विषय :— छत्तीसगढ़ राज्य की नदियों के प्रदूषित भाग के पुर्नरूद्धार हेतु गठित **"River Rejuvenation Committee"** की दिनांक 19/10/2020 को संपन्न बैठक का कार्यवाही विवरण।

——:000:——

शासन द्वारा दिनांक 07/08/2020 को केन्द्रीय प्रदूषण नियंत्रण बोर्ड को "Revised Action Plan for Rejuvenation of Polluted River Stretches of Chhattisgarh" प्रेषित किया गया था। केन्द्रीय प्रदूषण नियंत्रण बोर्ड द्वारा गठित टॉस्क फोर्स समिति द्वारा दिनांक 04/09/2020 को 14 वीं बैठक में उक्त कार्ययोजना का परीक्षण किया जाकर कतिपय बिन्दुओं पर जानकारी प्रस्तुत किये जाने के साथ कार्ययोजना को संशोधित किये जाने हेतु निर्देशित किया गया है। तद्नुसार विभिन्न विभागों से प्राप्त जानकारी को समाहित करते हुए प्रदेश की नदियों यथा हसदेव, खारून, महानदी, शिवनाथ एवं केलो नदी के प्रदूषित भागों के पुर्नरूद्धार हेतु पृथक–पृथक संशोधित कार्ययोजना तैयार की गई है।

2/ दिनांक 19/10/2020 को "River Rejuvenation Commitee" की बैठक आयोजित की गई। इस बैठक में निम्नलिखित अधिकारी उपस्थित थे :—

1. श्री अंकित आनंद, विशेष सचिव, आवास एवं पर्यावरण विभाग
2. श्री ओंकेश चन्द्रवंशी, अधीक्षण अभियंता, संचालक, नगरीय प्रशासन एवं विकास विभाग
3. श्री संतोष भगत, संयुक्त संचालक (प्रतिनिधि), संचालक, उद्योग, उद्योग भवन, रायपुर
4. श्री आर. पी. तिवारी, सदस्य सचिव, छत्तीसगढ़ पर्यावरण संरक्षण मंडल

3/ समिति द्वारा राज्य की हसदेव, खारून, महानदी, शिवनाथ एवं केलो नदी के प्रदूषित भाग के पुर्नरूद्धार हेतु पृथक–पृथक तैयार की गई संशोधित कार्ययोजना का अवलोकन कर अनुमोदन किया गया।

सदस्य सचिव छत्तीसगढ़ पर्यावरण संरक्षण मंडल (सदस्य)	for संचालक नगरीय प्रशासन एवं विकास विभाग (सदस्य)	संचालक उद्योग संचालनालय (सदस्य)	विशेष सचिव (स्वतंत्र प्रभार) आवास एवं पर्यावरण विभाग (अध्यक्ष)

REVISED ACTION PLAN FOR THE REJUVENATION OF POLLUTED RIVER STRETCH OF RIVER HASDEO

(KORBA TO URGA)

PRIORITY – IV

APPROVED BY:

RIVER REJUVENATION COMMITTEE, CHHATTISGARH

(Constituted in compliance of order of the Hon'ble National Green Tribunal)

SUBMITTED TO:

CENTRAL POLLUTION CONTROL BOARD, DELHI

TABLE OF CONTENT

S.No.	Content	Page No.
1.	Executive Summary	03
2.	Introduction	05
3.	Achievable Targets as per Hon'ble NGT Directions	05
4.	Water Quality Reports for the Year 2016-2019	05
5.	Identified Polluted River Stretches in the State	08
6.	Action Plan For Restoration of Polluted River Stretches Of River Hasdeo (Priority-IV)	09
7.	Major Towns And Industries in The Catchment of River Hasdeo	09
8.	Major Drains Contributing Pollution into River Hasdeo	13
9.	Latest Water Quality Characteristics of River Hasdeo	17
10.	Identification of Sources of Pollution	17
11.	Components of Action Plan	17
12.	Detailed Gap Analysis	19
13.	Ground Water Quality Monitoring	23
14.	River Hasdeo Rejuvenation Plan	23
15.	Monitoring of the Action Plans	26
16.	Action Plan	27

1. EXECUTIVE SUMMARY

The Hasdeo basin covers the area of the following districts viz. Koriya, Sarguja, Korba and Janjgir- Champa. The Hasdeo watershed submerges into the river Mahanadi which forms a large basin area.

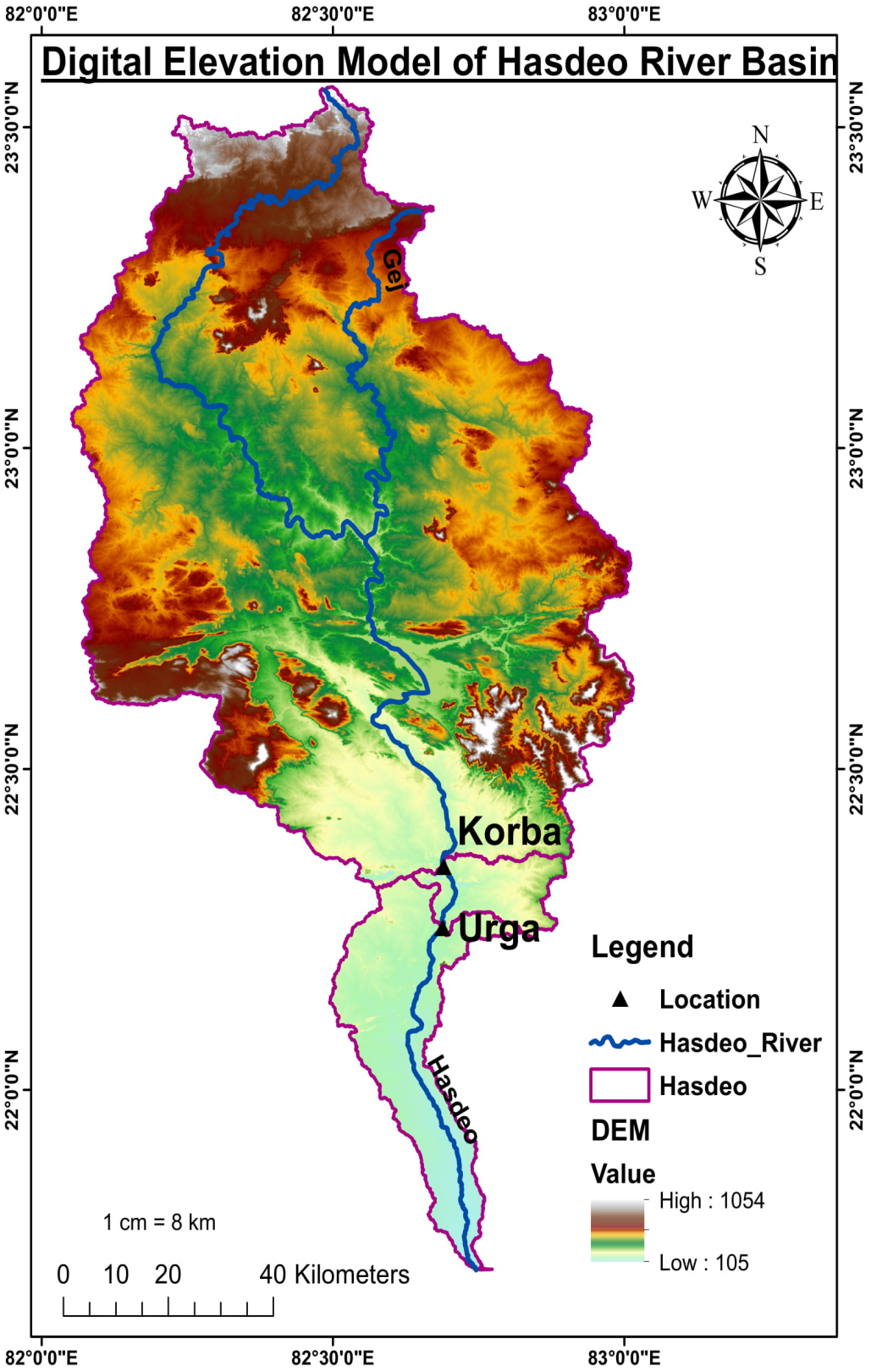
Korba City

The city of Korba in Chhattisgarh is important hub of thermal power plants and industries based on the minerals and coal found in the vicinity. It was a village governed by Gram Panchayat till 1973. In 1973, a Special Area Development Authority was created for 74 villages surrounding Korba and including Korba. In 1998, the Korba Municipal Corporation was created by including 56 villages under the Special Area Development Authority. The area of Korba Municipal Corporation is 215.02 sqkm. The population as per the 2011 census within Municipal Corporation limit was 3,65,073. At present the city neither has piped sewage collection system nor Sewage Treatment Plant. Sewage generated from the city is discharged in several nallas which meet river Hasdeo, and in turn adversely affect the river water quality.

Table No. 01

Sl. No	Salient Features of Town	Data
1.	Geographic Location	22.35^0N 82.68^0E
2.	Altitude	316 meters
3.	Climate	**Wet season –** Oppressive and Overcast **Dry season –** Mostly clear
4.	Temperature	Varies from 55^OF to 106^OF
5.	Rainfall	1295.50 milimetres

Digital map showing above details is enclosed.



2. INTRODUCTION

Hasdeo river basin area covers one of the most significant and interesting part of the Indian peninsular in Chhattisgarh state. Hasdeo River is a tributary of Mahanadi; flows at a stretch of 330 km from Hasdeo Mountain at an elevation of 1052 MSL and about 9.5 kms north of Sonhat village in Koriya district. Hasdeo river flows towards the south and central part of Koriya district at 23°N after flowing 29kms. It receives the Gej River on the left bank and in downstream it crosses the ranges of hills along Dhajag hills to meet the river Chornai. The Tan and Ahiran rivers are other hilly streams which join it.Katghora and Churri are located on the right bank. Korba, Champa, Bamhani and Dilli are located on the left bank of the river Hasdeo. It joins the Mahanadi at Mauhadih, about 12 km away from Sheorinarayan.

3. ACHIEVABLE TARGETS AS PER HON'BLE NGT DIRECTIONS

The main objective of the action plan is to bring polluted river stretches to be fit at-least for bathing purposes (i.e. BOD < 3 mg/l and FC < 500 MPN/100 ml) on or before 30/06/2021.

4. WATER QUALITY REPORTS FOR THE YEAR 2016, 2017, 2018, 2019

The river water quality at different locations is shown below. The heavy metal analysis of river water samples will be submitted to CPCB shortly.

Table No.02

pH	**Darri**		**D/s Urga**	
pH Unit	Min	Max	Min	Max
2016	7.16	7.22	7.18	7.2
2017	7.15	7.2	7.13	7.19
2018	7.17	7.29	7.18	7.39
2019	7.16	7.20	7.10	7.21

Table No. 03

DO	Darri		D/s Urga	
Mg/Ltr.	Min	Max	Min	Max
2016	5.0	6.2	4.2	5.0
2017	5.6	7	5.4	6.4
2018	6.2	7.4	6.2	7.2
2019	6.2	7.2	6.0	7.0

Table No. 04

BOD	Darri		D/s Urga	
Mg/Ltr.	Min	Max	Min	Max
2016	1.4	3.8	3.0	8.0
2017	1	2.4	1.6	2.6
2018	0.6	1.2	1.2	2.4
2019	0.6	1.8	1.0	2.0

Coliform	Darri		D/s Urga	
MPN/100ml	Min	Max	Min	Max
2019	–	–	6.0	49.0

River Flow in Polluted River Stretch:

Water Resource Department had prepared standard operating procedures (SOP) for the polluted river stretches for maintaining e-flow in the rivers and the same is being followed. Gate discharge stations have been provided for the measurement of flow in rivers. These stations are operated by Central Water Commission. As per data from Water Resources Department, Government of Chhattisgarh, the flow observed in Hasdeo river during last three years are as follows:-

Table No. 05

River / Location	Month	Flow (in Cumecs)			Daily e-flow (in Cumecs)
		2015-16	2016-17	2017-18	
Hasdeo / Kudurmal	June	28.496	21.117	13.371	0.238
	July	43.841	58.284	82.911	0.509
	August	45.630	70.569	40.749	0.361
	September	42.298	65.433	34.862	0.292
	October	16.244	22.929	26.862	0.217
	November	21.953	27.307	27.849	0.175
	December	18.247	19.532	17.204	0.179
	January	18.090	12.993	25.110	0.153
	February	19.444	15.750	23.654	0.088
	March	15.405	13.729	17.450	0.057
	April	17.451	13.416	16.183	0.030
	May	15.350	13.747	16.073	0.035

5. IDENTIFIED POLLUTED RIVER STRETCHES IN THE STATE

Central Pollution Control Board has identified polluted river stretches state wise and priority wise. On the basis of water quality data under National Water Quality Monitoring Programme for the year 2016 and 2017 following river stretches of Chhattisgarh have been identified as polluted stretches:-

River stretches have been categorized in five priority classes based on BOD concentration. River stretches having BOD between 6 to 10 mg/l have been kept under category “IV”. Similarly river stretches having BOD between 3 to 5 mg/l have been kept under category “V”.

Table No. 06

River Name	River Stretch	BOD Range/Max Value (mg/l)	Priority	Towns situated across the stretches	Approx length of the stretch (in km)
Hasdeo	Korba to Urga	3.6 – 7.0	IV	Korba	20
Kharoon	Bundari to Raipur	3.3 – 7.2	IV	Raipur	20
Mahanadi	Arrang to Sihawa	3.3 – 8.0	IV	Kanker, Dhamtari, Nawapara, Rajim	70
Seonath	Simga to Bemta	3.4 – 8.4	IV	Simga	10
Kelo	Raigarh to Kanaktora	3.8	V	Raigarh	15

Note:- 1. River stretches have been categorized in five priority classes based on BOD concentration. River stretches having BOD between 6 to 10 mg/l have been kept under category “IV”. Similarly river stretches having BOD between 3 to 5 mg/l have been kept under category “V”.

2. The polluting stretches as defined by CPCB in their document titled “River Stretches for Restoration of Water Quality” needs review on account of improper description of location. In fact the polluted stretches of these rivers are as below:-

Table No. 07

Polluted Stretches of Rivers

River Name	River Stretch
Kharoon	Bhatagaon to Bendari
Mahanadi	Sihawa to Arrang
Seonath	Bemta to Simga

6. ACTION PLAN FOR RESTORATION OF POLLUTED RIVER STRETCHES OF RIVER HASDEO (PRIORITY-IV)

The Biochemical Oxygen Demand (BOD) is one of the most common measures of pollutant organic material in water. BOD indicates the amount of permissible organic matter present in water. As per the water analysis report on Hasdeo River, it states that the organic pollution measured in terms of BOD varying on different points or sources. There are no major polluting industries that discharge effluents to cause serious contamination. Therefore, the main source of pollution is due to domestic waste and municipal sewage which is being dumped and flows into the nallahs & river. All sorts of waste and untreated sewage are released randomly into the Hasdeo River in absence of a sewage treatment facility. It is an important aspect for revival of River Hasdeo in context of its utility as it is an important Perennial River. Under the present status, it appears that River Hasdeo may serve the purpose of drinking, bathing and irrigation and for this objective, municipal sewage generated should be treated properly.

7. MAJOR TOWNS AND INDUSTRIES IN THE CATCHMENT OF RIVER HASDEO

Korba is the major town situated in the polluted river stretch. As per 2011 census, population of Korba city is 3, 65,073. In Korba, the drinking water is being supplied by drawing water from:

1. Surface water source through Hasdeo River (38 MLD)
2. Ground water source through tube wells (3 MLD)

Korba Municipal Corporation supplies about 41 MLD of water to the city through piped distribution network. The Corporation is also constructing one more water treatment plant of 29 MLD. The total capacity will be 71 MLD. The present gross per capita water supply is 112 L/Day. The addition of capacity will make it possible to supply at national norms of 135 LPCD.

Presently, sewage generation from Korba town is estimated around 45.7 MLD.The system is planned for 35 MLD STP. Presently there is a gap of 10.7 MLD between sewage generation and sewage treatment. The proposed STP of 35 MLD capacity will be constructed near Korba water treatment plant at village Kohadia. The premises will also house the proposed tertiary treatment plant and pumping station for supplying the tertiary treated sewage water to NTPC. The DPR for the above STP has prepared. Approval of the DPR is pending with the M/s NTPC Limited, Korba. It is proposed to install pumping stations at various locations with17 km interceptor sewer. The scheme will be based on PPP mode for 15 years. Estimated cost of the project is Rs.150 crores. 20 MLD treated effluent will be purchased by NTPC and rest will be used for future requirements.

All the water polluting units in catchment area of Hasdeo River have their captive effluent treatment arrangements and treated effluent is being used for different purposes within premises. List of industries having ETP installed, performance of captive ETP's and details of utilization of treated effluent are shown below:-

Table No. 08

Name of Industry	Water Consumption (KL/Day)	Effluent Generation (KL/Day)	Effluent Treatment Arrangement	Remark
M/s Lanco Amarkantak Power Limited Village –	25700	130	For industrial effluent ETP & for domestic	Effluent comply the standard and re-used

Patadi, District – Korba			effluent STP is provided.	for ash slurry making gardening and horticulture.
M/s Hasdeo Thermal Power Station Korba (West) 4x210 mw	16826	7214	For industrial effluent ETP & for domestic effluent septic tank / soak pits have been provided.	Industry comply the standard and re-used for ash slurry making. STP for domestic waste water for colony is under construction.
M/s Hasdeo Thermal Power Station Korba (West) 1x500 mw Ext-III	25049	5950	For industrial effluent ETP & for domestic effluent septic tank / soak pits have been provided.	Industry comply the standard and re-used for ash slurry making.
Dr. Shyama Prasad Mukherjee, Thermal Power Station, Korba (East)	22360	22000	For industrial effluent ETP & for domestic effluent septic tank / soak pits have been provided.	Industrial effluent comply the discharge standard and totally re-cycled.

M/s CSPGCL (East)	26541	3510	For domestic effluent septic tank / soak pits have been provided.	Industrial effluent is treated in ETP of Dr. Shyama Prasad Mukherjee, Thermal Power Station.
M/s Bharat Aluminium Company Limited, Post – Balco Nagar, District – Korba (540MW power plant)	37675	19440	For industrial effluent ETP & for domestic effluent STP is provided.	Complying with the prescribed standard treated effluent is re-cycled / re-used.
M/s Bharat Aluminium Company Limited, Post – Balco Nagar, District – Korba (1200 MW power plant)	54000	1000	For industrial effluent ETP & for domestic effluent STP is provided.	Complying with the prescribed standard treated effluent is re-cycled / re-used.
M/s Bharat Aluminium Company Limited, Post – Balco Nagar, District – Korba (3.25	803	30	For industrial effluent ETP & for domestic effluent STP is provided.	Complying with the prescribed standard treated effluent is re-cycled / re-

LTPA smelter plant Phase 1)				used.
M/s Bharat Aluminium Company Limited, Post – Balco Nagar, District – Korba (2.7 LTPA smelter plant Phase 2)	1142	120	For industrial effluent ETP & for domestic effluent STP is provided.	Complying with the prescribed standard treated effluent is re-cycled / re-used.

It is evident from above that effluent generated from industries is not being directly discharged into Hasdeo River.

There is no common effluent treatment plant in the Korba region.

Action Against Non-Complying Industries:-

Industries are complying with the effluent discharge standards. In case of non-compliance with respect to discharge of treated / untreated industrial effluent outside the premises and / or not complying to the discharge standards prescribed, CECB takes appropriate actions against non-complying units either by issuing closure direction or filing of court case against management.

8. MAJOR DRAINS CONTRIBUTING POLLUTION INTO RIVER HASDEO

Presently the Korba City neither has piped sewage collection system nor Sewage Treatment Plant. Effluent from the septic tanks of individual household or of colonies flow into the natural nallas. There are 3 main nallas namely Durpa nalla, Dengur nalla and Belgari nalla in the city which join the Hasdeo River.In addition to above, Kosavadi nalla, Railway nalla, Nalla coming from industrial area at Manikpur and joining Kosavadi nalla, Sitamani nalla, Gevra nalla, Nalla near S.P. Mukarjee Power Plant and Rampur nalla are also carrying sewage.The quality of nalla water is as given

below, the heavy metal analysis of nalla water samples will be submitted to CPCB shortly.

