormo Mandir	Right				1.02 km	22.818600,	87.97182			
Temple	RadhaKrishna Mandir	Left	360.73 m	22.807522,	87.953003						
Temple	Dakshin Kali mandir	Left				1.25 km	22.805675,	87.943411			
Bank	Chiladangi Branchi, SBI	Left				1.87 km	22.808737,				
Mosque	Fatepur jama Moseque	Left				645.87 m	22.797705,	87.967286			

Figure 3: Environmental & social features within and outside of 3 km. influence zone of Upper Rampur Left Embankment

Environmetal Features within 500m, 3 Km. and 10 Km. Radius of Hurhura Khal

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km. radios			Within 10 Km. radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Bank	State bank of india, Joyrampur ADB Branch	Left				1.82	22.681665,	87.87282			
Temple	Sitapur Samsan kali Mandir	Left				2.62	22.678296,	87.86491			
Mosque	Jayrmapur Jama Majisd	Left				1.68	22.670211,	87.86989			
Post Office	Natibpur Post office	Left				843.46 m	22.665331,	87.8884			
Mosque	Par Harishchak Masjid	Left				419.43 m	22.659083,	87.87933			
Temple	Ma Jagatguri Temple	Left				554.26 m	22.656128,	87.86937			
Hospital	Natibpur Primary Health Center	Left				485.5 m	22.666169,	87.8919			
Temple	Thakuranichak baroari kali mandir	Right				1.51	22.668920,	87.91062			
Temple	Bankaroy mandir	Right				706.21 m	22.666869,	87.90515			
Playground	Footbal Play Ground	Right				1.62	22.663373,	87.90261			
School	Mostafapur Gandhi high School	Right	103.36 m	22.658481,	87.90203						
Post Office	Balpai Post Office	Left	224.23 m	22.654384,	87.89903						
Temple	Balpai Ghosh bari durga puja	Left	445.76 m	22.648654,	87.89929						
Library	Balpai daulatchalk Sadharan Pathagar	Left				853.09 m	22.645886,	87.89597			
Temple	Balapi kali mandir	Left				1.22	22.646391,	87.89236			
School	Harishchak KHD Prathmick Bidayalaya	Left				2.03	22.651454, 87.881528				
School	Harishchak high school	Left				2.79	22.650620,	87.87503			
Temple	Harishchak Ganga Mandir	Left				2.95	22.644824,	87.87525			
Mosque	Khunachak Jama Masjid	Left				1.37	22.642384,	87.89654			
Temple	Narendrapur Shitala Mansha Mandir	Left				1.04	22.637621,	87.89344			
Bank	Marokhana Samity Bank	Left				2.05	22.612100,	87.85183			
Post Office	Marokhana Post Office	Left				1.98	22.612100,	87.85183			
School	Uttar Bhatora high school	Left				758.36 m	22.596876,	87.85999			
Playground	Gongatola Ball Ground	Left				1.46	22.597147,	87.85342			
Playground	Kaijuri Play ground	Left				1.85	22.597039,	87.85043			
Temple	Uttar Bhatora Boro Baba Mandir	Left				1.41	22.595612,	87.85414			
Temple	Mansa mandir	Left				1.22	22.593578,	87.85591			
Temple	Meta Para Kali Mandir	Left				949.86 m	22.580999,	87.85595			
Panchayet	Bhatora Gram Panchayat	Left				749.62 m	22.579636,	87.85825			
Temple	Maa Kali Temple	Left				929.5 m	22.563555,	87.85819			
Post Office	Bhatora Post office	Left				1.35	22.562893,	87.85538			
Mosque	Mosque	Left				700.34 m	22.562189,	87.86262			
Park	Beral Park, GBC	Left				574.05 m	22.554951,	87.86724			

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km. radios			Within 10 Km. radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Mosque	Ajangachi Panjatania Jame Masjid	Right	474.11 m	22.544090,	87.8871						
Bank	SBI mini bank	Right	190.11 m	22.544042,	87.88424						
Post Office	Kashmoli Post Office	Right				1.18	22.560335, 87.882238				
Temple	Solbaga Shibtala	Right				1.32	22.591491,	87.88083			
Temple	Mansa mandir	Right				1.14	22.611395,	87.88543			
Temple	Kalipada Janas Mandir	Right				2.35	22.614983,	87.89899			
Temple	Chaksalika Setola Mata Mandir	Right				3	22.611319,	87.90308			
Temple	Hayatpur Utturpara Mansha Mandir	Right	391.38 m	22.629464,	87.88511						
Bank	Paschimbamga Gramin Bank, Palaspai Branch	Right	458.5 m	22.633220,	87.90392						
Temple	Trikona Kali mandir	Right	364.63 m	22.639980,	87.90987						
Playground	Boyalia Paschim Para Play ground	Right				2.53	22.63187	87.92834			
School	Boyalia Board primay school	Right				2.82	22.630611,	87.93051			
Playground	Mostafapur Dakshinpara Playground	Right	347.95 m	22.646436,	87.90815						

Figure 4: Environmental & social features within and outside of 3 km. influence zone of Hurhura Left Embankment

Environmental features within 500m, 3km and 10 km. radius of 41 drainage canal proposed for desiltation

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km. radios			Within 10 Km. radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
School	Bainan Girl's High School	Right				1.15 Km from Bankura Khal	22°30'7.12"N	87°56'54.16"E			
School	Bainan Baman Das High School (H.S)	Right				0.60 Km from Bakura Khal	22°30'27.07"N	87°56'56.29"E			
School	Joypur Panchanan Roy College	Right				0.68 from sabgachtla khal	22°36'19.86"N	87°56'20.06"E			
Mosque	Hajrat Buropir Saheb Majar Sanglagna	Left	0.50 km from Birampur khal	22°30'11.19"N	87°54'56.34"E						
Mosque	Masjid Baitullah	Left	0.29 km from sabgachtla khal	22°36'10.45"N	87°55'15.61"E						
Mosque	Masjid a Alamin	Right				2.5 Km from Birampur Khal	22°29'51.09"N	87°56'49.05"E			
School	Bagnan College	Left				1.36 from Mahadevpur	22°27'27.44"N	87°58'16.35"E			
Temple	Uttar Benapur Soni Mandir	Left				3.4 from Nupurkhal	22°24'22.03"N	7°57'17.00"E			
Temple	Shitola Mandir	Right				2.68 Km from Ghoraberia Khal	22.602	87.846			
Temple	Kali Mandir	Right				2.38 Km from Ghoraberia Khal	22.6	87.848			
Playground	Kaijuri Play Ground	Right				2.10 Km from Ghoraberia Khal	22.598	87.85			
Temple	Mansa Mandir	Right				1.60 Km from Ghoraberia Khal	22.594	87.855			
Temple	Solbag Shibtala	Right				1.470 Km from Maja Damodar Khal	22.593	87.88			
Temple	Meta Para Kali Mandir	Right	0.300 km from Ghoraberia Khal	22.582	87.855						
Temple	Gurdha Monosa Mandir	Right				0.600 km from Ghoraberia Khal	22.584	87.852			
Post Office	Bhatora Post Office	Left	0.187 km from Kulia Khal	22.564	87.855						
Bank	Axis Bank	Left				1.4 km from Kulia Khal	22.562	87.842			
Bank	SbI	Left				1.64 km from Kulia Khal	22.559	87.839			

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km. radios			Within 10 Km. radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Temple	Shiv & Sitola Mandir	Left				2.4 km from Kulia Khal	22.554	87.829			
Post Office	Kashmoli Post Office	Left	0.109 km from Khorigeria Khal	22.562	87.883						
Park	Beral Park GBC	Left	0.385 km from Chitnantalipara Khal	22.556	87.867						
Temple	Sitola Mandir, Uttar Durgapur Temple	Left				1.83 km from Boalia Khal	22.374	88.041			
Post Office	Uttardurgapur Post office	Left				1.83 km from Boalia Khal	22.373	88.044			
Playground	Durgapur Football ground	Left				2.23 km from Boalia Khal	22.37	88.05			
Post Office	Post Office	Left				1.65 km from Boalia Khal	22.378	88.057			
Market	Ichhapur Market	Left				3.00 km from Boalia Khal	22.371	88.069			
Temple	Radhe Krishna Mandir	Left				3.00 km from Boalia Khal	22.378	88.074			
Mosque	Bhekutal Jame	Left				2.55 km from Boalia Khal	22.389	88.072			
Temple	Dahuka Shri Shri Babu Panchanan Mandir	Left	99 m from godakhali khal	22.411							
Temple	Boalia kali Mandir	Left	200 m from Boalia Khal	22.397	88.045						
Bank	Paschim Banga Gramin Bank	Left	62 m from Boalia Khal	22.398	88.047						
School	Barberia Board Primary School	Left				686 m from Boalia Khal	22.406	88.048			
Math	Bottolar Math	Left	310.88 m from Boalia Khal	22.406	88.052						
Playground	Samruk school field	Left	284.91 m from Boalia Khal	22.41	88.054						
Mosque	Gumukberia	Right				2.12 Km from Boalia Khal	22.412907,	88.074453			
Temple	Sundorpur Ponchonndo Mandir	Right				1.139 km from Boalia Khal	22.399	88.064			
Mosque	Rabeya Jame Masjid	Left				2.92 km from Nalpukhur khal	22.381	88.008			

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km. radios			Within 10 Km. radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Mosque	Kulanandapur Jame Masjid	Left				2.88 km from Nalpukhur Khal	22.382	88.004			
Market	Bhatughar Market	Left				2.4 km from Nalpukhur Khal	22.385	88.01			
School	Naoda High School	Left				1.4 km from Nalpukhur Khal	22.393	88.019			
Temple	Narayan Mandir	Left				2.06 km from Nalpukhur Khal	22.387	88.029			
Bank	SBI Sitapur Branch	Left				1.6 km from Nalpukhur Khal	22.393	88.03			
Market	Dagra Baro Bazar	Left				1.24 km from Nalpukhur Khal	22.397	88.024			
Mosque	Kazipara	Right				581 m from Rabibhag khal	22.436	88.02			
Mosque	Mosque	Right				638.24 m from Rabibhag Juma	22.435	88.02			
Mosque	Majher para Juma	Right				621.27 m from Rabibhag Khal	22.433	88.019			
Mosque	Rabibhag Juma	Right				680.08 m from Rabibhag Juma	22.43	88.019			
Post Office	Rabibhag Post office	Left	497.99 m from Rabibhag Khal	22.428	88.01						
Temple	Sabitri Temple	Left				1.29 km from Tetua Khal	22.432	87.981			
Temple	Burimar Temple	Left				1.03 km from Tetua Khal	22.432	87.986			
Mosque	Amuria Jam-e-Masjid	Left				1.35 km from Tetua Khal	22.435	87.99			
Temple	Durga Mandir	Left				1.04 km from Tetua Khal	22.422	87.98			
Post Office	Rupasgori Post Office	Right	298.47 m from Tetua Khal	22.425	88.003						
Mosque	Mondal Para Jumma Maszid	Left	306.86 m from Kultipara Khal	22.442	87.995						
Mosque	Gohalberiya Jumma Masjid	Left				594.21 m from Kultipara Khal	22.441	87.987			
School	Santoshpur shree gouranga vidyapith	Left	105.61 m from kultipara khal	22.445	87.99						

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km. radios			Within 10 Km. radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Mosque	Santoshpur MD. Para jame mosjid	Right	461.81 m from Kultipara Khal	22.449	87.989						
School	Al ameen mission school	Right				649.09 m from kultipara khal	22.449	87.985			
Office	Bagnan-II Bdo office howrah	Left				510.97 m from santoshpur khal	22.446	87.976			
Bank	Bank of Baroda, Antila Branch	Left				968.66 m from santoshpur khal	22.442	87.974			
Temple	Bishnu Mandir	Right	294.13 m from santoshpur khal	22.453	87.972						
Temple	Maa Jagashatri Temple	Right	184.7 m from santoshpur khal	22.453	87.977						
Mosque	Pak Panjata	Right				733.33 m from santoshpur khal	22.457	87.981			
College	Bagnan College	Right				805.86 m from santoshpur khal	22.458	87.971			
Temple	Kolepara Shiv Mandir	Left	123.53 m from santoshpur khal	22.449	87.975						
Temple	Srikrishnapur shib mandir	Right				1.05 km from santoshpur khal	22.459	88.012			
Temple	Shiv mandir	Right				690.15 m from santoshpur khal	22.46	88.006			
Playground	Majherchara Playground	Right	174.52 m from gopalpur khal	22.48	87.96						
Temple	Temple	Right	325.36 m from gopalpur khal	22.478	87.957						
Temple	Maa Jagashatri Temple	Right				739.9 m from gopalpur khal	22.476	87.968			
Mosque	Masjid	Right				792.2 m from gopalpur khal	22.479	87.971			
Mosque	Khadhinam uttor para zamo maszid	Right				990.9 m from gopalpur khal	22.478	87.973			
Temple	Kali Mandir	Right				1.6 km from gopalpur khal	22.481	87.98			
Playground	Playground	Right				2.04 km from gopalpur khal	22.48	87.984			
Mosque	Mosque	Right				1.7 km from gopalpur khal	22.471	87.978			

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km. radios			Within 10 Km. radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Bank	SBI, Bagnan branch	Right	334.23 m from mellok main khal	22.467	87.961						
Mosque	Bagnan masjid	Right	437.3 m from mellok main khal	22.464	87.959						
Police Station	Bagnan police station	Right				1.01 km from mellok main khal	22.468	87.967			
Hospital	Bagnan rural hospital	Right				729.7 m from mellok mainkhal	22.467	87.964			
Post Office	Bagnan sub post office	Right				1.33 km from mellok main khal	22.465	87.97			
School	Bagnan girls high school	Right				1.48 km from mellok main khal	22.465	87.971			
Railway station	Bagnan Railway station	Right									
Mosque	Mahadebpur imambara	Right				512.36 m from mahadevpur khal	22.466	87.982			
Temple	Chandrapur hari mandir	Right				779.87 m from mahadevpur	22.469	87.993			
Mosque	Jame Masjid Purana	Right				1.83 km from mahadevpur khal	22.479	87.994			
Temple	Temple	Right				1.16 km from gaighata khal	22.557	87.933			
Bank	Bank of Baroda	Right				883.8 m from gaighata khal	22.554	87.933			
Temple	Temple	Left	438.2 m from gaighata khal	22.543	87.931						
Bank	Syndicate Bank	Right				1.02 km from gaighata khal	22.536	87.959			
Temple	Loknath mandir	Right				865.4 m from bankura khal	22.53	87.966			
Post Office	Sarada Post office	Right				943.4 m from bankura khal	22.532	87.967			
Bank	Paschim banga grameen bank	Right				3.00 km from bankura khal	22.532	87.989			
Mosque	Mosque	Right				2.81 km from mahisamori khal	22.529	88.004			
Post Office	Gazipur sub post office	Right				1.78 km from mahisamori khal	22.566	87.9777			

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km. radios			Within 10 Km. radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Temple	Dhormo mandir	Right				2.08 km from mahisamori khal	22.567	87.981			
Post Office	Deora post office	Right				2.77 km from mahisamori khal	22.565	87.995			
Market	nowpara bazar	Right				1.5 km from mahisamori khal	22.561	87.983			
Playground	Ranapara football ground	Right				2.1 km from mahisamori khal	22.558	87.993			
Temple	Sashanasway kali mata temple	Right				1.5 km from mahisamori khal	22.551	87.993			
Temple	Shiv mandir	Left				1.59km from mahisamori khal	22.542	88.008			
Temple	Kali Mandir, kali tota	Left				910.10 m from mahisamori khal	22.539	87.998			
Temple	Shyambhu shiva mandir	Left				881.33 m from mahishamuri khal	22.542	87.974			
Mosque	Masjid madrasa	Right	12.5 m from mahisamori khal	22.551	87.968						
Temple	shir Kalimata mandir	Left	322.78 m from gopalpur khal	22.485	87.955						
Bank	Paschim banga gramin bank	Left				605.6 m from gopalpur khal	22.488	87.953			
School	Khajutty Jr. High girls madrash	Left				682.8 m from gopalpur khal	22.486	87.948			
Mosque	Mosque	Left				569.9 m from gopalpur khal	22.488	87.954			
Temple	Shri shri maharja mandir	Right									
Bank	Allahabad bank bakshirhat branch	Right				1.16 km from mankur khal	22.529	87.892			
Bank	SBI bakshi branch	Right				799.53 m from mankur khal	22.525	87.9			
Bank	SBI CSP bholsar	Right				995.06 m from mankur khal	22.525	87.915			
Temple	Mansa Mandir	Right				1.97 km from mankur khal	22.536	87.913			
Mosque	Bholsar gulma para masjid	Right				1.21 km from mankur khal	22.526	87.917			
Temple	Gopal mandir	Left				574.23 m from birarampur khal	22.512	87.922			

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km. radios			Within 10 Km. radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Temple	Kali mandir	Left	352.5 m from birarampur khal	22.51	87.923						
Post office	Chakur Post office	Left				690.08 m from birrampur khal	22.51	87.92			
Temple	shitola maa mandir	Left				831.2 m from birampur khal	22.512	87.919			
Mosque	Hajrat saheb masjid	Left				1.49 km from birampur khal	22.506	87.912			
Temple	Shiv temple	Left				1.98 km from birrampur khal	22.5	87.899			
Post Office	Subsit post office	Right				1.55 km from birrampur khal	22.492	87.932			
Market	Bainari Bazar	Right				1.31 km from birampur khal	22.506	87.944			
Temple	Koria Durga Mandir	Right	296.38 m from birampur khal	22.519	87.949						
Mosque	Karia Mallick Mosque	Right	261.4 m from birampur khal	22.517	87.95						
Temple	Sital chak kali matamilan manidir	Right				702 m from birampur khal	22.525	87.964			
Temple	Bandhgol sawsan kali mandir	Left				2.08 km from sabgaohtala khal	22.607	87.904			
Temple	Vimtola kali mandir	Left				2.68 km from sabgaohtala khal	22.61	87.899			
Temple	Chaksalika setola mata mandir	Left				2.4 km from sabgaohtala khal	22.612	87.903			
Library	Amoragori library	Left				841.15 m from sabgaohtala khal	22.608	87.92			
Mosque	Masjid baitullah	Left	396.69 m from sabgaohtala khal	22.604	87.921						
Mosque	Amoragori Rahamanlya Masjid	Left				988.14 m from sabgaohtala khal	22.61	87.926			
Bank	Indian overseas bank joypur branch	Left	418.32 m from sabgaohtala khal	22.606	87.936						
Police Station	Joypur police station	Left				619.18 m from sabgaohtala khal	22.607	87.938			
Bank	joypur co-operative bank	Right				791.9 m from sabgaohtala kahl	22.597	87.931			

Type of Structure	Utility / Structure	Left / Right	Within 500 m radios			Within 3 Km. radios			Within 10 Km. radios		
			Distance	Lat	Long	Distance	Lat	Long	Distance	Lat	Long
Temple	Shiv mandir	Right				548.8 m from sabgaohtala khal	22.583	87.933			
Temple	Kali mandir	Right				3 km from sabgaohtala khal	22.603	87.962			
Temple	Durga Mandir	Right				2.98 km from sabgaohtala khal	22.594	87.958			
Playground	Indian union club playground	Right							4.56 km from sabgaohtala khal	22.598	87.967
Playground	Mollarchak play ground	Right							5.43 km from mahisamori khal	22.531468	88.043198
Playground	Garchumuk sports ground	Right							3.45 km from boalia khai	22.357	88.059
Playground	Bacchri football ground	Right							6.69 km from boaila khal	22.343	88.005
Playground	Saira play ground	Left							7.28 km from nalpukhur khal	22.368	87.928

Annexure- 12: Block wise sampling villages where field study was carried out

Name of District	Name of Block	Name of the Panchayat	Name of the Village
Bankura	Bargora	Kharari	Kendra Bedia
Bankura	Patrasayer	Patrasayer	Bagan Para
Bankura	Patrasayer	Patrasayer	Patrasayer
East Burdwan	Galsi-I	Putna Pursa	Khuraj
East Burdwan	Burdwan-I	Belkash-I	Kaligrame
East Burdwan	Burdwan-I	Belkash-I	Matiyal
East Burdwan	Jamalpur	Jarugrame	Mahisgaria
East Burdwan	Jamalpur	Jarugrame	Tilkora
East Burdwan	Memari-I	Amodpur	Bizara
East Burdwan	Memari-I	Nimo-I	Sahapur
East Burdwan	Raina-4	Shamsundar	Shajpur
East Burdwan	katwa-1	saragram	saragram
East Burdwan	Raina-1	Samsundar	Samsundar
East Burdwan	Raina-1	Shamsundar	Gopinathpur
East Burdwan	Raina-1	Shamsundar	Shajpur
East Burdwan	Bhater	Mahata	Bosatpur
East Burdwan	Bhater	Mahachanda	Parhat
East Burdwan	katwa-1	saragram	Jamra
West Burdwan	Kanksa	Molandighi	Malandighi
West Burdwan	Kanksa	Molandighi	Kuldiha
Howrah	Domjur	Uttar Jhapordha	Mahish Nala
Howrah	Domjur	Uttar Jhapordha	Nonakundu
Howrah	AMTA-1	Balichak	Sarpai
Howrah	AMTA-1	Balichak	Sahachake
Howrah	Basgnan-2	Bbpur	Khajadapur
Howrah	Basgnan-2	Bbpur	Baidyanathpur
Howrah	Uluberia-M	Uluberia	Word-32
Howrah	Uluberia-M	Uluberia	Word-25
Howrah	Amta	Balichak GP	Sahachak
Howrah	Shyampur	Shyampur	Shyampur
Howrah	Shyampur	Shyampur	Alpin
Howrah	ULUBERIA _2	Banibon	Bindhabon Pur
Howrah	ULUBERIA _2	Banibon	Rajapur
Howrah	Udaynarayanpur	Pancharul	Kankari
Howrah	UPAYNARAYANPUR	PANCHRAUL	PANCHRAUL
Hooghly	Singur	Singur-II	Athalia
Hooghly	Singur	Singur-II	Ratanpur
Hooghly	Dhaniakhali	Shomospur II	Hajipur
Hooghly	Dhaniakhali	Shomospur II	Kashipur
Hooghly	Khanakul I	Ghoshpur	Kulat
Hooghly	Khanakul I	Ghoshpur	Kulgachiya
Hooghly	Pandua	Shikira Champta	Shikira
Hooghly	Pandua	Shikira Champta	Abira

Name of District	Name of Block	Name of the Panchayat	Name of the Village
Hooghly	Pulbadedpur	Goswami Malipara	Sinet
Hooghly	Pulbadedpur	Goswami Malipara	Talchini
Hooghly	Pursura	Chilidangi	Fatepur
Hooghly	Pursurah	Srirampur	Dhapdhara
Hooghly	Khanakul-II	Jagatpur	Jagatpur
Hooghly	Khanakul-II	Jagatpur	Nandanpur
Hooghly	Tarkeswar	Tarkeswar	Word No-6
Hooghly	Tarkeswar	Tarkeswar	Word No-14

Annexure- 13: Stake-holder consultation

District: Bankura
Block: Patrasayer
Gram Panchayat: Patrasayer
Village: Patrasayer









District: East Burdwan
Blocks: (1) Katwa, (2) Bhatar, (3) Raina, (4) Memari, (5) Jamalpur, (6) Burdwan, (7) Galsi








District: Howrah
Blocks: (1) Shyampur, (2) Domjur, (3) Bagnan, (4) Uluberia, (5) Uluberia-Municipality, (6) Amta, (7) Udaynarayanpur

Figure 1: Consultation with Line Departments (Fishery, Agriculture, Agri-marketing, Horticulture & WRIDD

Figure 2: Stakeholder consultation on Feasibility study at Bardhaman District

Figure 3: Consultation at Chapadanga Irrigation Division

Figure 4: Community consultation at Buguahana, Burdwan

Figure 5: Community Consultation near River Lift pump house at Dihivursut, Howrah

Figure 6: Consultation with farmers on Damodar Right embankment near Muslim para of Dihivursut, Howrah

Annexure- 14: Letter from Dept. of Environment on Non-requirement of Environment Clearance (EC)

নীরজ সিঙ্ঘল, আই এফ এস
মুখ্য পরিবেশ আধিকারিক
পরিবেশ বিভাগ
পশ্চিমবঙ্গ সরকার
প্রাণীসম্পদ ভবন, ৬ষ্ঠ তল, ব্লক ঃ এল বি-২
সেক্টর - ৩, সল্টলেক, কলকাতা - ৭০০ ১০৬
টেলিফ্যাক্স ঃ (০৩৩) ২৩৩৫-৫২৪৬

NIRAJ SINGHAL, IFS
Chief Environment Officer
Environment Department
Government of West Bengal
Pranisampad Bhaban, 5th Floor, Block - LB-2
Sector - III, Salt Lake, Kolkata - 700 106
Tele Fax : 033-2335-5246

E-mail : environmentwb@gmail.com

No. 3161 / EN / O – 44 / 2018 Date: 19th September, 2018

To
The Additional Chief Secretary,
Irrigation & Waterways Department,
Jalasampad Bhaban, 3rd Floor, Western Block,
Bidhannagar, Salt lake City, Kolkata – 700 091.

Sir,

This has reference to your letter No. 442- IFC/ IW/P/IFC/4M-06/2018 dated 12/09/2018 whereby it was requested to confirm exemption of Environmental Clearance (EC) for the proposed project 'West Bengal Major Irrigation and Flood Management Project'.

It may be observed that as per appendix – IX of MoEF&CC's Notification SO 141(E) dated 15.01.2016 'Dredging and de-silting of dams, reservoirs, weirs, barrages, river, and canals for the purpose of their maintenance, upkeep and disaster management' is exempted from requirement of EC.

As per amendment of EIA Notification vide MoEF&CC's notification S.O. 3977(E) dated 14.08.2018 – 'change in irrigation technology having environmental benefits (eg. From flood irrigation to Drip irrigation etc.) by an existing project without increase in dam height and submergence will not require EC'.

Yours sincerely,

(Niraj Singhal)

Annexure- 15 (a): Sediment quality report of Mundeswari River by RRI

Report on the soil samples collected from the bed of Mundeswari River

1. Introduction:

   From soil samples from the river bed of the Mundeswari at four sites were collected and sent to QCL, River Research Institute, Mohanpur by Hooghly Irrigation Division, I&W Dte, WB. The samples were sent to laboratory for determining their quality in respect of use at suitable place.

2. Lab Test and Result:

   As these were disturbed index properties only could be done on these samples. Visual classification of all the samples sieve analysis on sand samples and Atterberg limit tests on the clay samples were conducted. Results have been presented in Table-1. The particle size distribution curves have been given in Fig-1 and Fig-2.

3. Discussion:

   A. Markunda Ghat- The sample at 1 m below natural ground level (NGL) is yellowish brown fine sand. This sample contains only little mica, however fineness modulus (Criterion for use as construction material) is below 2. The samples at 2,3 and 4 meter are more or less same, yellowish gray silty clay have been very high liquid limit and plasticity index (LL-PL). The silty clays may be said heavy or fat clay. The clays are expected to show high shrink – swell behaviour, but at the same time are highly impervious.

   B. Kelepara- The samples collected from 1,2, 3 and 4 meter below NGL are more or less same, silty clay having index values (LL,PI) and belong to CH group.

   C. Chalkbelia- The samples collected from 1, 2 and 3 meter are fine to medium sand with fineness modulus expected to be not very high. The samples from 4 and 5 meter are silty clay belonging to CH group.

   D. Deehalpara- The samples of 1,2 and 3 meter are loamy clay belonging to CI group. The samples of 4 and 5 meter depth are clayey to loamy sand.

   The sands of these sites yellowish brown fine to medium sand (SP), the fineness modulus i.e. gradation is not good. However the mica content of these sands are low.

   The clays of Markunda Ghat, Kelepara are fat clays, expected to show high shrink – swell activity. However, these are highly impervious.

The clays of Chalkbelia and Deehalpara are of CH and CI Group but are expected to show low to medium swelling potential. These materials may suitably used as embankment or road construction.

No mines or cities (where chances of disposal or accumulation of toxic or heavy metals are more on vacant land)are nearby the sites. The clays (natural moisture contents indicate medium to stiff consistency) are similar to the older alluvium (distinctly different to the gray Gangetic alluvium) of the other Rarh plain (parts of Birbhum, Bankura, Burdwan, Hooghly, and West Midnapur) sites. These materials may safely be used.

D.P. Dolai, 7.9.18
R.O. QCL, RRI

C/S by S.S.De Dalal, 7/9/18
Dy. Dir (SM&Ch), RRI

Asim Chowdhury,
EE(SDP), RRI

Results of Laboratory Tests on the Samples of Bed Materials Collected from the Mundeswari River

Table-1

Lab Sl No.	Site	Chainmeter	Depth	Description of Soil	Natural Moisture Content of Disturbed Samples	Sieve Analysis	LL,PL	Swelling Index	Remarks (Soil Group)
Q/S 129/18	Markunda Ghat	7.5 km	1 m	Yellowish Brown Fine Sand		Done			SP
Q/S 130/18		7.5 km	2 m	Yellowish Grey Silty Clay			110, 30		CH
Q/S 131/18		7.5 km	3 m	Yellowish Grey Silty Clay					
Q/S 132/18		7.5 km	4 m	Yellowish Grey Silty Clay					
Q/S 133/18	Kelepara	10 km	1 m	Yellowish Grey Silty Clay with Bluish Tinge					
Q/S 134/18		10 km	2 m	Yellowish Grey Silty Clay with Bluish Tinge			75.5, 30.4		CH
Q/S 135/18		10 km	3 m	Yellowish Grey Silty Clay with Bluish Tinge					
Q/S 136/18		10 km	4 m	Yellowish Grey Silty Clay with Bluish Tinge	26.60%				
Q/S 137/18	Chalkbelia	12.5 km	1 m	Yellowish Brown Fine to Medium Sand		Done			SP
Q/S 138/18		12.5 km	2 m	Yellowish Brown Fine to Medium Sand					
Q/S 139/18		12.5 km	3 m	Brownish Dirty Fine to Medium Sand					
Q/S 140/18		12.5 km	4 m	Yellowish Brown Silty Clay with Kankars			58.8, 21.2	54%	CH Medium Swelling
Q/S 141/18		12.5 km	5 m	Yellowish Brown Silty Clay containing some sand and Kankars with Bluish Tinge					
Q/S 142/18	Deehalpara	16 km	1 m	Yellowish Grey, Loamy Clay with Kankars					
Q/S 143/18		16 km	2 m	Brownish Grey, Loamy Clay with Bluish Tinge					
Q/S 144/18		16 km	3 m	Brownish Grey, Loamy Clay with Bluish Tinge			38.6, 17.2		CI
Q/S 145/18		16 km	4 m	Brownish Clayey Sand with Bluish Tinge	19.70%				
Q/S 146/18		16 km	5 m	Whitish Loamy sand with Reddish and Bluish Tinge					

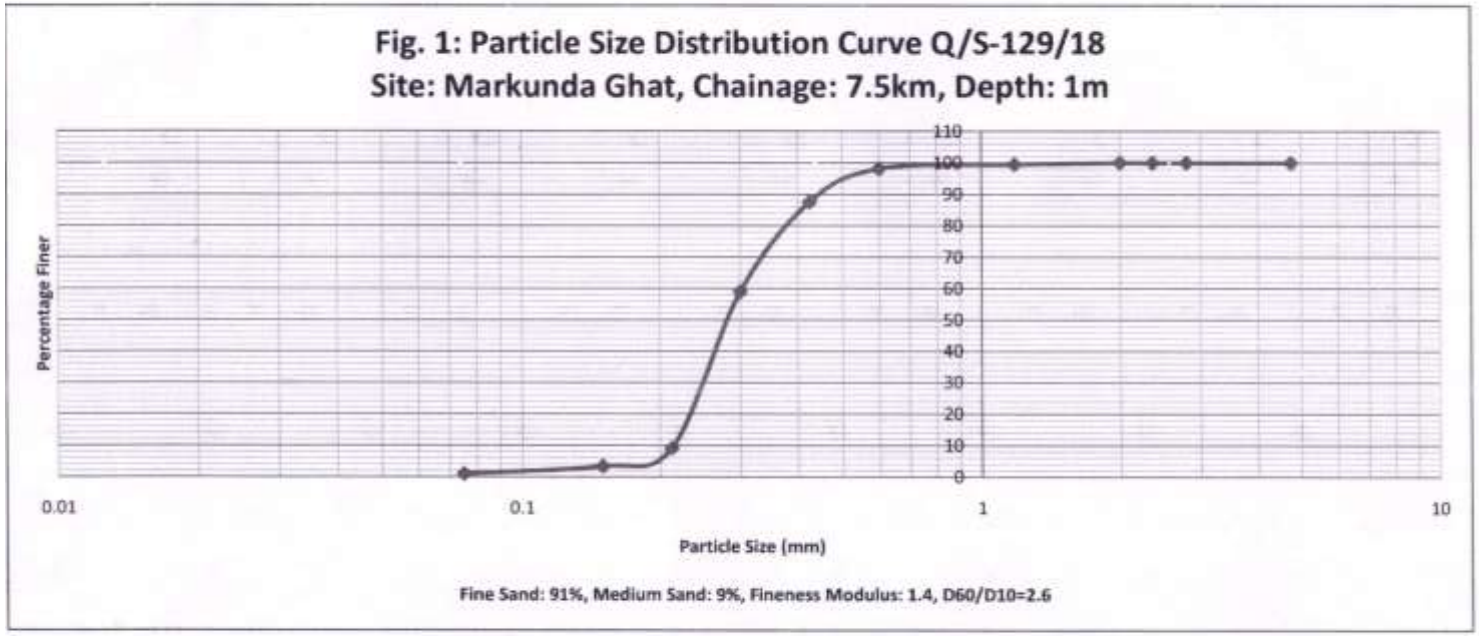


Fig. 1: Particle Size Distribution Curve Q/S-129/18
Site: Markunda Ghat, Chainage: 7.5km, Depth: 1m
Percentage Finer
110
100
90
80
70
60
50
40
30
20
10
0
0.01
0.1
1
10
Particle Size (mm)
Fine Sand: 91%, Medium Sand: 9%, Fineness Modulus: 1.4, D60/D10=2.6

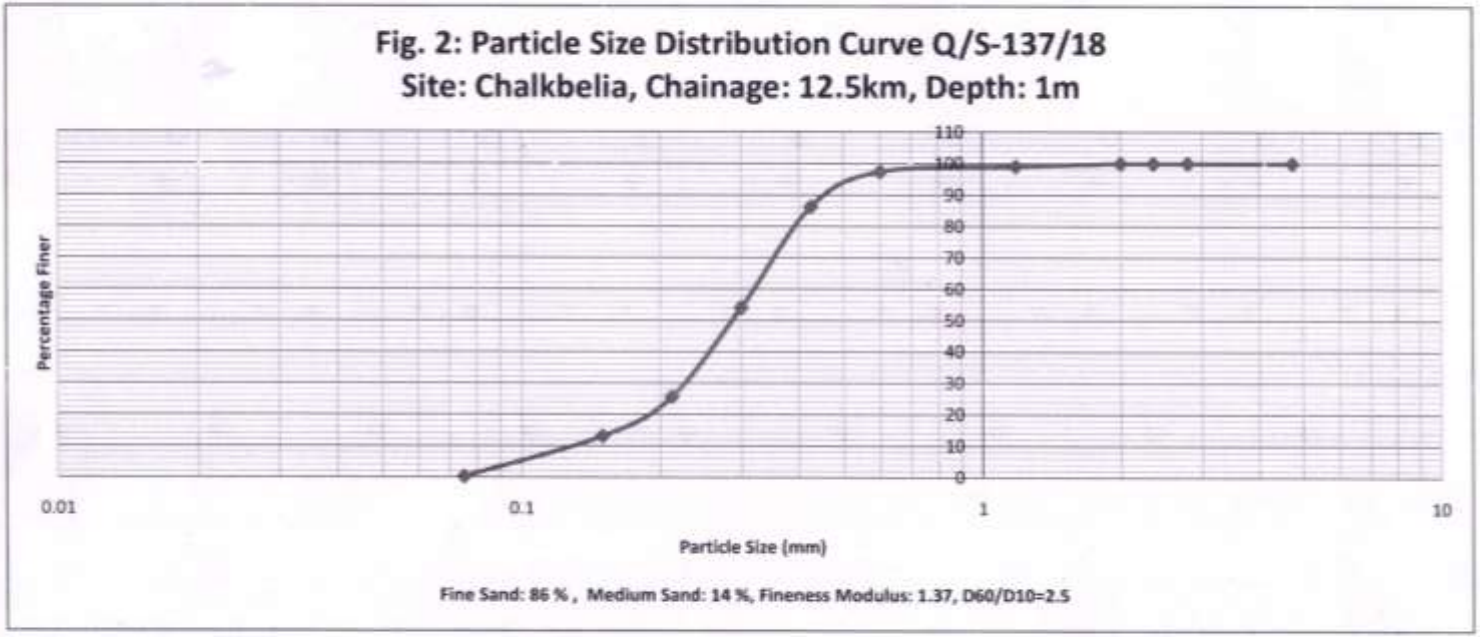
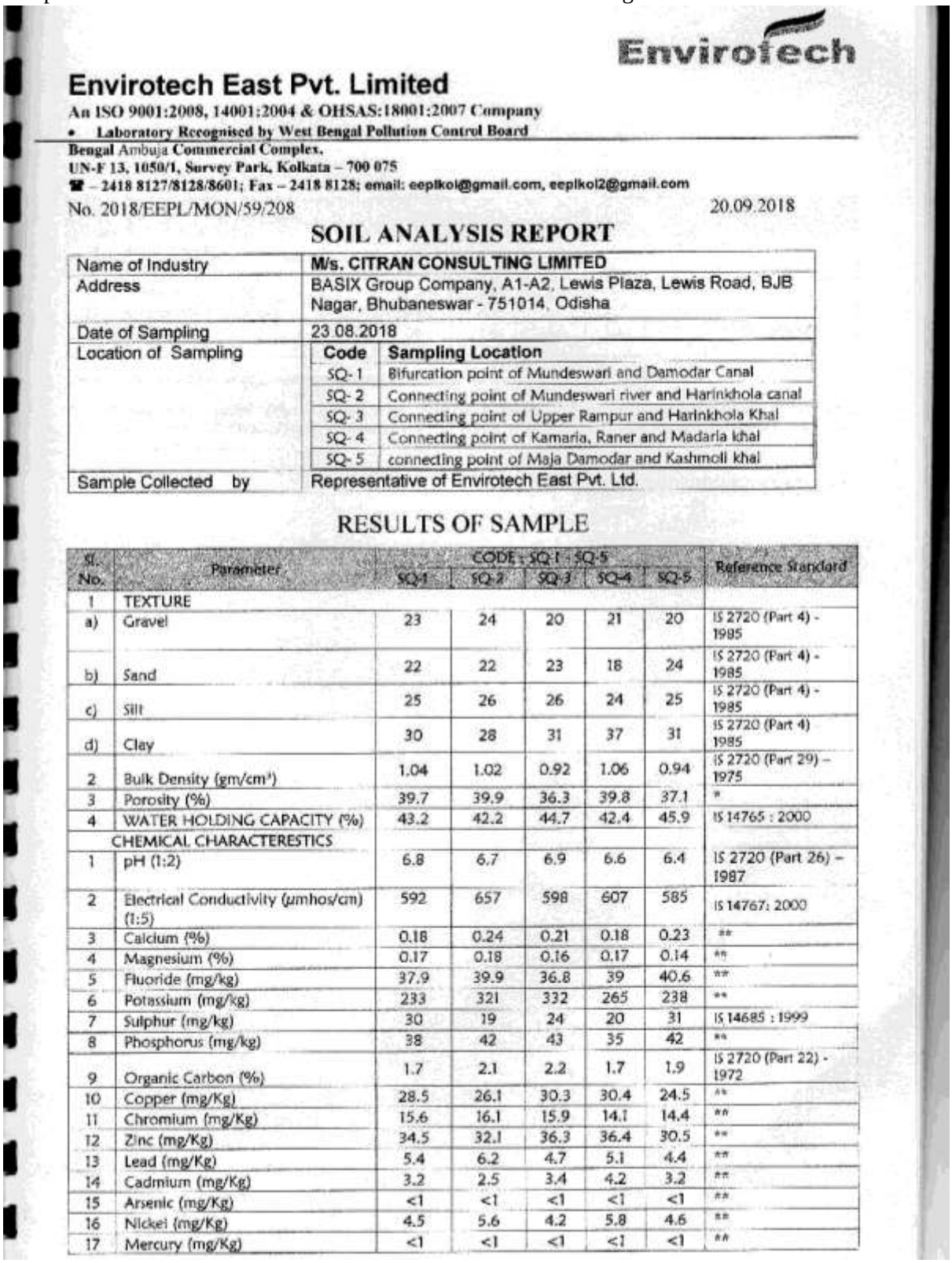


Fig. 2: Particle Size Distribution Curve Q/S-137/18
Site: Chalkbelia, Chainage: 12.5km, Depth: 1m
Percentage Finer
110
100
90
80
70
60
50
40
30
20
10
0
0.01
0.1
1
10
Particle Size (mm)
Fine Sand: 86 % , Medium Sand: 14 %, Fineness Modulus: 1.37, D60/D10=2.5

Annexure- 15 (b): Sediment Quality of Mundeswari and other drainage canal by MoEF & WBPCB recognized laboratory

Samples were drawn from Mundeswari river bed and bed of drainage canal.



Envirotech

Envirotech East Pvt. Limited

An ISO 9001:2008, 14001:2004 & OHSAS:18001:2007 Company

- Laboratory Recognised by West Bengal Pollution Control Board

Bengal Ambuja Commercial Complex,
UN-F 13, 1050/1, Survey Park, Kolkata – 700 075
☎ – 2418 8127/8128/8601; Fax – 2418 8128; email: eeplkol@gmail.com, eeplkol2@gmail.com

No. 2018/EEPL/MON/59/208 20.09.2018

SOIL ANALYSIS REPORT

Name of Industry	M/s. CITRAN CONSULTING LIMITED
Address	BASIX Group Company, A1-A2, Lewis Plaza, Lewis Road, BJB Nagar, Bhubaneswar - 751014, Odisha
Date of Sampling	23.08.2018
Location of Sampling	Code: Sampling Location SQ-1: Bifurcation point of Mundeswari and Damodar Canal SQ-2: Connecting point of Mundeswari river and Harinkhola canal SQ-3: Connecting point of Upper Rampur and Harinkhola Khal SQ-4: Connecting point of Kamaria, Raner and Madaria khal SQ-5: connecting point of Maja Damodar and Kashmoli khal
Sample Collected by	Representative of Envirotech East Pvt. Ltd.

RESULTS OF SAMPLE

Sl. No.	Parameter	CODE : SQ-1 - SQ-5					Reference Standard
		SQ-1	SQ-2	SQ-3	SQ-4	SQ-5	
1	TEXTURE						
a)	Gravel	23	24	20	21	20	IS 2720 (Part 4) - 1985
b)	Sand	22	22	23	18	24	IS 2720 (Part 4) - 1985
c)	Silt	25	26	26	24	25	IS 2720 (Part 4) - 1985
d)	Clay	30	28	31	37	31	IS 2720 (Part 4) 1985
2	Bulk Density (gm/cm³)	1.04	1.02	0.92	1.06	0.94	IS 2720 (Part 29) – 1975
3	Porosity (%)	39.7	39.9	36.3	39.8	37.1	*
4	WATER HOLDING CAPACITY (%)	43.2	42.2	44.7	42.4	45.9	IS 14765 : 2000
	CHEMICAL CHARACTERESTICS						
1	pH (1:2)	6.8	6.7	6.9	6.6	6.4	IS 2720 (Part 26) – 1987
2	Electrical Conductivity (µmhos/cm) (1:5)	592	657	598	607	585	IS 14767: 2000
3	Calcium (%)	0.18	0.24	0.21	0.18	0.23	**
4	Magnesium (%)	0.17	0.18	0.16	0.17	0.14	**
5	Fluoride (mg/kg)	37.9	39.9	36.8	39	40.6	**
6	Potassium (mg/kg)	233	321	332	265	238	**
7	Sulphur (mg/kg)	30	19	24	20	31	IS 14685 : 1999
8	Phosphorus (mg/kg)	38	42	43	35	42	**
9	Organic Carbon (%)	1.7	2.1	2.2	1.7	1.9	IS 2720 (Part 22) - 1972
10	Copper (mg/Kg)	28.5	26.1	30.3	30.4	24.5	**
11	Chromium (mg/Kg)	15.6	16.1	15.9	14.1	14.4	**
12	Zinc (mg/Kg)	34.5	32.1	36.3	36.4	30.5	**
13	Lead (mg/Kg)	5.4	6.2	4.7	5.1	4.4	**
14	Cadmium (mg/Kg)	3.2	2.5	3.4	4.2	3.2	**
15	Arsenic (mg/Kg)	<1	<1	<1	<1	<1	**
16	Nickel (mg/Kg)	4.5	5.6	4.2	5.8	4.6	**
17	Mercury (mg/Kg)	<1	<1	<1	<1	<1	**

Envirotech East Pvt. Limited

An ISO 9001:2008, 14001:2004 & OHSAS:18001:2007 Company

• Laboratory Recognised by West Bengal Pollution Control Board

Bengal Ambuja Commercial Complex,
UN-F 13, 1050/1, Survey Park, Kolkata – 700 075

☎ – 2418 8127/8128/8601; Fax – 2418 8128; email: eepikol@gmail.com, eepikol2@gmail.com

Sl. No.	Parameter	CODE - SQ-1 - SQ-5					Reference Standard
		SQ-1	SQ-2	SQ-3	SQ-4	SQ-5	
18	Boron (mg/Kg)	<1	<1	<1	<1	<1	**
19	Iron(mg/Kg)	31.7	33.9	34.5	24.6	27.8	**
20	Manganese (mg/Kg)	5.5	5.6	5.9	5	5.7	**
21	Molybdenum (mg/Kg)	3.4	2.2	3.1	2.7	2.4	**
22	DDT(mg/kg)	1.6	1.8	2.4	1.3	1.1	USEPA Method No. 680

Contents of this report are meant for your guidance and should not be used for Advertisement, Evidence or Litigation

* Methods of Soil Analysis (Part-1) – Physical and Mineralogical Methods (Published by American Society of Agronomy)
** Methods of Soil Analysis (Part-2) – Chemical and Micro-biological Properties Second Edition (Published by American Society of Agronomy)

for **ENVIROTECH EAST (P) LTD.**

(Asoke Kumar Banerjee)
Director

Annexure- 16: River Water Quality (Tested by SWID)

GOVERNMENT OF WEST BENGAL

Office of the Executive Engineer (A-I)
Surface Water Investigation Division-II
Purta Bhavan (4th Floor), Burdwan
PIN-713103, Ph- 0342-2644050
Email Id- eeswid2@gmail.com

Memo No-284 Dated, Burdwan, the 10th. September 2018

To,
The Executive Engineer
Hooghly Irrigation Division
&
DPIU, Hooghly
WBMIFMP

Subject: Report of Water Quality of "Mundeswari" River.

Ref: Your Memo. No. 19-2/ 1983 dated 23-08-2018

Dear Sir,

In reference to the above subject & Memo No I am enclosing herewith the of Water Quality Report of "Mundeswari" River (Two Points) which I received today.

Yours faithfully.

10/09/2018
Executive Engineer (A-I)
Burdwan S.W.I. Division II
Burdwan

Memo No- Dated, Burdwan, the

Copy Forwarded for information to:

1. The Superintending Engineer (A-I), S.W.I. Circle, Bikash Bhawan, 4th Floor, Salt Lake City, Kolkata-700091
2. The Director, SWID, Nirman Bhawan, 4th Floor, Salt Lake City, Kolkata-700091

Executive Engineer (A-I)
Burdwan S.W.I. Division II
Burdwan

Government of West Bengal
Divisional Chemical & Hydrological Laboratory
State Water Investigation Directorate
Spandan Complex (1st Floor), G.T. Road
Burdwan, Pin: 713101

Report on chemical analysis of water sample received from Assistant Engineer (A-I), SWI, Sub-Division II/C, Chinsurah, Ref Memo No. 57 Dated 20/02/2018 A.E(A.I),Surface Water Sub-Division No. II/D, Chinsurah

Sl. No.	Source (River Water)	Location (Mouza/Block)	pH	Specific Conductivity at 25°C in µmhos/cm or µS/cm	Total Hardness as $CaCO_3$ in mg/L	Chloride as Cl in mg/L	Total Iron as Fe in mg/L	Arsenic as As in mg/L	Fluoride as F in mg/L	Total Dissolved Solid in mg/L	Sodium as Na in mg/L
1.	BEHULA	Jangram	6.83	364	170	24	1.14	BDL	0.34	232	31.3
2.	BEHULA	Dakshin Gopalpur / Balagarh	7.04	564	240	27	0.43	BDL	0.20	360	63.6
3.	GHIA	Bakirranagachi/ Palbadalpur	7.34	542	220	26	0.51	BDL	0.24	346	55.2
4.	KANA	Dhopaghata /Singur	7.17	384	180	23	0.39	BDL	0.14	246	31.4
5.	KANA	Harirampur/ Dhaniakali	7.20	372	190	21	1.24	BDL	0.68	238	25.6
6.	SRASWATI	Jatrasuli/ Mogra	7.06	462	170	30	0.17	BDL	0.46	296	28.9
7.	SRASWATI	Krishnapur/ Chanditala II	7.68	2010	520	347	0.33	BDL	0.10	1288	400
8.	MUNDESWARI	Saiabi/ Pursurah	7.44	372	170	23	0.49	BDL	0.30	238	23.7
9.	MUNDESWARI	Murikana /Khanakul II	7.84	342	160	21	0.33	BDL	0.12	220	24.4
10.	DAMODAR	Sahapur/ Pursurah	7.70	340	150	24	0.28	BDL	0.39	218	21.7

Sl. No.	Source (River Water)	Location (Mouza/Block)	pH	Specific Conductivity at 25°C in µmhos /cm or µS/cm	Total Hardness as CaCO3 in mg/L	Chloride as Cl in mg/L	Total Iron as Fe in mg/L	Arsenic as As in mg/L	Fluoride as F in mg/L	Total Dissolved Solid in mg/L	Sodium as Na in mg/L
11.	DAMODAR	Kanaipara/ Pursurah	7.65	340	140	21	0.15	BDL	0.49	218	21.1
12.	DABAKESWAR	Patna/Goghat	7.72	340	160	26	0.53	BDL	0.50	216	23.9
13.	DABAKESWAR	Dhanyaghri/ Khanakul II	7.70	339	150	23	0.22	BDL	0.62	218	22.0
14.	KANA DAMADOR	Dighir/ Dhaniakali	7.40	372	180	24	4.28	BDL	0.72	238	22.3
15	KANA DAMADOR	Ganeshbati/ Jangipara	7.74	324	160	21	0.26	BDL	0.32	208	22.9
16	GHIA	Chanklala/ Dhaniakali	7.36	420	210	26	2.34	BDL	0.78	270	32.9

BDL: Below Detection Limit (Detection Limit of Iron and Arsenic are 0.10 and 0.01 mg/L respectively)

Chemist
DCHL,SWID,Burdwan
24/04/2018

Senior Chemist
DCHL,SWID,Burdwa
24/04/2018

Ref. No. Q-16061/1-2016-SWM/ 49/1(1)

Dated, Burdwan, the 24/04/2018

Forwarded for information and necessary action to:

The Assistant Engineer (A-I), Surface Water Sub-Division No. II/C, Chinsurah.

24.04.2018

Senior Chemist
Divisional Chemical &Hydrological Laboratory
S.W.I.D., Burdwan

Ref. No. Q-16062/1-2016-OSM/ 49/1/1(3)
Forwarded for information to:

1. The Director, SWID, Sech Bhawan(7th Floor),Salt Lake City, Kolkata-700091.
2. The Superintending Geologist Geological Circle, SWID, Bikash Bhawan, Kolkata-700091.
3. The Senior Geologist, Geological Div. No. II, SWID, Burdwan.

Dated, Burdwan, the 24/04/2018

Senior Chemist
Divisional Chemical &Hydrological Laboratory
S.W.I.D., Burdwan

Annexure- 17(a): Baseline Environmental Report of Air, River Water, & Noise Quality

Envirotech East Pvt. Limited
An ISO 9001:2008, 14001:2004 & OHSAS:18001:2007 Company
Laboratory Recognised by MoEFCC, Govt. of India
Laboratory Recognised by West Bengal Pollution Control Board
Bengal Ambuja Commercial Complex,
UN-F 13, 1050/1, Survey Park, Kolkata – 700 075
CIN NO. : U74210WB1989PTC047403
☎ – 2418 8127/8128/8601; Fax – 2418 8128; email: eeplkol@gmail.com, eeplkol2@gmail.com

No. 2018-19/EEPL/Lab/CTRAN/D2 September 19, 2018

MONITORING REPORT

1	**Project**	Environment monitoring for Air Quality/ Water Quality/ Soil Quality/ Noise & Vibration
2	**Proponent**	CTRAN Consulting Limited, Bhubaneswar
3	**Scope of Monitoring**	Parameters as described in Work Order
4	**Information Required**	Test Results of Environment Monitoring for attributes Air/Water/Soil/Noise
5	**Methodology**	Standard Methodology of CPCB / MoEF Guidelines & BIS as applicable
6	**Work Volume**	Water quality – 3 locations Ambient Air Quality – 5 Locations Soil Quality : 5 Locations Noise – 5 stations

Remarks: The test Results for different samples of Ambient Air, Surface Water, Soil and Noise collected from different locations as per directive received from proponent indicate that the locations are complying with the requirements of Environment with respect to the above parameters of analysis

for **ENVIROTECH EAST (P) LTD**

(Asoke Kumar Banerjee)
Director

Envirotech East Pvt. Limited

An ISO 9001:2008, 14001:2004 & OHSAS:18001:2007 Company

• Laboratory Recognised by West Bengal Pollution Control Board

Bengal Ambuja Commercial Complex,
UN-P 13, 1050/1, Survey Park, Kolkata – 700 075
☎ – 2418 8127/8128/8601; Fax – 2418 8128; email: eeplkol@gmail.com, eeplkol2@gmail.com

No. 2018/EEPL/MON/59/202

20.09.2018

MONITORING REPORT

Name of Industry	M/s. CITRAN CONSULTING LIMITED
Address	BASIX Group Company, A1-A2, Lewis Plaza, Lewis Road, BJB Nagar, Bhubaneswar - 751014, Odisha
Average Temperature (°C)	28
Weather Condition	Cloudy
Rainfall	28
Avg. Relative Humidity (%)	91
Barometric Pressure (mmHg)	750

AMBIENT AIR QUALITY MONITORING RESULT

Date of Monitoring	21.08.2018
Location Name	Bifurcation point of Mundeswari and Damodar Canal

RESULTS :

Parameters	Unit	Pollutants Concentration	NAAQ Standards	Reference Standard
Particulate Matter (size < 10 µm or PM_{10} µm)	µg/m³	46	100	IS 5182 (Part 23)
Particulate Matter (size < 2.5 µm or $PM_{2.5}$ µm)	µg/m³	20	60	**
Sulphur Dioxide (as SO_2)	µg/m³	< 4 µg/m³	80	IS 5182 (Part 2)
Nitrogen Dioxide (as NO_2)	µg/m³	19	80	IS 5182 (Part 6)
Ozone (as O_3)	µg/m³	11	100	* Method No. 411
Lead (as Pb)	µg/m³	< 0.01 µg/m³	1.0	IS 5182 (Part 22)
Carbon Monoxide (as CO)	mg/m³	0.4	02	***
Ammonia (as NH_3)	µg/m³	< 2 µg/m³	400	* Method No. 401
Benzene (as C_6H_6)	µg/m³	< 0.08 µg/m³	-	IS 5182 (Part 11)
Benzo (a) Pyrene (BaP)	ng/m³	< 0.1 ng/m³	-	IS 5182 (Part 12)
Arsenic (as As)	ng/m³	< 0.5 ng/m³	-	**
Nickel (as Ni)	ng/m³	< 2 ng/m³	-	**

ND – Not Detected, BDL – Below Detectable Limit;

Note - As per National Ambient Air Quality Standard dated November 2009, Annual Average of Benzene (as C6H6), Benzo (a) Pyrene (BaP), Arsenic (as As) and Nickel (as Ni) are 05, 01, 06 and 20 ng/m3 respectively

* Methods of Air sampling and analysis (Third Edition) – James P. Lodge Jr.
** Guidelines for the measurement of ambient Air Pollutants (Volume I) – CPCB
*** Guidelines for the measurement of ambient Air Pollutants (Volume II) – CPCB

Sample Collected by: Representative of Envirotech East Pvt. Ltd.

for ENVIROTECH EAST (P) LTD.