Table No. 09

JHARIYA NALLA KORBA

pH	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
2016	7.18	7.13	7.12	-	7.16	7.17	7.16	7.18	7.19	7.17	7.17	7.15
2017	7.19	7.17	7.16	7.23	7.18	7.16	7.14	7.14	7.14	7.14	7.16	7.17
2018	7.18	7.23	7.22	7.23	7.21	7.2	7.17	7.19	7.17	7.2	7.17	-

Table No. 10

BOD(mg/L)	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
2016	1.8	2.4	2.4	-	2.2	2.6	3.8	4.2	4.8	4.4	2.2	2
2017	2	1.8	1.4	1.6	1.8	2	2.6	2.2	1.6	1.6	1.8	1.6
2018	1.6	1.6	0.8	1.6	1.8	1.8	2.2	2.4	2.2	2.2	2	-

Table No.11

BELGIRINALLA KORBA

pH	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
2016	7.81	7.32	7.18	-	7.17	7.19	7.22	7.21	7.23	7.21	7.2	7.21
2017	7.19	7.2	7.18	7.18	7.18	7.17	7.13	7.14	7.15	7.15	7.16	7.15
2018	-	7.17	7.2	7.22	7.21	7.25	7.19	7.12	7.2	7.18	7.21	-

Table No.12

BOD(mg/L)	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
2016	2.4	2.6	2.6	-	2.4	3	3.2	3.6	4.4	4.6	2.2	2.4
2017	2	1.8	2	1.4	1.2	1.4	1.8	1.4	3.2	1.2	1.2	1.4
2018	-	1.2	1.6	1.8	2	1.4	2.2	2	2.2	1.6	1.4	-

Table No.13

DENGURNALLA KORBA

pH	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
2016	7.05	7.06	7.05	-	7.11	7.12	7.14	7.15	7.13	7.08	7.11	7.06
2017	7.06	7.04	7.06	7.11	7.06	7.08	7.07	7.08	7.06	7.06	7.08	7.13
2018	7.14	7.09	7.07	7.11	7.15	7.11	7.1	7.07	7.1	7.12	7.11	-

Table No.14

BOD(mg/L)	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
2016	3.2	3.6	3.2	-	4	5.4	5	5.8	6.2	6.4	2.8	2.6
2017	2	2.6	2.4	1.2	2	2.2	2.2	2	1.4	1.4	1.6	1.4
2018	1.1	1.4	1.2	1.2	1.6	1.4	2	2.2	2.4	2.2	2	-

Nalla Flow

The observed flows in Durpa nalla, Dengur nalla and Belgari nalla were 23.83,76.8 and 15.43 MLD respectively. The flow in following nalla observed as below:-

Table No. 15

S.N.	Name of Nalla	Location of Measurement	Date of Measurement	Flow (MLD)
1.	Durpa nalla	-	-	Dry. Small quantity used by farmers.
2.	Dengur nalla	22°22'42.49"N 82°42'46.41"E	8th April, 2017	81.08
3.	Belgari nalla	22°24'0.06"N 82°43'29.32"E	9th April, 2017	23.03
4.	Kosavadi nalla	22°20'13.50"N 82°43'24.54"E	11th April, 2017	10.86
5.	Nalla coming from industrial area to Manikpur	-	-	Dry. Only stagnant pool of water observed
6.	Sitamani nalla	22°19'37.35"N 82°42'35.41"E	7th April, 2017	9.28
7.	Rampur nalla	22°22'36.03"N 82°44'25.51"E	-	Dry
8.	Railway nalla	22°20'40.11"N 82°42'24.85"E	-	4.26
9.	Gerva nalla	22°22'3.01"N 82°41'42.13"E	-	5.38
10.	Nalla near S.P. Mukherjee TPS	-	-	Dry

9. LATEST WATER QUALITY CHARACTERISTICS OF RIVER HASDEO

The latest water quality characteristic of River Hasdeo for the year 2019 is as below:

Table No. 16

River Hasdeo (Korba to Urga) – P – IV

Monitoring Location		Hasdeo Barrage Darri Korba	Downstream near Village–Urga, Korba
BOD (mg/l)	Minimum	0.6	1.0
	Maximum	1.8	2.0
Fecal Coliform (MPN/100ml)	Minimum	4.0	1.8
	Maximum	110	22

10. IDENTIFICATION OF SOURCES OF POLLUTION

Hasdeo River is polluted due to discharge of untreated sewage of Korba town into the river. Various steps like construction of sewage treatment plant and recycling of treated waste water by NTPC Limited, cleaning of drains, plantation in flood plain area, removal of encroachment, In-situ bioremediation of drains, waste management (Solid waste, Hazardous waste, C&D waste, Bio- Medical Waste), maintenance of e-flow, Watershed management, rain water harvesting, adoption of good irrigation practices, development of bio-diversity park etc. with definite timelines and the implementing agency with budget estimates are included in action plan.

11. COMPONENTS OF ACTION PLAN

11.1 Channelization, treatment, utilization and disposal of treated domestic sewage:

(a) Identification of towns and villages in the catchment of polluted river stretch and estimation of quantity of sewage generation.

(b) Storm water drains carrying sewage and sullage joining river and interception and diversion of sewage to STPs.

(c) Treatment and disposal of septage and controlling open defecation.

(d) Identification of towns and villages for installing sewerage system and further sewage treatment plants.

11.2 Waste Management:

(a) Collection, segregation, transportation, disposal and treatment of municipal solid wastes generated from town in accordance of provisions of the Solid Waste Management Rules, 2016.

(b) Restriction of illegal disposal of solid waste along the river bank and flood plain zones.

(c) Burning of solid waste should be strictly prohibited.

(d) Construction and demolition wastes should be disposed in designated areas and no case it should be disposed into river beds or flood plain zone.

11.3 Industrial Pollution Control:

(a) Inventorization of industries.

(b) Category of industry and effluent quality.

(c) Treatment of effluents, compliance with standards and mode of disposal of treated effluents.

11.4 Flood Plain Zone:

(a) Regulating activities in flood plain zone.

(b) Management of Municipal, Plastic, Domestic Hazardous, Hazardous and Bio-medical.

(d) Improve irrigation practices.

11.5 Ecological/Environmental Flow (E-Flow):

(a) Measurement of flow of river.

(b) Requiement of flow of river.

(c) Mainatainance of flow of river.

12. DETAILED GAP ANALYSIS

Detail gap analysis with regard to sewage, industrial effluents, waste (municipal solid waste, domestic hazardous waste, industrial hazardous waste, biomedical waste, plastic waste and construction and demolition waste) waste management is mentioned below:

12.1 Sewage Management: Presently, sewage generation from Korba town is estimated around 45.7 MLD. The sewage treatment plant is planned for 35 MLD. Presently there is a gap of 10.7 MLD between sewage generation and sewage treatment. The proposed STP of 35 MLD capacity will be constructed near Korba water treatment plant at village Kohadia. The premises will also house the proposed tertiary treatment plant and pumping station for supplying the tertiary treated sewage water to NTPC. The DPR for the above STP has prepared. Approval of the DPR is pending with the M/s NTPC Limited, Korba. It is proposed to install pumping stations at various locations with17 km interceptor sewer.

Raw sewage from various nallas of Korba city will be intercepted by providing small height weirs with manually operated gates which can be taken out to clear the flow passage in monsoon. This intercepted raw sewage will be screened and de- gritted before taking it into the wet well of the pump house through a connecting pipe. The pipe will be provided with a gate which can isolate the pumping station from the nalla when required for maintenance. The screened and de-gritted sewage will be pumped to the STP. There will be three pumping stations at Railway Colony, Kosawadi and Gerva.

The sewage after primary treatment enters directly in to SBR basins which works in sequence and inflow is controlled by motorized gates Basins are equipped with Air blower under VFD (variable Frequency Drive), Fine membrane diffusers, Grid piping, return activated sludge (RAS), Surplus Activated Sludge (SAS) pumps, Decanters, Auto Valve, PLC etc.

The scheme will be based on PPP mode for 15 years. Estimated cost of the project is Rs.150 crores. 20 MLD treated effluent will be purchased by NTPC and rest will be used for future requirements.

Present generation of sewage	45.7 MLD
Capacity of sewage treatment plant	35.0 MLD
Gap in sewage treatment	10.7 MLD

12.2 Septage Management: In the State of Chhattisgarh, all the ULBs have Faecal Sludge Treatment Facilities either by Faecal Sludge Treatment Plant or by Co-treatment with STP for the treatment of faecal sludge generated from the household of the ULBs. The ULB of Korba has the Faecal Sludge Treatment Plants based on Low cost gravity based decentralized Phytorid Technology for the treatment of black water generated in these ULBs. Further, Korba is using nearby STP for co-treatment of septage. However, there is provision of enhance of septage treatment in the proposed STPs of these ULBs. Total fecal sludge generated in this river stretch is 104 KLD for which presently there is a capacity of treatment of fecal sludge about 115 KLD. The additional capacity is sufficient to treat the future 15 years period fecal sludge generation.

Current faecal sludge generation	104 KLD
Current faecal sludge treatment capacity	115 KLD
Gap in current faecal sludge treatment	NIL
Projected faecal sludge generation after 15 years	120 KLD

12.3 Industrial Effluent Management: There are total 09 nos. of water polluting industries are their in this polluted river stretch. From which 71.84 Kilo litres per day effluent is generated. Industries are having their captive effluent treatment arrangements by which the effluent is being treated and treated effluent is being used for different purposes within premises.

Present generation of effluent	Industrial	36.67 MLD
	Domestic	35.17 MLD
Capacity of industrial effluent treatment / processing	Industrial + Domestic	71.84 MLD
Gap in industrial effluent Treatment	Industrial + Domestic	NIL

12.4 Municipal Solid Waste Management: Chhattisgarh State has implemented the SWM Rules, 2016 by adopting Mission Clean City Model in 164 ULBs and Integrated waste management facility model in 2 ULBs of the State. Mission Clean City (MCC) is derived from Ambikapur model, which is a low cost, sustainable, decentralized model based on extensive segregation and recycling. It is combined with the benefits of citizen participation and urban livelihood promotion by involving business entities like women SHGs. Involvement of local citizens and Self-Help Groups (SHGs) has helped in 100% source segregation, and 100% door-to-door collection of segregated waste. The segregated waste is brought to the Garbage clinics (SLRM-Solid Liquid Resource Management Centres) using partitioned containers mounted on Tricycles, E-Rickshaws and Mini Tippers for secondary and tertiary segregation. The recyclable inorganic waste is segregated into various categories and sold to the authorized recyclers. The non-recyclable combustible waste is stored separately to be transported either to cement plants, power plants, Waste to Energy plants or other industries as Alternate Fuel and Raw material (AFR). The organic waste is manually sorted to recover certain resources such as egg shells, orange peels etc. which are processed into useful products. The organic waste is further fed to animals and the remaining waste goes to compost shed for composting. In this polluted river stretch, total 100 tonnes per day of municipal solid waste is generated which is processed/ treated by Mission Clean City Model.

Present generation of solid waste	100 TPD
Processing and treatment of solid waste	100 TPD
Gap in processing and treatment of solid waste	NIL

Details of case registered and amount of fines collected for dumping of waste till August, 2020:

Name of ULB	No. of cases registered	Amount of fines collected
Korba	178	Rs. 2,36,900

12.5 Domestic Hazardous Waste Management: The domestic hazardous waste is being collected separately in a black bag or in separate compartment in the tricycles/ mini tippers. Then the domestic hazardous

waste is stored temporarily in the SLRM Centres of the ULBs and handed over to the authorized agency for its proper disposal as per CPCB guidelines. In this polluted river stretch, total 200 kg per day of domestic hazardous waste is generated which is collected by the municipal authorities regularly.

Present generation of domestic hazardous waste	200 Kg/day
Collection of domestic hazardous waste	200 Kg/day
Gap in domestic hazardous waste collection	NIL

12.6 Industrial Hazardous Waste Management: In Korba region M/s BALCO is the generator of spent pot lining categorized as Hazardous Waste. Spent pot lining is supplied for re-processing as per SOP issued by CPCB. M/s BALCO has also constructed captive secured landfill facility for storage of SPL. Other hazardous wastes such as waste / used oil, aluminium dross, vanadium sludge etc. generated from the industries are utilized by authorized recyclers.

12.7 Biomedical Waste Management: A common Bio-medical waste treatment and disposal facility of M/s Enviro care international (CG), Korba is operational for Korba region. At present this facility is based on deep burial system. Process for up gradation to incinerator based facility shall be completed on or before 31/12/2020.

12.8 Construction & Demolition Waste: In this polluted river stretch, total 9.8 tonnes per day of construction and demolition waste is generated which is collected and primarily processed by the municipal authorities regularly.

Present generation of construction and demolition waste	9.80 TPD
Collection and processing of construction and demolition waste	9.80 TPD
Gap in processing of construction and demolition waste	NIL

12.9 Removal of Encroachment: There are 08 encroachments have been identified by the local body in this stretch out of which 03 encroachments have been removed. Remaining 05 encroachments will be removed before the timeline i.e. 31/03/2021.

Encroachments identified	08
Encroachments removed	03
Encroachments to be removed	05

12.10 Rain water harvesting: The status of installation and action plan for completion of remaining rain water harvesting structure is as follows:

Progress by UAD				
ULB Name	**Target**	**Completed**	**In progress**	**Time line**
Korba	1535	916	619	Mar-21

Progress by Industry Department				
Name of the District	**Target**	**Completed**	**In progress**	**Time line**
Korba	72	72	-	-

13. GROUNDWATER QUALITY MONITORING

Ground water quality in catchment area in the month of April 2019 is as follows:-

Table No.17

Parameter / Sampling Point	**pH**	**Suspended Solid (mg/L)**	**COD (mg/L)**	**Total Hardness (mg/L)**	**Chloride (mg/L)**	**Sulphate (mg/L)**
Borewell water in Dhanras, NTPC Korba	7.17	52	04	80	40.98	16
Borewell water in Village – Rogbahari, Korba	7.13	46	06	94	34.98	24

14. RIVER HASDEO REJUVENATION PLAN

14.1 Action Plan for management of sewage: The sewage treatment plant is planned for 35 MLD. The proposed STP of 35 MLD capacity will be constructed near Korba water treatment plant at village Kohadia. The

premises will also house the proposed tertiary treatment plant and pumping station for supplying the tertiary treated sewage water to NTPC. The DPR for the above STP has prepared. Approval of the DPR is pending with the M/s NTPC Limited, Korba. It is proposed to install pumping stations at various locations with17 km interceptor sewer.

14.2 Action Plan for management of industrial effluents: All the water polluting industries in the catchment area of this polluted river stretch have their captive ETPs. Action against defaulting industries discharging untreated effluent outside the premises is being conducted by CECB regularly.

14.3 Action Plan for management of utilization of treated sewage: Treated sewage will be utilized for irrigation or agricultural or industrial cooling or construction activities purposes once the STPs become operational. Treated water channel may also linked with irrigation network in order to reduce ground water consumption for irrigation uses.

14.4 Action Plan for management of solid waste: The Chhattisgarh State has implemented the SWM Rules, 2016 by adopting Mission Clean City Model in 164 ULBs and Integrated waste management facility model in 2 ULBs of the State. Mission Clean City (MCC) is derived from Ambikapur model, which is a low cost, sustainable, decentralized model based on extensive segregation and recycling. The proper implementation of this mission clean city model will be carried out. Also Urban Administration and Development Department, Government of Chhattisgarh has proposed action plan for prohibition of disposal of municipal solid waste and plastic waste in river as well as in municipal drains and levy of fine in case found violation.

14.5 Action Plan for management of Flood Plain Zone (FPZ): Forest department should identify/demarcate Flood Plain Zone and regulate the activities of plantation in Flood Plain Zone (FPZ) and notification of the Flood Plain Zones.

14.6 Action Plan for management of greenery development: Forest Department, Government of Chhattisgarh will develop the Bio-Diversity park in area of 200 hectares at Kesla PF 975. This has also included in the action plan.

14.7 Action plan for management of Environmental Flow (E-flow): State Water Resource department will measure the flow and maintain the Environmental Flow (E-flow) as and when required.

15. MONITORING OF THE ACTION PLANS

In compliance of the order dated 20/09/2018 of Hon'ble National Green Tribunal, Principal Bench, New Delhi, Government of Chhattisgarh, Department of Housing and Environment has constituted a committee known as "River Rejuvenation Committee" (RRC) on 22/11/2018 under the Chairmanship of Secretary/Officer on Special Duty, Department of Housing and Environment for preparation of Action Plan for execution, monitoring and development of requisite infrastructure for management of municipal sewage and industrial effluent for rejuvenation of polluted river stretches in Chhattisgarh. The RRC will function under the overall supervision and co-ordination of Principal Secretary, Department of Housing and Environment.

16. ACTION PLAN

ACTION PLAN FOR MANAGEMENT OF SEWAGE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Construction of Sewage Treatment Plant of 35 MLD for treatment of sewage flowing in various nalla.	State Government / Nagar Nigam, Korba / NTPC Korba	150 Cr.	31.03.2024 (i.e. 3 years after DPR approved by NTPC)
ACTION PLAN FOR MANAGEMENT OF INDUSTRIAL EFFLUENTS				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Action against defaulting industries discharging untreated effluent outside the premises.	CECB	–	Immediate
ACTION PLAN FOR MANAGEMENT OF UTILIZATION OF TREATED SEWAGE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Re-use of treated sewage in thermal power plant on PPP mode.	State Government / Nagar Nigam, Korba / NTPC	–	After completion of the STP

		Korba		
ACTION PLAN FOR MANAGEMENT OF SOLID WASTE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Prohibition of disposal of municipal solid waste and plastic waste in river as well as in municipal drains and levy of fine in case found violation.	Nagar Nigam, Korba	–	Immediate / Regularly
ACTION PLAN FOR MANAGEMENT OF FLOOD PLAIN ZONE (FPZ)				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Plantation in flood zone in available spaces.	Forest Department / Nagar Nigam, Korba	–	Next Monson Season
ACTION PLAN FOR MANAGEMENT OF GREENERY DEVELOPMENT				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	To develop Bio-Diversity park in area of 200 hectares at Kesla PF 975.	Forest department	2.00 Cr.	July, 2023

ACTION PLAN FOR MANAGEMENT OF ENVIRONMENTAL FLOW (E-FLOW)				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Measurement of flow of river and records maintained.	State Water Resource Department	–	Regularly
2.	Requirement of E-flow in the river must be maintained.	State Water Resource Department	–	As per requirement
OTHER ACTION POINTS				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Cleaning of drains before monsoon.	Nagar Nigam, Korba	–	Immediate
2.	In-Situ Bio-Remediation of Drains.	Nagar Nigam, Korba	Budget will be provided under 15th Finance Commission	31/12/2020
3.	To ensure rain water harvesting by the industrial, commercial and other institutions to promote ground water recharging.	Industry Department / CECB / Nagar Nigam, Korba	–	31/03/2021
4.	Removal of remaining 05 identified encroachments	Nagar Nigam, Korba	–	31/03/2021

5.	Collection of information on irrigation water used per hectare for different crops by Agriculture Department and evaluate whether use of Irrigation water per hectare has decreased or not? Based on the data obtained techniques like drip irrigation etc. should be promoted.	Agriculture Department	–	Regularly
6.	Adoption of good irrigation practices (Adoption of micro irrigation schemes which result in more crop per drop as per the available resources)	State Water Resource Department	–	It is a continuous process and no time target can be fixed. Work is done as per allocation.

REVISED ACTION PLAN FOR THE REJUVENATION OF POLLUTED RIVER STRETCH OF RIVER KELO

(RAIGARH TO KANAKTORA)

PRIORITY – V

APPROVED BY:

RIVER REJUVENATION COMMITTEE, CHHATTISGARH

(Constituted in compliance of order of the Hon'ble National Green Tribunal)

SUBMITTED TO:

CENTRAL POLLUTION CONTROL BOARD, DELHI

TABLE OF CONTENT

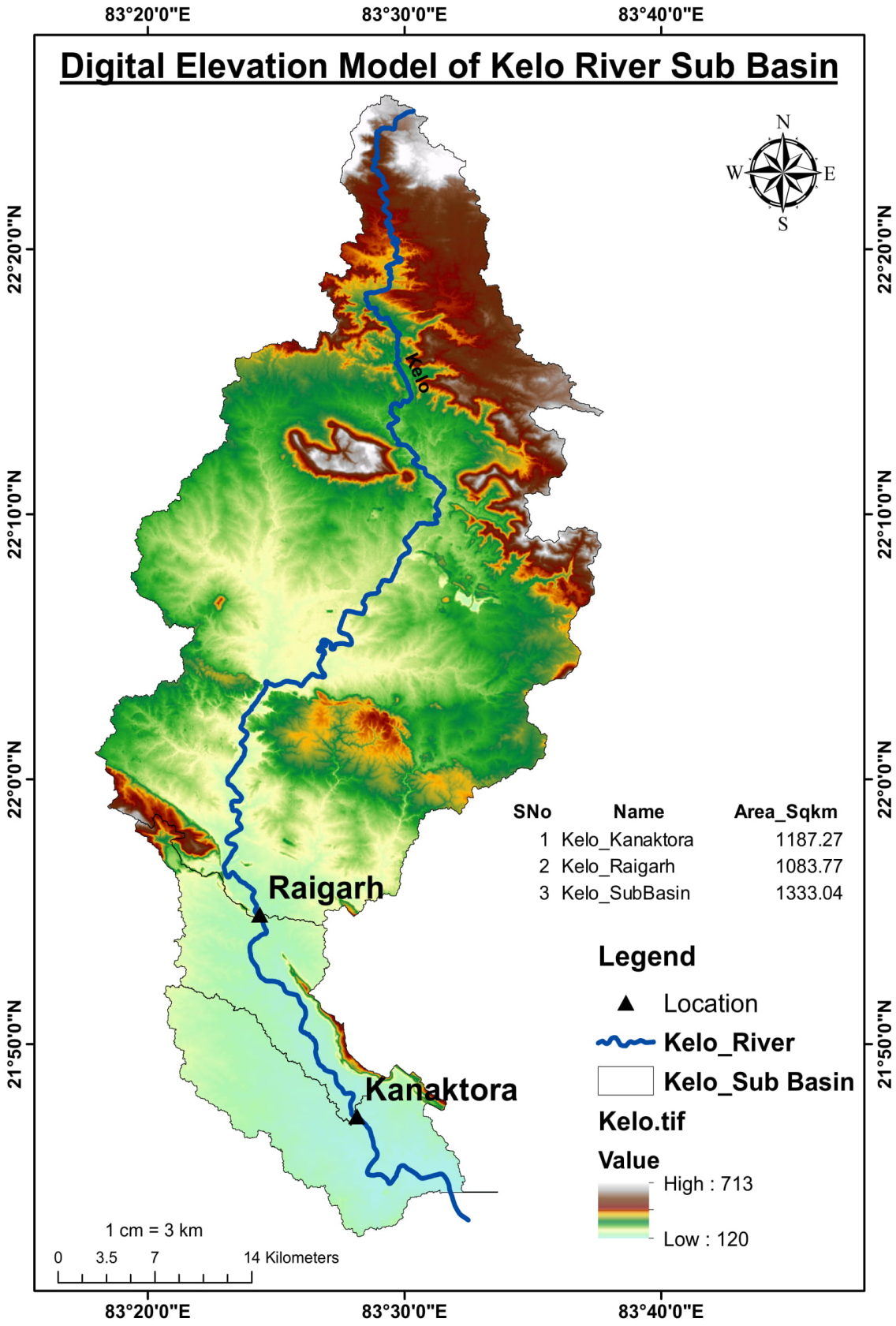
S.No.	Content	Page No.
1.	Executive Summary	03
2.	Introduction	05
3.	Achievable Targets as per Hon'ble NGT Directions	05
4.	Water Quality Reports for the Year 2016-2019	05
5.	Identified Polluted River Stretches in the State	07
6.	Action Plan for Restoration of Polluted River Stretch of River Kelo (Priority-V)	09
7.	Major Towns And Industries in the Catchment of River Kelo	09
8.	Major Drains Contributing Pollution into River Kelo	10
9.	Latest Water Quality Characteristics of River Kelo	13
10.	Identification of Sources of Pollution	13
11.	Components of Action Plan	13
12.	Detailed Gap Analysis	14
13.	River Kelo Rejuvenation Plan	19
14.	Monitoring of the Action Plans	20
15.	Action Plan	20
16.	Annexure	25

1. EXECUTIVE SUMMARY

There is Raigarh town is located in the catchment of the polluted river stretch from Raigarh to Kanaktora.