(Asoke Kumar Banerjee)
Director

Envirotech East Pvt. Limited
An ISO 9001:2008, 14001:2004 & OHSAS:18001:2007 Company
• Laboratory Recognised by West Bengal Pollution Control Board
Bengal Ambuja Commercial Complex,
UN-F 13, 1050/1, Survey Park, Kolkata – 700 075
☎ – 2418 8127/8128/8601; Fax – 2418 8128; email: eeplkol@gmail.com, eeplkol2@gmail.com

No. 2018/EEPL/MON/59/204 20.09.2018

MONITORING REPORT

Name of Industry	**M/s. CITRAN CONSULTING LIMITED**
Address	BASIX Group Company, A1-A2, Lewis Plaza, Lewis Road, BJB Nagar, Bhubaneswar - 751014, Odisha
Average Temperature (°C)	28
Weather Condition	Cloudy
Rainfall	28
Avg. Relative Humidity (%)	91
Barometric Pressure (mmHg)	750

AMBIENT AIR QUALITY MONITORING RESULT

Date of Monitoring	21.08.2018
Location Name	Connecting point of Mundeswari river and Harinkhola Canal

RESULTS :

Parameters	Unit	Pollutants Concentration	NAAQ Standards	Reference Standard
Particulate Matter (size < 10 µm or PM $_{10}$ µm)	µg/m^3	37	100	IS 5182 (Part 23)
Particulate Matter (size < 2.5 µm or PM $_{2.5}$ µm)	µg/m^3	15	60	**
Sulphur Dioxide (as SO_2)	µg/m^3	< 4 µg/m^3	80	IS 5182 (Part 2)
Nitrogen Dioxide (as NO_2)	µg/m^3	17	80	IS 5182 (Part 6)
Ozone (as O_3)	µg/m^3	09	100	* Method No. 411
Lead (as Pb)	µg/m^3	< 0.01 µg/m^3	1.0	IS 5182 (Part 22)
Carbon Monoxide (as CO)	mg/m^3	0.3	02	***
Ammonia (as NH_3)	µg/m^3	< 2 µg/m^3	400	* Method No. 401
Benzene (as C_6H_6)	µg/m^3	< 0.08 µg/m^3	-	IS 5182 (Part 11)
Benzo (a) Pyrene (BaP)	ng/m^3	< 0.1 ng/m^3	-	IS 5182 (Part 12)
Arsenic (as As)	ng/m^3	< 0.5 ng/m^3	-	**
Nickel (as Ni)	ng/m^3	< 2 ng/m^3	-	**

ND – Not Detected, BDL – Below Detectable Limit;

Note - As per National Ambient Air Quality Standard dated November 2009, Annual Average of Benzene (as C_6H_6), Benzo (a) Pyrene (BaP), Arsenic (as As) and Nickel (as Ni) are 05, 01, 06 and 20 ng/m^3 respectively

* Methods of Air sampling and analysis (Third Edition) – James P. Lodge Jr.
** Guidelines for the measurement of ambient Air Pollutants (Volume I) – CPCB
*** Guidelines for the measurement of ambient Air Pollutants (Volume II) – CPCB

Sample Collected by: Representative of Envirotech East Pvt. Ltd.

for **ENVIROTECH EAST (P) LTD**

(Asoke Kumar Banerjee)
Director

Envirotech East Pvt. Limited
An ISO 9001:2008, 14001:2004 & OHSAS:18001:2007 Company
• Laboratory Recognised by West Bengal Pollution Control Board
Bengal Ambuja Commercial Complex,
UN-F 13, 1050/1, Survey Park, Kolkata – 700 075
☎ – 2418 8127/8128/8601; Fax – 2418 8128; email: eepikol@gmail.com, eepikol2@gmail.com

No. 2018/EEPL/MON/59/205 20.09.2018

MONITORING REPORT

Name of Industry	**M/s. CITRAN CONSULTING LIMITED**
Address	BASIX Group Company, A1-A2, Lewis Plaza, Lewis Road, BJB Nagar, Bhubaneswar - 751014, Odisha
Average Temperature (°C)	28
Weather Condition	Cloudy
Rainfall	28
Avg. Relative Humidity (%)	91
Barometric Pressure (mmHg)	750

AMBIENT AIR QUALITY MONITORING RESULT

Date of Monitoring	21.08.2018
Location Name	Connecting point of Upper Rampur and Harinkhola Khal

RESULTS :

Parameters	Unit	Pollutants Concentration	NAAQ Standards	Reference Standard
Particulate Matter (size < 10 µm or PM_{10} µm)	µg/m³	41	100	IS 5182 (Part 23)
Particulate Matter (size < 2.5 µm or $PM_{2.5}$ µm)	µg/m³	17	60	**
Sulphur Dioxide (as SO_2)	µg/m³	< 4 µg/m³	80	IS 5182 (Part 2)
Nitrogen Dioxide (as NO_2)	µg/m³	21	80	IS 5182 (Part 6)
Ozone (as O_3)	µg/m³	08	100	* Method No. 411
Lead (as Pb)	µg/m³	< 0.01 µg/m³	1.0	IS 5182 (Part 22)
Carbon Monoxide (as CO)	mg/m³	0.5	02	***
Ammonia (as NH_3)	µg/m³	< 2 µg/m³	400	* Method No. 401
Benzene (as C_6H_6)	µg/m³	< 0.08 µg/m³	-	IS 5182 (Part 11)
Benzo (a) Pyrene (BaP)	ng/m³	< 0.1 ng/m³	-	IS 5182 (Part 12)
Arsenic (as As)	ng/m³	< 0.5 ng/m³	-	**
Nickel (as Ni)	ng/m³	< 2 ng/m³	-	**

ND – Not Detected, BDL – Below Detectable Limit.

Note - As per National Ambient Air Quality Standard dated November 2009, Annual Average of Benzene (as C_6H_6), Benzo (a) Pyrene (BaP), Arsenic (as As) and Nickel (as Ni) are 05, 01, 06 and 20 ng/m³ respectively

* Methods of Air sampling and analysis (Third Edition) – James P. Lodge Jr.

** Guidelines for the measurement of ambient Air Pollutants (Volume I) – CPCB

*** Guidelines for the measurement of ambient Air Pollutants (Volume II) – CPCB

Sample Collected by: Representative of Envirotech East Pvt. Ltd.

for **ENVIROTECH EAST (P) LTD.**

(Asoke Kumar Banerjee)
Director

Envirotech

Envirotech East Pvt. Limited

An ISO 9001:2008, 14001:2004 & OHSAS:18001:2007 Company

- Laboratory Recognised by West Bengal Pollution Control Board

Bengal Ambuja Commercial Complex,
UN-F 13, 1050/1, Survey Park, Kolkata – 700 075
☎ – 2418 8127/8128/8601; Fax – 2418 8128; email: eeplkol@gmail.com, eeplkol2@gmail.com

No. 2018/EEPL/MON/59/206 20.09.2018

MONITORING REPORT

Name of Industry	**M/s. CITRAN CONSULTING LIMITED**
Address	BASIX Group Company, A1-A2, Lewis Plaza, Lewis Road, BJB Nagar, Bhubaneswar - 751014, Odisha
Average Temperature (°C)	28
Weather Condition	Cloudy
Rainfall	28
Avg. Relative Humidity (%)	91
Barometric Pressure (mmHg)	750

AMBIENT AIR QUALITY MONITORING RESULT

Date of Monitoring	21.08.2018
Location Name	Connecting point of Kamaria, Raner and Madaria khal

RESULTS :

Parameters	Unit	Pollutants Concentration	NAAQ Standards	Reference Standard
Particulate Matter (size < 10 µm or PM_{10} µm)	µg/m³	34	100	IS 5182 (Part 23)
Particulate Matter (size < 2.5 µm or $PM_{2.5}$ µm)	µg/m³	13	60	**
Sulphur Dioxide (as SO_2)	µg/m³	< 4 µg/m³	80	IS 5182 (Part 2)
Nitrogen Dioxide (as NO_2)	µg/m³	15	80	IS 5182 (Part 6)
Ozone (as O_3)	µg/m³	7	100	* Method No. 411
Lead (as Pb)	µg/m³	< 0.01 µg/m³	1.0	IS 5182 (Part 22)
Carbon Monoxide (as CO)	mg/m³	0.4	02	***
Ammonia (as NH_3)	µg/m³	< 2 µg/m³	400	* Method No. 401
Benzene (as C_6H_6)	µg/m³	< 0.08 µg/m³	-	IS 5182 (Part 11)
Benzo (a) Pyrene (BaP)	ng/m³	< 0.1 ng/m³	-	IS 5182 (Part 12)
Arsenic (as As)	ng/m³	< 0.5 ng/m³	-	**
Nickel (as Ni)	ng/m³	< 2 ng/m³	-	**

ND – Not Detected, BDL – Below Detectable Limit:

Note - As per National Ambient Air Quality Standard dated November 2009, Annual Average of Benzene (as C_6H_6), Benzo (a) Pyrene (BaP), Arsenic (as As) and Nickel (as Ni) are 05, 01, 06 and 20 ng/m³ respectively

* Methods of Air sampling and analysis (Third Edition) – James P. Lodge Jr.
** Guidelines for the measurement of ambient Air Pollutants (Volume I) – CPCB
*** Guidelines for the measurement of ambient Air Pollutants (Volume II) – CPCB

Sample Collected by: Representative of Envirotech East Pvt. Ltd.

for **ENVIROTECH EAST (P) LTD.**

(Asoke Kumar Banerjee)
Director

Envirotech

Envirotech East Pvt. Limited

An ISO 9001:2008, 14001:2004 & OHSAS:18001:2007 Company

- Laboratory Recognised by West Bengal Pollution Control Board

Bengal Ambuja Commercial Complex,
UN-F 13, 1050/1, Survey Park, Kolkata – 700 075
☎ – 2418 8127/8128/8601; Fax – 2418 8128; email: eepikol@gmail.com, eepikol2@gmail.com

No. 2018/EEPL/MON/59/207 20.09.2018

MONITORING REPORT

Name of Industry	**M/s. CITRAN CONSULTING LIMITED**
Address	BASIX Group Company, A1-A2, Lewis Plaza, Lewis Road, BJB Nagar, Bhubaneswar - 751014, Odisha
Average Temperature (°C)	28
Weather Condition	Cloudy
Rainfall	28
Avg. Relative Humidity (%)	91
Barometric Pressure (mmHg)	750

AMBIENT AIR QUALITY MONITORING RESULT

Date of Monitoring	21.08.2018
Location Name	connecting point of Maja Damodar and Kashmoli Khal

RESULTS :

Parameters	Unit	Pollutants Concentration	NAAQ Standards	Reference Standard
Particulate Matter (size < 10 µm or PM $_{10}$ µm)	µg/m^3	38	100	IS 5182 (Part 23)
Particulate Matter (size < 2.5 µm or PM $_{2.5}$ µm)	µg/m^3	16	60	**
Sulphur Dioxide (as SO_2)	µg/m^3	< 4 µg/m^3	80	IS 5182 (Part 2)
Nitrogen Dioxide (as NO_2)	µg/m^3	17	80	IS 5182 (Part 6)
Ozone (as O_3)	µg/m^3	8	100	* Method No. 411
Lead (as Pb)	µg/m^3	< 0.01 µg/m^3	1.0	IS 5182 (Part 22)
Carbon Monoxide (as CO)	mg/m^3	0.3	02	***
Ammonia (as NH_3)	µg/m^3	< 2 µg/m^3	400	* Method No. 401
Benzene (as C_6H_6)	µg/m^3	< 0.08 µg/m^3	-	IS 5182 (Part 11)
Benzo (a) Pyrene (BaP)	ng/m^3	< 0.1 ng/m^3	-	IS 5182 (Part 12)
Arsenic (as As)	ng/m^3	< 0.5 ng/m^3	-	**
Nickel (as Ni)	ng/m^3	< 2 ng/m^3	-	**

ND – Not Detected, BDL – Below Detectable Limit;

Note - As per National Ambient Air Quality Standard dated November 2009, Annual Average of Benzene (as C_6H_6), Benzo (a) Pyrene (BaP), Arsenic (as As) and Nickel (as Ni) are 05, 01, 06 and 20 ng/m^3 respectively

* Methods of Air sampling and analysis (Third Edition) – James P. Lodge Jr.
** Guidelines for the measurement of ambient Air Pollutants (Volume I) – CPCB
*** Guidelines for the measurement of ambient Air Pollutants (Volume II) – CPCB

Sample Collected by: Representative of Envirotech East Pvt. Ltd.

for **ENVIROTECH EAST (P) LTD.**

(Asoke Kumar Banerjee)
Director

Envirotech East Pvt. Limited
An ISO 9001:2008, 14001:2004 & OHSAS:18001:2007 Company
Laboratory Recognised by MoEFCC, Govt. of India
Laboratory Recognised by West Bengal Pollution Control Board
Bengal Ambuja Commercial Complex,
UN-F 13, 1050/1, Survey Park, Kolkata – 700 075
CIN NO. : U74210WB1989PTC047403
☎ – 2418 8127/8128/8601; Fax – 2418 8128; email: eeplkol@gmail.com, eeplkol2@gmail.com

Water Analysis Report

Code	Sampling Location	Date of sampling
SW 1	Connecting point of Upper Rampur and Harinkhola Khal	21-08-2018 to 23.08.2018
SW 2	Connecting point of Kamaria, Raner and Madaria khal	
SW 3	connecting point of Maja Damodar and Khorigeria khal	

Sl. No.	Parameter	Unit	CODE : SW1 - SW3		
			SW1	SW2	SW3
1	pH		6.7	6.6	6.9
2	Conductivity	µmhos/cm	423	502	408
3	Dissolved Oxygen	mg/L	6.4	6.2	6.5
4	Biochemical Oxygen Demand (3 days at 27°C)	mg/L	3	5	3
5	Total Coliforms	MPN/100 ml	2442	3214	2229
6	Total Dissolved Solids	mg/L	248	287	234
7	Chloride (as Cl)	mg/L	74	102	85
8	Sulphate (as SO_4)	mg/L	17	22	13
9	Nitrate (as NO_3)	mg/L	1.9	2.6	1.4
10	Fluoride (as F)	mg/L	0.32	0.25	0.21
11	Calcium (as Ca)	mg/L	29	35	25
12	Magnessium (as Mg)	mg/L	10	13	15
13	Sodium (as Na)	mg/L	45	50	35
14	Iron (as Fe)	mg/L	0.11	0.08	0.07
15	Zinc (as Zn)	mg/L	<0.05	<0.05	<0.05
16	Arsenic (as As)	mg/L	<0.002	<0.002	<0.002
17	Lead (as Pb)	mg/L	<0.05	<0.05	<0.05
18	Cadmium (as Cd)	mg/L	<0.01	<0.01	<0.01

for **ENVIROTECH EAST (P) LTD**

(Asoke Kumar Banerjee)
Director

Envirotech

Envirotech East Pvt. Limited
An ISO 9001:2008, 14001:2004 & OHSAS:18001:2007 Company
Laboratory Recognised by West Bengal Pollution Control board
Bengal Ambuja Commercial Complex,
UN-F 13, 1050/1, Survey Park, Kolkata – 700 075
CIN NO. : U74210WB1989PTC047403
☎ – 2418 8127/8128/8601; Fax – 2418 8128; email: eeplkol@gmail.com, eeplkol2@gmail.com

No. 2018/EEPL/MON/59/209

20.09.2018

NOISE LEVEL MONITORING

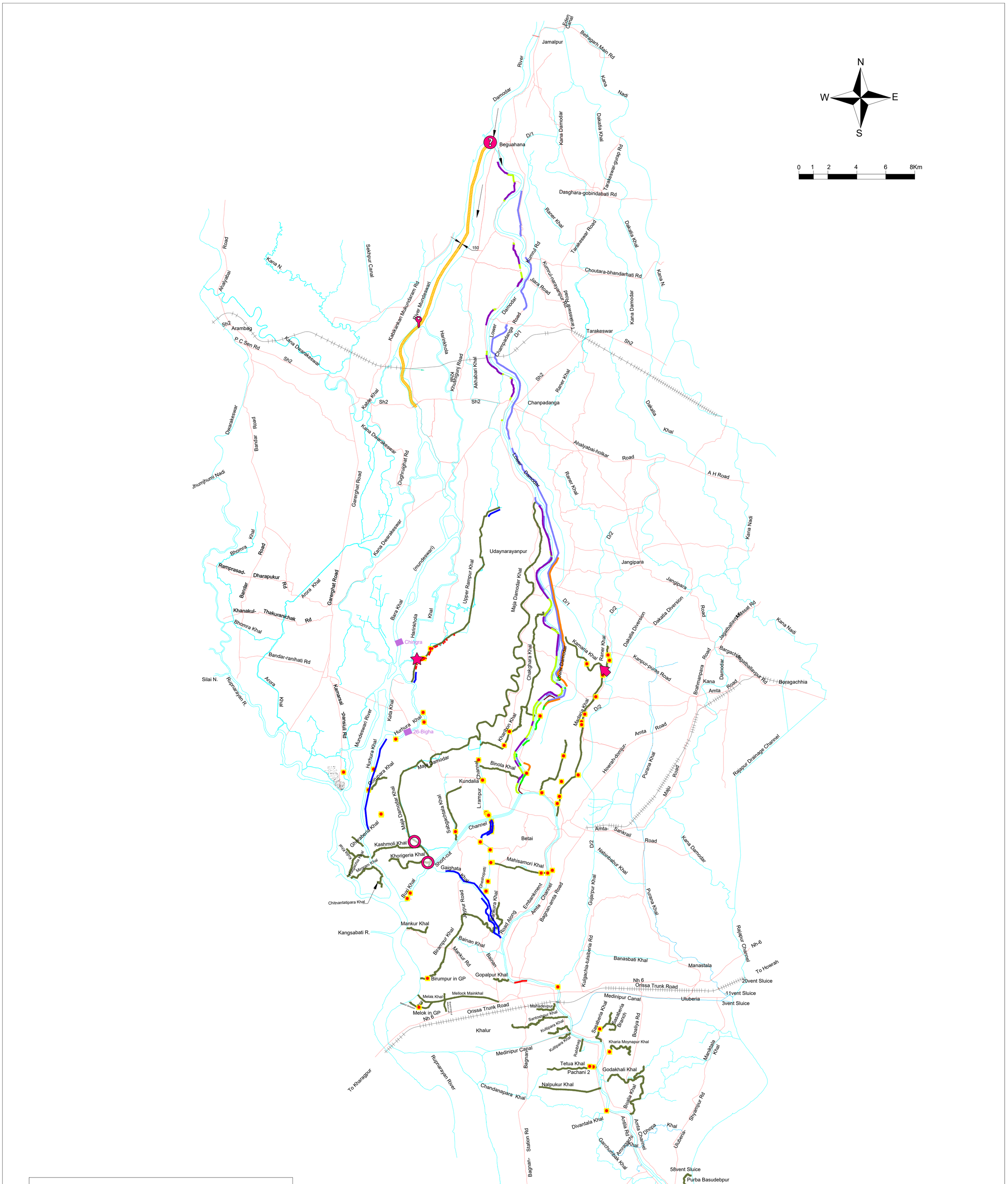
Name of Industry	**M/s. CITRAN CONSULTING LIMITED**
Address	BASIX Group Company, A1-A2, Lewis Plaza, Lewis Road, BJB Nagar, Bhubaneswar - 751014, Odisha
Date of Monitoring	23.08.2018

CODE	SAMPLING LOCATION	EQUIVALENT NOISE LEVEL, L_{eq} in dB(A)
		DAY TIME (Avg.)
N- 1	Bifurcation point of Mundeswari and Damodar Canal	47
N- 2	Connecting point of Mundeswari river and Harinkhola Canal	54
N- 3	Connecting point of Upper Rampur and Harinkhola Khal	51
N- 4	Connecting point of Kamaria, Raner and Madaria Khal	49
N- 5	Connecting point of Maja Damodar and Kashmoli Khal	55

for **ENVIROTECH EAST (P) LTD.**

(Asoke Kumar Banerjee)
Director

Annexure- 17(b): Map showing Baseline Environmental Monitoring location



Name of Client : Government of West Bengal Irrigation & Waterways Department	Project Name: Preparation of Feasibility Study, Detailed Engineering Design and Bidding Documents for Irrigation Rejuvenation and Flood Management in the Damodar Command Areas and Lower Damodar Sub-Basin in the State of West Bengal in India (WBMIFMP)	Name of Consultancy Firm : Eptisa Servicios de Ingenieria S.L.(Spain) In association with Eptisa India Pvt. Ltd.	Drawn By: B. Das Checked By: D. K. Maiti Approved By: R. Chakraborty	Drawing Title:- Proposed Interventions of Flood Modernization	Drawing No.: EIPL/MAP/DFSR/08	Date: July-2018 Revised R0

Sampling Plan

Location	Symbol Shown in Map	Location Description	Sample of	Sample collection description	No. of Sample
Location 1		Bifurcation point of Mundeswari and Damodar (Amta) Canal	Air		1
			Soil	Sample drawn from Mundeswari river bed	1
			Noise		1
Location 2		Connecting point of Mundeswari river and Harinkhola canal	Air		1
			Soil	Sample drawn from Mundeswari river bed	1
			Noise		1
Location 3		Connecting point of Upper Rampur and Harinkhola Khal	Air		1
			Soil	Sample drawn from bed of canal at this point	1
			Noise		1
			Canal Water	Canal water shall be collected from this point	1
Location 4		Connecting point of Kamaria, Raner and Madaria khal	Air		1
			Soil	Sample drawn from bed of canal at this point	1
			Noise		1
			Canal Water	Canal water shall be collected from this point	1
Location 5		Either from connecting point of Maja Damodar and Kashmoli khal or connecting point of Maja Damodar and Khorigeria khal	Air		1
			Soil		1
			Noise		1
			Canal Water	Canal water shall be collected from this point	1
Total (5 Location)					18

Annexure- 18: Photo graphs of ESIA study

BOTH SIDE ENCROACHMENT ON OF DAMODAR LEFT EMBANKMENT

Figure 5: Double floored pucca house located on country side crest line of Damodar left embankment at Santoshnagar

Figure 6: Soni mandir located on country side crest line of Damodar left embankment at Santosh Nagar

Figure 7: Sameswar Agriculture Co-operative bank located at country side toe line of Damodar Left Embankment at Sameswar

Figure 8: Abandoned building foundation located on country side toe line of Damodar left embankment at Rashpur

Figure 9: Burning ghat located on set back zone of Damodar left embankment at Dayal Mansha tala

Figure 10: Campus of Dayal Mansha tala burning ghat campus

Figure 11: House located on river side crest line of Damodar left embankment at Sameswar

Figure 12: Ramkrishna Mandal B.ED collage located on country side crest line of Damodar left embankment at Rashpur

Figure 13: Balaksangha mandir located on country side loe line of damodar left embankment at Rashpur

Figure 14: Electric transformer located on country side crest line of Damodar left Embankment at Rashpur Paschim (West) Para

Figure 15: Burning ghat located on country side crest line at Bhona

Figure 16: Semi-pucca house located on river side toe line of Damodar Left embankment near Baliachak

Figure 17: Cultivation on setback zone of Damodar left embankment near Bagoya

Figure 18: Sugarcane cultivation on setback of Damodar left embankment zone at Balichak

Figure 19: Burning ghat located on setback zone of Damodar left embankment near Kalyan chak

Figure 20: Kali mandir located on setback zone of Damodar left embankment at Simchak.