Raigarh Town

Raigarh is the east border of the Chhattisgarh State. Raigarh is a city and a Municipal Corporation. It is situated on Mumbai – Howrah main rail line. Raigarh city is a rapidly growing industrial city and home to the Mohan Jute Mill, one of the oldest jute mills in India. Raigarh is also a major producer of steel. Digital map showing above details is as below.


Digital Elevation Model of Kelo River Sub Basin
83°20'0"E
83°30'0"E
83°40'0"E
22°20'0"N
22°10'0"N
22°0'0"N
21°50'0"N
N
W
E
S
Kelo
Raigarh
Kanaktora
SNo Name Area_Sqkm
1 Kelo_Kanaktora 1187.27
2 Kelo_Raigarh 1083.77
3 Kelo_SubBasin 1333.04
Legend
Location
Kelo_River
Kelo_Sub Basin
Kelo.tif
Value
High : 713
Low : 120
1 cm = 3 km
0 3.5 7 14 Kilometers

2. INTRODUCTION

Kelo River originates from village Amapali at elevation of 710.36 m above mean sea level about 40 km North of Gharghora tahsil in Raigarh district. The total length of Kelo River is 112.60 km, which joins Mahanadi near village Mahadeopali, district Sambalpur (Orissa). It flows Western direction from its origin about 4 km. and deflected in south direction up to 35 km and leaves the hilly track and enters plains near Milupara village. It flows 78 km, in plain area. It reaches a place named Mahadev Pali in the State of Orissa and joins the Mahanadi River.

3. ACHIEVABLE TARGETS AS PER HON'BLE NGT DIRECTIONS

The main objective of the action plan is to bring polluted river stretches to be fit at-least for bathing purposes (i.e. BOD < 3 mg/l and FC < 500 MPN/100 ml) on or before 30/06/2021.

4. WATER QUALITY REPORTS FOR THE YEAR 2016, 2017, 2018, 2019

The river water quality at different locations is shown below:

Table No.

pH	U/S Raigarh		D/S Raigarh	
pH Unit	Min	Max	Min	Max
2016	7.4	7.5	7.3	7.7
2017	7.5	7.5	7.6	7.7
2018	7.5	7.5	7.6	7.6
2019	7.1	7.84	7.1	7.7

Table No.46

DO	U/S Raigarh		D/S Raigarh	
mg/L	Min	Max	Min	Max
2016	6.7	7.3	6.6	7.2
2017	6.8	7.2	6.6	7.1
2018	6.7	6.8	6.6	6.7
2019	6.5	7.8	6.2	7.6

Table No.47

BOD	U/S Raigarh		D/S Raigarh	
mg/L	Min	Max	Min	Max
2016	1	2.4	1.3	2.8
2017	0.4	2.8	1.2	3.1
2018	0.5	0.8	1.9	2.2
2019	1.7	3.3	2.1	3.9

Table No.48

Coliform	U/S Raigarh		D/S Raigarh	
MPN/100ml	Min	Max	Min	Max
2016	75	460	93	460
2017	39	460	46	460
2018	39	65	64	150
2019	30	210	230	460

The analysis results with heavy metal analysis of the river stretch for the samples collected on August, 2020 are attached as **Annexure – 1.**

River Flow in Polluted River Stretch:

Water Resource Department had prepared standard operating procedures (SOP) for the polluted river stretches for maintaining e-flow in the rivers and the same is being followed. Gate discharge stations have been provided for the measurement of flow in rivers. These stations are operated by Central Water Commission. As per data available from State Data Center, Water Resources Department, Government of Chhattisgarh, the flow observed in Kelo River during last three years are as follows:-

Table No. 13

River / Location	Month	Flow (in Cumecs)			Daily e-flow (in Cumecs)
		2015-16	2016-17	2017-18	
Kelo / Raigarh	June	0.000	142.487	779.729	2.526
	July	2759.233	1630.724	2549.306	5.591
	August	2117.808	3006.410	1533.389	7.867
	September	817.437	2626.065	1283.87	8.488
	October	133.925	877.976	534.041	0.857
	November	0.000	0.000	0.000	0.000
	December	0.000	0.000	0.000	0.000
	January	0.000	0.000	0.000	0.000
	February	0.000	0.000	0.000	0.000
	March	0.000	0.000	0.000	0.000
	April	0.000	0.000	0.000	0.000
	May	0.000	0.000	0.000	0.000

5. IDENTIFIED POLLUTED RIVER STRETCHES IN THE STATE

Central Pollution Control Board has identified polluted river stretches state wise and priority wise. On the basis of water quality data under National Water Quality Monitoring Programme for the year 2016 and 2017 following river stretches of Chhattisgarh have been identified as polluted stretches:-

River stretches have been categorized in five priority classes based on BOD concentration. River stretches having BOD between 6 to 10 mg/l have been kept under category “IV”. Similarly river stretches having BOD between 3 to 5 mg/l have been kept under category “V”.

Table No. 06

River Name	River Stretch	BOD Range/Max Value (mg/l)	Priority	Towns situated across the stretches	Approx length of the stretch (in km)
Hasdeo	Korba to Urga	3.6 – 7.0	IV	Korba	20
Kharoon	Bundari to Raipur	3.3 – 7.2	IV	Raipur	20
Mahanadi	Arrang to Sihawa	3.3 – 8.0	IV	Kanker, Dhamtari, Nawapara, Rajim	70
Seonath	Simga to Bemta	3.4 – 8.4	IV	Simga	10
Kelo	Raigarh to Kanaktora	3.8	V	Raigarh	15

Note:- 1. River stretches have been categorized in five priority classes based on BOD concentration. River stretches having BOD between 6 to 10 mg/l have been kept under category “IV”. Similarly river stretches having BOD between 3 to 5 mg/l have been kept under category “V”.

2. The polluting stretches as defined by CPCB in their document titled “River Stretches for Restoration of Water Quality” needs review on account of improper description of location. In fact the polluted stretches of these rivers are as below:-

Table No. 07

Polluted Stretches of Rivers

River Name	River Stretch
Kharoon	Bhatagaon to Bendari
Mahanadi	Sihawa to Arrang
Seonath	Bemta to Simga

6. ACTION PLAN FOR RESTORATION OF POLLUTED RIVER STRETCHES OF RIVER KELO (PRIORITY-V)

The Biochemical Oxygen Demand (BOD) is one of the most common measures of pollutant organic material in water. BOD indicates the amount of permissible organic matter present in water. As per the water analysis report on Kelo River, it states that the organic pollution measured in terms of BOD varying on different points or sources. There are no major polluting industries that discharge effluents to cause serious contamination. Therefore, the main source of pollution is due to domestic waste and municipal sewage which is being dumped and flows into the nallahs & river. All sorts of waste and untreated sewage are released randomly into the Kelo River in absence of a sewage treatment facility. It is an important aspect for revival of River Kelo in context of its utility as it is an important Perennial River. Under the present status, it appears that River Kelo may serve the purpose of drinking, bathing and irrigation and for this objective municipal sewage generated should be treated properly.

7. MAJOR TOWNS AND INDUSTRIES IN THE CATCHMENT OF RIVER KELO

As per 2011 census, Raigarh city has a population of 1,66,460. RMC supplies treated water to the urban and surrounding areas through piped systems. Residents in some areas also tap ground water for household use. The main source of water supply is from Kelo River. The present water supply in Raigarh is about 29 MLD through surface water source. At present, the city neither has any sewerage system nor sewage treatment plant. Hence complete sewer infrastructure and STP requires to be developed. The town does not have any organized drainage system. Road-side open drains are the means of transportation of the waste water. There are no systematic and organized system for collection and treatmentof effluent generated from septic tanks. Over flow of septic tanks directly discharges to the storm water drains which ultimately fall into the local nallas and finally meets the Kelo River. In order to eliminate the pollution of Kelo River due to the municipal residential waste of Raigarh city, it is utmost necessary to construct sewage treatment plants at the strategic locations

and intercept the flow of 12 nallas to avoid discharging the untreated sewage in Kelo River.

The topography is almost flat to gently sloping towards Kelo River. Major slope of Raigarh city is towards Kelo River from Eastern & Western boundary of Raigarh City.

Presently, generation of sewage from Raigarh city is about 30 MLD whereas 02 STP's of 25 and 07 MLD capacities are proposed.

All the water polluting units in catchment area of polluted river stretch has provided adequate effluent treatment facilities. Treated effluent is being used for different purposes within their premises. List of industries having ETP installed, performance of captive ETP's and details of utilization of treated effluent are shown in **Annexure – 2**. It is evident from above that effluent generated from industries is not being directly discharged into the river. There is no common effluent treatment plant in this region.

Action Against Non-Complying Industries:-

Industries are complying with the effluent discharge standards. In case of non-compliance with respect to discharge of treated / untreated industrial effluent outside the premises and / or not complying to the discharge standards prescribed, CECB takes appropriate actions against non-complying units either by issuing closure direction or filing of court case against management.

8. MAJOR DRAINS CONTRIBUTING POLLUTION INTO RIVER KELO

Nalla water quality in 2017 is shown below.

Table No.49

Parameter	pH	Total Suspended Solids (mg/l)	BOD (mg/l)	Chloride (mg/l)
Sampling Location				
Near Circuit House Raigarh	7.4	68	67	43
Faujdarpura	7.5	63	28	43
Khalepara	7.3	73	48	49
Puranabad	7.3	65	25	49

pura				
Gandhari Nalla	7.4	95	48	38
Kewrawadi chowk	7.2	55	56	52
Laxmipul	7.5	42	23	50
Beladula	7.3	85	68	38
Marine drive	7.1	59	65	66
Pansari plot	7.7	112	31	60

The analysis results of the sample collected in the August, 2020 with heavy metal analysis of 05 major nallas of the stretch is attached as **Annexure – 3.**

Nalla Flow

The details of nallas are as given below:-

Table No.50

S. No	Nallah Detail	Location Description	Remark
1.	LR-2	Located at baledula, Raigarh	These 6 Nallas adds to Capacity of STP-1 Left Side
2.	LR-3	Located at baledula, Raigarh	
3.	LR-4	Located at baledula, Raigarh	
4.	LR-8	Located at marine drive, SSR road, Raigarh	
5.	LR-10	Located at Panjari plot, Raigarh	
6.	LR-11	Located near Pahadpara, Raigarh	
7.	RR-1	Located near bandeali Fatima nagar	These 6 Nallas adds to Capacity of STP-2 Right Side
8.	RR-3	Located near faujdarpura, Raigarh	
9.	RR-4	Located near devangan moholla, Raigarh	
10.	RR-6	Located near kotapara, Raigarh	
11.	RR-7	Located at sahid chauk, Raigarh	
12.	RR-9	Located near panchadari, Raigarh	

The flow in these nallas observed is as below:-

Table No.51

Location	Time	Total Flow IN MLD
RR-1	10.22 AM	1.38
RR-1	3.55 PM	1.10
RR-1	5.18 PM	1.29

RR-3	11.05 AM	26.86
RR-3	3.51 PM	15.95
RR-3	5.46 PM	24.34
RR-4	11.25 AM	8.29
RR-4	3.39 PM	5.52
RR-4	5.40 PM	6.56
RR-6	11.36 AM	1.65
RR-6	3.34 PM	1.01
RR-6	5.32 PM	1.37
RR-7	11.47 AM	3.68
RR-7	3.14 PM	2.61
RR-7	5.25 PM	3.07
LR-11	9.58 AM	0.81
LR-11	1.48 PM	0.63
LR-11	4.28 PM	0.75
LR-2	10.16 AM	2.59
LR-2	2.15 PM	1.37
LR-2	4.52 PM	2.01
LR-8	11.18 AM	4.14
LR-8	1.26 PM	2.46
LR-8	4.59 PM	3.38
LR-10	11.27 AM	4.37
LR-10	1.34 PM	3.45
LR-10	4.52 PM	3.68
RR-9	11.38 AM	13.81
RR-9	1.44 PM	10.36
RR-9	4.46 PM	11.51
LR-4	11.15 AM	3.26
LR-4	1.16 PM	2.49
LR-4	5.08 PM	2.69
RR-10	10.33 AM	11.03
RR-10	2.18 PM	8.15
RR-10	5.55 PM	10.07
RR-11	10.06 AM	12.47
RR-11	2.39 PM	8.15
RR-11	6.05 PM	10.07
LR-3	11.11 AM	0.01
LR-3	1.11 PM	0.01
LR-3	5.08 PM	0.01

9. LATEST WATER QUALITY CHARACTERISTICS OF RIVER KELO

The latest water quality characteristic of River Kelo for the year 2019 is as below:

Table No. 08

River Kelo (Raigarh to Kanaktora) – P – V

Monitoring Location		Upstream Raigarh City	Near Kayaghat, Downstream Raigarh
BOD (mg/l)	Minimum	1.7	2.1
	Maximum	3.3	3.9
Fecal Coliform (MPN/100ml)	Minimum	30	230
	Maximum	210	460

10. IDENTIFICATION OF SOURCES OF POLLUTION

Kelo River is polluted due to discharge of untreated sewage of Raigarh city into the river. Various steps like construction of sewage treatment plant, cleaning of drains, plantation in flood plain area, removal of encroachment, In-situ bioremediation of drains, waste management (Solid waste, Hazardous waste, C&D waste, Bio- Medical Waste), maintenance of e-flow, Watershed management, rain water harvesting, adoption of good irrigation practices etc. with definite timelines and the implementing agency with budget estimates are included in action plan.

11. COMPONENTS OF ACTION PLAN

11.1 Channelization, treatment, utilization and disposal of treated domestic sewage:

(a) Identification of towns and villages in the catchment of polluted river stretch and estimation of quantity of sewage generation.

(b) Storm water drains carrying sewage and sullage joining river and interception and diversion of sewage to STPs.

(c) Treatment and disposal of septage and controlling open defecation.

(d) Identification of towns and villages for installing sewerage system and further sewage treatment plants.

11.2 Waste Management:

(a) Collection, segregation, transportation, disposal and treatment of municipal solid wastes generated from town in accordance of provisions of the Solid Waste Management Rules, 2016.

(b) Restriction of illegal disposal of solid waste along the river bank and flood plain zones.

(c) Burning of solid waste should be strictly prohibited.

(d) Construction and demolition wastes should be disposed in designated areas and no case it should be disposed into river beds or flood plain zone.

11.3 Industrial Pollution Control:

(a) Inventorization of industries.

(b) Category of industry and effluent quality.

(c) Treatment of effluents, compliance with standards and mode of disposal of treated effluents.

11.4 Flood Plain Zone:

(a) Regulating activities in flood plain zone.

(b) Management of Municipal, Plastic, Domestic Hazardous, Hazardous and Bio-medical.

(d) Improve irrigation practices.

11.5 Ecological/Environmental Flow (E-Flow):

(a) Measurement of flow of river.

(b) Requiement of flow of river.

(c) Mainatainance of flow of river.

12. DETAILED GAP ANALYSIS

Detail gap analysis with regard to sewage, industrial effluents, waste (municipal solid waste, domestic hazardous waste, industrial hazardous

waste, biomedical waste, plastic waste and construction and demolition waste) waste management is mentioned below:

12.1 Sewage Management: As per 2011 census, Raigarh city has a population of 1,66,460. RMC supplies treated water to the urban and surrounding areas through piped systems. Residents in some areas also tap ground water for household use. The main source of water supply is from Kelo River. The present water supply in Raigarh is about 29 MLD through surface water source. At present, the city neither has any sewerage system nor sewage treatment plant. Hence complete sewer infrastructure and STP requires to be developed. The town does not have any organized drainage system. Road-side open drains are the means of transportation of the waste water. There are no systematic and organized system for collection and treatmentof effluent generated from septic tanks. Over flow of septic tanks directly discharges to the storm water drains which ultimately fall into the local nallas and finally meets the Kelo River. In order to eliminate the pollution of Kelo River due to the municipal residential waste of Raigarh city, it is utmost necessary to construct sewage treatment plants at the strategic locations and intercept the flow of 12 nallas to avoid discharging the untreated sewage in Kelo River. The topography is almost flat to gently sloping towards Kelo River. Major slope of Raigarh city is towards Kelo River from Eastern & Western boundary of Raigarh City. Presently, generation of sewage from Raigarh city is about 30 MLD whereas 02 STP's of 25 and 07 MLD capacities are proposed.

Present generation of sewage	30.0 MLD
Capacity of sewage treatment plant	Bade Atarmuda (Raigarh) – 25 MLD Bajipali (Raigarh) – 07 MLD
Gap in sewage treatment	NIL
Present status of construction of sewage treatment plant (%)	Bade Atarmuda (Raigarh) – 25 MLD – 12% Completed Bajipali (Raigarh) – 07 MLD – 02% Completed

12.2 Septage Management: In the State of Chhattisgarh, all the ULBs have Faecal Sludge Treatment Facilities either by Faecal Sludge Treatment Plant or by Co-treatment with STP for the treatment of faecal sludge generated from the household of the ULBs. The ULB of Raigarh is using nearby STP for co-treatment of the black water generated in this ULB. Total fecal sludge generated in this river stretch is 47.5 KLD for which presently there is a capacity of treatment of fecal sludge about 80 KLD. This additional capacity is sufficient to treat the future 15 years period fecal sludge generation.

Current faecal sludge generation	47.5 KLD
Current faecal sludge treatment capacity	80.0 KLD
Gap in current faecal sludge treatment	NIL
Projected faecal sludge generation after 15 years	55.0 KLD

12.3 Industrial Effluent Management: There are total 12 nos. of water polluting industries are there in this polluted river stretch. From which 58.97 Kilolitres per day effluent is generated. Industries are having their captive effluent treatment arrangements by which the effluent is being treated and treated effluent is being used for different purposes within premises.

Present generation of effluent	Industrial	52.37 MLD
	Domestic	6.60 MLD
Capacity of industrial effluent treatment / processing	Industrial + Domestic	58.97 MLD
Gap in industrial effluent Treatment	Industrial + Domestic	NIL

12.4 Municipal Solid Waste Management: Chhattisgarh State has implemented the SWM Rules, 2016 by adopting Mission Clean City Model in 164 ULBs and Integrated waste management facility model in 2 ULBs of the State. Mission Clean City (MCC) is derived from Ambikapur model, which is a low cost, sustainable, decentralized model based on extensive segregation and recycling. It is combined with the benefits of citizen participation and urban livelihood promotion by involving business entities like women SHGs. Involvement of local citizens and Self-Help Groups (SHGs) has helped in 100% source segregation, and 100% door-to-door

collection of segregated waste. The segregated waste is brought to the Garbage clinics (SLRM-Solid Liquid Resource Management Centres) using partitioned containers mounted on Tricycles, E-Rickshaws and Mini Tippers for secondary and tertiary 8segregation. The recyclable inorganic waste is segregated into various categories and sold to the authorized recyclers. The non-recyclable combustible waste is stored separately to be transported either to cement plants, power plants, Waste to Energy plants or other industries as Alternate Fuel and Raw material (AFR). The organic waste is manually sorted to recover certain resources such as egg shells, orange peels etc. which are processed into useful products. The organic waste is further fed to animals and the remaining waste goes to compost shed for composting. In this polluted river stretch, total 58 tonnes per day of municipal solid waste is generated which is processed/ treated by Mission Clean City Model.

Present generation of solid waste	58 TPD
Processing and treatment of solid waste	58 TPD
Gap in processing and treatment of solid waste	NIL

Details of case registered and amount of fines collected for dumping of waste till August, 2020:

Name of ULB	No. of cases registered	Amount of fines collected
Raigarh	2207	Rs. 3,85,330

12.5 Domestic Hazardous Waste Management: The domestic hazardous waste is being collected separately in a black bag or in separate compartment in the tricycles/ mini tippers. Then the domestic hazardous waste is stored temporarily in the SLRM Centres of the ULBs and handed over to the authorized agency for its proper disposal as per CPCB guidelines. In this polluted river stretch, total 35 kg per day of domestic hazardous waste is generated which is collected by the municipal authorities regularly.

Present generation of domestic hazardous waste	35 Kg/day
Collection of domestic hazardous waste	35 Kg/day
Gap in domestic hazardous waste collection	NIL

12.6 Industrial Hazardous Waste Management: In Raigarh region, there are mainly sponge iron plants, power plants, mini steel plants (induction furnaces), ferro alloys plants and coal mines. From these industries, mainly spent oil / used oil, empty containers / drums containing chemicals are generated as hazardous waste. Spent oil / used oil and empty containers / drums are being sold to registered re-cyclers. Presently, Land fillable Hazardous Waste generated from the industries is being stored within the premises in safe manner.

12.7 Biomedical Waste Management: There is a common Bio-medical waste treatment and disposal facility is operational in Raigarh.

12.8 Construction & Demolition Waste: In this polluted river stretch, total 8.7 tonnes per day of construction and demolition waste are generated which is collected and primarily processed by the municipal authorities regularly.

Present generation of construction and demolition waste	8.70 TPD
Collection and processing of construction and demolition waste	8.70 TPD
Gap in processing of construction and demolition waste	NIL

12.9 Removal of Encroachment: There are 14 encroachments have been identified by the local body out of which 07 encroachments have been removed in this stretch. Remaining encroachments will be removed before 31/03/2021.

Encroachments identified	14
Encroachments removed	07
Encroachments to be removed	07

12.10 Rain water harvesting: The status of installation and action plan for completion of remaining rain water harvesting structure is as follows:

Progress by UAD				
ULB Name	**Target**	**Completed**	**In progress**	**Time line**
Raigarh	579	530	49	Mar-21

Progress by Industry Department				
Name of the District	**Target**	**Completed**	**In progress**	**Time line**
Raigarh	309	274	35	Mar-21

13. RIVER KELO REJUVENATION PLAN

13.1 Action Plan for management of sewage: As per 2011 census, Raigarh city has a population of 1,66,460. RMC supplies treated water to the urban and surrounding areas through piped systems. Residents in some areas also tap ground water for household use. The main source of water supply is from Kelo River. The present water supply in Raigarh is about 29 MLD through surface water source. Presently the generation of sewage from Raigarh city is about 30 MLD whereas 02 STP's of 25 and 07 MLD capacity are proposed.

13.2 Action Plan for management of industrial effluents: All the water polluting industries in the catchment area of this polluted river stretch have their captive ETPs. Action against defaulting industries discharging untreated effluent outside the premises is being conducted by CECB regularly.

13.3 Action Plan for management of utilization of treated sewage: Treated sewage will be utilized for irrigation or agricultural or industrial cooling or construction activities purposes once the STPs become operational. Treated water channel may also link with irrigation network in order to reduce ground water consumption for irrigation uses.

13.4 Action Plan for management of solid waste: The Chhattisgarh State has implemented the SWM Rules, 2016 by adopting Mission Clean City Model in 164 ULBs and Integrated waste management facility model in 2 ULBs of the State. Mission Clean City (MCC) is derived from Ambikapur model, which is a low cost, sustainable, decentralized model based on extensive segregation and recycling. The proper implementation of this mission clean city model will be carried out. Also Urban Administration and Development Department, Government of Chhattisgarh has proposed action

plan for prohibition of disposal of municipal solid waste and plastic waste in river as well as in municipal drains and levy of fine in case found violation.

13.5 Action Plan for management of Flood Plain Zone (FPZ): Forest department should identify/demarcate Flood Plain Zone and regulate the activities of plantation in Flood Plain Zone (FPZ) and notification of the Flood Plain Zones.

13.6 Action plan for management of Environmental Flow (E-flow): State Water Resource department will measure the flow and maintain the Environmental Flow (E-flow) as and when required.

14. MONITORING OF THE ACTION PLANS

In compliance of the order dated 20/09/2018 of Hon'ble National Green Tribunal, Principal Bench, New Delhi, Government of Chhattisgarh, Department of Housing and Environment has constituted a committee known as "River Rejuvenation Committee" (RRC) on 22/11/2018 under the Chairmanship of Secretary/Officer on Special Duty, Department of Housing and Environment for preparation of Action Plan for execution, monitoring and development of requisite infrastructure for management of municipal sewage and industrial effluent for rejuvenation of polluted river stretches in Chhattisgarh. The RRC will function under the overall supervision and co-ordination of Principal Secretary, Department of Housing and Environment.

15. ACTION PLAN

ACTION PLAN FOR MANAGEMENT OF SEWAGE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Construction of Sewage Treatment Plant of 35 MLD (Badhe Atarmuda 07	Nagar Nigam, Raigarh	57.53 Cr.	30/06/2021

	MLD and Banjipali Village 25 MLD) for sewage of various nala.			
ACTION PLAN FOR MANAGEMENT OF INDUSTRIAL EFFLUENTS				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Action against defaulting industries discharging untreated effluent outside the premises.	CECB	–	Immediate
ACTION PLAN FOR MANAGEMENT OF UTILIZATION OF TREATED SEWAGE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Reuse of treated effluent for various purposes i.e. plantation, reuse for industrial purposes, Agriculture etc.	Nagar Nigam, Raigarh	–	30/06/2021
ACTION PLAN FOR MANAGEMENT OF SOLID WASTE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Prohibition of disposal	Nagar Nigam,	–	Immediate /

	of municipal solid waste and plastic waste in river as well as in municipal drains and levy of fine in case found violation.	Raigarh		Regularly
ACTION PLAN FOR MANAGEMENT OF FLOOD PLAIN ZONE (FPZ)				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Plantation in flood zone in available spaces.	Forest Department / Nagar Nigam, Raigarh	–	Next Monson Season
2.	Removal of remaining 07 encroachments from banks of the river and taking appropriate action to prevent re-encroachment by plantation,development of bio-diversity parks etc.	Nagar Nigam, Raigarh / District Administration	–	31/03/2021
ACTION PLAN FOR MANAGEMENT OF ENVIRONMENTAL FLOW (E-FLOW)				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Measurement of flow of river and records maintained.	State Water Resource Department	–	Regularly

2.	Requirement of E-flow in the river must be maintained.	State Water Resource Department	–	As per requirement
OTHER ACTION POINTS				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Cleaning of drains before monsoon.	Nagar Nigam, Raigarh	–	Immediate
2.	In-Situ Bio-Remediation of Drains.	Nagar Nigam, Raigarh	Budget will be provided under 15th Finance Commission	31/12/2020
3.	To ensure rain water harvesting by the industrial, commercial and other institutions to promote ground water recharging.	Industry Department / CECB / Nagar Nigam, Raigarh	–	31/03/2021
4.	Collection of information on irrigation water used per hectare for different crops by Agriculture Department and evaluate whether use of Irrigation water per hectare has decreased or not? Based on the data obtained techniques like drip irrigation etc. should be promoted.	Agriculture Department	–	Regularly

5.	Adoption of good irrigation practices (Adoption of micro irrigation schemes which result in more crop per drop as per the available resources)	State Water Resource Department	–	It is a continuous process and no time target can be fixed. Work is done as per allocation.

ANNEXURES

Annexure – 1

Analysis result along with heavy metal analysis of polluted river stretch water sample collected in August, 2020

S. No.	Parameter	Unit	Kelo River Upstream	Kelo River Downstream
1.	pH value	–	6.93	7
2.	Turbidity	NTU	232.0	239.0
3.	Conductivity	uS/Cm	112.43	140.86
4.	Total solids	mg/l	628.66	121.76
5.	Total dissolved solids	mg/l	581.66	85.76
6.	Total suspended solids	mg/l	47.0	36.0
7.	Ammonical Nitrogen (NH_3N)	mg/l	0.50	0.63
8.	Nitrate Nitrogen (NO_3N)	mg/l	0.284	0.323
9.	Nitrite Nitrogen (NO_2N)	mg/l	0.18	0.20
10.	Phosphate (as PO_4)	mg/l	6.44	7.69
11.	Chloride	mg/l	10.99	11.99
12.	Sulphate	mg/l	56.29	51.51
13.	Dissolved Oxygen	mg/l	3.6	4.8
14.	Chemical Oxygen Demand	mg/l	56.0	18.0
15.	Bio–Chemical Oxygen Demand at 27^OC	mg/l	14.0	4.0
16.	Total Alkalinity (as $CaCO_3$)	mg/l	46.0	50.0
17.	Total Hardness (as $CaCO_3$)	mg/l	78.0	54.0
18.	Calcium Hardness	mg/l	30.0	40.0

19.	Magnesium Hardness	mg/l	48.0	14.0
20.	Calcium (as $CaCO_3$)	mg/l	12.02	16.03
21.	Magnesium	mg/l	11.66	3.40
22.	Arsenic	mg/l	N.D.	N.D.
23.	Cadmium	mg/l	N.D.	N.D.
24.	Zinc	mg/l	N.D.	N.D.
25.	Chromium	mg/l	N.D.	N.D.
26.	Lead	mg/l	N.D.	N.D.
27.	Nickel	mg/l	N.D.	N.D.
28.	Copper	mg/l	N.D.	N.D.
29.	Mercury	mg/l	N.D.	N.D.
30.	Coliform	MPN/100 ml	27	14.0
31.	Fecal Coliform	MPN/100 ml	6.8	3.6
32.	Fecal Straptococci	MPN/100 ml	Absent	Absent

Annexure – 2

List of industries having ETP installed, performance of captive ETP's and details of utilization of treated effluent

S.No.	Name of Industry	Quantity of Water used		Quantity of generated waste water		Waste water treatment system		Quality of effluent	Method and quantity of treated waste water which is reused/ recycled	Zero discharge condition in river is maintained or not
		Industrial (Kl/Day)	Domestic (Kl/Day)	Industrial (Kl/Day)	Domestic (Kl/Day)	Industrial	Domestic			
1	M/s SECL, gare IV/1 coal mine, Village-tanmar, District-Raigarh	400.00	Nil (amount included in M/s J.S.P.L Dongamhua)	400.00	Nil (amount included in M/s J.S.P.L Dongamhua)	Mine sump	Sewage treatment plant	According to standard limit	All treated water is reused in water spraying, fire suppression and plantation etc.	Zero discharge condition is maintained
2	M/s SECL, gare IV/2&3 coal mine, Village-tanmar, District-Raigarh	1090.00	Nil (amount included in M/s J.S.P.L Dongamhua)	1090.00	Nil (amount included in M/s J.S.P.L Dongamhua)	Mining and Settling Tanks	Sewage treatment plant	According to standard limit	700 Kl / day of treated water in the agricultural work and remaining treated water in water spraying, fire suppression and plantation etc.	Zero discharge condition is maintained
3	M/s Hindalco Industries Limited, gare pelma IV/4, coal mine,	8830.00	40.00	8830.00	30.00	Effluent treatment plant and reverse osmosis	Septic tank and soak pit	According to standard limit	All treated water is being utilized in drinking, agriculture works, water	Zero discharge condition is maintained

	banjhhikhol, tanmar, District-Raigarh					system			spraying and plantation etc.	
4	M/s Hindalco Industries Limited, gare pelma IV/5, coal mine, milupara, tanmar, District-Raigarh	9100	48.00	9100.00	38.00	Effluent treatment plant and reverse osmosis system	Septic tank and soak pit	According to standard limit	All treated water is being utilized in drinking, agriculture works, water spraying and plantation etc.	Zero discharge condition is maintained
5	M/s Jindal Steel and power limited dongamahua Captive power plant village-dongamahua District-Raigarh	11150	635.00	2185.00	510.00	Effluent treatment plant	Sewage treatment plant	According to standard limit	All treated water is reused in the process, dry spraying, horticulture and road cleaning etc.	Zero discharge condition is maintained
6	M/s Jindal power limited, village- tanmar, District-Raigarh	82000.00	2090.00	25200.00	1700.00	Effluent treatment plant	Sewage treatment plant	According to standard limit	All treated water is reused in the process, dust suppression, horticulture and road cleaning etc.	Zero discharge condition is maintained
7	M/s Nalwa Steeel and power limited, village-taraimaal, District-	2600.00	300.00	390.00	250.00	Setling tank, Nautralization pit, Recirculat	Sewage treatment plant	According to standard limit	After the treatment of whole industrial waste water treated water is reused in	Zero discharge condition is maintained

	Raigarh					ion pand			process, water sprinkling and plantation etc.	
8	M/s anjani Steels private limited, village-ujjavalpur, District-Raigarh	795.00	60.00	90.00	45.00	Setling tank, Nautralization pit, Recirculation pand	Septic tank and sock pit	According to standard limit	After the treatment of whole industrial waste water treated water is reused in process, water sprinkling and plantation etc.	Zero discharge condition is maintained
9	M/s Jindal Steel and power limited, Patrapali, District-Raigarh	48000.00	6500.00	5000.00	4000.00	Effluent treatment plant and effluent cycling system	Sewage treatment plant	According to standard limit	After the treatment of whole industrial waste water treated water is reused in process, water sprinkling and plantation etc.	Zero discharge condition is maintained
10	R.R. Energy limited, village-gadumariya, District-Raigarh	167.00	15.00	25.00	14.00	Setling tank, Nautralization pit, Recirculation pand	Septic and soak pit	According to standard limit	All treated waste water is reused within the premises for gardening and dust suppression etc.	Zero discharge condition is maintained

11	M/s shree krishna salvent, village-chhatamuda, District-Raigarh	50.00	5.00	25.00	4.00	Effluent treatment plant	Septic and soak pit	According to standard limit	All treated waste water is reused in process, ash handling and plantation.	Zero discharge condition is maintained
12	M/s Raigarh Salvent private limited, village-sahdevpali, District-Raigarh	65.00	5.00	30.00	4.00	Effluent treatment plant	Septic and soak pit	According to standard limit	All treated waste water is reused in process, ash handling and plantation.	Zero discharge condition is maintained

Annexure – 3

Heavy metal analysis result of 05 major nala water samples collected in August, 2020

S. No.	Parameter	Unit	Tukrapara Nala	Shahid Chowk, Purana Barapara	Panjari Plant	Chakrapath (Near Bhagat Singh Road)	Near Beladula
1.	pH value	–	6.43	6.75	6.79	6.93	7.03
2.	Turbidity	NTU	18.16	2.79	4.08	2.98	5.06
3.	Conductivity	uS/Cm	590.03	805.96	102.8	981.56	800.1
4.	Total solids	mg/l	478.9	521.83	684.5	639.3	489.06
5.	Total dissolved solids	mg/l	352.9	485.83	614.5	589.3	470.06
6.	Total suspended solids	mg/l	126.0	36.0	70.0	50.0	10.0
7.	Ammonical Nitrogen (as NH_3N)	mg/l	1.36	0.30	0.28	0.35	1.06
8.	Nitrate Nitrogen (as NO_3N)	mg/l	0.699	0.166	0.175	0.236	0.570
9.	Nitrite Nitrogen (as NO_2N)	mg/l	0.45	0.10	0.11	0.15	0.37
10.	Phosphate (as PO_4)	mg/l	0.96	2.28	2.35	2.60	1.19
11.	Chloride	mg/l	43.98	69.97	92.97	100.96	84.97
12.	Sulphate	mg/l	66.0	83.12	79.85	80.38	56.45

13.	Dissolved Oxygen	mg/l	3.6	3.2	5.2	3.8	3.0
14.	Chemical Oxygen Demand	mg/l	64.0	64.0	16.0	64.0	80.0
15.	Bio–Chemical Oxygen Demand at $27^{O}C$	mg/l	16.0	18.0	4.0	16.0	20.0
16.	Total Alkalinity (as $CaCO_3$)	mg/l	148.0	218.0	294.0	270.0	206.0
17.	Total Hardness (as $CaCO_3$)	mg/l	226.0	276.0	352.0	336.0	290.0
18.	Calcium Hardness	mg/l	174.0	212.0	288.0	268.0	234.0
19.	Magnesium Hardness	mg/l	52.0	64.0	64.0	68.0	56.0
20.	Calcium (as $CaCO_3$)	mg/l	69.73	84.96	115.43	107.41	93.78
21.	Magnesium	mg/l	12.63	15.55	15.55	16.52	13.60
22.	Arsenic	mg/l	N.D.	N.D.	N.D.	N.D.	N.D.
23.	Cadmium	mg/l	N.D.	N.D.	N.D.	N.D.	N.D.
24.	Zinc	mg/l	N.D.	N.D.	N.D.	N.D.	N.D.
25.	Chromium	mg/l	N.D.	N.D.	N.D.	N.D.	N.D.
26.	Lead	mg/l	N.D.	N.D.	N.D.	N.D.	N.D.
27.	Nickel	mg/l	N.D.	N.D.	N.D.	N.D.	N.D.
28.	Copper	mg/l	N.D.	N.D.	N.D.	N.D.	N.D.
29.	Mercury	mg/l	N.D.	N.D.	N.D.	N.D.	N.D.

30.	Coliform	MPN/ 100ml	33.0	38.0	13.0	34.0	46.0
31.	Fecal Coliform	MPN/ 100ml	9.2	11.0	4.0	9.3	14.0
32.	Fecal Straptococci	MPN/ 100ml	Absent	Absent	Absent	Absent	Absent

N.D. – Not Detected

REVISED ACTION PLAN FOR THE REJUVENATION OF POLLUTED RIVER STRETCH OF RIVER KHAROON

(BHATAGAON TO BENDRI)

PRIORITY – IV

APPROVED BY:

RIVER REJUVENATION COMMITTEE, CHHATTISGARH

(Constituted in compliance of order of the Hon'ble National Green Tribunal)

SUBMITTED TO:

CENTRAL POLLUTION CONTROL BOARD, DELHI

TABLE OF CONTENT

S.No.	Content	Page No.
1.	Executive Summary	03
2.	Introduction	06
3.	Achievable Targets as per Hon'ble NGT Directions	06
4.	Water Quality Reports for the Year 2016-2019	06
5.	Identified Polluted River Stretches in the State	09
6.	Action Plan For Restoration of Polluted River Stretches of River Kharoon (Priority-IV)	10
7.	Major Towns And Industries in The Catchment of River Kharoon	10
8.	Major Drains Contributing Pollution into River Kharoon	12
9.	Latest Water Quality Characteristics of River Kharoon	14
10.	Identification of Sources of Pollution	14
11.	Components of Action Plan	15
12.	Detailed Gap Analysis	16
13.	Ground Water Quality Monitoring	20
14.	River Kharoon Rejuvenation Plan	21
15.	Monitoring of the Action Plans	22
16.	Action Plan	23
17.	Annexures	27

1. EXECUTIVE SUMMARY

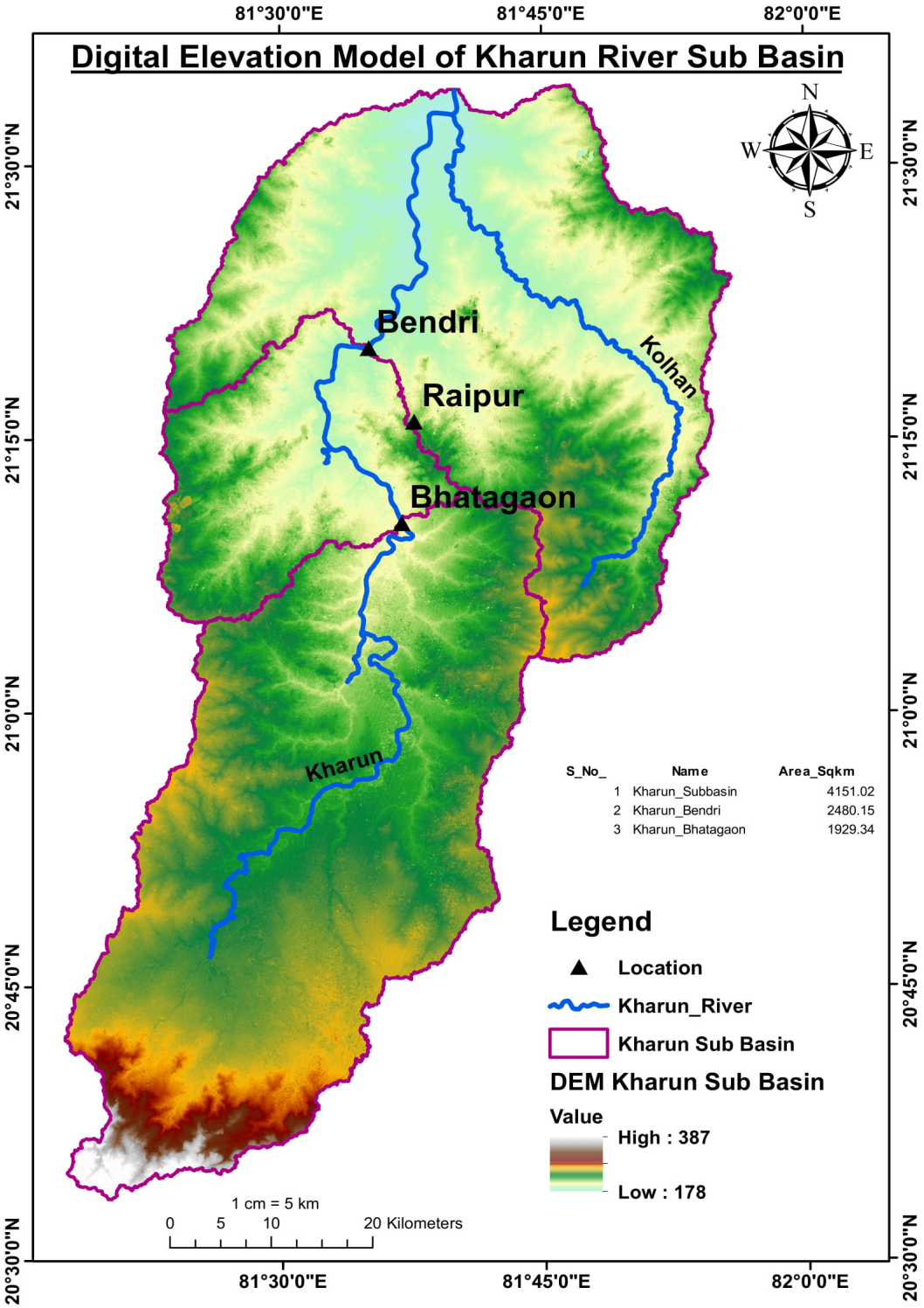
Kharun River is one of the important tributary of Seonath River. Seonath sub-basin is one of the important sub-basins of Mahanadi River. Kharun River basin falls in Durg, Raipur and Dhamtari districts.