Table 1: Both side Encroachment on Damodar Right Embankment

Both side Encroachment on Damodar Right Embankment	
 *Figure 21: Household toilet constructed within setback zone of Damodar Right embankment near Tokapur River Lift point*	 *Figure 22: View of Damodar Right embankment near Tokapur Purba (East) Muslimpara Para*
 *Figure 23: House located within setback zone of Damodar Right embankment near Tokapur River Lift point*	 *Figure 24: DGPS survey in process on Damodar Right Embankmnt near Tokapur Tokapur Purba (East) Muslimpara Para*

Figure 25: Bokpota Eco park located adjacent to country side toe line of Damodar right embankment at Bokpota

Figure 26: Site office with labour camp of Mackintosh Burn Limited on setback zone of Damodar Right Embankment for construction of river over bridge at Bokpota

Figure 27: Bedi located on river side crest line of Damodar Right embankment at Shibani para

Figure 28: Omkarnath ashram located on setback zone of Damodar right embankment at Akna

Figure 29: Abandoned house located on setback zone of Damodar Right embankment near Akna Omkarnath Ashram

Figure 30: Semi pucca house located adjacent to right site embankment of damodar river near Samanta Para of Joynagar

Figure 31: Burning ghat located on setback zone of Damodar Right embankment near Akna Omkarnath Ashram

Figure 32: Semi pucca house located on setback zone of Damodar Right embankment near Samanta Para of Jaynagar

Table 2: Both side encroachment on Upper Rampur khal

Encroachment on Left Embankment of Upper Rampur Khal	
	
	

Table 3: Encroachment over Left embankment of Hurhura Channel

Encroachment over Left Embakement of Hurhura Channel	
 	

Table 4: Sacred Grove on Left Embankment of Upper Rampur Khal

Figure 33: Sacred grove (300 years old Baniyan Tree) on upper rampur left Eambankment at Bhut Bhanga More (No project activity is proposed in this area)

Table 5: Canal Water Pollution on Upper Rampur Khal

 *Figure 34: Jute rotting activity on Upper Rampur Khal*	 *Figure 35: Jute rotting activity on Upper Rampur Khal*
 *Figure 36: Canal Water Pollution in Upper Rampur Khal*	 *Figure 37: Canal Water Pollution in Upper Rampur Khal*

Table 6: Scenario of Mundeswari River in the Month of September, 2018

Scenario of Mundeswari River

Figure 38: Bifurcation point of Mundeswari and Amta Channel (Damodar)

Figure 39: View of Mundeswari River in the month of September, 2018

Figure 40: View of Mundeswari River near Markunda Village in the month of September, 2018

Figure 41: Mundeswari river at Aruna Bera (Up to which dredging is proposed)

Figure 42: Mundeswari river at Aruna Bera (Up to which dredging is proposed)

Table 7: Monsoon Agricultural Practice in Howrah District

Figure 43: Spraying of pesticide during monsoon cultivation near feri ghat at Dihivut (on country side of Damodar Right embankment)

Figure 44: Cultivation of Taro root during monsoon season near feri ghat at Dihivut (on country side of Damodar Right embankment)

Figure 45: Monsoon cultivation of paddy on breach affected -2017 (5 feet sand deposited on almost 33 Acre agli land)country side, located opposite side of River Lift pump house at Dihivut

Figure 46: Monsoon paddy cultivation on Damodar Right setback zone near River Lift pump house at Dihivut

Figure 47: Uncultivated river side agri-land of Damodar right embankment during monsoon - due to heavy sand deposition

Figure 48: Pesticide Spray machine (near Muslim para at Dihivut - Damodar Right embankment)

Figure 49: Uncultivated (during monsoon) setback zone of Damodar right embankment located near Ghola Karmakar para

Figure 50: Pig Grazing by women during monsoon on setback zone of Damodar Right Embankment nearby River Lift pump house at Dihivut

Figure 51: Pesticide use by farmers - near to Muslim para of Dihivut (Damodar Right embankment)

Figure 52: DGPS survey in process on Damodar Right Embankmnt near Tokapur Tokapur Purba (East) Muslimpara Para

Table 8: Picture on Inundation and breaching

Inundation and breaching

Figure 53: Ring band protection with Gunny bag at breach point (during 2017) of Damodar Right Embankment near Tokapur River Lift point

Figure 54: Cattle washing on river side inundated area of Damodar Right embankment near Tokapur Purba (East) Muslimpara Para

Figure 55: Inundated agri land located on setback zone of Damodar Right embankment near Tokapur Purba (East) Muslimpara Para

Figure 56: Wave breaker (country side) provided on spill zone located on Damodar Right Embankment at Shibani para

Figure 57: Breach point (2017) of Damodar Right dwarf embankment located near Tokapur River Lift point

Figure 58: Bathing ghat on Damodar Right embankment at Tokapur Purba (East) Muslimpara Para

Annexure- 19: MoM on ESMP Consultation & sharing workshop

Minutes of meeting on "Consultation and Sharing Workshop on Environmental and Social Management Plan (ESMP) of West Bengal Major Irrigation and Flood Management Project (WBMIFMP)"

This meeting was held on Friday 16th November 2018 at Coference Hall, 12th Floor of "Subhannya", SGO Complex, Salt Lake City, Kolkata-700064, with the Welcomes Addressed by Mr. Subir kumar Laha, Chief Engineer and Project Director, SPMU-WBMIFMP, IW&D, Government of West Bengal. He welcomed the delegates from IWD, Line departments, Local Self-governance Institute, ESIA & FS consultant, NGOs representatives, Sand mining & construction company, farmers, educational institute. CE&PD has narrated project objectives with background and objective of "Consultation and Sharing Workshop on Environmental and Social Management Plan (ESMP)". ESIA consulting team was asked to present proposed ESMP specially designed for this WBMIFMP project.

Mr. Kader Mirdha (Consultant) on behalf of CTRAN Consulting has presented the project activity specific ESMP through Power Point Presentation with support by Mr. Saroj Nayak (Vice President) of the CTRAN and IWD officials. Mr. Subrata Chottopadhaya (APD- SPMU) has described project activities under Irrigation Management components. Baseline findings of environmental and social features were described elaborately. The house has silently observed anticipated impact due to project intervention and proposed management plan to mitigate adverse environmental & social impacts. Entire presentation and consultation were carried out in local Bengali language.

Table 9: Participants Feedback on the work-shop programme

SN	Name of the Participants	Institution / Organization	Issue Raised	Reply/ Addressed in ESMP
1.	Mr. Rajarshi Chakrabarty	Environmental Officer Environmental Dept., GoWB	He appreciated the proposed ESMP with suggestion to incorporate detail compensatory afforestation plan at 1: 5 ratios against felling of 744 nos. tree with more than 50cm GBH. Afforestation location with suitable species shall be specified in plan. He also enquires about implementation mechanism of afforestation plan.	Responsibility of afforestation is given to implementing contractor. Avenue plantation will be done alongside of earther embankment where there is no PCC block lining. However, contractor will prepare site specific plan in consultation with local people and IWD and engage Forest Dept. for compensatory plantation.
2	Dr. Prakash Pradhan	Research Assistant, West Bengal Bio-diversity Board, GoWB	Suggested to consult with the bio-diversity board for identification of probable impact on flora and fauna community and mitigation measures. He also suggested to promote indegenious trees, crops instead of hybrid crops, trees. The community seeds bank may be incorporated in the project activity plan. During de-siltation of cannel, the fish breeds may be affected, whether the ESMP	Official of Biodiversity board were consulted on 26th October, 2018 at there office located at 5th Floor, Animal Husbandry building. They have suggestes to consider impact on Fishing Cat, Mongoose, Asian Small Clawed Otter, Fresh Water Turtles/Terrapins, Jungle Cat, Jackal, Monitor Lizard, etc., in addition to several species of birds including the White-eyed Pochard.

SN	Name of the Participants	Institution / Organization	Issue Raised	Reply/ Addressed in ESMP
			has provision to address any such impact.	Impact on these endangered/ threattend species are idenfied and mitigation plan is proposed accordingly. Desiltation activities are proposed to be implemented during day time. Vibration arrangement to be made by contractor to allow species to come out from cave and migrate to nearby bush. Mixed plantation with locally grown tree species is proposed for afforestation. Improved varities of locally grown high value crop will be promoted under this project. Developing community seeds bank is not part of this irrigation project. Community seeds bank may be promoted under other project of Agri-marketing department. Desiltation activities will be carried out only during non-monsoon period. However, consultation with Dept. of Fishery has revailed non-presence of any such natural breeding point on Mundeswari river as it remains almost dry even during monsoon period, until the discharge is more than 40,000 cusec.
3	Priya Hazra	Project Associate, WWF India, West Bengal State Office	Possibility of dolphin's seedling in Damodar river during monsoon shall be examined properly. In general, Dolphin gets badly injured during their movement in the sluice gate.	Portion of Mundeswari river where desiltation is prposed remains dry even during monsoon period except water in few pockets. Consultation with Bio-diversity board has not revailed any such possibility of Dolphine in Damodar river. Moreover, dry desiltation will be adopted only during non-monsoon period.
4	Monoj Porel	Project Co-ordinator, Itarai Asha Deep Foundation, NGO-Udaynarayanpur-II	There may be social issues like women trafficking, sexual harassment in the work place during project implementation. Management plan need to consider this such activities in advance.	Workers camp site is proposed atleast 500 meter away from nearny habitation. Contractor will provide seperate toilet facility for women workers. Security guard will be posted at each camp site to restrict movement of local people within camp site.
			One of project blocks in Howrah district has been affected by Arsenic. The safe drinking water facilities shall be provided to all community and workers.	This does not come under perview of project. However, contractor will provided safe drinking water to all of its workers.
5	Rupchand Bera	*Savapati*, Amti-II, Howrah Dist.	Aggrieved village people may not come down to DPMU/ SPMU office each time. He suggested to include Panchayet Samiti and Zila	Bottom level of PRI system i.e Gram Panchayat is given 1st tier responsibility for greavance redressal. This is very common practice in West Bengal.

SN	Name of the Participants	Institution / Organization	Issue Raised	Reply/ Addressed in ESMP
			Parishad as second and third tier of greavance redressal nodal point.	GP member may resolve any greavance in consultation with other PRI members at higher level.
6.	Mr. Sudarshan Gupta	Propitor (Sand Miner), Loknath Estate & Export Pvt Ltd.	In Mundeswari river, layer wise desiltation may be carried out to reduce burden of disposal of desilted material. Sand layer and soil layers may be segregated in this way at source itself. Soil mixed sand material will be used in filling purpose and sand material will be used for construction purpose. He also suggested to disclose phase wise desiltation plan to public in advance.	The CE & PD did not agreeed with layer wise desiltation activity. He further added saying, matter was already discussed during project formulation stage and discurred owing to non techno-economic feasible option. However, matter will further be discussed during meeting with interested bidding contractor. If contractors can come up with feasible techno-economic solution, matter will be considered and included in bidding condition. 5 – 19 km. chainage of Mundeswari River will be desilted in 1st phase and remaining portion in 2nd phase.
7.	Mrs. Salma Murmu	Secretary, *Shibnibas Adivasi Women Development Society* (NGO), Sonamukhi, Bankura	*Adivasi* population leaving in the high land area in Sonamukhi district do not receive sufficient irrigation during non-monsoon period. Farmers of Sonamukhi faces elephant attack on agriculture firm.	Canal resectioning, slope lining and renovation of existing irrigation structures are proposed to improve irrigation facility. Irrigation devision has nothing to do with elephant attack. Matter may be placed before forest department.
8.	Dr. Kamal Alam	Core Support Scientist, Pralit Roy Environment & Education Trust	He critically reviewed the proposed project interventions and appreciates the ESMP.	
9.	Banibrata Hait	Fisherman, Khanakul-II, Hooghly	Portions of earthen embankment are badly affected by Rat. There should be concrete lining of entire embankment.	Entire stretch can't be PCC block lined with available fund. Critically afftected portions are selected for PCC block lining.

Participants list

Consultation and Sharing Workshop on Environmental and Social Impact Assessment (ESIA) and Management Plan of West Bengal Major Irrigation and Flood Management Project (WBMIFMP)

Organised By: SPMU- WBMIFMP, Irrigation & Waterways Department, Govt. of West Bengal
Facilitated By: CTRAN Consulting Limited (www.ctranconsulting.com)

Date: 16th November, 2018 Time: 11:30 AM

Venue: Conference Hall at 12th Floor of "Subhannya", SGO Complex, Salt Lake, Kolkata- 700064, Salt Lake.

Attendance Sheet

Sl. No.	Name of Participant	Institution Name/ Department	Designation	**Type of Participant** (NGO/ SHG/ FPO/ FPC/ Fisherman/ Farmer/ Sand Miner/ Contractor/ Govt. Service/ Educational Institute/ Consultant)	Contact No	e-mail ID	Signature
1.	Subir Kumar Lahe	I & W. D.	CE & PD.		9431416423		
2.	D.K. Maiti	EPTISA	DTL	Consultant	9831185139		
3.	Mayuraksha Bardhan	River Research Institute, W.B, I & W Dte.	Dy Director (Hydraulics)	Govt. Service	9432100700	ochclnmiwb@gmail.com	16/11/18
4.	Pranab Kr. Ghosh	CTRAN Consulting	Project Coordinator	Consultant	9932116130	pranab99@gmail.com	
5.	Amitava Mondal	CTRAN Consulting Ltd.	FPO Coordinator	Consultant	9681283475	amitava.dal89@gmail.com	
6.	Sudarshan Gupta	Lokenath Estate & Export Pvt. Ltd.	Shareholder, Manager	Sand Miner	9051451367	info@lokenath.in	
7.	Prasanta Kr. Maity WBCS (Exe)	District Collectorate Howrah.	Dy. DLR LRO, Howrah.	Govt. Service	8336916366	dydlrohowrah@gmail.com	16/11/18
8.	REKHA MONDAL, SRO-II	ADM (LR) OFFICE, HOOGHLY	SRO-II, ADM & DL&LRO OFFICE, HOOGHLY	GOVT. SERVICE	7797016346	dlrohooghly@gmail.com	16.11.18

Sl. No.	Name of Participant	Institution Name/ Department	Designation	Type of Participant (NGO/ SHG/ FPO/ FPC/ Fisherman/ Farmer/ Sand Miner/ Contractor/ Govt. Service/ Educational Institute/ Consultant)	Contact No	e-mail ID	Signature
9.	MONOJ POREL	Hazrai Asha Deep	Co-ordinator	NGO	9732986143	Hazraiashadeep @ yahoo.com	M. Porel.
10.	TAPAN KUMAR HAZRA	F.P.O.	Farmer	Farmer	8348536653		Tapan Kr Hazra
11.	MD NAZRUL ISLAM	Nutanhat Secretary Nutanhate Hospitalpara Khadi Unnayan Samity P.O.-Nutanhat, Dist.-Burdwan Pin-713147 (W.B.)	Secretary, (NGO)	NGO/VO	9674967186, 03453-266426	nkkus.ngovo@gmail.com.in	16.11.2018
12.	SAILAU DDIN	KAIRAPUR WELFERE SOCIETY	Member	NGO	8617002741		
13.	Priya Hazra	WWF India, WBSO	Project Associate	NGO	8700435243	hazrapriya1@gmail.com	Hazra
14.	Subhra Khan	Hooghly Divn P.W.D., Govt. of W.B.	Assistant Engineer (Civil)	Govt.	9073362594	acpwdusd@gmail.com	16/11
15.	Salma murmu			N.G.O.	9434392591	samas Bankura @ rediffmail.com	16.11.18
16.	Rajarshi Chakraborty	Environment Deptt	Environment Officer	Govt	23355220	environmentwb @gmail.com	
17.	Prakash Pradhan	W.B Biodiversity Board	Research Asst.	Govt	7908106469		
18.	S. Chattopadhyay	SPMU, WBMIFMP I&WD, Govt	Addl. Pri. Director - II	Govt.	9123906386	sbrata10@gmail.com	
19.	L. K. Mandi	Addl. Director of Agriculture (C) W.B. Agriculture	Addl. Director of Agriculture (PC) W.B.	Govt.	9932734238	ada.spec.ab2018 @gmail.com	16.11.18
20.	J. Dutta	I&W Deptt	Ex. Engr/ Hooghly (1) Division	Govt Deptt.	9830706653	hooghlyid@gmail.com	

Sl. No.	Name of Participant	Institution Name/ Department	Designation	Type of Participant (NGO/ SHG/ FPO/ FPC/ Fisherman/ Farmer/ Sand Miner/ Contractor/ Govt. Service/ Educational Institute/ Consultant)	Contact No	e-mail ID	Signature
21.	Paritha Rani	SHG Hooghly Co-ordinator Agragati Mahila Sangha	Co-ordinator	SHG	9474861643		
22.	Supriya Dhara	Agragati Mahila Sangha Prathamik B.S.S. Ltd.	SC	SHG	9474802651	agragatimohila@gmail.com	S. Dhara
23.	Sk. Asraf Ali	ADM (LR) Office Purba Bardhaman	SRO-II	Govt. employee	7001500277	asraf.ali2012@gmail.com	16-11-18
24.	Rupchand Bera	Sarapati Amta-II Howrah	Sarapati	Social Service	9732529049	—	16/11/18
25.	Sk Jakir Hossain	Hooghly			7797829393		SHossain
26.	Tapan Samanta	Sand mine Leaseholder	Hooghly	Sand miner	9609566909	tapan G mail 1965	T. Samanta
27.	Nurul Mondal		"	Sand mafia	7797837676		
28.	Diganta Maity	I & WD	Dy. PD (Civil) IV SPMU, WBMSFMP	Govt. Service	9433066850	diganta.maity@rediffmail.com	
29.	Prasanta Kumar Hait		Hooghly	Sand Mining	9433249885	Prasantadeltibalpur@rediffmail.com	
30.	Dr. Kamal Adak	Pratit Roy Environment & Education Trust	Core Support scientist	NGO, Hooghly	9434316519	dr.adak1974@gmail.com	16/11/18
31.	Soumya Sundar Bhattacharya	TWD	DPD-VI DPMU-II	Govt.	9433426104	dpd6.spmu@gmail.com	
32.	Amit Pakira	PWD	JE	Govt. Service	9433997287		

Sl. No.	Name of Participant	Institution Name/ Department	Designation	Type of Participant (NGO/ SHG/ FPO/ FPC/ Fisherman/ Farmer/ Sand Miner/ Contractor/ Govt. Service/ Educational Institute/ Consultant)	Contact No	e-mail ID	Signature
33.	Sanoj Nayak	CTRAN consulting	UP	corpaitant-	9437326787	Sanoj.cantnyak@ctran consulting.com.	16/11/2018
34.	Tarun Kr Ballav	IQW Dte	DPD - V	Govt. Service	9434619479		16/11/18
35.	Sudip Halder	I & W D &	DPD(Civil)-I	Govt. Service	9433130851	dpd. spmu @ gmail.com	16/11/18
36.	Bambarala Hait	BLOCK = KHANAKUL - 2		FISHERMAN	9734373358	amitrabarala @ com.	16/11/18
37.	Bipasdut Chakrabarty	Addl. P.D. DPMU - II	WBMIFMP I & W Dte	Client	9433013548		16/11/18
38.	Kadir Mridha	CTRAN Consulting	Consultant	Consultant	8337932884	Kadir.mridha @ctranconsulting com	
39.							
40.							
41.							
42.							
43.							
44.							

Annexure- 20 (a): MoM with Sand Miners Regarding Utilization of Desilted Material

GOVERNMENT OF WEST BENGAL
OFFICE OF THE ADDITIONAL DISTRICT MAGISTRATE AND
DISTRICT LAND & LAND REFORMS OFFICER, HOOGHLY
JIBAN PAUL'S GARDEN, HOOGHLY - 712103
PH. – (033) 26802097/98, FAX – 91-33-26800578
Email : dllrohugli@gmail.com

Proceeding of meeting held at the chamber of the Additional District Magistrate and District Land & Land Reforms Officer, Hooghly on **05.09.2018** in connection with utilization of bed materials which will be obtained from desiltation from Mundeswari River, Hooghly

Members Present

Sl. No.	Name	Designation		Sl. No.	Name	Designation
1	Dr. Rajat Nanda	ADM & DL & LRO, Hooghly		11	Sk. Abdus Sattar	Mahaprabhu Enterprise
2		Executive Engineer, Irrigation & Waterways, Hooghly		12	Sk. Mosaraf Hossain	New Madina Marbel
3	Mrinal Roy	Superiantendent Engineer & Addl. Project Director-II, I & W Dte.		13	Sita Ram Sannte	Alam Enterprise
4		Additional Project Director-IV, DPMU-II, WBMIFMP		14	Arup Kumar Ghosh	Unik Brick Field
5	Somenath Ghosh	A.E/Mundeswari(I) Sub-Division		15	Sk. Md. Alinawaz	Serina Construction
6	Sri Sudarshan Gupta	Lokenath Estate & Export Pvt. Ltd.		16	Sk. Abdus Sattar	
7	Kajal Ghosh			17	Tapan Kr. Samanta	EXCELL MOVERS
8	Sk. Abdur Sattar			18	Sk. Nizam Uddin	Apanjan Supplier
9	Prasanta Kumar Hait			19	Dipak Maiti	Consultant EPTISA(I) Ltd.
10	Tanmoy Kumar Roy					

The Additional District Magistrate and District Land & Land Reforms Officer, Hooghly took the chair and the meeting started. At the onset Executive Engineer, Irrigation brief the details of the project i.e. desiltation or excavation from the Mundeswari River bed. He said that the work of excavation will be conducted in two phases. He further briefed that the work of delineation of the zone of mining in the Mouza Map is being conducted jointly by the team of Irrigation & Land and Land Reforms Department.

In the 1st phase which will take approximate 1(one) year time and will cover region of 12 KM. 35 Lakhs cubic meter of sand (river bed material) will be desilted. This meeting has been necessited for chalking out disposal plan of the materials that will be excavated. The Lessees (sand mining) and the prospective sand miners were given offer to dispose the excavated materials from the project site or from a suitable location that will be decided by the Irrigation and Waterways Department and which will fall within 5(five) KM of the site of excavation.

Contd.....2

The sand miners opined for extraction of bed materials by themselves to segregate the bed materials according to classification and grain size, i.e. either sand or mixture of sand, silt and clay for effective and use. It was opined by the IWD officials that such a condition may affect the work plan and also the specification of the work and therefore, may not be acceptable to the IWD. The preferred option would be to do the excavation by the IWD agencies and transportation of the excavated materials by the sand miners from site. IWD officials assured to address the concerns of the Sand miners, keeping in view the need of ;end use of the excavated materials, to the extent feasible. This proposal of the IWD was finally accepted.

The lease holder and prospective miners were asked to submit formal proposals by Monday i.e. 10.09.2018 in writing. While submitting their willingness, they will cover the following points;-

a) The minimum amount of sand/river bed materials the sand miner will be able to and will dispose monthly.
b) The point or site from which the sand miner will collect the sand and the route they will follow.
c) Infrastructural support that will be required by the sand miner for disposition of the excavated material.
d) Any other note of interrogation.

It was made clear from the chair that as is usual the sand miner will get the sand on pre payment of Royalty & Cess alongwith other contributions as usual in case of mining. The said payment will be realized at the end of BL & LRO concerned.

It was further decided that after receipt of proposals from the sand miners the next course of action will be decided.

The meeting ended thanks from the chair.

Additional District Magistrate &
District Land & Land Reforms Officer, Hooghly

Memo No.IX-08/Earth Extr. Mundeswari/ 5101/1(3) /MM. Date- 10-9-18

Copy forwarded to:-

1) The District Magistrate, Hooghly for kind information.
2) The Executive Engineer, Hooghly Irrigation & Waterways Division, Hooghly.
3) The Additional Project Director IV, DPMU-II, WBMIFMP.

Additional District Magistrate &
District Land & Land Reforms Officer, Hooghly

Annexure- 20 (b): Proposal by Sand Miners Regarding Utilization of Desilted Material

To
11.09.2018
ADM & DL & LRO,
Hooghly,
Dist-hooghly

Sub: disposal of excavated river bed material of the river mundeswari proposed to be executed in year 2019 dist Hooghly

Ref: 1. Mail dated 04.09.18. Memo No. IX-08/Earth Extr. Mundeswari/4971/MM dated 04.09.18
2. Mail dated 11.09.18. Memo No. IX-08/Earth Extr. Mundeswari/5101/1(3)/MM dated 10.09.18

Respected sir,

As per information received from office of ADM & DL & LRO, HOOGHLY in a meeting held on 05.09.18, the river mundeswari will be excavated in year 2019, covering a span of 19 km, width 150mt and depth 3m.

Lokenath Estate & Export Pvt. Ltd., a private limited company having registered office at 582, D.H.Road, Behala, Kolkata-700034, carrying out business of supplier of building raw material to leading construction and real estate companies like Larsen & Toubro Limited, Simplex Project Limited, Simplex Infrastructure Limited, Ideal real Estate, Diamond group, DTC group, RVNL Metro rail under construction in kolkta and many others , Fly Ash Brick Manufacturing at Aamtala dist:24 Parganas South, Sand minning at Mouza Chandur Dist Hooghly,Sand Minning Mouza Hatsimul, Srirampur, Haripur Dist Purba Bardhaman.

Lokenath Estate & Export Pvt. Ltd. is keenly interested in procuring the job of disposal of river bed material, expecting the plan of material disposal would be for a period of one year approximately and expected quantity of materials 35,00,000 m^3 consisting of sand silt soil pebbles and other materials.

So material to be disposed for filling purpose in a period of 12 months which comes to about 2,91,666m^3/month which would be 9,722m^3/day. Expecting height of stored heap of 5m, daily 1,944m^2 or 0.480 acres of land would be required for stock of materials, and for stock of 30 days land required would be 14 acres or 44 bighas approximately.

In view of the large scale job of disposal of excavated riverbed material, Lokenath Estate & Export Pvt. Ltd. intends to execute the job in association with the following firms:-

a) Excel Movers, having registered office at Village-Masinan ,
P.S- Pursurah, P.O.- Sodepur, Hooghly-712 415, doing business of supplier of building raw Materials, transportation, minning of Sand at Mouza- Chahbense Dist.- Hooghly,
And also sand minning at Mouza- Srirampur, Hatsimul, Dist.- Purba Burdwan.

b) Prasanta Kumar Hait, having registered office at Village- Dehibatpur, P.O.- Alati,
P.S.- Pursurah, Dist.- Hooghly, Pin Code- 712 414, doing business of lifting Sand from River, selling of Sand, drezzing in river, Government Contractor, Sand minning at Mouza- Baikunthapur, Dist.- Hooghly.

c) Uttam Samanta, having registered office at, Village- Masinan, P.S.- Purusrah, P.O.- Sodepur,

Hooghly- 712 415, doing business of transportation, supplier of building raw material and minning sand at Mouza- Narasinhapur, Dist.- Purba Burdwan.

d) Sudarshan Gupta, having registered office at 582, Diamond Harbour Road, Behala,Kolkata- 700 034, doing business of transportation , supplier of building raw materials, Sand minning at Mouza- Becharhat, Srirampur, Hatsimul, Dist.- Purba Burdwan.

In this disposal of river bed material some of the major problems would be dealt with as follows:-

1. Daily around 850 truck load material has to be disposed. Each dumper expecting to do 10 trips, so around 85 trucks will be required. We keeping in mind unforeseen circumstances will be recruiting 120 dumpers from transporters.

2. In order to load dumpers and trucks effectively and smoothly we need loading pokhland. We would ne requiring about 12 pokhlands of model 210 Komatsu. We are already running 6 such machines currently. We have already finalized discussion for recruiting 12 such pokhlands.

3. Land would be required minimum 50 bighas for ease of activities & securities. Land can be made available alongs side the currently passage of following river which are sketch as river in mouza map but over years river has shrunk to much leaser width. Apart from this, land would be acquired by general public at a higher rate even its available beyond the distance of 5km. We have finalized dealing with land owners in adjoining mouzas near mundeswari river excavation site, the details of which are as follows:

MOUZA	BANK	ACRE	BIGHA	DISTANCE (Approx.)
1. MAYAPUR	WEST	21.66	65	5 KM
2. MALAYPUR	WEST	16.33	49	3 KM
3. ALATI	EAST	7.33	22	4 KM
4. DEULPARA	EAST	10.00	30	5 KM
5. BAIKUNTHAPUR	EAST	11.66	35	5 KM
6. SOALUK	EAST	10.00	30	2 KM
7. BACHANARI	WEST	6.00	18	3 KM
8. KESHABPUR	WEST	5.00	15	5 KM
9. ARUNBERA	EAST	7.33	22	4 KM
10. DAKSHIN RASULPUR	WEST	6.00	18	5 KM
11. FATEPUR	WEST	5.00	15	3 KM
12. GOLAMICHAK	EAST	6.66	20	5 KM
		112.97	339	

4. One of the biggest problem would be accessible approach metallic roads to excavated sites along side the river. Such roads will bear the load of 1000 trips of loaded trucks daily which will further damage the road. So road with huge extra strength need to be built by government. Damaged roads to be repaired immediately by government otherwise smooth flow of trucks will be hampered. In case of break down of lorry passage will be block disrupting communication so wider road would be required.

On 05.09.18 at the meeting at office of ADM & DL & LRO, Hooghly, a total of 7 roads were demarcated in mouza map for transportation of riverbed material. We will be using all these roads for transportation of riverbed material. In addition to it, we have identified another approach road to riverbed which is owned privately and have convinced the owners to allow us for transportation of riverbed material. This private road also needs to be developed into metallic road by government for smooth flow of dumpers.

We would be glad to collect material from riverbed itself provided strong approach passage to excavation site is made available to us.

5. If strong 4G internet service can be made available along the path of excavation in riverbed and adjoining 5km region, it would not only help us in smooth disposal of excavated riverbed material but will also help the agency excavating the riverbed. Global Companies that would compete for the tender would be happy to compete for the tender if strong internet facility is available in the zone. It will create a stronghold of the management with real time exploration possible remotely at regional and head offices. Real time exploration will help in faster decision making and fasten the problem solving processes with aid quick aid from officers at regional and head offices during the hectic workload of excavation and disposal of riverbed material.

6. We intend to transport the riverbed material from excavation site to a storage place within 5Km from excavating river. Then we would store the riverbed material at these storage sites until disposed off finally. We also need to pay rent to landowners until riverbed material is disposed. We also need to bear cost of logistics and transportation and other overheads.

So we need to be well aware of money we would be paid by government for transportation of material from riverbed to storage site within 5Km in amount of money per cubic meter of riverbed material transported to storage site, along with terms and conditions of payment. We also need to know the amount of money government would be paying us for disposal of materials from storage sites in amount of money per cubic meter of material disposed along with terms and conditions of payment.

Contact Person:
Sudarshan Gupta
09051451367

Yours Faithfully,
Brijnandan Gupta
Director
Lokenath Estate & Export Pvt Ltd
08420494499

Annexure- 21: MoM with Brick Kiln Owners Regarding Utilization of Desilted Material

GOVERNMENT OF WEST BENGAL
OFFICE OF THE ADDITIONAL DISTRICT MAGISTRATE AND
DISTRICT LAND & LAND REFORMS OFFICER, HOOGHLY
JIBAN PAUL'S GARDEN, HOOGHLY - 712103
PH. – (033) 26802097/98, FAX – 91-33-26800578
Email : dllrohugli@gmail.com

Memo No. IX-08/ Earth Extr. Mundeswari/ 4716 / MM Dated- 17.08.2018

Proceeding of meeting held at the chamber of the Additional District Magistrate and District Land & Land Reforms Officer, Hooghly on 09.08.2018 in connection with utilization of earth of silt to be excavated from Mundeswari River in dredging process in block Jamalpur, District- Purba Bardhaman and block Arambagh and Pursurah, District- Hooghly.

The following members were present in the meeting :

1) ADM & DL & LRO, Hooghly
2) Executive Engineer, Hooghly Irrigation Division
3) Deputy DL & LRO-I, Hooghly
4) Deputy DL & LRO-II, Hooghly
5) Office-in-Charge, M.M. Section
6) Representatives of Brick Field Owners Association

ADM & DL & LRO, Hooghly took the chair and invited discussion. Executive Engineer Hooghly District, Irrigation Department narrated the details before the members of the different Brick Field Owners Association. He explained that huge silt will be removed from the bed of Mundeswari River and same will be deposited in selected places within 0-5 KM distance from the both banks of river. Some selected roads will be developed for frequent to and fro movement of trucks which also may be used by brick field owner, for plying and loading their trucks. After narrating in details Executive Engineer invited Brick Field Association members to inform him the approximate number of brick fields interested to collect the silt, total yearly requirement of earth by them so that an assessment of their tentative need of earth be made.

On the other hand, members of the Brick Field Owners Association clarified that they are in dire need of brick earth and they are agreed to fetch the excavated earth if that earth be suitable for manufacture of bricks and contain less proportion of sand. They expressed the need of testing the suitability of the soil for brick manufacturing by way of boring in at least three places within the project area. After that they would be able to give tentative estimation of the earth to be consumed by the brick field.

Executive Engineer agreed to hold the boring from their end in presence of the Brick Field Owners Association members so that the issue may be amicably settled.

ADM & DL & LRO, Hooghly requested both the Executive Engineer and the members of the Brick Field Owners Association to settle the issue at the earliest possible. ADM & DL & LRO, Hooghly also requested the Executive Engineer to provide the copy of the map of respective area of excavation and connecting roads therein and also a copy of the report relating to soil testing after boring.

As there is no further issue to discuss the meeting ended with thanks to and from the Chair.

Additional District Magistrate &
District Land & Land Reforms Officer, Hooghly

Contd.....2

Memo No.IX-08/Earth Extr. Mundeswari/ 4716/(9) /MM . Date- 17.08.2018

Copy forwarded to:-

1) The District Magistrate, Hooghly for kind information.
2) The Executive Engineer, Hooghly Irrigation & Waterways Division, Hooghly.
3) The Secretary, Bengal Brick Field Owners' Association , 23-A,Netaji Subhas Road (3rd floor), Kolkata-700001.
4) The Secretary, Pandua Thana Brick Field Owners' Association, 20,Bose para Lane, Serampore, Mahesh,Hooghly .
5) The Secretary, Kalna Road Brick Field Owners' Association, Pandua-Kalna Road , P.O & P.S.Pandua,Hooghly.
6) The Secretary, Hooghly District Brick Manufacturers' Association, G.T Road,Taldanga, Chandannagore,Hooghly
7) The Secretary, Ballykhal Brick Field Owners' Association, Ramsita Mandir P.O. -Makhla Hooghly
8) The Secretary, Bhadrakali-Kotrang-Konnagore Brick Field Owners' Association, 9,G.T Road,(West) Konnagore, Hooghly-712235.
9) The President / Secretary , Arambagh Sub-Division Brick Field Owners' Association, Gourhati More(RN-24), Arambagh, Hooghly.

Additional District Magistrate &
District Land & Land Reforms Officer, Hooghly

Annexure- 22: List of Activity Require Regulatory Clearance

Contractor as well as owner has to obtain certain kind of prior permission for different activity to be carried out during project implementation. List of activity for which permission need to be obtained from different govt agency are listed below

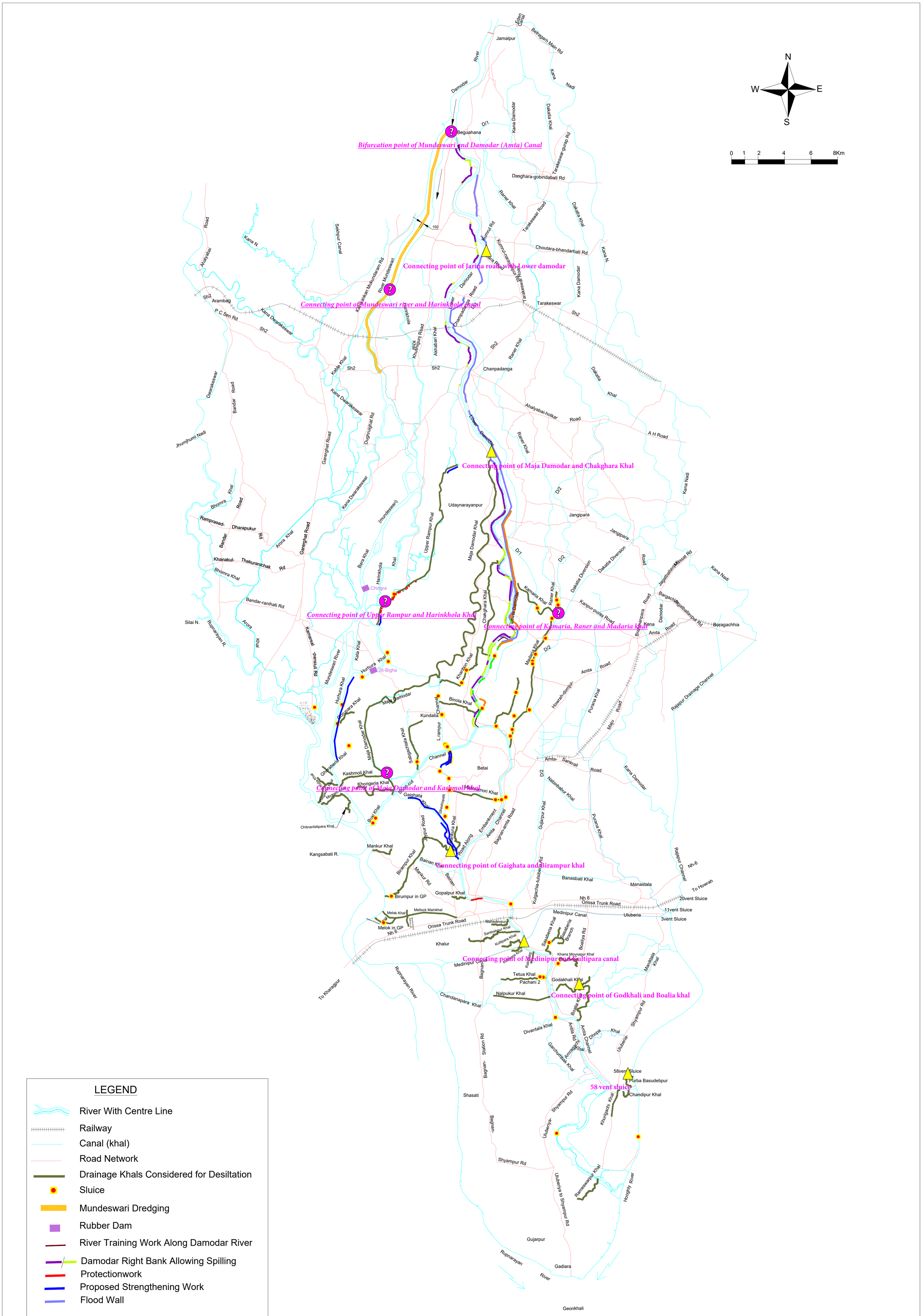
Table 10: Regulatory clearance to be obtained before commencement of different activity

Sl. No.	Clearance Required	Applicable Regulation	Issuing Authority	Requirement	Responsibility
1	Consent to Establish (CtE) and Operate (CtO)	Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981	WBSPCB	Consent shall be obtained before commencement of construction work for the plant and machinery (Hot Mix, WMM, Batching, Crusher, and Diesel Generator greater than 15 KVA) required for the project.	Contractor
2	Tree Cutting	West Bengal Trees (Protection and Conservation in Non-Forest Areas) Act, 2006 and Rules, 2007	State Forest Department (State DFO)	Permission shall be obtained before felling of tree.	Respective DPMU
3	Establishment of Camp		Local GP or authority	Permission for establishing labour camps	Contractor
4	Storing and dumping of waste materil		Local GP or authority	Temporary storing or dumping of waste material (C&D waste, Desilted material)	Contractor
5	Pollution Under Control Certificate	Motor Vehicles Act, 1988	State Transport Authority	Vehicles and machineries shall comply with the Motors Vehicle act and submit pollution under control (PUC) certificate	Contractor

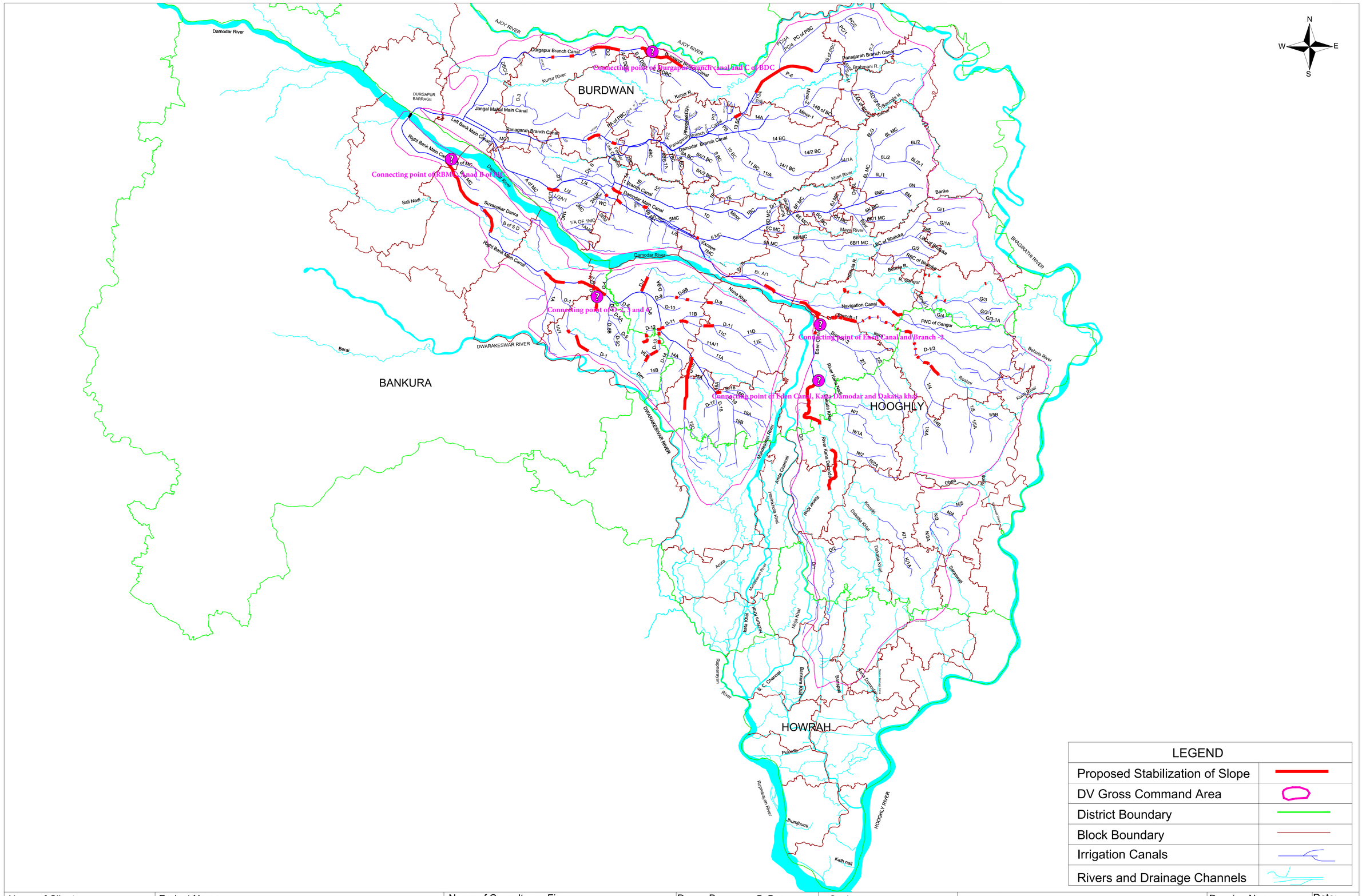
Annexure- 23: Parameters for Air, Surface & Ground Water, Soil quality Monitoring during Project Implementation

Inland Surface Water (Class C)		**Ground Water**		**Ambient Air Quality (AAQ)**		**Soil Quality Testing**	
(IS: 2296-1982)		(BIS 10500 : 1991)		(NAAQS)- 2009			
Sl. No.	**Parameters**	**Sl. No.**	**Parameters**	**Sl. No.**	**Parameters**	**Sl. No**	**Parameters**
1	pH Value	1	Colour	1	PM_{10}	1	pH
2	Dissolved Oxygen	2	Odour	2	$PM_{2.5}$	2	Electrical Conductivity
3	Biochemical Oxygen Demand (3 days at 27^0C)	3	Turbidity	3	Sulphur Dioxide (SO2)	3	Organic Carbon
4	Total Coliforms (TC)	4	pH	4	Nitrogen Dioxide (NO2)	4	Texture
5	Colour	5	Total Hardness	5	Ozone (O3)	5	Phosphorous as P
6	Fluoride (as F)	6	Iron (as Fe)	6	Lead (Pb)	6	Potassium as K
7	Cadmium (as Cd)	7	Chloride (as Cl)	7	Carbon Monoxide (CO)	7	Sulphur as S
8	Chloride (as Cl)	8	Residual Free Chlorine	8	Ammonia (NH3)	8	Calcium as Ca
9	Chromium (Cr 6+)	9	Dissolved Oxygen (DO)	9	Benzene (C6H6)	9	Magnesium as Mg
10	Total Desolved Solid (TDS)	10	Calcium (as Ca)	10	Benzo(a)Pyrene (BaP)	10	Chromium as Cr
11	Sulphates (SO4)	11	Copper (as Cu)	11	Arsenic (As)	11	Lead as Pb
12	Lead (as Pb)	12	Manganese (as Mn)	12	Nickel (Ni)	12	Zinc as Zn
13	Coppur (Cu)	13	Sulphate (as SO4)			13	Cadmium as Cd
14	Arsenic (as As)	14	Nitrate (as NO3)			14	Arsenic as As
15	Iron (as Fe)	15	Fluoride (as F)			15	Fluoride as F
16	Phenolic Compound (C6H5OH)	16	Cadmium (as Cd)			16	Nickel as Ni
17	Zinc (as Zn)	17	Arsenic (as As)			17	Mercury as Hg
18	Anionic detergent (MBAS)	18	Lead (as Pb)			18	Boron as B
19	Oil & Grease	19	Zinc (as Zn)			19	Copper as Cu
20	Nitrate (as NO_3)	20	Chromium (Cr 6+)			20	Iron as Fe
		21	Boron (as B)			21	Manganese as Mn
						22	Molybednum as Mo

Annexure- 24: Map showing future monitoring location during construction and Operation stage



Name of Client :	Project Name:	Name of Consultancy Firm :	Drawn By: B. Das	Drawing Title:-	Drawing No.:	Date:
Government of West Bengal Irrigation & Waterways Department	Preparation of Feasibility Study, Detailed Engineering Design and Bidding Documents for Irrigation Rejuvenation and Flood Management in the Damodar Command Areas and Lower Damodar Sub-Basin in the State of West Bengal in India (WBMIFMP)	Eptisa Servicios de Ingenieria S.L.(Spain) In association with eptisa Eptisa India Pvt. Ltd.	Checked By: D. K. Maiti Approved By: R. Chakraborty	Proposed Interventions of Flood Modernization	EIPL/MAP/DFSR/08	July-2018 Revised R0



LEGEND	
Proposed Stabilization of Slope	
DV Gross Command Area	
District Boundary	
Block Boundary	
Irrigation Canals	
Rivers and Drainage Channels	

Name of Client : Government of West Bengal Irrigation & Waterways Department	Project Name: Preparation of Feasibility Study, Detailed Engineering Design and Bidding Documents for Irrigation Rejuvenation and Flood Management in the Damodar Command Areas and Lower Damodar Sub-Basin in the State of West Bengal in India (WBMIFPM)	Name of Consultancy Firm : eptisa Eptisa Servicios de Ingenieria S.L.(Spain) In association with Eptisa India Pvt. Ltd.	Drawn By: B. Das Checked By: S. Mukherjee Approved By: R. Chakraborty	Scale: 0 2.5 5 10 15 20Km	Drawing Title:- Proposed Stabilization of Slope	Drawing No.: EIPL/MAP/DFSR/07	Date: July-2018 Revised R0

Annexure- 25 (a): Format for Monthly & Quarterly E&S Monitoring Report on ESMP Implementation

(To be filled by separately by 1) Contractor (monthly) and 2) the Jr. Environmental and Social Safeguard Specialist at DPMU level (Quarterly)

Monthly/ Quarterly Report **Reporting Period: ……..**

I. Package Description

1.1	Contract Package	
1.2	Name of the Contractor	
1.3	Name of the project component and activity	
1.4	Work Completed for the Month	Earth work/ Concrete work/ Masonry / Flood Wall/ PCC lining
		Others Specify….

II. Establishment of Contractors Camp - Yes / No

1 **Usage of Camp -** Plant / Machines/ Labour

1.1 If Plant - Crusher unit/ HMP/ WMM / Any Other

1.2 If Machinery stocking - Yes / No

Sl.N0	**Type of Machinery in Operation**	**Number**	**Fitness/ PCB certificate obtained**	**Remarks – Repaired at camp / sent to Garage**
1	Paver			
2	Rollers			
3	Excavators			
4	Dumpers			
5	Vehicles (Tractors/ Trucks)			
6	Others (mention)			
7				
8				
9				
10				
11				

1.3 Labour - Permanent / Transit

S.No	**Particulars**	**Remarks**		
i	Total Number of Labourers employed?	ST :	SC:	Others:
ii	Number of Male labourers?	ST :	SC:	Others:
iii	Number of female labourers?	ST :	SC:	Others:
iv	Number of local labourers?	ST :	SC:	Others:
v	Name the village from where the labour comes from?			
vi	Number of migrant labourers?			
vii	Number of dwelling units in the camp?			

viii	Type of dwellings?	Pucca : _____Number Kutcha : _____Number
ix	Water Supply provided?	
x	Drinking water supply provided?	Tube well/ Open Well/ Tanker/ supply water etc
xi	Number of Toilets provided?	
xii	Type of Toilet?	Leach pit / Soak Pit / Septic tank
xii	Number of Bath rooms provided?	
xiii	Separate Bath rooms provided for women?	Yes / No
xiv	Washing platforms provided?	
xv	Drainage facility provided?	
xvi	Crèche facility provided?	
xvii	Availability of Health centre?	Nearest
xviii	First Aid Facility Available?	
xix	Health Camp / HIV awareness conducted?	Yes / No If yes provide details
xx	Fuel used in the Camp?	Fire wood/ Kerosene/ LPG
xxi	Does the Camp have Workshop for Repair?	Yes / No
xxii	Any Oil Spill taking Place?	Yes / No
xxiii	Oil / Grease traps / solid plat forms provided?	Yes / No

1.4.1 Storage of Fuel — Temporary/ Permanent
1.4.2 Type of Fuel Stored? — HSD/ Petrol
1.4.3 License Obtained? — Yes/ NO
1.6 Any Blasting Material Stored? — Yes/ NO
1.6.1 License Obtained ? — Yes/ NO

III. Haulage Road — **Existing Road/ Temp Road Created**
1. Maintenance of Haulage Road done? — Yes / No
2. Dust Suppression Measures taken? — Yes / No

IV. Quarries Under Operation — Yes / No
1. If Yes, Number of Quarries in Use and locations?
2. If No, Name of Vendor, from whom the material Purchased (SPCB Certificate of Vendor to be enclosed)
3. Are the Vehicles used for Supplying material were covered ? Yes / No

V. Erosion Control Measures: — Silt Traps/ Construction in Lean Season / Compaction Taken up

VI. Dump Sites: — Identified - Yes / No
Low lying areas Used - Yes/ No
Disposal Sites – identified - Yes/ No

VIII. Storage of Material: — Adj . to Canal / ROW/ Agri. Land / etc.
1. **Blockage of Natural drains** — Yes / No

IX. Dust Control Measure:

S.No.	Measure	Remarks
1	Dust control devices are available	Yes/ No
2	Sprinkling of water carried out.	Yes/ No

3	Cover on the vehicles	Yes/ No
4	Cover on stack materials	Yes/ No

X. Noise Control Measure:

S.No.	Measure	Remarks
1	Machines establishes in Habitation	Yes / No
2	Away from Habitations	Yes / No
3	Machines Sent for Maintenance regularly	Yes / No

XI. Safety Measures Taken:

S.No.	Measure	Remarks
1	Whether first aid post established at site?	Yes/No
2	Whether safety helmets given to all workmen at site?	Yes/No
3	Whether safety belts / ribbons used at work site	Yes/No
4	Whether gum boots, tarring unfits, spectacles etc. given to person handling bitumen?	Yes/No

XII. Environmental Monitoring Details

Sl.No	Type of Test	Number of Locations	Date of Test (last conducted)	Remarks
1	Air Quality			
2	Noise Quality			
3	Ground Water			
4	Surface Water			
5	Soil/ Silt			

Signature of the Contractor/ Sr. Environmental Specialist **Signature of the PD**
Name of the Specialist **Name of the PD**
Date **Date Verified**

Environmental & Social Management Plan (EMP) Implementation Data

(To be filled by separately by 1) Contractor (monthly) and 2) the Jr. Environmental and Social Safeguard Specialist at DPMU level (Quarterly)

1. Details of Statutory Clearance

No	Name of the project component and activity	Name of the Contract Package	Date of Agreement	Date of Completion	Date of Commencement of Civil work	Permission from State Forest Dept*	Labour License Details Validity*		Insurance undertaken validity*	
							From	To	From	To

(Note: * Attach relevant papers)

2. Details of Quarries / Vendors

No	Name of the project component and activity	Name of the Contract Package	Quarries Established (YES/ NO)	Name of Vendors	Details of Vendors Environmental Clearances Validity*					
					Sand		Stone Products		Boulders	
					From	To	From	To	From	To

(Note: * Attach relevant papers)

3. Details of Environmental Monitoring / Testing

No	Name of the project component and activity	Name of the Contract Package	Env. Monitoring / Testing particulars*		
			Parameters	**No. of locations Samples tested**	**Date of Testing**
			Air Quality		
			Noise Quality		
			Ground Water		
			Surface Water		
			Soil/ Silt		

(Note: Env. Testing should be from the Approved Laboratory as mentioned in the ESIA including ESMP report
* Attach relevant papers)

Signature of the Contractor/ Jr. Environmental Specialist
Name
Date

Signature of the APD
Name of the APD
Date Verified

Annexure- 25 (b): Format for SPMU's Half Yearly E&S Management Monitoring Report

(This format will also be used for Mid-term and End-term Audit)

Chapter I: Project Background:

1.1 Project Overview and Contextual Relevance
1.2 Project Development Objectives
1.3 Project Components and Activities
1.4 Environmental Management Framework
1.5 Social Management Framework

Chapter II: Regulatory Requirement and Compliances

2.1 Environmental Regulatory Requirements and Compliances (Project Specific)

2.1.1 Consent to Establish and Consent to Operate under Air & Water Pollution
2.1.2 Letter of Authorization for handling hazardous Waste (if applicable)
2.1.3 Tree cutting permission from DFO
2.1.5 Clearance for Disposal of Dredged materials from WBPCB
2.1.6 Agreement letter with Pvt. Land owner for borrowing earth (if required)
2.1.7 GP Clearance for establishment of Labour Camp and Temporary Disposal of Waste aterial
2.1.8 PUC Compliance / Certificate from RTO
2.1.9 Authorization / Permission of Material Supplier
2.1.10 Any other compliances that are required

2.2 Social Regulatory Requirements and Compliances

2.2.1 SIA Notification (if land acquisition is involved)
2.2.2 Notification for Land Acquisition (as per LARR Act), if any
2.2.3 Labour License
2.2.4 Any other compliances that are required

Chapter III: Environmental Performance

3.1 Soil Pollution
3.2 Water Pollution
3.3 Noise Pollution
3.4 Waste Management / Sediment Disposal & Management
3.5 Pest Management
3.6 Management of Flora and Fauna / Local Bio-diversity
3.7 Physical Cultural Resources, its Protection and Management

Chapter IV: Social Performance

4.1 People's Understanding and Awareness of the Project
4.2 Land Acquisition, Rehabilitation and Resettlement (if required)
4.3 Gender Inclusion
4.4 Tribal Inclusion and Safeguards
4.5 Project Impact on Vulnerable Groups
4.6 Safety and Security of Workers

Chapter V: Monitoring and Supervision

5.1 Monitoring of Environmental Parameters and Measures Taken
5.2 Monitoring of Social Parameters and Measures Taken

Chapter VI: Information Disclosure, Consultation, and Participation

Chapter VII: Grievance Redress Mechanism (GRM)

Chapter VIII: Conclusions and recommendations

Annexure I: List of Documents Reviewed and Verified

Annexure II: List of Project Sites Visited and Consultations

Annexure- 26: Terms of Reference (ToR) for Position of Environmental Expert at SPMU and DPMU

Annexure- 26.A ToR for Senior Environmental Specialist

Position: Senior Environmental Specialist
No. of Position: One

Project Description:

To improve the existing irrigation network, optimizing conjunctive and sustainable use of ground and surface water across in the project area and throughout the year, and to reduce flooding The Government of West Bengal (GoWB) has proposed "West Bengal Major Irrigation and Flood Management Project (WBMIFMP)". The Government of West Bengal (GoWB) has applied for USD 290 million financing from the International Bank for Reconstruction and Development (IBRD) and from the Asian Infrastructure Investment Bank (AIIB) towards the cost of the WBMIFMP.