Raipur City

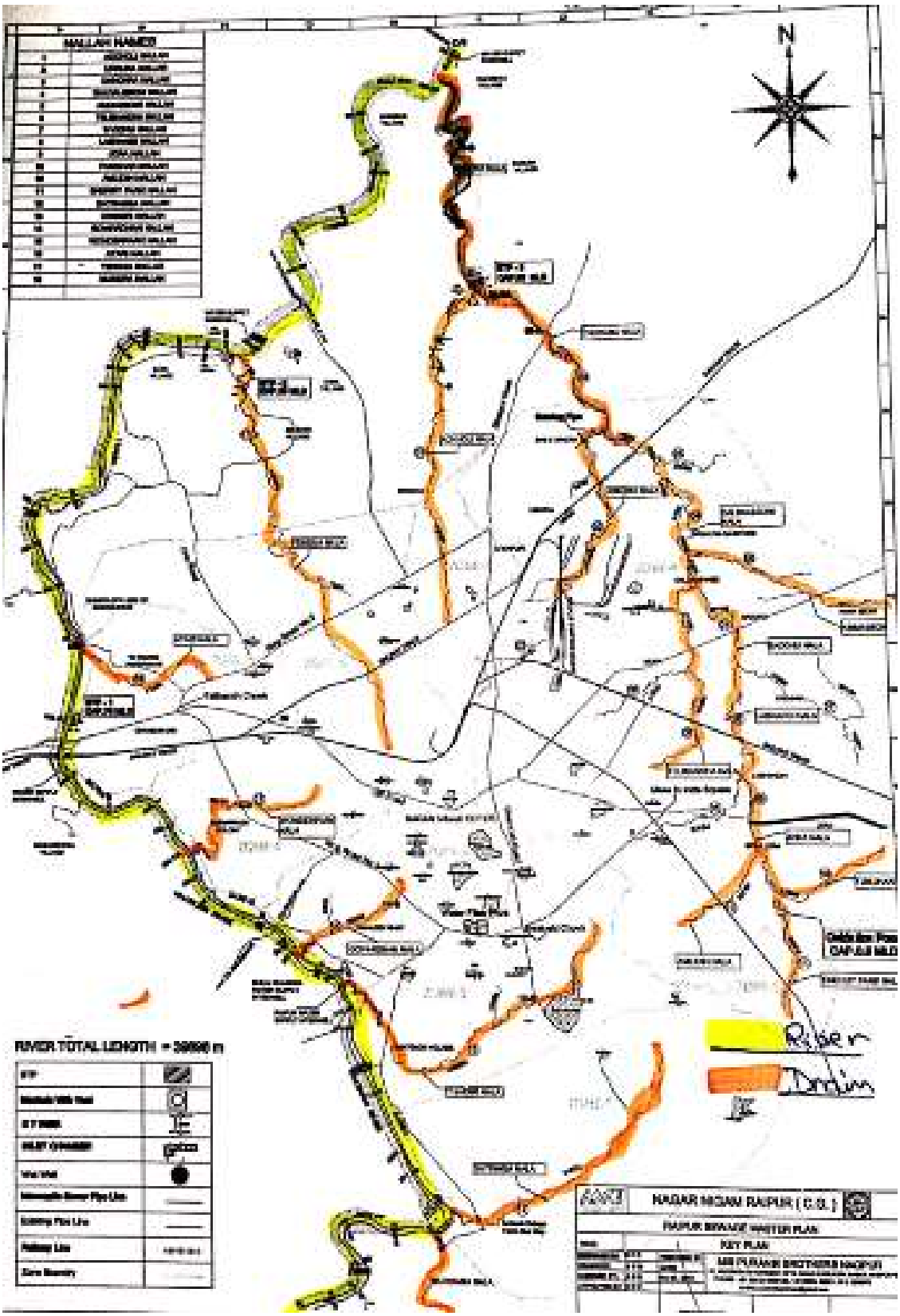
Raipur is the capital and the largest city of Chhattisgarh State. It was formerly a part of Madhya Pradesh before the State of Chhattisgarh was formed on 1st November, 2000. Raipur is the biggest agricultural produce market, industrial hub and eminent cultural platform of Chhattisgarh State. Raipur is the largest market of steel in India. Raipur houses one of the biggest iron markets in India.

Presently there is no collection network for waste water. Mostly all the households are having sanitation units with septic tanks and supernatant is discharged into nearby drains, which eventually flows in 17 nallas before meeting Kharoon River at 7 locations around the city. In the year 1982 an underground drainage scheme was executed in some parts of Raipur city and 5 sewage pumping stations were constructed to collect the sewage and three oxidation ponds were also constructed near Dal Dal Seoni, Birgaon and Changorabhata which are now not in very good condition.

Digital map showing above details is enclosed.


Digital Elevation Model of Kharun River Sub Basin
81°30'0"E
81°45'0"E
82°0'0"E
21°30'0"N
21°15'0"N
21°0'0"N
20°45'0"N
20°30'0"N
N
W
E
S
Bendri
Raipur
Bhatagaon
Kolhan
Kharun
S_No_ Name Area_Sqkm
1 Kharun_Subbasin 4151.02
2 Kharun_Bendri 2480.15
3 Kharun_Bhatagaon 1929.34
Legend
Location
Kharun_River
Kharun Sub Basin
DEM Kharun Sub Basin
Value
High : 387
Low : 178
1 cm = 5 km
0 5 10 20 Kilometers

Kharun River Raipur



2. INTRODUCTION

The Kharun River basin is situated between 20° 38' N to 21°36'N Latitude and 81°20' to 81°55'E Longitude. Kharun River originates from Petechua in the South-East of the Durg district and after flowing about 129 km joins Seonath River near Somnath in Raipur district.

The catchment area of Kharun River basin is 4112 sqkm. It flows to the west of Raipur town and supplies water to Raipur city through a small storage Bhatagaon anicut. It is supplemented from Ravi Shankar Sagar reservoir situated at Dhamtari on Mahanadi River. The major part of Kharun River basin comes under command area of Ravi Shankar Sagar reservoir and small part under Tandula reservoir. The main types of land use and land cover are agriculture, forest, settlements, barren etc. and main crops are paddy, oilseeds, wheat, gram and vegetable.

Kharun is originally an intermittent river having no flow during lean season. Moreover there has been no water storage structure at the upstream. To tackle the situation, the Kharun River is being supplemented from Ravi Shankar Sagar reservoir through canals to meet various water demands and water supplied for various usages through series of anicuts.

3. ACHIEVABLE TARGETS AS PER HON'BLE NGT DIRECTIONS

The main objective of the action plan is to bring polluted river stretches to be fit at-least for bathing purposes (i.e. BOD < 3 mg/l and FC < 500 MPN/100 ml) on or before 30/06/2021.

4. WATER QUALITY REPORTS FOR THE YEAR 2016, 2017, 2018, 2019

The river water quality at different locations is shown below.

Table No. 01

Location	Bhatagaon		Bendri	
pH	Min	Max	Min	Max
2016	7.34	7.86	7.24	7.88
2017	7.48	7.84	7.4	7.76

2018	7.68	7.74	7.58	7.68
2019	7.00	7.56	7.24	7.80

Table No. 02

DO	Bhatagaon		Bendri	
mg/L	Min	Max	Min	Max
2016	6.5	7.8	6.2	7.4
2017	6.5	7.6	5.6	6.9
2018	6.4	7.4	6.2	7.0
2019	6.2	7.6	5.5	7.4

Table No. 03

BOD	Bhatagaon		Bendri	
mg/L	Min	Max	Min	Max
2016	1.8	2.4	1.3	2.8
2017	2.1	3.3	2.6	3.4

Table No. 04

Coliform	Bhatagaon		Bendri	
MPN/100ml	Min	Max	Min	Max
2016	110	350	170	500
2017	170	300	170	350
2018	210	210	240	284

River Flow in Polluted River Stretch:

Water Resource Department had prepared standard operating procedures (SOP) for the polluted river stretches for maintaining e-flow in the rivers and the same is being followed. Gate discharge stations have been provided for the measurement of flow in rivers. These stations are operated by Central Water Commission. As per data from Water Resources Department, Government of Chhattisgarh, the flow observed in Kharoon River during last three years are as follows:-

Table No. 05

River / Location	Month	Flow (in Cumecs)			Daily e-flow (in Cumecs)
		2015-16	2016-17	2017-18	
Kharoon / Pathardih	June	516.560	0.000	432.160	2.25
	July	1913.286	2405.266	889.575	29.81
	August	337.861	3962.485	1355.898	6.60
	September	2027.387	5267.677	2258.597	2.95
	October	412.267	2941.195	1671.792	0.03
	November	17.344	2.711	0.000	0.000
	December	0.000	0.000	0.000	0.000
	January	0.000	0.000	0.000	0.000
	February	0.000	0.000	0.000	0.000
	March	0.000	0.000	0.000	0.000
	April	0.000	0.000	0.000	0.000
	May	0.000	0.000	0.000	0.000

5. IDENTIFIED POLLUTED RIVER STRETCHES IN THE STATE

Central Pollution Control Board has identified polluted river stretches state wise and priority wise. On the basis of water quality data under National Water Quality Monitoring Programme for the year 2016 and 2017 following river stretches of Chhattisgarh have been identified as polluted stretches:-

River stretches have been categorized in five priority classes based on BOD concentration. River stretches having BOD between 6 to 10 mg/l have been kept under category “IV”. Similarly river stretches having BOD between 3 to 5 mg/l have been kept under category “V”.

Table No. 06

River Name	River Stretch	BOD Range/Max Value (mg/l)	Priority	Towns situated across the stretches	Approx length of the stretch (in km)
Hasdeo	Korba to Urga	3.6 – 7.0	IV	Korba	20
Kharoon	Bundari to Raipur	3.3 – 7.2	IV	Raipur	20
Mahanadi	Arrang to Sihawa	3.3 – 8.0	IV	Kanker, Dhamtari, Nawapara, Rajim	70
Seonath	Simga to Bemta	3.4 – 8.4	IV	Simga	10
Kelo	Raigarh to Kanaktora	3.8	V	Raigarh	15

Note:- 1. River stretches have been categorized in five priority classes based on BOD concentration. River stretches having BOD between 6 to 10 mg/l have been kept under category “IV”. Similarly river stretches having BOD between 3 to 5 mg/l have been kept under category “V”.

2. The polluting stretches as defined by CPCB in their document titled “River Stretches for Restoration of Water Quality” needs review on account of improper description of location. In fact the polluted stretches of these rivers are as below:-

Table No. 07

Polluted Stretches of Rivers

River Name	River Stretch
Kharoon	Bhatagaon to Bendari
Mahanadi	Sihawa to Arrang
Seonath	Bemta to Simga

6. ACTION PLAN FOR RESTORATION OF POLLUTED RIVER STRETCHES OF RIVER KHAROON (PRIORITY-IV)

The Biochemical Oxygen Demand (BOD) is one of the most common measures of pollutant organic material in water. BOD indicates the amount of permissible organic matter present in water. As per the water analysis report on Kharoon River, it states that the organic pollution measured in terms of BOD varying on different points or sources. There are no major polluting industries that discharge effluents to cause serious contamination. Therefore, the main source of pollution is due to domestic waste and municipal sewage which is being dumped and flows into the nallahs & river. All sorts of waste and untreated sewage are released randomly into the Kharoon River in absence of a sewage treatment facility. It is an important aspect for revival of River Kharoon in context of its utility as it is an important Perennial River. Under the present status, it appears that River Kharoon may serve the purpose of drinking, bathing and irrigation and for this objective municipal sewage generated should be treated properly.

7. MAJOR TOWNS AND INDUSTRIES IN THE CATCHMENT OF RIVER KHAROON

The city with more than one million urban populations must have a systematically planned sewerage network. The population of 2011 census for Raipur city is 10,48,112, which was 6,97,013 in the year 2001. This

enhancement in the population is mainly because of formation of new Chhattisgarh State in the year 2000. Raipur is well connected by roads, railways and air. It has become more prominent after the setup of Atal Nagar, the capital city. The total area of Raipur city is 142 sqkm which further expands to 226 sqkm after addition of 7 adjoining villages to its boundaries.

The topography of the area is almost flat to gently sloping towards North. The area consists of sub-dendritic drainage pattern. Kharun River from western boundary of Raipur City flowing from south to north and ultimately meets Sheonath River. The Raipur City catchment area comes under Kharun River which finally joins Mahanadi River Basin through Sheonath River which flows from almost West to East direction.

Total length of nallas flowing through Raipur city is about 150 kms which need lining for retaining the natural drainage pattern of the city as well as conveying all the sewage to desired locations of proposed STPs. This can form a part of secondary network, where all the drains can be connected in a planned manner.

The sewage generated in dry weather conditions are assessed at about 22 locations. Supply of water from Raipur Municipal Corporation is 200 MLD and 20 MLD from ground water source. Additional 14 MLD water supply is from adjoining Birgaon Municipal Corporation and 12 MLD water supplied by CSIDC in the industrial area. Hence, total supply of water is about 246 MLD. Dry weather sewage flow observed at the proposed treatment sites totalling about 164 MLD.

The sewage treatment system has been planned for 206 MLD. Four sewage treatment plants have been proposed as follows:-

(a) 75 MLD at Chandandih

(b) 35 MLD at Kara

(c) 90 MLD at Nimora

(d) 06 MLD at Bhatagaon

The sewage treatment plants at Chandandih, Kara and Nimora have been included in “AMRIT MISSION”. The construction of these STPs is in

progress. Sewage treatment plant at Bhatagaon is being constructed by Municipal Corporation Raipur.

Interception and Diversion of Nalla Water

The flow measurement was carried out at designated locations of drains discharging into the proposed STPs. Total locations were identified and divided into three parts i.e. nallah no 13,14,15 and 16 along with sub nallas are connected in STP 1. STP 2 is proposed at the end of nallah no 17 and nallah no 3B & 1B along with sub nallhas are connected into STP 3. Flow measurement was carried out to know the ultimate receipt of the total load.The total hydraulic load received by STP 1 is 79.72 MLD, STP 2 is 43.00 MLD and STP 3 is 107.86 MLD.

All the water polluting units in catchment area of polluted river stretch has provided adequate effluent treatment facilities. Treated effluent is being used for different purposes within their premises. List of industries having ETP installed, performance of captive ETP's and details of utilization of treated effluent are shown in **Annexure – 1**. It is evident from above that effluent generated from industries is not being directly discharged into the river. There is no common effluent treatment plant in this region.

Action Against Non-Complying Industries:-

Industries are complying with the effluent discharge standards. In case of non-compliance with respect to discharge of treated / untreated industrial effluent outside the premises and / or not complying to the discharge standards prescribed, CECB takes appropriate actions against non-complying units either by issuing closure direction or filing of court case against management.

8. MAJOR DRAINS CONTRIBUTING POLLUTION INTO RIVER KHAROON

From the drainage pattern of Raipur city it has been identified that total 23 numbers nallahs including all sub nallahs are major carrier of sewage water. The physico-chemical characteristics of the drainage water for all nallahs along with sub nallahs are enclosed in **Annexure –2.**

The nalla water quality for sample collected during August 2020 in Raipur area is as follows:-

Table No. 08

S.N.	Sample Collected From	BOD 3 day 27^{O}C	Coliform	Faecal Streptococci	Faecal Coliform
		mg/l	MPN/ 100 ml	MPN/ 100 ml	MPN/ 100 ml
1.	Kara Nala, Near Shri Sita Ispat, Raipur	5.0	31	5.5	Absent
2.	Chokara Nala Munrethi, Raipur	9.0	43	8.3	Absent
3.	Chingri Nala, Bhatagaon Raipur	19.0	58	17.0	Absent
4.	Wonderland Nala, Beside Indraprasth Colony, Raipur	3.0	21	4.0	Absent
5.	Koliyari Nala, Raipur	6.0	40	6.1	Absent

Heavy metal analysis of above nallas is attached as **Annexure – 3.**

Nalla Flow

The flow in following nalla observed is as below:-

Table No. 09

Sr. No	Location Name	Average Flow in MLD
1	Nala No-13	13.40
2	Nala No-14	45.46
3	Nala No-15	18.83

4	River Up Stream	97.56
5	Nala No-3B	105.43
6	Nala No-17	43.00
7	Nala No-1B	2.43
8	Nala No-3BA	306.74
9	Nala No-3A	209.46
10	River Down Stream	283.57
11	Nala No -16	2.02
12	Nala No -14B	64.69
13	Nala No -13B	21.98
14	Nala No -15B	23.70
15	Nala No -8	13.84
16	Nala No -7	17.94
17	Nala No -6	39.52
18	Nala No -2	41.13
19	Nala No -4	98.74
20	Nala No -5	11.64

9. LATEST WATER QUALITY CHARACTERISTICS OF RIVER KHAROON

The latest water quality characteristic of River Kharoon for the year 2019 is as below:

Table No. 10

River Kharoon (Bhatagaon to Bendri) – P – IV

Monitoring Location		**Near water supply intake well, Bhatagaon**	**Near water supply intake well, Bendri**
BOD (mg/l)	Minimum	2.1	2.8
	Maximum	8.6	6.8
Fecal Coliform (MPN/100ml)	Minimum	<2	<2
	Maximum	84	94

10. IDENTIFICATION OF SOURCES OF POLLUTION

Kharoon River is polluted due to discharge of untreated sewage of Raipur city into the river. Various steps like construction of sewage treatment

plants, cleaning of drains, plantation in flood plain area, removal of encroachment, In-situ bioremediation of drains, waste management (Solid waste, Hazardous waste, C&D waste, Bio- Medical Waste), maintenance of e-flow, Watershed management, rain water harvesting, adoption of good irrigation practices, development of bio-diversity park etc. with definite timelines and the implementing agency with budget estimates are included in action plan.

11. COMPONENTS OF ACTION PLAN

11.1 Channelization, treatment, utilization and disposal of treated domestic sewage:

(a) Identification of towns and villages in the catchment of polluted river stretch and estimation of quantity of sewage generation.

(b) Storm water drains carrying sewage and sullage joining river and interception and diversion of sewage to STPs.

(c) Treatment and disposal of septage and controlling open defecation.

(d) Identification of towns and villages for installing sewerage system and further sewage treatment plants.

11.2 Waste Management:

(a) Collection, segregation, transportation, disposal and treatment of municipal solid wastes generated from town in accordance of provisions of the Solid Waste Management Rules, 2016.

(b) Restriction of illegal disposal of solid waste along the river bank and flood plain zones.

(c) Burning of solid waste should be strictly prohibited.

(d) Construction and demolition wastes should be disposed in designated areas and no case it should be disposed into river beds or flood plain zone.

11.3 Industrial Pollution Control:

(a) Inventorization of industries.

(b) Category of industry and effluent quality.

(c) Treatment of effluents, compliance with standards and mode of disposal of treated effluents.

11.4 Flood Plain Zone:

(a) Regulating activities in flood plain zone.

(b) Management of Municipal, Plastic, Domestic Hazardous, Hazardous and Bio-medical.

(d) Improve irrigation practices.

11.5 Ecological/Environmental Flow (E-Flow):

(a) Measurement of flow of river.

(b) Requiement of flow of river.

(c) Mainatainance of flow of river.

12. DETAILED GAP ANALYSIS

Detail gap analysis with regard to sewage, industrial effluents, waste (municipal solid waste, domestic hazardous waste, industrial hazardous waste, biomedical waste, plastic waste and construction and demolition waste) waste management is mentioned below:

12.1 Sewage Management: The sewage generated in dry weather conditions are assessed at about 22 locations. Supply of water from Raipur Municipal Corporation is 200 MLD and 20 MLD from ground water source. Additional 14 MLD water supply is from adjoining Birgaon Municipal Corporation and 12 MLD water supplied by CSIDC in the industrial area. Hence, total supply of water is about 246 MLD. Dry weather sewage flow observed at the proposed treatment sites totalling about 164 MLD.

The sewage treatment system has been planned for 206 MLD. Four sewage treatment plants have been proposed as follows:-

(a)75 MLD at Chandandih

(b) 35 MLD at Kara

(c) 90 MLD at Nimora

(d) 06 MLD at Bhatagaon

The sewage treatment plants at Chandandih, Kara and Nimora have been included in “AMRIT MISSION”. The construction of these STPs is in progress. Sewage treatment plant at Bhatagaon is being constructed by Municipal Corporation Raipur.

Present generation of sewage	164 MLD
Capacity of sewage treatment plant	206 MLD (Chandandih – 75 MLD Kara – 35 MLD Nimora – 90 MLD Bhatagaon – 06 MLD)
Gap in sewage treatment	NIL
Present status of completion of construction of sewage treatment plant (%)	Chandandih – 75 MLD – 40% Completed Kara – 35 MLD – 40% Completed Nimora – 90 MLD – 40% Completed Bhatagaon – 06 MLD – 70% Completed

12.2 Septage Management: In the State of Chhattisgarh, all the ULBs have Faecal Sludge Treatment Facilities either by Faecal Sludge Treatment Plant or by Co-treatment with STP for the treatment of faecal sludge generated from the household of the ULBs. The ULB of Raipur has the Faecal Sludge Treatment Plants based on Low cost gravity based decentralized Phytorid Technology for the treatment of black water generated in these ULBs. Further, Raipur is using nearby STP for co-treatment of septage. However, there is provision of enhance of septage treatment in the proposed STPs of these ULBs. Total fecal sludge generated in this river stretch is 236.71 KLD for which presently there is a capacity of treatment of fecal sludge about 284 KLD. This additional capacity is sufficient to treat the future 15 years period fecal sludge generation.

Current faecal sludge generation	236.71 KLD
Current faecal sludge treatment capacity	284.00 KLD
Gap in current faecal sludge treatment	NIL
Projected faecal sludge generation after 15 years	273.00 KLD

12.3 Industrial Effluent Management: There are total 26 nos. of water polluting industries are there in this polluted river stretch. From which 0.12 Kilo litres per day effluent is generated. Industries are having their captive effluent treatment arrangements by which the effluent is being treated and treated effluent is being used for different purposes within premises.