The project aims at modernization of irrigation system, with special emphasis on conjunctive use of ground and surface water in the Damodar Valley Project Command Area of the State, in the districts of Purba & Paschim Burdwan, Bankura, Hooghly and Howrah and improvement of flood management infrastructure in Lower Damodar Sub-basin, mainly in the districts of Hooghly and Howrah. Prime objective of proposed project is to rejuvenate and rehabilitate existing irrigation network for sustainable development in DVC area and management of floods in Lower Damodar Sub-Basin in West Bengal. Proposed project has mainly four broader objectives namely 1) *Irrigation Modernization, 2) Irrigation Management, 3) Flood Management and 4) Crop Diversification.* Project will also promote conjunctive use of surface and ground water for agriculture. The expected results of the project are to improve irrigation in order to benefit agriculture in the DVCA, and to reduce annual flooding in the Lower Damodar sub-basin area.

Project Duration:

The project duration is for five years.

Project Area:

The project will be implemented in selected locations five districts of West Bengal, namely East & West Bardhaman, Bankura, Hooghly and Howrah.

Scope for Senior Environmental Specialist:

Senior environmental expert will be responsible for providing input and guidance on implementation of environmental management and safeguards to the contractor, DPIU and DPMU/ SPMU and assisting in building environmental management capacity of SPMU, DPMU, DPIU, line departments - Department of Food Processing Industries and Horticulture, Agriculture Marketing Dept., Agriculture Dept. and Fisheries Department.

Specific focus of the assignment

Specifically, the Senior Environmental Specialist will:

(i) Ensure the necessary national environmental approvals are obtained in a timely manner to advance project implementation;
(ii) Review of site specific management plan prepared by contractor;
(iii) Prepare site specific environmental performance criteria;

(iv) Monitor the update and implementation of project activity specific 'ESMPs;
(v) Monitor routine environmental monitoring activities as defined in Environmental and Social Monitoring Plan;
(vi) Monitor project activity sites against any unexpected environmental impacts;
(vii) Advise Contractor, SPMU, DPMU on environment problems and/ or requirements, and recommend mitigating measures;
(viii) Prepare environmental monitoring reports on ESMP implementation and compliance and submit it to the World Bank;
(ix) Take part in project performance monitoring and evaluation activities; and
(x) Assess and prepare capacity building program on environmental issues at the SPMU, DPMU, DPIU, line departments - Department of Food Processing Industries and Horticulture, Agriculture Marketing Dept., Agriculture Dept. and Fisheries Department.
(xi) Arrange and participate in safeguard review missions by the World Bank and AIIB.
(xii) Liaise with the West Bengal State Pollution Control Board, Biodiversity Board, all line departments on project-related environmental issues;

Professional Profile:

1. Master degree in environmental science/ management.
2. Minimum 15 years of professional experience of working in assessing environmental impact and monitoring environment safeguards.
3. Familiarity with the World Bank's, ADB's, IFC's environmental guidelines is preferred.
4. Experience in similar irrigation projects and geographic areas are an added advantage.
5. Proficiency in both written and spoken English, and knowledge of locally spoken language - Bengali are an advantage
6. Experience of working in rural areas and willingness to travel to project areas / locations;
7. Knowledge on Project Management principles;
8. Efficiency in computer Knowledge;
9. Having proficient communication Skill in English, including preparation of reports, documents, IEC materials etc. in English;
10. Prior experience of working in similar projects will be an added advantage.

Age Limit:
Maximum age limit is 45 years;

Reporting:
The Specialist would report to the Project Director or any person designated as Reporting Authority by the Project Director, WBMIFMP on monthly, quarterly and annual basis.

Work Station:
The Specialist would be based in the WBMIFMP Project office at the State Headquarters and would make at least 10 field visits or field visits as per the requirement in every month to project sites. However, if so wished and found necessary by the Project Director, she / he may be placed at the DPMU level for required period of time, to be specified by the SPMU of WBMIFMP.

Duration of Engagement:
The Specialist would be engaged initially for a period of 1 year on full time and contractual basis.The engagement period may be extended subject to satisfactory performance and mutual consent of the SPMU-WBMIFMP and the Specialist, not exceeding the project period.

Annexure- 26.B ToR for Environmental Specialist

Position: Environmental Specialist (Jurior)
No. of Position:

Project Description:

To improve the existing irrigation network, optimizing conjunctive and sustainable use of ground and surface water across in the project area and throughout the year, and to reduce flooding The Government of West Bengal (GoWB) has proposed "West Bengal Major Irrigation and Flood Management Project (WBMIFMP)". The Government of West Bengal (GoWB) has applied for USD 290 million financing from the International Bank for Reconstruction and Development (IBRD) and from the Asian Infrastructure Investment Bank (AIIB) towards the cost of the WBMIFMP.

The project aims at modernization of irrigation system, with special emphasis on conjunctive use of ground and surface water in the Damodar Valley Project Command Area of the State, in the districts of Purba & Paschim Burdwan, Bankura, Hooghly and Howrah and improvement of flood management infrastructure in Lower Damodar Sub-basin, mainly in the districts of Hooghly and Howrah. Prime objective of proposed project is to rejuvenate and rehabilitate existing irrigation network for sustainable development in DVC area and management of floods in Lower Damodar Sub-Basin in West Bengal. Proposed project has mainly four broader objectives namely 1) *Irrigation Modernization, 2) Irrigation Management, 3) Flood Management and 4) Crop Diversification.* Project will also promote conjunctive use of surface and ground water for agriculture. The expected results of the project are to improve irrigation in order to benefit agriculture in the DVCA, and to reduce annual flooding in the Lower Damodar sub-basin area.

Project Duration:

The project duration is for five years.

Project Area:

The project will be implemented in selected locations five districts of West Bengal, namely East & West Bardhaman, Bankura, Hooghly and Howrah.

Scope for Senior Environmental Specialist:

Environmental Expert will be responsible for providing input and guidance on implementation of environmental management and safeguards to the contractor, DPIU and DPMU/ SPMU and assisting in building environmental management capacity of SPMU, DPMU, DPIU, line departments - Department of Food Processing Industries and Horticulture, Agriculture Marketing Dept., Agriculture Dept. and Fisheries Department.

Specific focus of the assignment

Specifically, the Junior Environmental Specialist will:

(i) Ensure the necessary national environmental approvals are obtained in a timely manner to advance project implementation;
(xiii) Review of site specific management plan prepared by contractor;
(xiv) Prepare site specific environmental performance criteria;

(xv) Monitor the update and implementation of project activity specific 'ESMPs;
(xvi) Monitor routine environmental monitoring activities as defined in Environmental and Social Monitoring Plan;
(xvii) Monitor project activity sites against any unexpected environmental impacts;
(xviii) Advise Contractor, SPMU, DPMU on environment problems and/ or requirements, and recommend mitigating measures;
(xix) Prepare environmental monitoring reports on ESMP implementation and compliance and submit it to the World Bank;
(xx) Take part in project performance monitoring and evaluation activities; and
(xxi) Assess and prepare capacity building program on environmental issues at the SPMU, DPMU, DPIU, line departments - Department of Food Processing Industries and Horticulture, Agriculture Marketing Dept., Agriculture Dept. and Fisheries Department.
(xxii) Arrange and participate in safeguard review missions by the World Bank and AIIB.
(xxiii) Liaise with the West Bengal State Pollution Control Board, Biodiversity Board, all line departments on project-related environmental issues;

Professional Profile:

11. Master degree in environmental science/ management.
12. Minimum 8 years of professional experience of working in assessing environmental impact and monitoring environment safeguards.
13. Familiarity with the World Bank's, environmental guidelines is preferred.
14. Experience in other linear projects and geographic areas are an added advantage.
15. Proficiency in both written and spoken English, and knowledge of locally spoken language - Bengali are an advantage
16. Experience of working in rural areas and willingness to travel to project areas / locations;
17. Knowledge on Project Management principles;
18. Efficiency in computer Knowledge;
19. Having proficient communication Skill in English, including preparation of reports, documents, IEC materials etc. in English;
20. Prior experience of working in similar projects will be an added advantage.

Age Limit:
Maximum age limit is 35 years;

Reporting:
The Specialist would report to the Additional Project Director (APD) at the District Project Management Unit (DPMU) level or any person designated as Reporting Authority by the APD-DPMU, WBMIFMP on monthly, quarterly and annual basis.

Work Station:
The Specialist would be based at the DPMU of WBMIFMP Project office at the District Headquarters and would make at least 15 field visits or field visits as per the requirement in every month to project sites. However, if so wished and found necessary by the APD, she / he may be placed at the DPIU level for required period of time, to be specified by the DPMU of WBMIFMP.

Duration of Engagement:
The Specialist would be engaged initially for a period of 1 year on full time and contractual basis.The engagement period may be extended subject to satisfactory performance and mutual consent of the DPMU / SPMU-WBMIFMP and the Specialist, not exceeding the project period.

Annexure- 26.C ToR for Senior Social Cum Gender Development Specialist

Position: Senior Social cum Gender Development Specialist
No. of Position: One

Project Description:
To improve the existing irrigation network, optimizing conjunctive and sustainable use of ground and surface water across in the project area and throughout the year, and to reduce flooding The Government of West Bengal (GoWB) has proposed "West Bengal Major Irrigation and Flood Management Project (WBMIFMP)". The Government of West Bengal (GoWB) has applied for USD 290 million financing from the International Bank for Reconstruction and Development (IBRD) and from the Asian Infrastructure Investment Bank (AIIB) towards the cost of the WBMIFMP.

The project aims at modernization of irrigation system, with special emphasis on conjunctive use of ground and surface water in the Damodar Valley Project Command Area of the State, in the districts of Purba & Paschim Burdwan, Bankura, Hooghly and Howrah and improvement of flood management infrastructure in Lower Damodar Sub-basin, mainly in the districts of Hooghly and Howrah. Prime objective of proposed project is to rejuvenate and rehabilitate existing irrigation network for sustainable development in DVC area and management of floods in Lower Damodar Sub-Basin in West Bengal. Proposed project has mainly four broader objectives namely 1) *Irrigation Modernization, 2) Irrigation Management, 3) Flood Management and 4) Crop Diversification.* Project will also promote conjunctive use of surface and ground water for agriculture. The expected results of the project are to improve irrigation in order to benefit agriculture in the DVCA, and to reduce annual flooding in the Lower Damodar sub-basin area.

Project Duration:
The project duration is for five years.

Project Area:
The project will be implemented in selected locations five districts of West Bengal, namely Purba& Paschim Bardhaman, Bankura, Hooghly and Howrah.

Need for Social cum Gender Development Specialist:
The Social Cum Gender Development Specialist will be primarily responsible for developing necessary strategy to ensure that the project is achieving its social development objective i.e. equity, inclusiveness and transparency by institutionalizing participatory process. The specialist will guide, mentor, monitor and evaluate the functioning and performance of social mobilization work, establishing systems to achieve the social development objectives of the project and work closely with environment expert and other key stakeholders of the project. One of the prime role of the specialist would be to ensure execution of social safeguards as per the Environment and Social Management Framework (ESMF) / Environment and Social Impact Assessment (ESIA).

Scope of Work:

1. Guide the project stakeholders and facilitatecollection and analysis of social, cultural and economic information that are relevant to the project and in line with the ESMF / EIA requirements;

2. Support in institutionalising the social safeguard parameters, as per ESMF / EIA in project framed activities;

3. Conduct periodic field visits and consult / discuss with the local community organisations / associations of farmers and related other stakeholders, as identified in the project;

4. Discuss with contractors and associated Govt. Departments from time to time to ensure that gender balance and inclusive approach is adopted in project activities;

5. Facilitate in increasing participation of women in construction and other project activities;

6. Coordinate, organise and impart training on social safeguard measures to be taken for different category of stakeholders;

7. Prepare, design and conduct workshop/seminar for the project staff and other stakeholders on social development aspects, mapping of indicators and appraising the learning cases;

8. Facilitate collection of gender disaggregated data and conduct analyse of project benefits by social, economic and sex (male / female) categories;

9. Facilitate documentation of learning cases with regard to social safeguard measures / practices and its wider dissemination;

10. Preparation of leaflets / pamphlets / IEC materials for sensitisation of stakeholders and community on the project benefits and its socio-economic dimensions;

11. Conduct period review meetings with the stakeholders, including Government Departments to ensure gender inclusion and equity aspects of project activities along with key achievements as per the social indicators.

12. Conducting internal monitoring and evaluation of project activities and mapping the progress in line with the social indicators.

13. Collate the internal monitoring reports for M&E of the project and preparing internal monitoring reports, covering social management aspects of the project;

14. Periodic appraisal of progress in line with the social safeguard to the project director;

15. Carrying out other activities as assigned by the PD-SPMU or designated person of SPMU.

Professional Profile:

21. Master's degree in Sociology/Anthropology/ Social work.

22. At least 15 years of professional experience of working in related field of rural development programme/ Irrigation Improvement Project of Govt. or Non-government organization.

23. Fluency in English and workable knowledge of Bengali is an added advantage;

24. Experience of working in rural areas and willingness to travel to project areas / locations;

25. Knowledge on Project Management principles;

26. Efficiency in computer Knowledge;

27. Having proficient Communication Skill in English, including preparation of reports, documents, IEC materials etc. in English;

28. Prior experience of working in similar projects will be an added advantage.

Age Limit:
Maximum age limit is 55 years;

Reporting:

The Specialist would report to the Project Director or any person designated as Reporting Authority by the Project Director, WBMIFMP on monthly, quarterly and annual basis.

Work Station:
The Specialist would be based in the WBMIFMP Project office at the State Headquarters and would make at least 10 field visits or field visits as per the requirement in every month to project sites. However, if so wished and found necessary by the Project Director, she / he may be placed at the DPMU level for required period of time, to be specified by the SPMU of WBMIFMP.

Duration of Engagement:
The Specialist would be engaged initially for a period of 1 year on full time and contractual basis.The engagement period may be extended subject to satisfactory performance and mutual consent of the SPMU-WBMIFMP and the Specialist, not exceeding the project period.

Annexure- 26.D ToR for Social Cum Gender Development Specialist

Position: Social (Juniou) cum Gender Development Specialist
No. of Position: Two

Project Description:
To improve the existing irrigation network, optimizing conjunctive and sustainable use of ground and surface water across in the project area and throughout the year, and to reduce flooding The Government of West Bengal (GoWB) has proposed "West Bengal Major Irrigation and Flood Management Project (WBMIFMP)". The Government of West Bengal (GoWB) has applied for USD 290 million financing from the International Bank for Reconstruction and Development (IBRD) and from the Asian Infrastructure Investment Bank (AIIB) towards the cost of the WBMIFMP.

The project aims at modernization of irrigation system, with special emphasis on conjunctive use of ground and surface water in the Damodar Valley Project Command Area of the State, in the districts of Purba & Paschim Burdwan, Bankura, Hooghly and Howrah and improvement of flood management infrastructure in Lower Damodar Sub-basin, mainly in the districts of Hooghly and Howrah. Prime objective of proposed project is to rejuvenate and rehabilitate existing irrigation network for sustainable development in DVC area and management of floods in Lower Damodar Sub-Basin in West Bengal. Proposed project has mainly four broader objectives namely 1) *Irrigation Modernization, 2) Irrigation Management, 3) Flood Management and 4) Crop Diversification.* Project will also promote conjunctive use of surface and ground water for agriculture. The expected results of the project are to improve irrigation in order to benefit agriculture in the DVCA, and to reduce annual flooding in the Lower Damodar sub-basin area.

Project Duration:
The project duration is for five years.

Project Area:
The project will be implemented in selected locations five districts of West Bengal, namely Purba& Paschim Bardhaman, Bankura, Hooghly and Howrah.

Need for Social cum Gender Development Specialist:
The Social Cum Gender Development Specialist will be primarily responsible for developing necessary strategy to ensure that the project is achieving its social development objective i.e. equity, inclusiveness and transparency by institutionalizing participatory process. The specialist will guide, mentor, monitor and evaluate the functioning and performance of social mobilization work, establishing systems to achieve the social development objectives of the project and work closely with environment expert and other key stakeholders of the project. One of the prime role of the specialist would be to ensure execution of social safeguards as per the Environment and Social Management Framework (ESMF) / Environment and Social Impact Assessment (ESIA).

Scope of Work:

1. Establish regular field contact and rapport building with the local community where the project will be executed;

2. Guide the project stakeholders and facilitatecollection and analysis of social, cultural and economic information that are relevant to the project and in line with the ESMF / EIA requirements;

3. Support in institutionalising the social safeguard parameters, as per ESMF / EIA in project framed activities;

4. Conduct periodic field visits and consult / discuss with the local community organisations / associations of farmers and related other stakeholders, as identified in the project;

5. Discuss with contractors and associated Govt. Departments (district level / DPIUs) from time to time to ensure that gender balance and inclusive approach is adopted in project activities;

6. Facilitate in increasing participation of women in construction and other project activities;

7. Coordinate, organise and impart training on social safeguard measures to be taken for different category of stakeholders;

8. Collection of gender disaggregated data and analyse of project benefits by social, economic and sex (male / female) categories;

9. Documentation of learning cases with regard to social safeguard measures / practices;

10. Preparation of leaflets / pamphlets / IEC materials in Bengali for sensitisation of stakeholders and community on the project benefits and its socio-economic dimensions;

11. Conduct period review meetings with the stakeholders, including Government Departments to ensure gender inclusion and equity aspects of project activities along with key achievements as per the social indicators.

12. Conducting internal monitoring of project activities and mapping the progress in line with the social indicators.

13. Periodic appraisal of progress in line with the social safeguard to the APD-DPMU and Senior Social Cum Gender Development Specialist of the SPMU;

14. Carryng out other activities as assigned by the APD-DPMU and Senior Specialist of SPMU.

Professional Profile:

1. Master's degree in Sociology/Anthropology/ Social work.

2. At least 7 years of professional experience of working in related field of rural development programme/ Irrigation Improvement Project of Govt. or Non-government organization.

3. Fluency in Bengali and English;

4. Experience of working in rural areas and willingness to travel to project areas / locations;

5. Knowledge on Project Management principles;

6. Efficiency in computer Knowledge;

7. Having proficient Communication Skill, including preparation of reports, documents etc. in Bengali and English;

8. Prior experience of working in similar projects will be an added advantage.

Age Limit:
Maximum age limit is 40 years;

Reporting:

The Specialist would report to the Additional Project Director (APD) at the District Project Management Unit (DPMU) level or any person designated as Reporting Authority by the APD-DPMU, WBMIFMP on monthly, quarterly and annual basis.

Work Station:
The Specialist would be based at the DPMU of WBMIFMP Project office at the District Headquarters and would make at least 15 field visits or field visits as per the requirement in every month to project sites. However, if so wished and found necessary by the APD, she / he may be placed at the DPIU level for required period of time, to be specified by the DPMU of WBMIFMP.

Duration of Engagement:
The Specialist would be engaged initially for a period of 1 year on full time and contractual basis.The engagement period may be extended subject to satisfactory performance and mutual consent of the DPMU / SPMU-WBMIFMP and the Specialist, not exceeding the project period.

Annexure- 27: Guidance on Chance Find Procedures

(To be annexed to the EMP for All Construction and Dredging Works)

1. PCR Definition

Physical Cultural Resources (PCR) refer to: "movable or immovable objects, sites, structures or groups of structures having archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance".

.

2. Procedure upon Discovery

Suspension of Work

If a PCR comes to light during the execution of the works, the contractor shall stop the works. After stopping work, the contractor must immediately report the discovery to the respective APD (III or IV) at DPMU level. The contractor may not be entitled to claim compensation for work suspension during this period. The Resident Engineer may be entitled to suspend work and to request from the contractor some excavations at the contractor's expense if he thinks that a discovery was made and not reported.

Respective APD (III or IV) at DPMU level immediately inform PD at SPMU level regarding the discover. Depending on the magnitude of the PCR, PD at SPMU level should check with the Archaeological Survey of India (ASI) for advice on whether *all works* should be stopped, or only the works immediately involved in the discovery, or, in some cases where large buried structures may be expected, all works may be stopped within a specified distance (for example, 50 meters) of the discovery.

Demarcation of the Discovery Site

With the approval of the respective APD (III or IV) at DPMU level, the contractor is then required to temporarily demarcate, and limit access to, the site.

Non-Suspension of Work

The PD in consultation with the ASI will decide whether the PCR can be removed for the work to continue, for example in cases where the find is one coin.

Chance Find Report

The contractor should then, at the request of the respective APD (III or IV) at DPMU level, and within 7 days, make a *Chance Find Report*, recording:

- Date and time of discovery;
- Location of the discovery;
- Description of the PCR;
- Photo documentation of the PCR;
- Estimated weight and dimensions of the PCR;
- Temporary protection implemented.

The Chance Find Report should be submitted to the PD, ASI and other concerned parties as agreed with the ASI, and in accordance with national legislation. The PD is required to inform the ASI accordingly.

Arrival and Actions of Cultural Authority

The ASI will be requested to arrive at the discovery site within 24 hours, and determine the action to be taken. Such actions may include, but not be limited to:

- Removal of PCR deemed to be of significance;
- Execution of further excavation within a specified distance of the discovery point;
- Extension or reduction of the area demarcated by the contractor.

These actions should be taken within 5 days. The contractor may or may not be entitled to claim compensation for work suspension during this period.

If the ASI fails to arrive within the stipulated period, the PD may have the authority to extend the period by a further stipulated time. If the ASI fails to arrive after the extension period, the PD may have the authority to instruct the contractor to remove the PCR or undertake other mitigating measures and resume work. Such additional works can be charged to the contract. However, the contractor may not be entitled to claim compensation for work suspension during this period.

Further Suspension of Work

During this 5 day period, the ASI may be entitled to request the temporary suspension of the work at or in the vicinity of the discovery site for an additional period of up to, 15 days. The contractor may, or may not be, entitled to claim compensation for work suspension during this period.

Annexure- 28: ESMP Implementation Monitoring Plan by Project Activities

Annexure- 28(a) ESMP Implementation Monitoring Plan for Irrigation Modernization

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
B.1 & B.2 (common activity)					
I. Restoration of Carrying Capacity of Main, Branch and Distributaries canals (B.1) **I. Restoration of carrying capacity (Earth work for re-sectioning) of other Minor/ Sub-minor (LVL 4) – (B.2)**					
Top soil exposure due to denudation leading to soil erosion	The clearing of vegetation in sections will ensure only areas of the land to be developed at a particular time are exposed to agents of erosion. This will also ensure the cleared areas of the land are not left bare over long periods as development at the cleared areas will be carried out immediately. This will minimize erosion at the project site.	No. of tree species with more than 50 GBH cleared in different phases and area restored; Quantum of earth (Cum) generated, percentage utilised and disposed-off. Denuded area covered under plantation after construction (% of area) Water quality in the working zone and deviations from the standards / baseline in different periods.	Physical Verification of Site; Report of the Contractor; Water Quality Report	DPIU	Weekly
Impact on flora/ fauna during weed cleaning operation	Contractor shall take reasonable precaution to prevent his workers from damaging any flora or fauna of the area specially during vegetation clearance. Vegetation clearance shall be limited to portions of the canal to be excavated at a particular time. The entire land will not be cleared at a time and this will allow any fauna to migrate to adjoining areas.	Quantum of weeds generated, its use and disposal Quantum of water hyacinths along with weeds converted to manure	Physical Verification of Site; Report of the Contractor; Consultation with locals Physical verification of composting site/s	DPIU	Weekly
Organic pollution due to improper dumping of removed aquatic weeds (mostly water hyacinth) leading to unhygienic conditions, inconvenience to local commuters, odour, etc	The management and disposal of this waste will be as follows (details are provided in the ESMP for waste management): Local community will be allowed to use the weeds for domestic use such as using it as fuel (shrub stem, root), animal fodder or for composting. Identification of temporary storage locations for drying and temporary storage of the aquatic weed waste in consultation with the IWD site engineers and the local government authority. The locations will not be within	Usages of weeds along with hyacinths	Physical verification of site; Consultation with local community; Review of quarterly report by contractor;	DPIU	Weekly

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	100 m of the identified Sensitive Receptors (listed in Table 36 under Section 4.16).				
	The Contract Package ESMP and Contractor's ESMP will list and provide map of the identified locations.				
	Temporary storage of the aquatic weed waste at identified locations for a period not exceeding 10 days.				
	Sale or free lifting of dry/semi-dry aquatic weed waste for onward processing into compost, ropes (for handicrafts and furniture making), fodder, etc. The Contract Package ESMP and Contractor's ESMP will provide details of quantity to be disposed in this way along with details of interested parties.				
	The following Dos and Don'ts are to be followed for management of aquatic weed waste:				
	• The aquatic weed waste will not be stored at unauthorized locations. • Burning of aquatic weed waste is not to be undertaken. • Dumping of aquatic weed waste at unauthorized locations is not to be undertaken. • In case on onward sale of the aquatic weed waste, the sale agreement will include prohibition of environmentally harmful practices (open burning of semi-wet waste, dumping of waste residues in unauthorized locations including water bodies, etc.).				
Air Pollution due to Burning of weeds	Contractor shall not adopt practice of burning weeds; Discouraging local community in burning of weeds;	Air quality in the work site and aberration from standards. Usages of weeds along with hyacinths	Air quality report; Consultation with local people / workers Review of quarterly report by contractor;	DPIU	Weekly
Flooding of nearby agricultural field during dewatering before re-sectioning	Most of the restoration work will be carried out when the canal bed is dry. Else, earthen bund shall be constructed for dewatering of active work zone; Canal water shall not be pumped out for dewatering purpose to nearby agricultural field to avoid any kind of crop damage as well as agricultural land pollution (although probability of land/ soil pollution is very low; as this water is being used for irrigation purpose).	No. of resectioning sites where dewatering is done; Crop area and type affected due to dewatering; Crop compensation paid to affected farmers.	Site inspection / visit; Consultation with farmer having land adjoining to work site Review of quarterly report by contractor;	DPMU	Weekly

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	Crop compensation shall be paid to affected farmers on occurrence of crop damage due to dewatering.				
Crop damage due to interrupted irrigation supply	Contractor shall submit work plan with canal closure timeline for each restoration site to DPMU at least before 45 days of any crop season; Restoration plan shall not be approved by DPMU, if not submitted at least 45 days prior to any crop season; Subsequent to receive and approve of work plan, farmers should be informed about canal closure plan at-least before 30 days of any crop season. Canal closure notice board shall be displayed at local panchayat/ irrigation/ fishery and BDO office.	Submission & approval of canal closure plan; Dissemination of canal closure plan	Review of canal closure plan Consultation with farmer having land adjoining to work site Review of quarterly report by contractor;	DPMU	Before each crop season
Sediment transport in downstream canal water leading to increased TDS and turbidity	All earther bund constructed for dewatering purpose shall be removed and entire work zone shall be levelled properly before monsoon period to maintain natural canal flow, minimize soil and sediment transportation to downstream and water pollution. Immediate collection and clearance of excess muck/soil from canal bed to minimize the erosion potential and sediment transportation into canal water which may cause increased water turbidity or TDS;	Removal of earthen bund; clearing and levelling of work zone; Amount of muck / silt generated, reused and disposed-off; Downstream and upstream water quality;	Site inspection / visit; Review of quarterly report by contractor; Analysis of water quality report	DPMU	Weekly (specially before monsoon) Quarterly
Stripping, stocking of generated earth on agricultural field may damage top soil of agricultural field	Formulate and submit site specific temporary storing and reuse plan for generated earth material from re-sectioning.	Quantity of material generated, reused and disposed;	Review of plan/s;	SPMU	Weekly
	Identification of temporary storage locations for the generated earth material in consultation with the IWD site engineers and the local government authority. The Contract Package ESMP and Contractor's ESMP will list and provide map of the identified locations. Temporary storage of the generated earth material at the identified locations for a period not exceeding 30 days. Muck may be stored on either side of embankment / canal bank and Government land along canal bank for temporary period; Storing of excavated material on nearby agricultural field shall be avoided to the extent possible;	Agricultural land (area in Ha.) affected due to stocking of materials; Provision of availability of alternative way, where ever required; Crop compensation paid	Physical observation; Consultation with affected farmers Report on amount of material excavated, used, dumped;	DPMU	Weekly