Present generation of effluent	Industrial	0.09 MLD
	Domestic	0.03 MLD
Capacity of industrial effluent treatment / processing	Industrial + Domestic	0.12 MLD
Gap in industrial effluent Treatment	Industrial + Domestic	NIL

12.4 Municipal Solid Waste Management: Chhattisgarh State has implemented the SWM Rules, 2016 by adopting Mission Clean City Model in 164 ULBs and Integrated waste management facility model in 2 ULBs of the State. Mission Clean City (MCC) is derived from Ambikapur model, which is a low cost, sustainable, decentralized model based on extensive segregation and recycling. It is combined with the benefits of citizen participation and urban livelihood promotion by involving business entities like women SHGs. Involvement of local citizens and Self-Help Groups (SHGs) has helped in 100% source segregation, and 100% door-to-door collection of segregated waste. The segregated waste is brought to the Garbage clinics (SLRM-Solid Liquid Resource Management Centres) using partitioned containers mounted on Tricycles, E-Rickshaws and Mini Tippers for secondary and tertiary segregation. The recyclable inorganic waste is segregated into various categories and sold to the authorized recyclers. The non-recyclable combustible waste is stored separately to be transported either to cement plants, power plants, Waste to Energy plants or other industries as Alternate Fuel and Raw material (AFR). The organic waste is manually sorted to recover certain resources such as egg shells, orange peels etc. which are processed into useful products. The organic waste is further fed to animals and the remaining waste goes to compost shed for composting. In this polluted river stretch, total 470 tonnes per day of municipal solid waste is generated which is processed/ treated by Mission Clean City Model.

Present generation of solid waste	470 TPD
Processing and treatment of solid waste	470 TPD
Gap in processing and treatment of solid waste	NIL

Details of case registered and amount of fines collected for dumping of waste till August, 2020:

Name of ULB	No. of cases registered	Amount of fines collected
Raipur	1004	Rs. 2,26,580

12.5 Domestic Hazardous Waste Management: The domestic hazardous waste is being collected separately in a black bag or in separate compartment in the tricycles/ mini tippers. Then the domestic hazardous waste is stored temporarily in the SLRM Centres of the ULBs and handed over to the authorized agency for its proper disposal as per CPCB guidelines. In this polluted river stretch, total 335 kg per day of domestic hazardous waste is generated which is collected by the municipal authorities regularly.

Present generation of domestic hazardous waste	335 Kg/day
Collection of domestic hazardous waste	335 Kg/day
Gap in domestic hazardous waste collection	NIL

12.6 Industrial Hazardous Waste Management: In Raipur region, there are mainly sponge iron plants, power plants, mini steel plants (induction furnaces), ferro alloys plants and rolling mills. From these industries, mainly spent oil / used oil, empty containers / drums containing chemicals are generated as hazardous waste. Spent oil / used oil and empty containers / drums are being sold to registered re-cyclers. There are hazardous waste re-cycling / re-processing units (metal recovery) such as aluminium dross, lead acid battery, zinc ash / dross etc. The residue left after metal recovery is being stored within the premises in safe manner. There are some galvanizing units generating ETP sludge as hazardous waste. This ETP sludge is being used in cement manufacturing. Presently, Land fillable Hazardous Waste generated from the industries is being stored within the premises in safe manner. CSIDC Limited is in the process of development

of common TSDF in Raipur District for disposal of Hazardous Waste of the State.

12.7 Biomedical Waste Management: A 2,000 kg/day capacity common bio-medical waste treatment and disposal facility is operational in Siltara, Raipur. This facility comprises of incinerator (capacity 02 tonne per day), autoclave and shredder.

12.8 Construction & Demolition Waste: In this polluted river stretch, total 77.5 tonnes per day of construction and demolition waste is generated which is collected and primarily processed by the municipal authorities regularly.

Present generation of construction and demolition waste	77.5 TPD
Collection and processing of construction and demolition waste	77.5 TPD
Gap in processing of construction and demolition waste	NIL

12.9 Rain water harvesting: The status of installation and action plan for completion of remaining rain water harvesting structure is as follows:

Progress by UAD				
ULB Name	**Target**	**Completed**	**In progress**	**Time line**
Raipur	9586	4500	5086	Dec-21

Progress by Industry Department				
Name of the District	**Target**	**Completed**	**In progress**	**Time line**
Raipur	174	174	-	-

13. GROUND WATER QUALITY MONITORING

Ground water sample quality collected in April 2019 in Raipur area is as follows:-

Table No. 11

Parameter / **Sampling Point**	**pH**	**Suspended Solid (mg/l)**	**COD (mg/l)**	**Total Hardness (mg/l)**	**Chloride (mg/l)**
Borewell water in premises of M/s	7.8	36	8.2	166	48

Prakriti Industry Rawanbhata Raipur					

Heavy metal analysis result of ground water samples collected in August, 2020 in Raipur area is attached as **Annexure – 4.**

14. RIVER KHAROON REJUVENATION PLAN

14.1 Action Plan for management of sewage: The sewage generated in dry weather conditions are assessed at about 22 locations. Supply of water from Raipur Municipal Corporation is 200 MLD and 20 MLD from ground water source. Additional 14 MLD water supply is from adjoining Birgaon Municipal Corporation and 12 MLD water supplied by CSIDC in the industrial area. Hence, total supply of water is about 246 MLD.Dry weather sewage flow observed at the proposed treatment sites totalling about 164 MLD. The sewage treatment system has been planned for 206 MLD.

14.2 Action Plan for management of industrial effluents: All the water polluting industries in the catchment area of this polluted river stretch have their captive ETPs. Action against defaulting industries discharging untreated effluent outside the premises is being conducted by CECB regularly.

14.3 Action Plan for management of utilization of treated sewage: Treated sewage will be utilized for irrigation or agricultural or industrial cooling or construction activities purposes once the STPs become operational. Treated water channel may also linked with irrigation network in order to reduce ground water consumption for irrigation uses.

14.4 Action Plan for management of solid waste: The Chhattisgarh State has implemented the SWM Rules, 2016 by adopting Mission Clean City Model in 164 ULBs and Integrated waste management facility model in 2 ULBs of the State. Mission Clean City (MCC) is derived from Ambikapur model, which is a low cost, sustainable, decentralized model based on extensive segregation and recycling. The proper implementation of this mission clean city model will be carried out. Also Urban Administration and

Development Department, Government of Chhattisgarh has proposed action plan for prohibition of disposal of municipal solid waste and plastic waste in river as well as in municipal drains and levy of fine in case found violation.

14.5 Action Plan for management of Flood Plain Zone (FPZ): Forest department should identify/demarcate Flood Plain Zone and regulate the activities of plantation in Flood Plain Zone (FPZ) and notification of the Flood Plain Zones.

14.6 Action plan for management of Environmental Flow (E-flow): State Water Resource department will measure the flow and maintain the Environmental Flow (E-flow) as and when required.

15. MONITORING OF THE ACTION PLANS

In compliance of the order dated 20/09/2018 of Hon'ble National Green Tribunal, Principal Bench, New Delhi, Government of Chhattisgarh, Department of Housing and Environment has constituted a committee known as "River Rejuvenation Committee" (RRC) on 22/11/2018 under the Chairmanship of Secretary/Officer on Special Duty, Department of Housing and Environment for preparation of Action Plan for execution, monitoring and development of requisite infrastructure for management of municipal sewage and industrial effluent for rejuvenation of polluted river stretches in Chhattisgarh. The RRC will function under the overall supervision and co-ordination of Principal Secretary, Department of Housing and Environment.

16. ACTION PLAN

ACTION PLAN FOR MANAGEMENT OF SEWAGE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Construction of four numbers Sewage Treatment Plants of total capacity 206 MLD for treatment of sewage of Raipur town as follows:- a. 75 MLD at Chandandih b. 35 MLD at Kara c. 90 MLD at Nimora d. 06 MLD at Bhatagaon	State Government / Nagar Nigam, Raipur	240.63 Cr.	30/06/2021
ACTION PLAN FOR MANAGEMENT OF INDUSTRIAL EFFLUENTS				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Action against defaulting industries discharging untreated effluent outside the premises.	CECB	–	Immediate

ACTION PLAN FOR MANAGEMENT OF UTILIZATION OF TREATED SEWAGE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Reuse of treated effluent for various purposes i.e. plantation, reuse for industrial purposes, Agriculture etc.	State Government / Nagar Nigam, Raipur	–	30/06/2021
ACTION PLAN FOR MANAGEMENT OF SOLID WASTE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Prohibition of disposal of municipal solid waste and plastic waste in river as well as in municipal drains and levy of fine in case found violation.	Nagar Nigam, Raipur	–	Immediate / Regularly
ACTION PLAN FOR MANAGEMENT OF FLOOD PLAIN ZONE (FPZ)				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Plantation in flood zone in available spaces.	Forest Department / Nagar Nigam, Raipur	–	Next Monson Season

ACTION PLAN FOR MANAGEMENT OF ENVIRONMENTAL FLOW (E-FLOW)				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Measurement of flow of river and records maintained.	State Water Resource Department	–	Regularly
2.	Requirement of E-flow in the river must be maintained.	State Water Resource Department	–	As per requirement
OTHER ACTION POINTS				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Cleaning of drains before monsoon.	Nagar Nigam, Raipur	–	Immediate
2.	In-Situ Bio-Remediation of Drains.	Nagar Nigam, Raipur	Budget will be provided under 15th Finance Commission	31/12/2020
3.	To ensure rain water harvesting by the industrial, commercial and other institutions to promote ground water recharging.	Industry Department / CECB / Nagar Nigam, Raipur	–	31/12/2021
4.	Collection of information on irrigation water used per hectare	Agriculture Department	–	Regularly

	for different crops by Agriculture Department and evaluate whether use of Irrigation water per hectare has decreased or not? Based on the data obtained techniques like drip irrigation etc. should be promoted.			
5.	Adoption of good irrigation practices (Adoption of micro irrigation schemes which result in more crop per drop as per the available resources)	State Water Resource Department	–	It is a continuous process and no time target can be fixed. Work is done as per allocation.

ANNEXURES

Annexure – 1

List of industries having ETP installed, performance of captive ETP's and details of utilization of treated effluent

S.No	Name and Address of the industry	Nature of Industry	Quantity of Water Utilized (KLD)		Quantity of generated raw effluent (KLD)		Effluent treatment facility		Quality of the treated industrial effluent	Quantity (KLD) and method of the recycle/reuse of treated industrial effluent	Status of zero discharge of industrial effluent into the river Yes/No	Remark
			Industrial	Domestic	Industrial	Domestic	Industrial	Domestic				
1	M/s Sachdev Food Products Village- Borjhara, Urla, District – Raipur (C.G.)	Rice Mill	42.0	3.5	17.0	2.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle/Reuse-17.0	Yes	-
2	M/s Shanti Parboiling Industries G.E. Road, Tatibandh, District - Raipur (C.G.)	Rice Mill	30.0	3.0	12.0	2.4	NO	Septic Tank / Soak Pit	Complying With the prescribed standards	-	Yes	Direction for closure issued dated 21.06.2017
3	M/s Anuj Rice Mills PrivateLimited , Urla Industrial Area Urla, Raipur (C.G.)	Rice Mill	50.0	3.0	20.0	2.4	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for closure/disconnection of electricity supply issued dated 30.06.2017
4	M/s Diamond Wire PrivateLimited (Formerly Name-Platinum Wire) Plot No. 293 Part, Sector C, Urla,	Galvanizing unit	1.0	0.4	0.5	0.3	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-0.5	Yes	At present unit closed

	District-Raipur (C.G.)											
5	M/s Iswar Paper Mill, 248/11, Nahar Road, Ring Road no.-2, Godwara, District-Raipur (C.G.)	Paper Mill	8.5	0.7	3.5	0.6	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-3.5	Yes	-
6	M/s Progressive Exim Limited, Plot no.-952, 953, Sector D, Urla, Sarora, District-Raipur (C.G.)	Solvent Plant	5.0	0.7	2.0	0.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-2.0	Yes	-
7	M/s Rukmani Electrical Components PrivateLimited, Unit-2, Urla, District-Raipur (C.G.)	Galvanizing unit	1.5	0.8	0.5	0.7	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-0.5	Yes	-
8	M/s Chetan Industries Sarora Road, Urla, District-Raipur (C.G.)	Galvanizing unit	2.0	1.0	1.0	0.9	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-1.0	Yes	-
9	M/s Progressive Exim Limited, Unit-2, Industrial Area Urla Sarora, District-Raipur (C.G.)	Solvent Unit	5.0	0.6	2.0	0.5	Neutralisation/ Settling Tank	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-2.0	Yes	-
10	M/s Lahari Laminates PrivateLimited, Hirapur Jarway, Tendua, Tatiband, District-Raipur (C.G.)	Lamination of Plywood	1.0	0.8	0.5	0.7	Neutralisation/ Settling Tank	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-0.5	Yes	-
11	M/s Jyoti Structures Limited Plot No-1037/1046 Sarora, Ring Road Urla Ind Complex, District-Raipur (C.G.)	Galvanizing unit	2.5	1.1	1.0	1.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-1.0	Yes	At present unit closed
12	M/s Paras Vanaspati PrivateLimited, Industrial Area Urla, District-Raipur (C.G.)	Solvent unit	6.0	0.8	2.5	0.7	Neutralisation/ Settling Tank	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-2.5	Yes	-
13	M/s R R Ispat (A Unit of Godwari	Galvanizing unit	2.5	1.2	1.0	1.1	ETP	Septic Tank /	Complying With the	Recycle / Reuse-	Yes	-

	Power and Ispat Limited), Plot No. 490/1 Urla I/A Raipur (C.G.)							Soak Pit	prescribed standards	1.0		
14	M/s Real Ispat & Power Limited Village- Borjhara, Post- Urla, Bendri Road, Raipur(C.G.)	Galvanizing unit	2.0	1.3	1.0	1.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 1.0	Yes	-
15	M/s Shri Ashutosh Engineering Industries Unit II, New Pathradih, Urla, District –Raipur (C.G.)	Galvanizing unit	1.5	1.0	0.5	0.9	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 0.5	Yes	-
16	M/s Unique Structures & Towers Limited, Industrial Area, Urla, District-Raipur (C.G.)	Galvanizing unit	1.0	0.8	0.5	0.7	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 0.5	Yes	-
17	M/s Uniworth Limited (Dyeing Division) 923, 945 Urla Groth Center, Urla Industrial Estate Post - Sarora Sector - D Urla Raipur (C.G.)	Dyeing unit	12.0	2.0	5.0	1.9	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	At present unit closed
18	M/s Barbarik Tie up Private Limited Village-Bendri, District-Raipur (C.G.)	Galvanizing unit	1.0	0.8	0.5	0.7	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 0.5	Yes	-
19	M/s RSPL. Limited Plot No.- 31-37, Kanhera Road, Village-Achholi, District-Raipur (C.G.)	Detergent unit	2.0	1.0	1.0	0.9	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 1.0	Yes	-
20	M/s. Jai Shadani Industries Plot No.- 161-A & 159-A,Industrial Area Urla,District- Raipur (C.G.)	Galvanizing unit	1.0	0.4	0.5	0.3	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 0.5	Yes	-
21	M/s. Krishna Iron Strips and Tubes	Galvanizing unit	1.5	1.0	0.5	0.9	ETP	Septic Tank /	Complying With the	Recycle / Reuse-	Yes	-

	PrivateLimitedPlot No.- 821/A, Urla Industrial Area, District-Raipur(C.G.)							Soak Pit	prescribed standards	0.5		
22	M/s Vandana Udyog Limited Plot- 281, Sector- C, Industrial Area Urla, District - Raipur(C.G.)	Galvanizing unit	5.0	2.0	2.0	1.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 2.0	Yes	-
23	M/s Goyanka Rockwool(India) PrivateLimited Ring road No.2, Sondongari, District - Raipur(C.G.)	Rock Wool Insulation	16.0	2.0	6.5	1.5	Setlling Cum Neautrilization Tank	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 6.5	Yes	-
24	M/s EMC Tower Limited Village – Bendri, Block – Dharsiwa, District - Raipur(C.G.)	Galvanizing unit	5.0	2.0	2.0	1.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 2.0	Yes	-
25	M/s Laxmi Kripa Ispat Private Limited Industrial Area Urla, District - Raipur(C.G.)	Galvanizing unit	12.0	2.0	5.0	1.9	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
26	M/s Honey Wires Electroplaters Village – Sarora, Industrial Area Urla, District - Raipur(C.G.)	Galvanizing unit & Fabricating Unit	-	1.0	-	0.8	-	Septic Tank / Soak Pit	Complying With the prescribed standards	-	Yes	At Present Galvanizing Unit is closed

Annexure – 2

Physico-chemical characteristics of the drainage water for all nallahs along with sub nallahs

S. no	Sampling Spot	NH3-N (mg/l)	BOD (mg/l)	COD (mg/l)	Cl (mg/l)	DO (mg/l)	O&G (mg/l)	Alkalinity (mg/l)	pH	SO_4 (mg/l)	TSS(mg/l)	TDS(mg/l)
1	River Upstream	3.08	4.60	12.48	13.50	4.5	< 4	90.20	7.99 at 25°C	2.59	< 10	124
2	Mundra Nala	2.52	7.84	19.60	19.28	3.2	<4	127.60	7.72 at 25°C	8.81	<10	208
3	Nala No 12B	3.36	11.80	27.44	71.35	3.4	<4	308	7.58 at 27°C	20.73	<10	544
4	Nala No 13	3.92	44.00	138.72	139.81	3.1	<4	424.60	7.35 at 25°C	12.96	162	814
5	Nala No 14	3.36	27.00	93.84	48.21	3.6	<4	198	6.97 at 25°C	9.59	<10	348
6	Nala No 15	4.20	12.46	37.44	80.03	3.2	<4	294.8	7.30 at 25°C	14.51	<10	588
7	Nala No 16	4.20	13.87	33.28	189.95	3.0	<4	275	7.18 at 25°C	11.92	18	810
8	Nala No 3B	2.52	51.42	126.ss48	183.20	3.6	<4	222.8	7.21at 25°C	32.39	50	794
9	Nala No 1A	4.20	27.85	66.56	306.63	3.2	<4	231	7.22 at 25°C	81.63	28	1304
10	Nala No 3BA	4.20	4.40	16.64	366.41	3.4	<4	180.40	6.91at 25°C	23.32	28	842
11	Nala No 1B	2.52	25.84	77.52	260.34	3.5	<4	517	7.61at 25°C	38.87	<10	1598
12	Nala No 17	4.20	284.61	928	212.13	3.1	<4	365.2	7.33 at 25°C	67.38	12	1192
13	Nala No 3A	5.04	4.00	20.8	115.71	3.8	<4	237.8	7.18 at 25°C	33.69	<10	830
14	River Downstream	6.44	14.66	44.00	202.49	4.1	<4	165	6.78 at 25°C	20.99	<10	518
15	13 B	11.76	42.66	128.00	120.53	3.2	<4	391.6	7.20 at 25°C	19.44	80	736
16	14B	7.00	76.00	228.00	101.24	3.4	<4	345.4	7.00 at 25°C	17.49	<10	644
17	15B	4.20	216	544.00	81.96	3.5	<4	330	7.05 at 25°C	9.72	<10	596
18	Nala No 8	14.52	5.56	16.64	134.99	3.5	<4	387.2	7.31at 25°C	76.33	<10	788
19	Nala No 7	4.20	18.00	56.00	149.46	3.6	<4	380.6	7.61 at 25°C	15.29	32	824
20	Nala No 6	14.56	34.00	92.00	96.42	3.4	<4	297	7.06 at 25°C	16.33	<10	562
21	Nala No 4	2.52	12.48	37.44	91.60	3.5	<4	299.2	7.22 at 25°C	10.37	<10	590
22	Nala No 2	4.76	16.00	36.00	101.24	3.4	<4	286	7.11 at 25°C	17.10	<10	592
23	Nala No 5	2.40	20.00	48.00	144.64	3.2	<4	233.2	7.07 at 25°C	13.47	80	506

Annexure – 3

Heavy metal analysis of nallas

S.No.	Characteristics	Arsenic (AS)	Cadmium (Cd)	Murcury (Hg)	Zinc (Zn)	Chromium (Cr)	Lead (Pb)	Nickel (Ni)	Iron (Fe)	Copper (Cu)	Fluoride (F)
	Unit	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**
	Sample Collected from										
1.	Kara Nala, Near Shri Sita Ispat, Raipur	N.D.	N.D.	N.D.	0.04	N.D.	N.D.	N.D.	0.13	2.4	–
2.	Chokara Nala Munrethi, Raipur	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.16	1.4	–
3.	Chingri Nala, Bhatagaon Raipur	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.09	1.8	–
4.	Wonderland Nala, Beside Indraprasth Colony, Raipur	N.D.	N.D.	N.D.	0.07	N.D.	N.D.	N.D.	0.10	2.0	–
5.	Koliyari Nala, Raipur	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.11	2.4	–

N.D. – Not Detected.

Annexure – 4

Heavy metal analysis result of ground water samples collected in August, 2020 in Raipur area

S.No.	Characteristics	Arsenic (AS)	Cadmium (Cd)	Murcury (Hg)	Zinc (Zn)	Chromium (Cr)	Lead (Pb)	Nickel (Ni)	Iron (Fe)	Copper (Cu)	Fluoride (F)
	Unit	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**
	Sample Collected from										
1.	Borewell water, Primary School, Kara	N.D.	N.D.	N.D.	N.D.	N.D.	0.02	N.D.	0.09	2.6	–
2.	Handpump water near temple, Village – Munrethi, Raipur	N.D.	N.D.	N.D.	N.D.	N.D.	0.04	N.D.	0.06	1.9	–
3.	Borewell water, Indraprasth colony, Raipur	N.D.	N.D.	N.D.	N.D.	N.D.	0.01	N.D.	0.07	3.6.	–

N.D. – Not Detected

REVISED ACTION PLAN FOR THE REJUVENATION OF POLLUTED RIVER STRETCH OF RIVER MAHANADI

(SIHAWA TO AARANG)

PRIORITY – IV

APPROVED BY:

RIVER REJUVENATION COMMITTEE, CHHATTISGARH

(Constituted in compliance of order of the Hon'ble National Green Tribunal)

SUBMITTED TO:

CENTRAL POLLUTION CONTROL BOARD, DELHI

TABLE OF CONTENT

S.No.	Content	Page No.
1.	Executive Summary	03
2.	Introduction	05
3.	Achievable Targets as per Hon'ble NGT Directions	07
4.	Water Quality Reports for the Year 2016-2019	07
5.	Identified Polluted River Stretches in the State	09
6.	Action Plan For Restoration of Polluted River Stretches Of River Mahanadi (Priority-IV)	11
7.	Major Towns And Industries in The Catchment of River Mahanadi	11
8.	Major Drains Contributing Pollution into River Mahanadi	13
9.	Latest Water Quality Characteristics of River Mahanadi	13
10.	Identification of Sources of Pollution	14
11.	Components of Action Plan	14
12.	Detailed Gap Analysis	15
13.	Ground Water Quality Monitoring	20
14.	River Mahanadi Rejuvenation Plan	20
15.	Monitoring of the Action Plans	21
16.	Action Plan	22

1. EXECUTIVE SUMMARY

The Mahanadi is one of the major rivers of India, flowing in the east direction and draining into the Bay of Bengal. Among the peninsular rivers, in water potential and flood producing capacity, it ranks second to the Godavari River. Kanker, Dhamtari, Gobra Navapra and Rajim are main towns in this stretch of Mahanadi River.

Kanker Town

Kanker is a Municipal Council and a district head quarter. Kanker town is situated on the National Highway NH-43.Kanker town lies between Chhattisgarh's two largest cities i.e. Raipur and Jagdalpur. According to the 2011 census Kanker town has a population of 37442. Presently all houses dispose their domestic sewage in open channels. These channels are connected with nallas and discharge their sewage in these nallas. Finally these nallas dispose their sewage in Dudh River at different locations. Dudh River passes through middle of town, splitting the town in two parts. The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 4.54 MLD. STP having capacity of 7.7 MLD is proposed considering the future requirement.

Dhamtari Town

Dhamtari is a Municipal Corporation and a district head quarter. According to the 2011 census Dhamtari district has a population of 101677. All houses dispose off their sewage (Through Septic Tank) in various nalas. These nalas are connected to Main Nalas namely PD Nala or Sorid Nala. There is a canal passing at northen side of town. Smaller area above canal disposing sewage in Arjuni nalla. Arjuni nalla flowing Sourten to Northen side. After few km this nalla become dry. PD Nala runs across the town carrying most of the seweage of this town. It serves Industrial Area, Dhamtari Railway Station area, Ghadi Chowk, Balak Chowk, Gole Bazar, Bhairudan Manaklal Nahar, Vivekanand Nagar, Bania Para Itwari Bazar, Brahaman Para, Maratha Para, Rambagh, St. Lahari Nagar, Sundar Ganj, Shitalpara, Hatkeshar, Subhash Nagar, Dak Bungalow, Housing Board Colony, Post Office ward etc. Another nala is Sorid Nala which serves the area of Dani

Tola, Gokulpur, Moat of Maratha Para area, VIP Bazar, Bhatgaon, Sori ward, Jodhapur Ward, Tikrapara, Banspara, Post Office Ward etc. The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 12.35 MLD. STP having capacity of 19.6 MLD is proposed considering the future requirement.

Gobra Nawapara

Gobra Nawapara is a Municipality in district of Raipur, Chhattisgarh. The Gobra Nawapara city is divided into 18 wards. The Gobra Nawapara Municipality has population of 29,315. There are RCC channel drains exist in the town. Presently all houses disposed their domestic sewage in open channel. These channel are connected with RCC rectangular section main trunk line, laid on river bank parallel to river. This drain disposed sewage in Mahanadi River. Ward-1, Ward-2 and ward no 18 are not connected with existing drainage system. These area has little flow and dry out at places hence no need to propose additional sewer line for these area. Area near Shitala Talab are not connected with existing drain. The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 3.59 MLD. STP having capacity of 7.6 MLD is proposed considering the future requirement.

Rajim

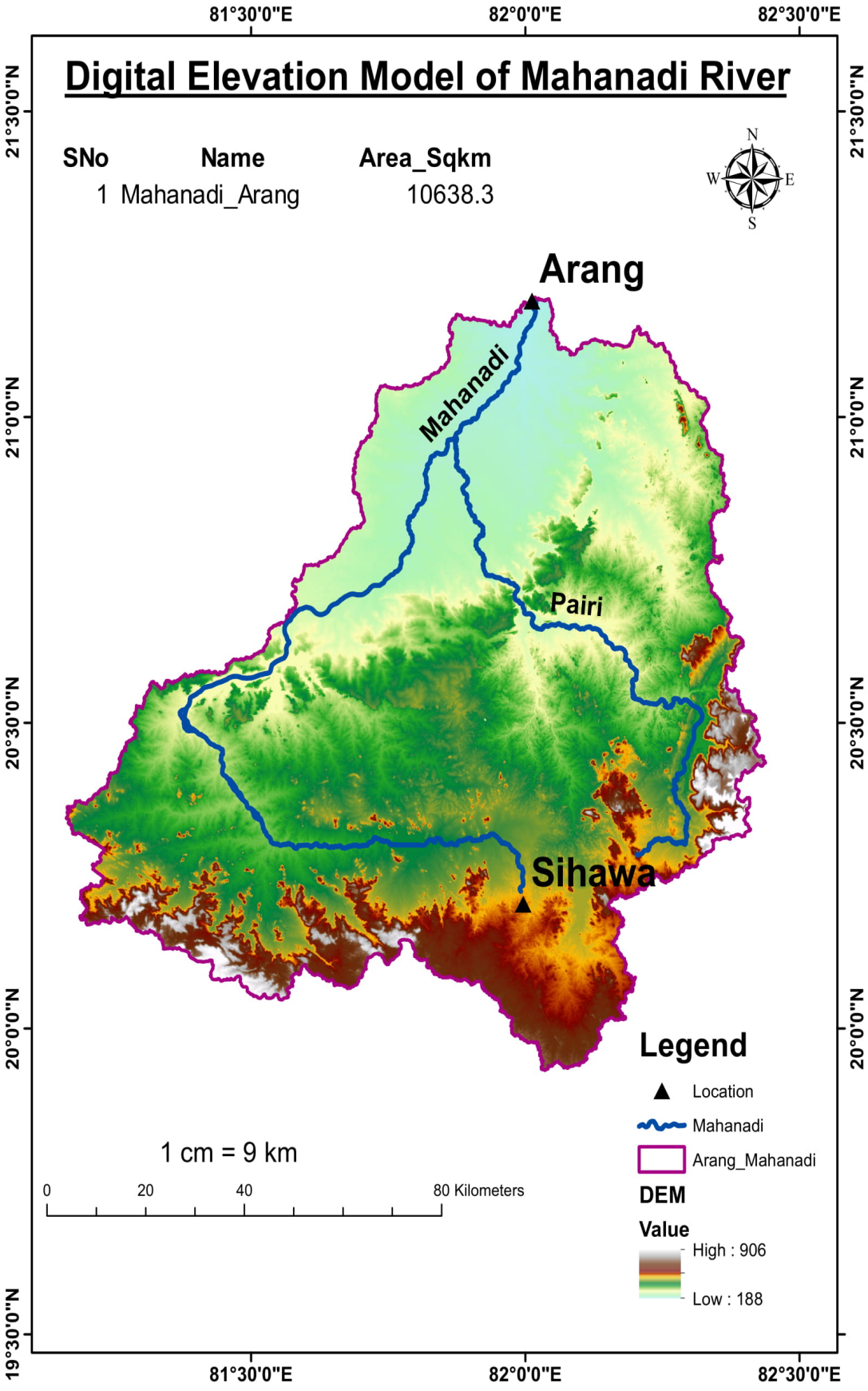
Rajim is a Nagar Panchayat in the district of Gariyaband. The Rajim town is divided into 15 wards. The Rajim Nagar Panchayat has a population of 14,090. There are open RCC/PCC block drain exist in the town. Presently all houses disposed their domestic sewage in open channels.These channels are connected with nallas and discharge their sewage in these nallas. Finaly these nallas disposed their sewage in Mahanadi River at four locations. The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 1.71 MLD. STP having capacity of 2.8 MLD is proposed considering the future requirement.

2. INTRODUCTION

The Mahanadi River basin extends over an area of about 1.42×10^5sqkm upto Kaimundi (delta head) and lies between longitude 80^0 30' - 86^0 50' East and Latitudes 19^0 21' - 23^0 35' North. The basin mainly covers large areas in the states of Chhattisgarh (75,532 sqkm) and Orissa (55,754 sqkm).

The Mahanadi basin is bounded on the north by the Central India hills, on the South-East by Eastern Ghats and on the West by the Mekala range. There are five well defined physical regions in the basin, namely, the northern plateau, the Eastern ghats, the coastal plains, the erosional plains of the central table land and the northern plateau. The northern plateau and Eastern ghats are well forested hilly regions, the coastal plains stretching over the districts of Cuttack and Puri covers the large delta formed by the Mahanadi and is a fertile area well suited for intensive cultivation, the plains of the central table land area is traversed by the Mahanadi and its tributaries.

The Mahanadi River originates near Sihawa, which is near Nagri town in Dhamtari district of Chhattisgarh State. The total length of the river from the source to its outfall into sea is about 851 km, out of which, 357 km is in Chhattisgarh State and the remaining 494 km is in Orissa. Throwing off numerous branches, the Mahanadi falls into the Bay of Bengal. The map of Mahanadi basin is as below.


Digital Elevation Model of Mahanadi River
SNo Name Area_Sqkm
1 Mahanadi_Arang 10638.3
N
W
E
S
Arang
Mahanadi
Pairi
Sihawa
81°30'0"E
82°0'0"E
82°30'0"E
21°30'0"N
21°0'0"N
20°30'0"N
20°0'0"N
19°30'0"N
Legend
Location
Mahanadi
Arang_Mahanadi
DEM
Value
High : 906
Low : 188
1 cm = 9 km
0 20 40 80 Kilometers

3. ACHIEVABLE TARGETS AS PER HON'BLE NGT DIRECTIONS

The main objective of the action plan is to bring polluted river stretches to be fit at-least for bathing purposes (i.e. BOD < 3 mg/l and FC < 500 MPN/100 ml) on or before 30/06/2021.

4. WATER QUALITY REPORTS FOR THE YEAR 2016, 2017, 2018, 2019

The river water quality at different locations is shown below.

Table No. 37

Location	Sihawa		Rudri		Rajim		Aarang	
pH	Min	Max	Min	Max	Min	Max	Min	Max
2016	7.46	7.68	7.4	7.86	5.56	7.84	7.44	7.86
2017	7.42	7.74	7.52	7.74	7.28	7.86	7.46	7.84
2018	7.68	7.76	7.72	7.84	7.66	7.84	7.56	7.67
2019	7.28	7.80	7.23	7.80	7.32	7.82	7.80	7.82

Table No. 38

DO	Sihawa		Rudri		Rajim		Aarang	
mg/L	Min	Max	Min	Max	Min	Max	Min	Max
2016	6.2	6.8	6.5	7.4	6.3	7.8	6.7	7.7
2017	5.4	6.7	6.2	7.6	6.1	7.4	6.8	7.2
2018	5.9	6.6	6.2	7.2	5.6	6.2	5.6	7.2
2019	6.2	6.8	6.5	7.1	5.6	6.6	6.1	6.8

Table No.39

BOD	Sihawa		Rudri		Rajim		Aarang	
mg/L	Min	Max	Min	Max	Min	Max	Min	Max
2016	2.2	2.6	2.2	2.6	1.8	2.8	1.9	2.8
2017	2.1	3.5	2.2	2.4	2.1	2.8	2.4	3.3

Table No. 40

Coliform	Sihawa		Rudri		Rajim		Aarang	
MPN/100ml	Min	Max	Min	Max	Min	Max	Min	Max
2016	90	350	110	500	110	350	110	300
2017	170	300	110	350	110	500	170	350
2018	170	170	210	210	206	240	240	240

River Flow in Polluted River Stretch:

Water Resource Department had prepared standard operating procedures (SOP) for the polluted river stretches for maintaining e-flow in the rivers and the same is being followed. Gate discharge stations have been provided for the measurement of flow in rivers. These stations are operated by Central Water Commission. As per data from Water Resources Department, Government of Chhattisgarh, the flow observed in Mahanadi river during last three years are as follows:-

Table No. 11

River / Location	Month	Flow (in Cumecs)			Daily e-flow (in Cumecs)
		2015-16	2016-17	2017-18	
Mahanadi / Rajim	June	317.612	0.000	0.000	3.176
	July	2266.106	2245.443	2629.931	21.930
	August	165.000	6949.374	2610.211	1.597
	September	4231.504	10218.864	2988.943	42.315
	October	0.000	6765.185	2525.077	0.000
	November	0.000	383.190	0.000	0.000
	December	0.000	0.000	0.000	0.000
	January	0.000	0.000	0.000	0.000
	February	0.000	0.000	0.000	0.000
	March	0.000	0.000	0.000	0.000
	April	0.000	0.000	0.000	0.000
	May	0.000	0.000	0.000	0.000

5. IDENTIFIED POLLUTED RIVER STRETCHES IN THE STATE

Central Pollution Control Board has identified polluted river stretches state wise and priority wise. On the basis of water quality data under National Water Quality Monitoring Programme for the year 2016 and 2017 following river stretches of Chhattisgarh have been identified as polluted stretches:-

River stretches have been categorized in five priority classes based on BOD concentration. River stretches having BOD between 6 to 10 mg/l have been kept under category “IV”. Similarly river stretches having BOD between 3 to 5 mg/l have been kept under category “V”.

Table No. 06

River Name	River Stretch	BOD Range/Max Value (mg/l)	Priority	Towns situated across the stretches	Approx length of the stretch (in km)
Hasdeo	Korba to Urga	3.6 – 7.0	IV	Korba	20
Kharoon	Bundari to Raipur	3.3 – 7.2	IV	Raipur	20
Mahanadi	Arrang to Sihawa	3.3 – 8.0	IV	Kanker, Dhamtari, Nawapara, Rajim	70
Seonath	Simga to Bemta	3.4 – 8.4	IV	Simga	10
Kelo	Raigarh to Kanaktora	3.8	V	Raigarh	15

Note:- 1. River stretches have been categorized in five priority classes based on BOD concentration. River stretches having BOD between 6 to 10 mg/l have been kept under category “IV”. Similarly river stretches having BOD between 3 to 5 mg/l have been kept under category “V”.

2. The polluting stretches as defined by CPCB in their document titled “River Stretches for Restoration of Water Quality” needs review on account of improper description of location. In fact the polluted stretches of these rivers are as below:-

Table No. 07

Polluted Stretches of Rivers

River Name	River Stretch
Kharoon	Bhatagaon to Bendari
Mahanadi	Sihawa to Arrang
Seonath	Bemta to Simga

6. ACTION PLAN FOR RESTORATION OF POLLUTED RIVER STRETCHES OF RIVER MAHANADI (PRIORITY-IV)

The Biochemical Oxygen Demand (BOD) is one of the most common measures of pollutant organic material in water. BOD indicates the amount of permissible organic matter present in water. As per the water analysis report on Mahanadi River, it states that the organic pollution measured in terms of BOD varying on different points or sources. There are no major polluting industries that discharge effluents to cause serious contamination. Therefore, the main source of pollution is due to domestic waste and municipal sewage which is being dumped and flows into the nallahs & river. All sorts of waste and untreated sewage are released randomly into the Mahanadi River in absence of a sewage treatment facility. It is an important aspect for revival of River Mahanadi in context of its utility as it is an important Perennial River. Under the present status, it appears that River Mahanadi may serve the purpose of drinking, bathing and irrigation and for this objective, municipal sewage generated should be treated properly.

7. MAJOR TOWNS AND INDUSTRIES IN THE CATCHMENT OF RIVER MAHANADI

Kanker Town

Kanker is a Municipal Council and a district head quarter. Presently all houses dispose their domestic sewage in open channels. These channels are connected with nallas and discharge their sewage in these nallas. Finally these nallas dispose their sewage in Dudh River at different locations. The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 4.54 MLD. STP having capacity of 7.7 MLD is proposed considering the future requirement.

Dhamtari Town

Dhamtari is a Municipal Corporation and a district head quarter. According to the 2011 census Dhamtari district has a population of 101677. All houses dispose off their sewage (Through Septic Tank) in various nalas. These nalas are connected to Main Nalas namely PD Nala or Sorid Nala. The

water supply in town is 135 litres per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 12.35 MLD. STP having capacity of 19.6 MLD is proposed considering the future requirement.

Gobra Nawapara

Gobra Nawapara is a Municipality in district of Raipur, Chhattisgarh. The Gobra Nawapara city is divided into 18 wards. The Gobra Nawapara Municipality has population of 29,315. There are RCC channel drains exist in the town. Presently all houses disposed their domestic sewage in open channel. These channel are connected with RCC rectangular section main trunk line, laid on river bank parallel to river. This drain disposed sewage in Mahanadi River. Ward-1, Ward-2 and ward no 18 are not connected with existing drainage system. These area has little flow and dry out at places hence no need to propose additional sewer line for these area. Area near Shitala Talab are not connected with existing drain. The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 3.59 MLD. STP having capacity of 7.6 MLD is proposed considering the future requirement.

Rajim

Rajim is a Nagar Panchayat in the district of Gariyaband. The Rajim town is divided into 15 wards. The Rajim Nagar Panchayat has a population of 14,090. There are open RCC/PCC block drain exist in the town. Presently all houses disposed their domestic sewage in open channels.These channels are connected with nallas and discharge their sewage in these nallas. Finaly these nallas disposed their sewage in Mahanadi River at four locations. The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 1.71 MLD. STP having capacity of 2.8 MLD is proposed considering the future requirement.

Kanker, Dhamtari, Gobra Nawapra and Rajim are main towns in this stretch of Mahanadi River. No any industrial cluster or medium / major water polluting industries is situated near Kanker town. Therefore no industrial effluent is being discharged into the river near Kanker. List of industries having ETP installed, performance of captive ETP's and details of utilization

of treated effluent in Dhamtari, Gobra Nawapara and Rajim town are shown in **Annexure – 1, Annexure – 2 and Annexure – 3** respectively.

Rice mills are the main industry in Dhamtari, Nawapara and Rajim area. These rice mills are seasonal and generating small quantity of effluent. These operating rice mills have provided ETP and utilize their treated effluent within their premises. No effluent is being discharged outside the premises. CECB has issued closure directions to those rice mills, which had not provided adequate effluent treatment facilities. Therefore, no untreated industrial effluent is being discharged into the River in these areas.

Action Against Non-Complying Industries:-

Industries are complying with the effluent discharge standards. In case of non-compliance with respect to discharge of treated / untreated industrial effluent outside the premises and / or not complying to the discharge standards prescribed, CECB takes appropriate actions against non-complying units either by issuing closure direction or filing of court case against management.

8. MAJOR DRAINS CONTRIBUTING POLLUTION INTO RIVER MAHANADI

The quality of nalla water along with heavy metal analysis in the Kanker, Dhamtari, Gobra Nawapara and Rajim town is attached as **Annexure – 4**.

9. LATEST WATER QUALITY CHARACTERISTICS OF RIVER MAHANADI

The latest water quality characteristic of River Mahanadi for the year 2019 is as below:

Table No. 16
River Mahanadi (Sihawa to Aarang) – P – IV

Monitoring Location		Origin of Mahanadi, Sihawa	Near Gandhi Bridge, Aarang
BOD (mg/l)	Minimum	2.2	3.0
	Maximum	4.0	4.2
Fecal Coliform (MPN/100ml)	Minimum	14	10
	Maximum	170	120

10. IDENTIFICATION OF SOURCES OF POLLUTION

Mahanadi River is polluted due to discharge of untreated sewage of Kanker, Dhamtari, Nawapara and Rajim town into the river. Various steps like construction of sewage treatment plants, cleaning of drains, plantation in flood plain area, removal of encroachment, In-situ bioremediation of drains, waste management (Solid waste, Hazardous waste, C&D waste, Bio-Medical Waste), maintenance of e-flow, Watershed management, rain water harvesting, adoption of good irrigation practices etc. with definite timelines and the implementing agency with budget estimates are included in action plan.

11. COMPONENTS OF ACTION PLAN

11.1 Channelization, treatment, utilization and disposal of treated domestic sewage:

(a) Identification of towns and villages in the catchment of polluted river stretch and estimation of quantity of sewage generation.

(b) Storm water drains carrying sewage and sullage joining river and interception and diversion of sewage to STPs.

(c) Treatment and disposal of septage and controlling open defecation.

(d) Identification of towns and villages for installing sewerage system and further sewage treatment plants.

11.2 Waste Management:

(a) Collection, segregation, transportation, disposal and treatment of municipal solid wastes generated from town in accordance of provisions of the Solid Waste Management Rules, 2016.

(b) Restriction of illegal disposal of solid waste along the river bank and flood plain zones.

(c) Burning of solid waste should be strictly prohibited.

(d) Construction and demolition wastes should be disposed in designated areas and no case it should be disposed into river beds or flood plain zone.

11.3 Industrial Pollution Control:

(a) Inventorization of industries.

(b) Category of industry and effluent quality.

(c) Treatment of effluents, compliance with standards and mode of disposal of treated effluents.

11.4 Flood Plain Zone:

(a) Regulating activities in flood plain zone.

(b) Management of Municipal, Plastic, Domestic Hazardous, Hazardous and Bio-medical.

(d) Improve irrigation practices.