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	Generated earth material shall not be stored or dumped in unauthorized locations including water bodies and wetlands.				
	Available private land may be used for temporary stocking after discussion and willingness of the land owner;				
	The land owner will be paid compensation for the period of use of land;				
	Land should be restored to its previous condition after lifting excavated materials;				
	Bund shall be provided around storage area of muck to restrict littering and leaching.				
	Entire soil material shall be re-used for on-site and off-site works (such as canal backfilling, lining, levelling, embankment raising & strengthening, construction of temporary diversion road, filling and levelling of access road) that require soil/ earth to the extent possible. Entire muck shall be reused before monsoon season;				
	Safe temporary access routes / by-pass route will be provided for community members to access their farms during the canal re-sectioning period, if no alternative is available.				
Dust and air pollution from flying of dried up earth generated from re-sectioning work	Regular water sprinkling arrangement on desilted material specially during hot-summer season to maintain soil moisture and minimise dust pollution;	Arrangement of water sprinkling; Tarpaulin lining during transportation; Air quality near to the site and at habitation areas;	Site inspection; Community consultation	DPIU/ DPMU	Weekly
	All truck shall be tarpaulin covered while transporting desilted material; At canal stretches in proximity of sensitive receptors, the following additional mitigation measures will be implemented: The Contract Package ESMPs and Contractors ESMPs will specify the list of sensitive receptors. (the list of sensitive receptors – educational institutions, healthcare institutions and etc. are provided in Table 36 under Section 4.16).				
	Quarterly air quality monitoring shall be carried out at the Sensitive Receptor locations.			M & E Agency	Quarterly
		Tarpaulin lining during transportation;	Grievances, if any; Community consultation	DPIU/ DPMU	Weekly

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
Littering during transportation of excavated material	All transportation vehicle shall be provided lining arrangement while transporting muck to restrict littering on road.	Air quality near to the site and at habitation areas;	Air quality report		Quarterly
Disturbance in fishing by local fisher community	Local fishers will face disturbance in catch at active zone of canal resectioning work due to construction of bund. However, fisher community may perform fishing on other part of canal, where bund is not constructed.	Submission & approval of canal closure plan; Dissemination of canal closure plan; Grievance on fishing;	Review of canal closure plan	DPMU	Before construction of bund
	Contractor shall submit work plan with canal closure timeline for each restoration site to DPMU at least before 45 days of construction of bund for dewatering purpose;		Site visit and consultation with local fisher community		Monthly
	Restoration plan shall not be approved by DPMU, if not submitted at least 45 days prior to initiation of work at each site;				
	Subsequent to receive and approve of work plan, local fisher community should be informed about canal closure plan at-least before 30 days from bund construction. Canal closure notice board shall be displayed at local panchayat/ irrigation/ fishery and BDO office.				
II. Slope Stabilization of Critically Affected Reaches of Main, Branch and Distributaries canals by PCC Block Lining (B.1) **II. Slope stabilization of critically affected reaches of Minor / Sub-minor (LVL 4) by PCC Block lining (B.2)**					
Impact due to construction activity	ESMP for construction activity shall be applied				
Top soil exposure due to denudation leading to soil erosion	The clearing of vegetation in sections will ensure only areas of the land to be developed at a particular time are exposed to agents of erosion. This will also ensure the cleared areas of the land are not left bare over long periods as development at the cleared areas will be carried out immediately. This will minimize erosion at the project site.	No. of tree species cleared in different phases and area restored; Quantum of earth (Cum) generated, percentage utilised and disposed-off. Denuded area covered under plantation after construction (% of area) Water quality in the working zone and deviations from the standards / baseline in different periods; Lining work initiated on cleared portion	Physical Verification of Site; Report of the Contractor; Water Quality Report	DPIU	Weekly
Impact on flora/ fauna during weed cleaning operation	Contractor shall take reasonable precaution to prevent his workers from damaging any flora or fauna of the area specially during vegetation clearance.	Quantum of weeds generated, its use and disposal	Physical verification of site; Review of quarterly report by contractor;	DPIU	Weekly

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	Vegetation clearance shall be limited to portions of the canal slope to be lined at a particular time. The entire land shall not be cleared at a time and this will allow any fauna to migrate to adjoining areas.		Consultation with locals		
Organic pollution due to improper dumping of removed weeds, shrub stems, stumps, roots, twinges and leave on canal side embankment leading to inconvenience to local commuters; odour pollution.	Possibility shall be explored to engage Food Processing Industries and Horticulture Department for using removed weed in vermi composting promoted under this project. The management and disposal of this waste will be as follows (details are provided in the ESMP for waste management): Local community will be allowed to collect the shrub stems, stumps, roots for use as fuelwood and fencing material and weeds for domestic use such as using it as fuel, animal fodder or for composting.	Quantum of weeds generated, its use and disposal;	Physical verification of site; Consultation with local community; Review of quarterly report by contractor;	DPIU	Weekly
	Identification of temporary storage locations for drying and temporary storage of the weed waste in consultation with the IWD site engineers and the local government authority. The locations will not be within 100 m of the identified Sensitive Receptors (listed in Table 36 under Section 4.16).				
	The Contract Package ESMP and Contractor's ESMP will list and provide map of the identified locations.				
	Temporary storage of the weed waste at identified locations for a period not exceeding 10 days.				
	Sale or free lifting of dry/semi-dry weed waste for onward processing into compost, ropes (for handicrafts and furniture making), fodder, etc. The Contract Package ESMP and Contractor's ESMP will provide details of quantity to be disposed in this way along with details of interested parties.				
	The following Dos and Don'ts are to be followed for management of weed waste:				
	• Weed waste will not be stored at unauthorized locations. • Contractor shall not burn weed waste. • Dumping of weed waste at unauthorized locations is not to be undertaken. • In case on onward sale of the weed waste, the sale agreement will include prohibition of				

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	environmentally harmful practices (open burning of semi-wet waste, dumping of waste residues in unauthorized locations including water bodies, etc.).				
Air Pollution due to Burning of weeds, shrub stems, stumps, roots, twinges and leave	Contractor shall not adopt practice of burning weeds, shrub stems, stumps, roots, twinges and leave;	Air quality in the work site and aberration from standards.	Air quality test report;	DPIU	
	Discouraging local community in burning of weeds, shrub stems, stumps, roots, twinges and leave;		Consultation with local people / workers	DPIU	Weekly
Tree felling due to PCC lining activity	Avoidance of tree cutting to the possible extent with locational and design alternatives;	No. of trees uprooted by at project site;	Physical verification by site inspection	SPMU	Quarterly
	Chainage wise requirement of tree felling shall be counted with their species;	No. of trees not falling in the working zone but uprooted;	Review of records / repots	DPMU	Monthly
	Consult with local community as well as DPIU in identifying suitable local indigenous tree species; available community land or Govt. vacant land for compensatory plantation.	No. of trees planted (compensatory afforestation) and zone of plantation;	Consultation with local community	DPMU	
	Tree felling shall be commenced only after obtaining permission from Dept. of forest.	Type of tree species planted and bio-diversity maintenance		DPMU	
	Shrub stems, stumps, roots shall be uprooted properly to eliminate any chance of void under PCC lining.	Plant survival rate (newly planted saplings)		DPIU	
	Before taking civil measures, the surface area of the ground to be occupied shall be cleared of all roots and vegetable matter and stripped to a suitable depth as per IS: 4701 – 1982.				
	To compensate loss of tree and to improve the local aesthetic value, Compensatory tree plantation at 1:5 ratio will be carried out.			DPMU	
Loss of top soil	Generated small quantity of top soil shall be preserved and suitably reused for levelling, back filling purpose.	Quantum of top soil generated, percentage utilized and disposed-off;	Physical Verification of Site;	DPMU	Weekly
	Top soil may be temporarily staked in either side of embankment for field reuse;	Denuded area covered under plantation after construction (% of area).	Review of quarterly report by contractor;		
Dust pollution due to stocking of top soil on embankment site	Regular water sprinkling shall be provided to maintain moisture content- which in turn will reduce dust pollution;	Record on water sprinkling	Report of the Contractor;	DPIU	Weekly
	In case of transportation of top soil, tarpaulin cover shall be provided to restrict dust pollution during transportation.	Tarpaulin cover during transportation	Record on days of water sprinkling done in non-monsoon seasons	DPIU	Weekly

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	At canal stretches in proximity of sensitive receptors, the following additional mitigation measures will be implemented:				
	The Contract Package ESMPs and Contractors ESMPs will specify the list of sensitive receptors. (the list of sensitive receptors – educational institutions, healthcare institutions and etc. are provided in Table 36 under Section 4.16).				
	Quarterly air quality monitoring shall be carried out at the Sensitive Receptor locations.				
Sediment transport in streams, canal, water bodies leading to increased TDS and turbidity	Immediate collection and clearance of excess muck/soil from canal slope/bed to minimize the erosion potential and sediment transportation into canal water which may cause increased water turbidity or TDS.	Quantum of earth (Cum) generated, percentage utilized and disposed-off; Mechanism adopted for safe storage of generated top soil for reuse / clearing; Denuded area covered under plantation after construction (% of area) Slope maintained as per design Downstream and upstream water quality;	Site inspection / visit; Review of quarterly report by contractor; Analysis of water quality report	DPMU	Monthly
	Slopes of embankments to be constructed and maintained at a stable gradient according to design specifications to minimize gully erosion;				
	Embankments shall not be left un-compacted during construction works to minimize wind and water erosion.				
Littering on road due to transportation of earth from borrow areas	All transportation vehicle shall be provided with tarpaulin lining.	Lining in transportation vehicle; Borrow area and earth quantity	Site inspection / visit; Review of quarterly report by contractor;	DPIU	Weekly
III. Rehabilitation and upgradation of canal regulating structures of Main, Branch and Distributaries canals (sub-component under B-1) **III. Rehabilitation and upgradation of canal regulating structures of Minor / Sub-minors (sub-component under B.2)** **IV. Providing controlled structures (Duckbill weir) at tail end of canals and other locations of Level 4 canals (sub-component under B-1)** **IV. Construction of gates/shutters at uncontrolled outlets (sub-component under B.2)**					
Impact due to construction activity	ESMP for construction activity shall be applied				
Air and dust pollution due to demolition work; health impact on workers	All structure and demolition sites shall be wetted regularly before and after demolition work, to minimize air and fugitive dust pollution.	Air quality in the site; Workers using PPEs	Site inspection and physical verification; Air quality report	DPMU	Weekly
	Demolition site shall be covered from all site to arrest fine particle as well as to reduce air pollution.				
	Demolition workers shall be provided with PPEs to minimize health impact due to dust and air pollution				

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
Noise pollution & vibration and its impact on workers and community health	Demolition site shall be covered from all site to arrest / restrict spreading of noise due to demolition work.	Machinery / equipment / vehicles having latest certificate of maintenance;	Site inspection and physical verification;	DPMU	Weekly
	All demolition work shall be restricted between day time (7.0 AM to 8.0 PM).	No. of workers using ear-plugs / ear-muffs to reduce occupation exposure;	Noise quality report;		Quarterly (During demolition)-13 location
	Local people shall be made aware of specific time duration of demolition work, in advance.	Noise emitting machineries with protecting damping;			
	Sign board showing site of demolition work and time shall be provided at demolition site;	Use of explosive; blasting operation	Verification of used instrument / machineries;		
	Demolition work will not be permitted at any silence area or zone (100 meters from hospital, school) during active working hours (10 AM to 5 PM); demolition work in silence zone shall preferably be carried out on weekend and holiday or between 6 A.M to 10 A.M and 5 PM to 8 PM of other weekdays.		Consultation with local habitants;		
	Heavy noise emitting equipment shall be fitted with silencer. Noise barrier shall be provided to generator set.				
	Reducing the noise produced from a vibrating machine by vibration damping i.e. making a layer of damping material (rubber, neoprene, cork or plastic) beneath the machine.		Site inspection and physical verification	DPMU	Weekly
	Explosion or blasting operation shall not be performed within 500 meters periphery of nearby local habitat or structure.	Blasting sites and measure adopted to reduce effect of vibration	Consultation with local habitants		
	Contractor shall conduct vibration testing during blasting operation (if any) by engaging any third party at least at ten (10 – for whole project) location. Testing location shall be identified in consultation with DPMU and submit vibration report to DPMU.	Damage due to blasting/ vibration	Vibration testing;	Contractor	Each Blasting Site
	Demolition workers shall be provided with PPEs (earmuff) to minimize health impact due to noise pollution				
Vertical water fall with high velocity on the downstream side of crest may cause erosion	Apron/ wave breaker where ever required shall be provided for decapitation of excess energy	Apron/ wave breaker provided;	Site inspection and physical verification	DPIU/ DPMU	

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
Water and land pollution due to debris from dismantling structures and spoil	Reuse of dismantled materials to the possible extent; Unused / unusable materials shall be auctioned as per the procedures of Govt. / IWD or leftover C&D waste shall be disposed-off in the nearby sanitary landfill site.	Reuse and disposal of C&D items; Water Pollution management plan; Water quality in nearby river/ stream;	Water quality report; Site inspection; Review of records / reports	DPMU	Weekly
B.2- Minor Canal (L4) and Chak Infrastructure Modernization					
V. Irrigation through installation of pressured supply					
Impact due to construction of water storage sump	ESMP for construction activity shall be applied				
Consumption of conventional energy for pumping and water distribution which will increase economic cost of production	Along with electrification, use of solar panels for energizing the water extracting pumps and channelizing water to the fields	Percentage increase in area irrigated; Percentage reduction in gap ayacut in the command; Consumption of renewable and non-renewable energy;	Consultation with farmers in the command area; Reports / records; Site Inspection	IWD	Quarterly
VI. Construction of water retaining structure over minor channels to create storage for use in rabi crops					
Impact due to construction activity	ESMP for construction activity shall be applied				
Flooding of nearby agricultural field during dewatering before construction	Construction work shall be carried out when the river/ canal bed is dry.	No. of sites where dewatering is done	Site inspection / visit;	DPMU	Weekly
	Else, earthen bund shall be constructed for dewatering of active work zone;	Adopted dewatering mechanism;	Consultation with farmer having land adjoining to work site		
	River/ canal water shall not be pumped out for dewatering purpose to nearby agricultural field to avoid any kind of crop damage as well as agricultural land pollution (although probability of land/ soil pollution is very low; as this water is being used for irrigation purpose).	Crop area and type affected due to dewatering;	Review of quarterly report by contractor;		
	Crop compensation shall be paid to affected farmers on occurrence of crop damage due to dewatering.	Crop compensation paid to affected farmers.			
Crop damage due to interrupted irrigation supply	Contractor shall submit work plan with canal/ river closure timeline for each restoration site to DPMU at least before 45 days of any crop season;	Submission & approval of canal/river closure plan	Review of closure plan	DPMU	Before each crop season
	River/ canal closure plan shall not be approved by DPMU, if not submitted at least 45 days prior to any crop season;	Dissemination of canal/ river closure plan	Consultation with farmer having land adjoining to work site		

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	Subsequent to receive and approve of work plan, farmers should be informed about canal closure plan at-least before 30 days of any crop season. Canal closure notice board shall be displayed at local panchayat/ irrigation/ fishery and BDO office.		Review of quarterly report by contractor;		
Sediment transport in streams, canal leading to increased TDS and turbidity	All earther bund constructed for dewatering purpose shall be removed and entire work zone shall be levelled properly before monsoon period to maintain natural canal flow, minimize soil and sediment transportation to downstream and water pollution. Muck/ soil may be stored at canal/ river set back zone or either side of embankment for temporary period. Immediate collection and clearance of excess muck/soil from canal bed to minimize the erosion potential and sediment transportation into canal water which may cause increased water turbidity or TDS;	Removal of earthen bund; Clearing and levelling of work zone; Reuse and disposal of muck; Downstream and upstream water quality;	Site inspection / visit; Review of quarterly report by contractor; Analysis of water quality report	DPMU	Quarterly; before monsoon
VII. Demonstration for diversification and support in Horticulture, providing infrastructure of cultivation and construction of low cost storage structure – Department of Food Processing Industries and Horticulture					
1) Providing subsidy for area expansion and planting material to promote less water consuming fruits and vegetables					
Agriculture run off may be containing excess fertilizer promotes the excessive growth of aquatic plants (such as algae, weed and water hyacinth)	Optimum use of fertilizer, promotion of the use of organic manure and bio-fertilizer. Prevention of agricultural runoff to flow in to the canal / river / water bodies by adoption of efficient irrigation methods; Promotion of IPNM strategies among the farmers in the command area by training, demonstrations and hand holding support. Supply of IEC materials on specific doses of application of fertilizer for different crops during different seasons, in accordance with the earlier researches.	Farm level water quality; Farm level soil test; No. of farmers adopted INM / IPM / IPNM by holding category and crop type during different agricultural seasons;	Soil test report; Soil health card; Farm level water quality report; Field assessment; Consultation with farmers Consultation with extension service provides	Dept. of FPI&H	Monthly
Deterioration of groundwater quality	Promotion of organic farming that encourages use of organic fertilizers and pesticides Optimum use of chemical fertilizer and pesticides. Discouraging ground water extraction for agricultural and meeting high water consumption requirements in critical / semi-critical / unsafe zones. Sensitization / awareness of farmers on ground water extraction potential and ground water conservation.	No. of farmers adopted INM / IPM / IPNM by holding category and crop type during different agricultural seasons; Increase in surface water utilization and decrease in ground water withdrawal for irrigation purpose;	Ground water quality testing; Review of report on fertilizer and pesticide use; Field assessment on use of fertilizer and pesticide .	Dept. of Agriculture	Monthly

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	Participatory Ground Water Management through ground water user groups may be promoted, more specifically in semi-critical groundwater zones.	Use of chemical fertilizer and pesticides			
Soil quality degradation due to excess use of Fertilizer and pesticide	Training farmers for promoting adoption of integrated weed and pest management practices such as use of certified and disease tolerant seed varieties, use of early maturing seed varieties, proper land preparation, early planting, following recommended planting space between rows and plants, timely/early weeding, suitable water management practices and the use of agrochemicals where necessary. This will minimize the rate of agrochemical use.	No. of farmers adopted INM / IPM / IPNM by holding category and crop type during different agricultural seasons; No. of training organized on integrated weed and pest management.	Record on training provided; Review of record on use of different type of fertilizer and pesticide; Field assessment on use of fertilizer and pesticide	Dept. of FPI&H	Quarterly
	Dept. of Horticulture and Agriculture will ensure successful implementation of IPNM (given in ESMF of WBMIFMP).				
	Dept. of Horticulture and Agriculture will sensitize farmers to, preferentially, use selective pesticides with low environmental impact quotient (EIQ) where appropriate, rather than broad-spectrum products, to minimize impacts on non-target species.				
	Under minimum/reduced tillage, the stocks and leaves of harvested crops will be left on the field as much as possible to serve as mulch to conserve soil moisture and also improve soil biological condition on decomposition.				
	The farmers will be encouraged to use organic manure to minimize the use of inorganic manure and improve soil biological conditions.				
2) Providing subsidy for construction of Shade-net house 3) Providing subsidy for infrastructure development for promotion of vermi compost, protected cultivation and post-harvest infrastructure					
Construction activity	ESMP for construction activity camp site management plan shall be applied				
Use of agricultural land for construction	Use of irrigated agriculture land for PHI will be avoided,	Location of and type of land selected for PHI development; Number of PHI constructed;	Field observation; Consultation with farmer/ community	Dept. of FPI&H	Quarterly
	Exploring availability of Govt./ GP land for construction PHI,				

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
of Post-Harvest Infrastructure (PHI)	In PPP mode of infrastructure creation, the private body (FPC/ SHG), individual entrepreneur should arrange land in case of non-availability of Govt. land.	Use of Govt. land for construction of PHI			
Soil contamination due to storing of construction material on agriculture field	Construction work shall not be carried out during monsoon season; to minimize impact on cultivated crop, construction work shall be carried out only when firm land is devoid of any crop; any left-out waste or construction material shall be stored and collected and disposed properly; metal waste shall be sold to authorized recycler.	Period of construction work; list of construction material with quantity; Waste utilization plan adopted during implementation;	Community consultation; Consultation with implementing contractor on waste utilization; review of record on waste utilization	Dept. of FPI&H	Monthly
VIII. Agriculture Marketing – Agriculture Marketing Dept.					
1) Construction of aggregation centre/ pack house for temporary/ intermediate storage of farm produces (1/ FPC)					
Impact due to construction activity	ESMP for construction activity shall be applied				
Use of agricultural land for construction of aggregation centre / pack house	Use of irrigated agricultural land for aggregation centre / pack house will be avoided; Exploring availability of Govt. land / GP land for PHI; In PPP mode of infrastructure creation; private body should arrange land in case of non-availability of govt. land.	Change in land use pattern, if any; Construction activities as per the design;	Physical verification and production assessment; Consultation with farmers; Review of reports	Dept. of Agriculture Marketing	Fortnightly
Soil contamination due to generation of solid waste	Solid waste shall be collected regularly to maintain aesthetic value of nearby area and maintain hygiene condition.	Construction related practices followed / adopted;	Detail project Report (DPR); Consultation with FPC members; Site visit and physical verification	Dept. of Agriculture Marketing	Fortnightly
Procurement and use of machineries that does not comply to standards resulting with poor energy efficiency.	The machineries / instruments to be procured / installed should have ISI mark and energy efficiency certification.	Machineries / equipment procured / installed; Vendor details (registered / unregistered)	Review of documents; Consultation with FPC members; Site visit and physical verification	Dept. of Agriculture Marketing	Before Purchase
2) Transport subsidy to each FPC for procurement of motorized van (4.5 lakh/ FPC)					
Procurement and use of vans that are not as per the standard for agricultural	The van to be procured should comply to prescribed standards for transportation of agricultural commodities;	Vehicle procured and its standards; Vendor details (registered / unregistered)	Review of documents; Consultation with FPC members; Site visit and physical verification	Dept. of Agriculture Marketing	Before sanctioning subsidy

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
commodity transportation					
IX. Promotion of cage based pisciculture in the main and branches of irrigation canals					
1) Providing 8 no. cages with appurtenant to each SHG/ FPGs 2) Providing fish seed, fish feed etc. to SHG/ FPGs as one-time sustenance support					
Pollution from overstocking and overfeeding	Avoiding overfeeding; Avoiding or minimize or control use of medication	Use of feeding system and application of medicines	Consultation with fishers / SHGs / FPG members; Site inspection and physical verification	Dept. of Fishery	Monthly
Risk of cultivation of exotic species that may impact native populations	Maintaining proper stocking density; Avoiding stocking exotic and invasive species;	Stocking density and species assessment in cases	Consultation with fishers / SHGs / FPG members; Site inspection and physical verification	Dept. of Fishery	Monthly

Annexure- 28(b) ESMP Implementation Monitoring Plan for Flood Management

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
I. Desiltation of Mundeswari river for a length of 19.67 km from Beguahana to further downstream (including 430 metre u/s of undivided Damodar) **II. Desiltation of 41 nos. other drainage channels**					
Top soil/ sand exposure due to denudation leading to soil erosion	The clearing of vegetation in sections will ensure only areas of the land to be developed at a particular time are exposed to agents of erosion. This will also ensure the cleared areas of the land are not left bare over long periods as development at the cleared areas will be carried out immediately. This will minimize erosion at the project site.	Portion cleared at a particular time; Desilting work initiated on cleared portion; Water and air quality in the working zone and deviations from the standards / baseline in different periods.	Physical verification of site; Report of the Contractor; Water & Air Quality Report	DPIU	Weekly
Impact on flora/ fauna during weed cleaning operation	Contractor shall take reasonable precaution to prevent his workers from damaging any flora or fauna of the area specially during vegetation clearance. Vegetation clearance shall be limited to portions of the river/ drainage channels to be desilted at a particular time. The entire land will not be cleared at a time and this will allow any fauna to migrate to adjoining areas.	Quantum of weeds generated, its use and disposal	Physical verification of site; Consultation with workers/ local people; Review of quarterly report by contractor;	DPIU	Weekly
Organic pollution due to improper dumping of removed weed on river/ drainage channels side embankment leading to inconvenience to local commuters; odour pollution	Possibility shall be explored to engage Food Processing Industries and Horticulture Department for using removed weed/ hyacinth in vermi composting promoted under this project. The management and disposal of this waste will be as follows (details are provided in the ESMP for waste management): Local community will be allowed to use the weeds for domestic use such as using it as fuel (shrub stem, root), animal fodder or for composting.	Quantum of weeds generated, its use and disposal;	Physical verification of site; Consultation with local community; Review of quarterly report by contractor;	DPIU	Weekly
	Identification of temporary storage locations for drying and temporary storage of the aquatic weed waste in consultation with the IWD site engineers and the local government authority. The locations will not be within 100 m of the identified Sensitive Receptors (listed in Table 36 under Section 4.16).				
	The Contract Package ESMP and Contractor's ESMP will list and provide map of the identified locations.				

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	Temporary storage of the aquatic weed waste at identified locations for a period not exceeding 10 days.				
	Sale or free lifting of dry/semi-dry aquatic weed waste for onward processing into compost, ropes (for handicrafts and furniture making), fodder, etc. The Contract Package ESMP and Contractor's ESMP will provide details of quantity to be disposed in this way along with details of interested parties.				
	The following Dos and Don'ts are to be followed for management of aquatic weed waste:				
	• The aquatic weed waste will not be stored at unauthorized locations. • Burning of aquatic weed waste is not to be undertaken. • Dumping of aquatic weed waste at unauthorized locations is not to be undertaken. In case on onward sale of the aquatic weed waste, the sale agreement will include prohibition of environmentally harmful practices (open burning of semi-wet waste, dumping of waste residues in unauthorized locations including water bodies, etc.).				
Air Pollution due to Burning of weeds	Contractor shall not adopt practice of burning weeds; Discouraging local community in burning of weeds;	Air quality in the work site and aberration from standards.	Air quality test report; Consultation with local people / workers	DPIU	Weekly
Flooding of nearby agricultural field during dewatering before desiltation		No. of sites where dewatering is done; Crop area and type affected due to dewatering; Crop compensation paid to affected farmers.	Site inspection / visit; Consultation with farmer having land adjoining to work site Review of quarterly report by contractor;	DPMU	Weekly
	Most of the desiltation work will be carried out when the river/ drainage channels bed is dry.				
	Else, bund shall be constructed for dewatering of active work zone;				
	River/ drainage channels water shall not be pumped out for dewatering purpose to nearby agricultural field to avoid any kind of crop damage as well as agricultural land pollution (although probability of land/ soil pollution is very low; as this water is being used for irrigation purpose).				
	Crop compensation shall be paid to affected farmers on occurrence of crop damaged due to dewatering.				

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	In case channel/ river (undivided Damodar) water is pumped out for dewatering the following do and don'ts will be followed: Ensure that the pumped-out water will not deteriorate the water quality of the receptor water bodies. Undertake prior consultation, secure agreement and give adequate notice to other users of receptor water bodies. Don't let the water out onto roads, areas close to habitations that are prone to water logging, etc.				
Crop damage due to interrupted irrigation supply	Contractor shall submit work plan with river/ drainage channel closure timeline for each desiltation site to DPMU at least before 45 days of any crop season; Desiltation plan shall not be approved by DPMU, if not submitted at least 45 days prior to any crop season; Subsequent to receive and approve of work plan, farmers should be informed about river/ drainage channel closure plan at-least before 30 days of any crop season. River/ drainage channel closure notice board shall be displayed at local panchayat/ irrigation/ fishery and BDO office.	Availability of approved of river/ canal closure plan; Dissemination of river/ canal closure plan	Review of river/ canal closure plan; Consultation with farmer having land adjoining to work site; Review of quarterly report by contractor;	DPMU	Before each crop season
Sediment transport in river/ drainage channel leading to increased TDS and turbidity	All bund constructed for dewatering purpose shall be removed and entire work zone shall be levelled properly before monsoon period to maintain natural river/ drainage channel flow, minimise soil and sediment transportation to downstream and water pollution. Immediate collection and clearance of excess sand/ muck/soil from river/ drainage channel bed to minimize the erosion potential and sediment transportation into river/ drainage channel water which may cause increased water turbidity or TDS;	Removal of bund; clearing and levelling of work zone; Amount of sand/ muck / silt generated, reused and disposed-off; Water Quality of upstream and downstream	Site inspection / visit; Review of quarterly report by contractor;	DPMU	Weekly (specially before monsoon)
Over desiltation and/or desiltation in unplanned area / manner may aggravate environmental impact	Contractors having prior experience of river/ drainage channel desiltation and well-trained staff should only be selected for desiltation of Mundeswari river & other 41 drainage channel. Contractor shall conduct site specific testing of desilted materials to assess the appropriateness for different users. Preparation of Safety and Security plan by the Contractor before initiation of desiltation work. Prepared and submit desiltation plan including disposal plan with action time chart and risk management plan to	Experience of contractor in river and canal desiltation; Availability of desiltation plan, safety plan and desiltation scheduling; Volume of desilted material generated in each quarter and reused for beneficial purpose	Work order, work agreement and completion certificate; Physical verification of site and tallying with the plan; Consultation with contractor; Communication letter	SPMU	During selection of contractor Before desiltation

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	DPMU and SPMU for approval prior to carrying out desiltation operations. Desiltation plan should be prepared considering its location w.r.t environmental sensitive locations/ archaeological locations/ cultural festival/ pollution influx in the area/ quality & texture of desilted material/ available depth etc. through local sources and past experience.				
Health impact on workers and local community due to desiltation operation	Desilting contractor should follow the defined safety procedures to avoid accidents and spills.	Application of safety norms	Site visit; consultation with workers and contractor	DPMU/ SPMU	DPMU- Weekly, SPMU- Monthly
	Inform local community prior to desiltation operation to avoid any conflict arising from desiltation operation.	Prior information to local community	Consultation with local community	DPMU/ SPMU	
Dewatering of desilted material and associated water and soil contamination and sediment transportation	Desilted material should be temporarily stored on setback zone to drain out water; tail water shall properly be channelized in a sump to settle down sediment; sediment free filtrate water will be discharged into downstream river water.	No. of sediment trap provided; cleaning of sump;	Site Inspection; Discussion with contractor / workers; Physical verification	DPMU/ SPMU	DPMU- Weekly, SPMU- Monthly
	Sediment settling sump shall be cleaned regularly to avoid over-flow.				
	Tail water shall not be discharged directly to downstream river water without sediment trapping;				
	Regular monitoring of the excess water at sediment trapping system shall be done. This will help in assessing the efficiency of sediment trap system provided at site.				
Sediment release, transportation and mixing with water during desiltation	No stacking of desilted material on river bed or agricultural field during monsoon period;	Stacking and reused quantum of desilted materials; Removal of ramps	Site inspection and observation; Discussion with contractor; Site inspection, specifically before the on-set of monsoons; Review of transportation log book;	DPMU/ SPMU	DPMU- Weekly, SPMU- Monthly
	Immediate shifting of desilted materials from stream to temporary stacking point;				
	Early evacuation of desilted material/ dewatered sand material from set-back zone to next point to minimize the potential for erosion into river water which may cause soil and sediment transportation in downstream.			DPMU	
	Proper levelling of work zone before monsoon.				
Soil pollution due to temporary stacking of desilted materials; stocking on agricultural field	Desilted waste management plan given in Section 7.3.3 shall be applied	Soil and water quality;	Physical verification through site;	DPMU/ SPMU	DPMU- Weekly, SPMU- Monthly
	Desiltation material will temporarily be stored on river set back zone located on both side of river and bank of drainage channel.	Stacking and disposal management practices adopted;	Review of data on desilted quantum, used and disposed quantum;		
	Storing of excavated material on nearby agricultural field shall be avoided to the extent possible;	Soil and water quality;			

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	In case of unavoidable circumstances, agreement of farmer is mandatory for use of land for temporary stocking;	Quantum of stocking and area used (in Ha.); No. of farmers land temporarily used for stacking;	Soil and water quality and comparing with baseline; Review of agreement with farmers; Consultation with farmers		
	Compensation to farmers for temporary stacking;				
	Earmarked land shall be developed by removing top soil for temporary stacking.				
	Bed lining using brick paving and thick tarpaulin in the area of stocking to restrict it's mixing with top soil;				
	Bund around temporary storing area of desilted material;				
	Top soil shall be preserved and levelled properly after removal of entire desilted material;				
	Restoration of land to its previous position or its improvement				
	Desilted material shall be reused before monsoon season;				
Disposal of excess desilted material- Impact on Soil quality.	Desilted material should not be disposed-off in river banks or agricultural field;	Disposal percentage to total desilted quantum; Reused area and quantum reused (percent to total desilted material); Disposal site status and disposal methods; Soil quality in disposal site	Site inspection; Consultation with locals / inhabitants; Review of documents; Soil quality report	DPMU/ SPMU	DPMU- Weekly, SPMU- Monthly
	Reuse of desilted material to the possible extent and disposal of remains;				
	Filling up of vacant low-lying Government land identified and approved both by the IWD and by the local government authority				
	In case, if the desilted materials found unsuitable for field or other application, it would be disposed-off as per the sediment disposal plan given in Section- 7.3.3.				
	If desilted material is found contaminated with heavy metal at any particular location, material should be disposed at nearby approved TSDF site.				
Dust and air pollution from flying of dried up desilted material; littering during transportation	Regular water sprinkling arrangement on desilted material specially during hot-summer season to maintain soil moisture and minimise dust pollution;	Air pollution in the work and habitation site; Covering of transportation means	Air quality report review; Site inspection; Discussion with local habitants.	DPMU	Regular
	All truck shall be tarpaulin covered while transporting desilted material;				
	Transportation vehicle with bed lining arrangement while transporting desilted material to restrict littering on road.				
	At canal stretches in proximity of sensitive receptors, the following additional mitigation measures will be implemented:				
	The Contract Package ESMPs and Contractors ESMPs will specify the list of sensitive receptors. (the list of				

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	sensitive receptors – educational institutions, healthcare institutions and etc. are provided in Section 4.16).				
	Quarterly air quality monitoring shall be carried out at the Sensitive Receptor locations.				Quarterly
Impact on fauna including Vulnerable mammal (Fishing Cat, Asian Small-clawed Otter) and Snake (King Cobra)	Desiltation operation shall be carried out only during non-monsoon period when major portion of river/ drainage channel bed remains dry;	Reported cases of impact on aquatic fauna	Site inspection and observation; Review of reports / data; Discussion with local community	DPIU/ DPMU	DPIU- Regular, DPMU- Weekly
	The contractor and its workers will be educated / sensitized on endangered/ vulnerable species and its protection measures;				
	Hunting or poaching of Vulnerable mammal (Fishing Cat, Asian Small-clawed Otter) and Snake (King Cobra) shall be strictly restricted. On observation, any such species shall be allowed to migrate in nearby area.				
	Not using any threatened/ near threatened species for commercial purpose;				
	Desiltation work at Mundeswari river shall be restricted between 6 AM to 6 PM; any kind of work on river bed shall NOT be performed during night time (7 PM to 6 AM)				
	All sources of light on Mundeswari river bed shall be switched off during night time (6PM to 7AM)				
	Vibration measures shall be performed before initiation of desiltation work at Mundeswari River to allow species to come out from their cave and migrate to surrounding places;				
	Weed clearing on Mundeswari river shall be restricted to active work zone, this will allow fauna species to migrate in nearby bushes;				
	Fishing cat which is State animal of West Bengal shall be protected from any kind of damage; occurrence of damage to any vulnerable, threatened species shall be reported to Dept. of Biodiversity on regular basis;				
	Silencer shall be provided with all noise generating machineries operating during desiltation operation; Reducing the noise produced from a vibrating machine by vibration damping i.e. making a layer of damping material (rubber, neoprene, cork or plastic) beneath the machine;				

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
Impact on aquatic fish and benthic communities	Desiltation operation shall be carried out only during non-monsoon period when major portion of river/ drainage channel bed remains dry;	Reported cases of impact on aquatic fish	Site inspection and observation; Review of reports / data; Discussion with local community	DPIU/ DPMU	DPIU-Regular, DPMU-Weekly
	The contractor and its workers will be educated / sensitized on vulnerable (3), endangered (1), near threatened (3) and near extinction fish species and its protection measures;				
	Not performing fishing activity during desiltation work in river/ drainage channel or near-around area water-bodies,				
	Not using any threatened/ near threatened species for commercial purpose;				
	Any vulnerable (3), endangered (1), near threatened (3) and near extinction fish species found during dewatering of active desiltation zone shall be preserved and immediately release to downstream river/ drainage channel water.				
Impact on socioeconomic environment	Limiting desiltation operations to day time only, i.e. 7:00 Am-8:00 PM;	Seasonality and timing of desilting operation; Use of technically specified earthmoving machineries with operational clearance;	Site inspection; Log book and document verification; Consultation with local inhabitants;	DPIU/ DPMU	DPIU-Regular, DPMU-Weekly
	Use of machineries equipped with noise reduction / masking equipment;				
	Log book should be maintained for recording the accidents at site.				
	Analysis shall be carried out to assess the reason for the accident / mortality and measures should be taken to prevent repetition of the event.				
Disruption of livelihoods due to temporary stocking of desilted material in agricultural land located at set back zone	To the extent possible areas with habitation / business establishments / cultivable areas will be avoided;	Total cultivated and uncultivated land (in Ha.) used for temporary stocking; Temporary acquisition of land for stocking (in Ha.); Willingness of the land owner / cultivator to use land for stacking No. of persons affected and no. of persons paid compensation	Site inspection; Consultation with farmers / contractor / local community; Review of reports / documents	DPMU/ SPMU	DPMU-Weekly, SPMU-Monthly
	In case of any loss of livelihood, PAP will be compensated under the project.				
Impact on livelihood of local fisher community	Allowing fishing in other locations, excluding the working zone on temporary basis;	No. of fisher's dependent on specific location for fishing;	Discussion with fishers;	DPIU	Weekly

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
		Average percentage increase or reduction in seasonal catch; Shift in catching locations	Discussion with fishery Dept.		
III. Armouring of Damodar Right Dwarf embankment to act as Broad Crested Weir to allow controlled spilling of flood water **IV. Improving Damodar Protected Left Embankment by providing adequate free board to withstand flood through construction of flood walls at identified locations** **V. Improving Upper Rampur & Hurhura Channels by providing adequate freeboard through provision of flood wall on Left Embankments** **VI. Raising & Strengthening of countryside existing earthen embankments to its design section of Damodar Left, Hurhura Left & Lower Rampur left embankments** **VII. Protection / River training works on river Damodar / Mundeswari, Hurhura Khal, Upper Rampur and Lower Rampur Khal**					
Impact due to construction activity	ESMP for construction activity shall be applied				
Top soil exposure due to denudation leading to soil erosion	The clearing of vegetation in sections will ensure only areas of the land to be developed at a particular time are exposed to agents of erosion. This will also ensure the cleared areas of the land are not left bare over long periods as development at the cleared areas will be carried out immediately. This will minimize erosion at the project site.	No. of tree species cleared in different phases and area restored; Quantum of earth (Cum) generated, percentage utilized and disposed-off. Denuded area covered under plantation after construction (% of area) Water quality in the working zone and deviations from the standards / baseline in different periods; Work initiated on cleared portion	Physical Verification of Site; Report of the Contractor; Water Quality Report	DPIU	Weekly
Impact on flora/ fauna during weed cleaning operation	Contractor shall take reasonable precaution to prevent his workers from damaging any flora or fauna of the area specially during vegetation clearance. Vegetation clearance shall be limited to portions of the embankment at a particular time. The entire land will not be cleared at a time and this will allow any fauna to migrate to adjoining areas.	Quantum of weeds generated, its use and disposal	Physical verification of site; Consultation with workers/ local people; Review of quarterly report by contractor; Review of quarterly report by contractor;	DPIU	Weekly
Organic pollution due to improper dumping of removed weeds, shrub stems, stumps, roots, twinges and leave on canal side embankment leading to inconvenience to local commuters; odour pollution	Possibility shall be explored to engage Food and Horticulture Department for using removed weed in vermi composting promoted under this project. The management and disposal of this waste will be as follows (details are provided in the ESMP for waste management): Local community will be allowed to use the weeds for domestic use such as using it as fuel (shrub stem, root), animal fodder or for composting.	Quantum of weeds generated, its use and disposal;	Physical verification of site; Consultation with local community; Review of quarterly report by contractor;	DPIU	Weekly

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	Identification of temporary storage locations for drying and temporary storage of the aquatic weed waste in consultation with the IWD site engineers and the local government authority. The locations will not be within 100 m of the identified Sensitive Receptors (listed in Section 4.16).				
	The Contract Package ESMP and Contractor's ESMP will list and provide map of the identified locations.				
	Temporary storage of the aquatic weed waste at identified locations for a period not exceeding 10 days.				
	Sale or free lifting of dry/semi-dry aquatic weed waste for onward processing into compost, ropes (for handicrafts and furniture making), fodder, etc. The Contract Package ESMP and Contractor's ESMP will provide details of quantity to be disposed in this way along with details of interested parties.				
	The following Dos and Don'ts are to be followed for management of aquatic weed waste:				
	• The aquatic weed waste will not be stored at unauthorized locations. • Burning of aquatic weed waste is not to be undertaken. • Dumping of aquatic weed waste at unauthorized locations is not to be undertaken. • In case on onward sale of the aquatic weed waste, the sale agreement will include prohibition of environmentally harmful practices (open burning of semi-wet waste, dumping of waste residues in unauthorized locations including water bodies, etc.).				
Air Pollution due to Burning of weeds, shrub stems, stumps, roots, twinges and leave	Contractor shall not adopt practice of burning weeds, shrub stems, stumps, roots, twinges and leave; Discouraging local community in burning of weeds, shrub stems, stumps, roots, twinges and leave;	Air quality in the work site and aberration from standards.	Consultation with local people / workers; Review of quarterly report by contractor; Air quality test report;	DPIU	Weekly
Water and soil pollution due to coal tarring of bullah; health impact on workers	Coal tarring of bullah on agricultural land or river bed/ bank shall be avoided to the possible extent;	Quantity or coal tar purchased; Lining provided; use of PPF by workers	Site visit, Consultation with workers	DPIU	Weekly

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	Impervious lining arrangement shall be provided at coal tarring area;				
	Worker shall use full set of protective gear (hand gloves, shoes, mask, etc.) while handling coal tar; a first-aid kit will be available;				
Felling of trees (total 788, 526 with GBH= ≥ 50 ≤ 80 and 262 with GBH ≥ 80 nos.) due to flood wall construction and embankment strengthening works	Avoidance of tree cutting to the possible extent with locational and design alternatives;	No. of trees uprooted by at project site;	Physical verification by site inspection	SPMU	Quarterly
	Chainage wise requirement of tree felling shall be counted with their species;	No. of trees not falling in the working zone but uprooted;	Review of records / repots	DPMU	Monthly
	Consult with local community as well as DPIU in identifying suitable local indigenous tree species; available community land or Govt. vacant land for compensatory plantation.	No. of trees planted (compensatory afforestation);	Consultation with local community	DPMU	
	Tree felling shall be commenced only after obtaining permission from Dept. of forest.	Type of tree species planted and bio-diversity maintenance		DPMU	
	No tree felling will be allowed beyond the identified working zone; cutting of holy tree *Ficus religiosa* (*Peepal*) shall be avoided to the possible extent;	Plant survival rate (newly planted saplings)		DPIU	
	The construction and excavated materials will be staked at a safe distance from tree located in such areas to avoid any damage to the trees;			DPMU	
	Shrub stems, stumps, roots shall be uprooted properly to eliminate any chance of void.				
	To compensate loss of tree and to improve the local aesthetic value, compensatory tree plantation at 1:5 ratio will be carried out.				
	Maintaining bio-diversity in compensatory afforestation and avoid mono species plantation; Mixed plantation with locally grown species will be promoted in consultation with Forest Department and local community / Gram Panchayat;				
	Bamboo palisade will be provided around plantation area; after care measures for a period of thee year will be taken up				
Loss of top soil	Generated small quantity of top soil shall be preserved and suitably reused for levelling, back filling purpose.	Quantum of top soil generated, percentage utilized and disposed-off; Denuded area covered under plantation after construction (% of area).	Physical Verification of Site; Review of quarterly report by contractor;	DPMU	Weekly
	Top soil may be temporarily staked in either side of embankment for field reuse;				

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
Dust pollution due to stocking of top soil on embankment site	Regular water sprinkling shall be provided to maintain moisture content- which in turn will reduce dust pollution; In case of transportation of top soil, tarpaulin cover shall be provided to restrict dust pollution during transportation.	Arrangement of water sprinkling; Record on water sprinkling; Tarpaulin cover during transportation; Air quality near to the site and at habitation areas;	Site inspection; Report of the Contractor; Record on days of water sprinkling done in non-monsoon seasons	DPIU	Weekly
	At canal stretches in proximity of sensitive receptors, the following additional mitigation measures will be implemented:				
	The Contract Package ESMPs and Contractors ESMPs will specify the list of sensitive receptors. (the list of sensitive receptors – educational institutions, healthcare institutions and etc. are provided in Section 4.16).				
	Quarterly air quality monitoring shall be carried out at the Sensitive Receptor locations.		Air quality monitoring report	DPMU	Quarterly
Littering on road due to transportation of earth from borrow areas; dust pollution	All transportation vehicle shall be provided with tarpaulin lining.	Lining in transportation vehicle;	Site inspection / visit; Review of quarterly report by contractor;	DPIU	Weekly
Impact on public utilities and disruption of services	Consideration of design and locational alternative for minimum disruption of public utilities. Relocation of affected public utilities in consultation with concerned dept.; Reconstruction of demolished community facilities or provision of compensation in consultation with GP / local community; Necessary permission shall be obtained from respective Govt. agency;	No. of public utilities / community assets shifted / relocated / repaired or compensated;	Site inspection; Discussion with inhabitants on facilities and services; Review of records / reports	SPMU	Monthly
Impact on assets and livelihood; due to eviction from encroached land	To the extent possible, eviction will be avoided; In case of any eviction, the affected persons/families to be identified in advance and will be compensated at replacement value for the lost asset; (Refer RAP for detail) The affected person will be compensated / assisted before taking physical possession of the asset; Option for temporary relocation, till the end of construction, will be explored Loss of crop to be compensated financially in case of temporary use of land;	No. of persons affected and relocated (temporarily / permanently) No. of affected persons provided compensation awards for loss / acquisition of assets; No. of persons reengaged in different livelihood activities; Improvement / reduction in income of the affected families	List of affected families; List of PAFs / PAPs compensated for loss of assets; Consultation with PAFs / PAPs; Visit to project sites and physical observation of livelihood restoration.	DPMU/ SPMU	DPMU-Weekly SPMU-Monthly

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
Cultural properties such as Mandir- 31, burning ghat- 3 located on the both sides of the embankment	Re-examination of CPR before commencement of the work and list down CPR to be affected.	No. and type of cultural properties affected;	Site inspection;	DPMU	DPMU- Weekly SPMU- Monthly
	Design and location shall be modified to the possible extent to protect all cultural property and / or to minimize impact on it;	No. and type of CPR for which compensation paid or newly constructed;	Discussion with inhabitants on affected and restored CPR;	SPMU	DPMU- Weekly SPMU- Monthly
	If in case it is unavoidable, project shall construct or arrange similar establishment or compensate for the loss of asset in consultation with local people / GP.		Review of records / reports	SPMU	
VIII. Remodeling & Reconstruction of sluices at the outfalls of drainage channels					
Impact due to construction activity	ESMP for construction activity shall be applied				
Air and dust pollution due to demolition work; health impact on workers	All structure and demolition sites shall be wetted regularly before and after demolition work, to minimise air and fugitive dust pollution.	Air quality in the site; Workers using PPEs	Site inspection and physical verification; Air quality report	DPMU	Weekly
	Demolition site shall be covered from all site to arrest fine particle as well as to reduce air pollution.				
	Demolition workers shall be provided with PPEs to minimise health impact due to dust and air pollution				
	The Contract Package ESMPs and Contractors ESMPs will specify the list of sensitive receptors (given in Section 4.16).				
	Regular monitoring of air emissions at the Sensitive Receptor locations.				Quarterly
Noise pollution & vibration and its impact on workers and community health	Demolition site shall be covered from all site to arrest / restrict spreading of noise due to demolition work.	Machinery / equipment / vehicles having latest certificate of maintenance;	Site inspection and physical verification	DPMU	Weekly
	All demolition work shall be restricted between day time (7.0 AM to 8.0 PM).	No. of workers using ear-plugs / ear-muffs to reduce occupation exposure;	Noise quality report		Quarterly (During demolition)
	Local people shall be made aware in advance regarding specific time duration of demolition work.	Noise emitting machineries with protecting damping.			
	Sign board showing site of demolition work and time shall be provided at demolition site;	Use of explosive; blasting operation	Verification of used instrument / machineries;		
	Demolition work will not be permitted at any silence area or zone (100 metres from hospital, school) during active working hours (10 AM to 5 PM); demolition work in		Consultation with local habitants		

Expected Impact	Mitigation Measures	Monitoring Indicators	Means of Verification	Supervising and Monitoring Entity	Monitoring Frequency
	silence zone shall preferably be carried out on weekend and holiday or between 7 A.M to 10 A.M and 5 PM to 8 PM of other weekdays.				
	Heavy noise emitting equipment shall be fitted with silencer. Noise barrier shall be provided to generator set.				
	Reducing the noise produced from a vibrating machine by vibration damping i.e. making a layer of damping material (rubber, neoprene, cork or plastic) beneath the machine.		Site inspection and physical verification	DPMU	Weekly
	Explosion or blasting operation shall not be performed within 500-meter periphery of nearby local habitat or structure.	Blasting sites and measure adopted to reduce effect of vibration;	Consultation with local habitants		
	Contractor shall conduct vibration testing during blasting operation (if any) by engaging any third party at least at ten (10 - for whole project) location. Testing location shall be identified in consultation with DPMU and submit vibration report to DPMU.	Damage due to blasting/ vibration	Vibration testing;	Contractor	During Blasting Operation/ Each Site
	Demolition workers shall be provided with PPEs (earmuff) to minimise health impact due to noise pollution				
	The Contract Package ESMPs and Contractors ESMPs will specify the list of sensitive receptors (given in Section 4.16).				
	Regular monitoring of air emissions at the Sensitive Receptor locations.				
Vertical water fall with high velocity on the downstream side of crest may cause erosion	Apron/ wave breaker where ever required shall be provided for decapitation of excess energy	Apron/ wave breaker provided	Site inspection and physical verification	DPIU/ DPMU	Monthly
Water and land pollution due to debris from dismantling structures and spoil	Reuse of dismantled materials to the possible extent (C&D waste management plan given in Section 7.3.1 shall be applied);	Reuse and disposal of C&D items Water quality in nearby river/ stream;	Water quality report; Site inspection; Review of records / reports	DPMU	Weekly
	Unused / unusable materials shall be auctioned as per the procedures of Govt. / IWD or left-over C&D waste shall be disposed-off in the nearby sanitary landfill site.				

Annexure- 29: Model Code of Conduct (ESHS) for Contractor's Employees and subcontractors

1.introduction

This Code of Conduct will oblige all Contractor's Personnel (including sub-contractors and day workers) to abide by following practices, as a minimum. Additional obligations may be imposed during project implementation to respond to particular concerns of the region, the location and the project sector or to specific project requirements. Contractor may also impose any additional or strengthen code of conduct on his workers/ staff.

The Code of Conduct should be written in plain language and signed by each worker to indicate that they have:

- received a copy of the code;
- had the code explained to them;
- acknowledged that adherence to this Code of Conduct is a condition of employment; and
- understood that violations of the Code can result in serious consequences, up to and including dismissal, or referral to legal authorities.

A copy of the code of conduct will be displayed at prominent locations easily accessible to the community and project affected people. Name and contact number of the authorised representative of the contractor competent to attend the grievances of the local community or project affected persons should also be provided on the display board, in languages comprehensible to the local community, Project Manager's Personnel, and Employer's Personnel.

2.Model Code of Conduct (ESHS)

2.1 **None of Employees of the Contractor and the Subcontractor shall be involved in the following activities**:

- Burning of vegetation waste in open space.
- Unauthorized storage of inflammable substances or harmful non-desired chemical/ pesticide in labour camp or work site.
- Harm or disturbance (including hunting/ poaching) to any endangered or threatened species like Fishing Cat, Mongoose, Asian Small Clawed Otter, Fresh Water Turtles/Terrapins, Jungle Cat, Jackal, Monitor Lizard, King Cobra, White-eyed Pochard, etc., or plant species *Ficus religiosa* (a culturally significant tree).
- Harm or disturbance to any culturally significant site.
- Unauthorized removal of timber.
- Disposal of solid or liquid wastes in river/canal, water bodies, streams, etc
- Illicit or criminal activities including sexual harassment of women or children (prohibit use of language or behavior, in particular towards women and/or children,

that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate).

- Violence including sexual and/or gender-based violence (for example acts that inflict physical, mental or sexual harm or suffering, threats of such acts, coercion, and deprivation of liberty
- Exploitation including sexual exploitation and abuse (for example the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favours or other forms of humiliating, degrading behaviour, exploitative behaviour or abuse of power).
- Use of illegal substances and consumption of intoxicating materials
- Discrimination in dealing with the local community (including vulnerable and disadvantaged groups), Project Manager's Personnel, Employer's Personnel and also among themselves on the basis of family status, ethnicity, race, gender, religion, language, marital status, age, disability (physical and mental), sexual orientation, gender identity, political conviction or social, civic, or health status
- Open defecation
- Retaliation of workers who report violations of the Code, if that report is made in good faith.
- Fishing practice in local or community pond

2.2 The Code of Conduct (ESHS) shall ensure:

- Compliance with applicable laws, rules, regulations, consent conditions and the measures specified in the Contractor's ESHS-MSIP
- Compliance with applicable health and safety requirements to protect the Contractor's own employees or subcontractors (e.g. by wearing prescribed personal protective equipment at worksites or during undertaking any activity in relation to execution of work), local community (including vulnerable and disadvantaged groups), Project Manager's Personnel and the Employer's Personnel (e.g. taking all precautions to prevent avoidable accidents and promptly reporting to the Engineer/Employer on any accident that might have occurred at worksite)
- Regular interaction with the local community, members of the local community before initiation of work as well as during project implementation period. Public consultation to maintain community integrity and social links.
- Convey attitude of respect to affected person as well as regional culture and traditions
- Protection of children (persons less than 18 years of age) (including prohibitions against sexual activity or abuse, or otherwise unacceptable behaviour towards children, limiting interactions with children, and ensuring their safety in project areas)
- Use specified sanitary facilities provided by their employer and not open areas
- Avoidance of conflicts of interest (such that benefits, contracts, or employment, or any sort of preferential treatment or favours, are not provided to any person with whom there is a financial, family, or personal connection)
- Respecting reasonable work instructions (including regarding environmental and social norms)

- Protection and proper use of property (for example, to prohibit theft, carelessness or waste)
- Duty to report violations of this Code
- Store chemicals appropriately with proper labelling and promptly inform to relevant agencies on accidental spill or incident