11.5 Ecological/Environmental Flow (E-Flow):

(a) Measurement of flow of river.

(b) Requiement of flow of river.

(c) Mainatainance of flow of river.

12. DETAILED GAP ANALYSIS

Detail gap analysis with regard to sewage, industrial effluents, waste (municipal solid waste, domestic hazardous waste, industrial hazardous waste, biomedical waste, plastic waste and construction and demolition waste) waste management is mentioned below:

12.1 Sewage Management:

Kanker Town

The water supply in town is 135 litres per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present

about 4.54 MLD. STP having capacity of 7.8 MLD is proposed considering the future requirement.

Dhamtari Town

The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 12.35 MLD. STP having capacity of 19.6 MLD is proposed considering the future requirement.

Gobra Nawapara

The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 3.59 MLD. STP having capacity of 7.5 MLD is proposed considering the future requirement.

Rajim

The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 1.71 MLD. STP having capacity of 2.8 MLD is proposed considering the future requirement.

Present generation of sewage	Kanker – 4.54 MLD Dhamtari – 12.35 MLD Nawapara – 3.59 MLD Rajim – 1.71 MLD
Capacity of sewage treatment plant	Kanker – 7.8 MLD Dhamtari – 19.6 MLD Nawapara – 7.5 MLD Rajim – 2.8 MLD
Gap in sewage treatment	NIL

12.2 Septage Management: In the State of Chhattisgarh, all the ULBs have Faecal Sludge Treatment Facilities either by Faecal Sludge Treatment Plant or by Co-treatment with STP for the treatment of faecal sludge generated from the household of the ULBs. The ULBs of Kanker, Dhamtari, Gobra Navapara and Rajim have the Faecal Sludge Treatment Plants based on Low cost gravity based decentralized Phytorid Technology for the treatment of black water generated in these ULBs. However, there is

provision of enhance of septage treatment in the proposed STPs of these ULBs. Total fecal sludge generated in this river stretch is 20.3 KLD for which presently there is a capacity of treatment of fecal sludge about 23 KLD. The additional capacity is sufficient to treat the future 15 years period fecal sludge generation.

Current faecal sludge generation	20.3 KLD
Current faecal sludge treatment capacity	23.0 KLD
Gap in current faecal sludge treatment	NIL
Projected faecal sludge generation after 15 years	24 KLD

12.3 Industrial Effluent Management: There are total 131 nos. of water polluting industries are their in this polluted river stretch. From which 1.49 Kilolitres per day effluent is generated. Industries are having their captive effluent treatment arrangements by which the effluent is being treated and treated effluent is being used for different purposes within premises.

Present generation of effluent	Industrial	0.96 MLD
	Domestic	0.53 MLD
Capacity of industrial effluent treatment / processing	Industrial + Domestic	1.49 MLD
Gap in industrial effluent Treatment	Industrial + Domestic	NIL

12.4 Municipal Solid Waste Management: Chhattisgarh State has implemented the SWM Rules, 2016 by adopting Mission Clean City Model in 164 ULBs and Integrated waste management facility model in 2 ULBs of the State. Mission Clean City (MCC) is derived from Ambikapur model, which is a low cost, sustainable, decentralized model based on extensive segregation and recycling. It is combined with the benefits of citizen participation and urban livelihood promotion by involving business entities like women SHGs. Involvement of local citizens and Self-Help Groups (SHGs) has helped in 100% source segregation, and 100% door-to-door collection of segregated waste. The segregated waste is brought to the Garbage clinics (SLRM-Solid Liquid Resource Management Centres) using partitioned containers mounted on Tricycles, E-Rickshaws and Mini Tippers for secondary and tertiary segregation. The recyclable inorganic waste is

segregated into various categories and sold to the authorized recyclers. The non-recyclable combustible waste is stored separately to be transported either to cement plants, power plants, Waste to Energy plants or other industries as Alternate Fuel and Raw material (AFR). The organic waste is manually sorted to recover certain resources such as egg shells, orange peels etc. which are processed into useful products. The organic waste is further fed to animals and the remaining waste goes to compost shed for composting. In this polluted river stretch, total 15 tonnes per day of municipal solid waste is generated which is processed/ treated by Mission Clean City Model.

Present generation of solid waste	15 TPD
Processing and treatment of solid waste	15 TPD
Gap in processing and treatment of solid waste	NIL

Details of case registered and amount of fines collected for dumping of waste till August, 2020:

Name of ULB	No. of cases registered	Amount of fines collected
Kanker	322	Rs. 89,130
Dhamtari	213	Rs. 70,700
Gobra Nawapara	82	Rs. 82,320
Rajim	41	Rs. 15,290

12.5 Domestic Hazardous Waste Management: The domestic hazardous waste is being collected separately in a black bag or in separate compartment in the tricycles/ mini tippers. Then the domestic hazardous waste is stored temporarily in the SLRM Centres of the ULBs and handed over to the authorized agency for its proper disposal as per CPCB guidelines. In this polluted river stretch, total 12 kg per day of domestic hazardous waste is generated which is collected by the municipal authorities regularly.

Present generation of domestic hazardous waste	12 Kg/day
Collection of domestic hazardous waste	12 Kg/day
Gap in domestic hazardous waste collection	NIL

12.6 Industrial Hazardous Waste Management: There is no major hazardous waste generating unit situated in these areas.

12.7 Biomedical Waste Management: Bio medical waste is being treated and disposed by deep burial method.

12.8 Construction & Demolition Waste: In this polluted river stretch, total 2.0 tonnes per day of construction and demolition waste is generated which is collected and primarily processed by the municipal authorities regularly.

Present generation of construction and demolition waste	2.00 TPD
Collection and processing of construction and demolition waste	2.00 TPD
Gap in processing of construction and demolition waste	NIL

12.9 Removal of Encroachment: There is 01 encroachment has been identified by the local body of Kanker in this stretch which has been removed.

Encroachments identified	01
Encroachments removed	01
Encroachments to be removed	NIL

12.10 Rain water harvesting: The status of installation and action plan for completion of remaining rain water harvesting structure is as follows:

Progress by UAD				
ULB Name	**Target**	**Completed**	**In progress**	**Time line**
Dhamtari	1104	1019	85	Mar-21
Kanker	108	88	20	Mar-21
Rajim	148	106	42	Mar-21
Gobra Navapara	98	78	20	Mar-21

Progress by Industry Department				
Name of the District	**Target**	**Completed**	**In progress**	**Time line**
Dhamtari	21	21	-	-
Kanker	22	22	-	-

13. GROUNDWATER QUALITY MONITORING

Ground water quality in catchment area for the samples collected on August, 2020 with heavy metal analysis is attached as **Annexure – 5.**

14. RIVER MAHANADI REJUVENATION PLAN

14.1 Action Plan for management of sewage:

Kanker Town

Total sewage generation is estimated at present about 4.54 MLD. STP having capacity of 7.7 MLD is proposed considering the future requirement.

Dhamtari Town

Total sewage generation is estimated at present about 12.35 MLD. STP having capacity of 19.6 MLD is proposed considering the future requirement.

Gobra Nawapara

Total sewage generation is estimated at present about 3.59 MLD. STP having capacity of 7.6 MLD is proposed considering the future requirement.

Rajim

Total sewage generation is estimated at present about 1.71 MLD. STP having capacity of 2.8 MLD is proposed considering the future requirement.

14.2 Action Plan for management of industrial effluents: All the water polluting industries in the catchment area of this polluted river stretch have their captive ETPs. Action against defaulting industries discharging untreated effluent outside the premises is being conducted by CECB regularly.

14.3 Action Plan for management of utilization of treated sewage: Treated sewage will be utilized for irrigation or agricultural or industrial cooling or construction activities purposes once the STPs become operational. Treated water channel may also linked with irrigation network in order to reduce ground water consumption for irrigation uses.

14.4 Action Plan for management of solid waste: The Chhattisgarh State has implemented the SWM Rules, 2016 by adopting Mission Clean City Model in 164 ULBs and Integrated waste management facility model in 2 ULBs of the State. Mission Clean City (MCC) is derived from Ambikapur model, which is a low cost, sustainable, decentralized model based on extensive segregation and recycling. The proper implementation of this mission clean city model will be carried out. Also Urban Administration and Development Department, Government of Chhattisgarh has proposed action plan for prohibition of disposal of municipal solid waste and plastic waste in river as well as in municipal drains and levy of fine in case found violation.

14.5 Action Plan for management of Flood Plain Zone (FPZ): Forest department should identify/demarcate Flood Plain Zone and regulate the activities of plantation in Flood Plain Zone (FPZ) and notification of the Flood Plain Zones.

14.6 Action plan for management of Environmental Flow (E-flow): State Water Resource department will measure the flow and maintain the Environmental Flow (E-flow) as and when required.

15. MONITORING OF THE ACTION PLANS

In compliance of the order dated 20/09/2018 of Hon'ble National Green Tribunal, Principal Bench, New Delhi, Government of Chhattisgarh, Department of Housing and Environment has constituted a committee known as "River Rejuvenation Committee" (RRC) on 22/11/2018 under the Chairmanship of Secretary/Officer on Special Duty, Department of Housing and Environment for preparation of Action Plan for execution, monitoring and development of requisite infrastructure for management of municipal sewage and industrial effluent for rejuvenation of polluted river stretches in Chhattisgarh. The RRC will function under the overall supervision and co-ordination of Principal Secretary, Department of Housing and Environment.

16. ACTION PLAN

ACTION PLAN FOR MANAGEMENT OF SEWAGE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Construction of Sewage Treatment Plants at Kanker, Dhamtari, Gobra Navapra and Rajim towns of capacity 7.7 MLD, 19.6 MLD, 7.6 MLD and 2.8 MLD respectively for treatment of sewage.	Concerned local body	Kanker – 19.88 Cr. Dhamtari – 29.78 Cr. Gobra Navapara – 13.87 Cr. Rajim – 12.37 Cr.	30/06/2023 (i.e. 3 years after approval of DPR from State Finance Dept.)
ACTION PLAN FOR MANAGEMENT OF INDUSTRIAL EFFLUENTS				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Action against defaulting industries discharging untreated effluent outside the premises.	CECB	–	Immediate

ACTION PLAN FOR MANAGEMENT OF UTILIZATION OF TREATED SEWAGE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Reuse of treated effluent for various purposes i.e. plantation, reuse for industrial purposes, Agriculture etc.	Concerned local body	–	30/06/2023
ACTION PLAN FOR MANAGEMENT OF SOLID WASTE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Prohibition of disposal of municipal solid waste and plastic waste in river as well as in municipal drains and levy of fine in case found violation.	Concerned local body	–	Immediate / Regularly
ACTION PLAN FOR MANAGEMENT OF FLOOD PLAIN ZONE (FPZ)				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Plantation in flood zone in available spaces.	Forest Department / local bodies	–	Next Monson Season

ACTION PLAN FOR MANAGEMENT OF ENVIRONMENTAL FLOW (E-FLOW)				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Measurement of flow of river and records maintained.	State Water Resource Department	–	Regularly
2.	Requirement of E-flow in the river must be maintained.	State Water Resource Department	–	As per requirement
OTHER ACTION POINTS				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Cleaning of drains before monsoon.	Concerned local body	–	Immediate
2.	In-Situ Bio-Remediation of Drains.	Concerned local body	Budget will be provided under 15th Finance Commission	31/12/2020
3.	To ensure rain water harvesting by the industrial, commercial and other institutions to promote ground water recharging.	Industry Department / CECB / Concerned local body	–	31/03/2021
4.	Collection of information on irrigation water used per hectare	Agriculture Department	–	Regularly

	for different crops by Agriculture Department and evaluate whether use of Irrigation water per hectare has decreased or not? Based on the data obtained techniques like drip irrigation etc. should be promoted.			
5.	Adoption of good irrigation practices (Adoption of micro irrigation schemes which result in more crop per drop as per the available resources)	State Water Resource Department	–	It is a continuous process and no time target can be fixed. Work is done as per allocation.

ANNEXURES

Annexure – 1

List of industries having ETP installed, performance of captive ETP's and details of utilization of treated effluent in Dhamtari town

S.NO	Name and Address of The Industry	Nature of	Quantity Of water Utilized (KLD)		Quantity Of generated raw effluent (KLD)		Effluent treatment facility (KLD)		Quality of the treated industrial effluent	Quantity (KLD) and method of recycle/ reused of treated industrial effluent	Status of zero discharge of industrial effluent into the river Yes/No	Remark
			Industrial	Domestic	Industrial	Domestic	Industrial	Domestic				
1	M/S Ashirwad Enterprizess, sambalpur, District- Dhamtari (C.G.)	Parboiled Rice Mill	8.0	1.0	3.0	0.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle/ Reuse- 3.0	Yes	-
2	M/S Shri Hariom Dhan Kutai kendara, industrial ward, District- Dhamtari (C.G.)	Parboiled Rice Mill	3.5	0.5	1.5	1.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 1.5	Yes	-
3	M/S Shri Kishan Kanhaiya Rice Industries, Village- Seradabri, District- Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for Closure/ disconnection of electricity supply issued dated 29.05.2017
4	M/S Shree Sai Agrotech, Navagaun Road, Bastar, District- Dhamtari (C.G.)	Parboiled Rice Mill	25.0	2.0	10.0	8.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 10.0	Yes	-
5	M/S Sharda Rice Industries, District- Dhamtari (C.G.)	Parboiled Rice Mill	9.5	1.0	4.0	3.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 4.0	Yes	-

6	M/S Sakhambari Rice Mill, I/A Dhamtari, District-Dhamtari (C.G.)	Parboiled Rice Mill	13.0	1.0	5.0	4.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
7	M/S Shree Balaji I/A Dhamtari, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.0	1.0	5.0	4.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
8	M/S Gopal Industries, District - Dhamtari (C.G.)	Parboiled Rice Mill	13.5	1.0	5.5	4.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.5	Yes	-
9	M/S Om Industries, Sihava Road, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	2.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
10	M/S Meera Rice Industries, Village-Mudipar, District - Dhamtari (C.G.)	Parboiled Rice Mill	26.5	1.0	10.5	8.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-10.5	Yes	-
11	M/S A.K. Rice Industries, Village-Bhoyna, District - Dhamtari (C.G.)	Parboiled Rice Mill	8.5	1.0	3.5	3.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-3.5	Yes	-
12	M/S Shekhar Paddy Industries, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.0	1.5	5.0	4.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
13	M/S Mahaveer Traders, District - Dhamtari (C.G.)	Parboiled Rice Mill	14.5	1.0	6.0	4.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-6.0	Yes	-
14	M/S Vinay Rice Industries, Shihawa Road, Dhamtari, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for Closure/ disconnection of electricity supply issued dated 14.06.2017
15	M/S Agrawal Usana Udyog, District - Dhamtari (C.G.)	Steam Rice Mill	12.0	1.5	5.0	4.0	Neutralisation/ Settling Tank	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	
16	M/S Ram Dayal Chiranjilal, Main Road, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for Closure/ disconnection of electricity supply issued dated

												14.06.2017
17	M/S Pooja (Priya) Industries, Sihava, District - Dhamtari (C.G.)	Parboiled Rice Mill	9.5	0.5	4.0	3.2	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for Closure/ disconnection of electricity supply issued dated 14.06.2017
18	M/S Ashish Industries, Raipur Road, District - Dhamtari (C.G.)	Parboiled Rice Mill	2.5	0.5	1.0	0.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 1.0	Yes	-
19	M/S Indian Rice Mill, District - Dhamtari (C.G.)	Parboiled Rice Mill	6.0	1.0	2.5	2.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 2.5	Yes	-
20	M/S Ajay Rice Products, Village- Sarsopuri, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
21	M/S Chhattisgarh Rice Mill, Samblapur, District - Dhamtari (C.G.)	Parboiled Rice Mill	20.5	2.0	8.0	6.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 8.0	Yes	-
22	M/S Aadeshwar Traderse, Sambalpur, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.0	1.0	5.0	4.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
23	M/S Shree Bajrang Paddy Industries, District - Dhamtari (C.G.)	Parboiled Rice Mill	9.5	1.0	4.0	3.2	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for Closure/ disconnection of electricity supply issued dated 14.06.2017
24	M/S Khandelwal Agro, Industrial Ward, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.0	1.0	5.0	4.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
25	M/S Devshree Industries, Industrial Ward, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.0	1.0	5.0	4.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
26	M/S Gopal Agro Industries, I/A Dhamtari, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.0	1.0	5.0	4.0	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for Closure/ disconnection of electricity supply issued dated 14.06.2017

27	M/S R.L. Agrotech Limited Industrial Ward Dhamtari, District Dhamtari	Parboiled Rice Mill	19.0	2.0	7.5	6.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 7.5	Yes	-
28	M/S Harsh Parboiling Rice Mill, Village- Charmudiya Road, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
29	M/S Tulsi Rice Mill, (Ashish Agrotech) Village- Sambalpur, Raipur Road, District - Dhamtari (C.G.)	Parboiled Rice Mill	11.5	1.0	4.5	3.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 4.5	Yes	-
30	M/S Kushal Agro Industries, Village- Mudpar, Dhamtari, District - Dhamtari (C.G.)	Parboiled Rice Mill	19.0	1.5	7.5	6.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 7.5	Yes	-
31	M/S Kushal Paddy Industries, District - Dhamtari (C.G.)	Parboiled Rice Mill	6.0	0.5	2.5	2.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 2.5	Yes	-
32	M/S Ambika Rice Mill, Shankardaha Road, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.0	1.0	5.0	4.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
33	M/S Dinesh Industries, Haraftrai, District - Dhamtari (C.G.)	Parboiled Rice Mill	6.0	0.5	2.5	2.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 2.5	Yes	-
34	M/s Radheshyam Rice Mill, Chhoti Kareli, Magarlod, District- Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
35	M/s Arihant Usna Udyog Sihawa Road Dhamtari, District- Dhamtari (C.G.)	Parboiled Rice Mill	12.0	1.0	5.0	0.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
36	M/S Mahamaya Foods, Bhothli Road, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	9.5	1.0	4.0	3.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 4.0	Yes	-
37	M/S Maa Chandi Rice Industries, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	19.0	1.5	7.0	6.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 7.0	Yes	-

38	M/S Murti Rice Mill, Charmudiya Road Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.0	1.0	5.0	4.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
39	M/S Jyoti Interprizess, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.0	1.0	5.0	4.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
40	M/S Amrit Agrotech, Charmudiya Road, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
41	M/S Bhagwati Paddy Processing, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	9.5	1.0	4.0	3.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-4.0	Yes	-
42	M/S Anmol Agrotech, Megharoad, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	9.5	1.0	4.0	3.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-4.0	Yes	-
43	M/S Jagdamba Rice Mill, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	1.5	0.5	0.5	0.4	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for closure issued dated 17.06.2017
44	M/S Siddhi Ganesh Rice Industries, Charmudia Road, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	19.0	1.5	7.0	6.4	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for closure issued dated 17.06.2017
45	M/S Maheswari Rice Industries, Village-Kurud, Charmudia Road, District - Dhamtari (C.G.)	Parboiled Rice Mill	4.0	0.5	1.5	1.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-1.5	Yes	-
46	M/S Shree Gurukripa Rice Mill, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for closure issued dated 29.05.2017
47	M/S Murti Agro Industries Rice Mill, Village- Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	15.5	1.5	6.0	5.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-6.0	Yes	-
48	M/S Geetalaxmi Mordern Rice Mill, Village-Sonpur, Kodebod, Kurud District - Dhamtari (C.G.)	Parboiled Rice Mill	89.0	5.0	35.5	30.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-35.5	Yes	-

49	M/S H.P. Agro Industries District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
50	M/S Kabir Rice Mill, Bhothli, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	8.5	1.0	3.5	2.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-3.5	Yes	-
51	M/S Bajaj Agro Industries, Bhothli Road, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	17.0	1.5	7.0	5.6	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-7.0	Yes	-
52	M/S Pratik Rice Industries, Charmudia Road, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	8.5	1.0	3.5	2.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-3.5	Yes	-
53	M/S Kela Rice Industries, Charmudia Road, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
54	M/S Om Traiding Company, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	9.5	1.0	4.0	3.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-4.0	Yes	-
55	M/S Krishna Foods, Village-Mandraud, Tahsil-Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
56	M/S Shree Rice Mill, Charmudiya Road Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
57	M/S Shri Ganpati Rice Mill, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-
58	M/S Shree Balaji Rice Mill, Bhothli Road , Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	
59	M/S Poonam Rice Industries, Bothli Road, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.5	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-5.0	Yes	-

60	M/S Shyam Rice Industries, Village- Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
61	M/S Shri Tirupati Balaji Rice Mill, Village- Bothli Road, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	19.0	2.0	7.5	6.5	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for Closure/ disconnection of electricity supply issued dated 14.06.2017
62	M/S Shivnath Industries, Bhhothli Road, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	8.5	1.0	3.5	2.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 3.5	Yes	-
63	M/S Shri Sai Rice Mill, Bhothli Road, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	24.0	1.5	9.5	8.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 9.5	Yes	-
64	M/S Krishna Paddy Industries, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
65	M/S Shree Laxmi Rice Mill, Dhamtari Road Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	19.0	1.0	7.5	6.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 7.5	Yes	-
66	M/S Jai Chandi Rice Mill, Bhharda, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	8.5	1.0	3.5	2.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 3.5	Yes	-
67	M/S Sidharth Agro Products, Senhabhata Megha Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	4.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
68	M/S Mahaveer Rice Mill, Village - Banjari, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	25.0	1.0	10.0	8.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 4.8	Yes	-
69	M/S Jai Ambey Rice Mill, Kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	3.0	1.0	1.5	0.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 1.5	Yes	-
70	M/S Mangalmurti Agro, village-bhothli, tahsil-kurud, District - Dhamtari (C.G.)	Parboiled Rice Mill	4.0	0.5	1.5	1.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 1.5	Yes	-

71	M/s Saraswati Trading Company, Dhamtari, District- Dhamtari (C.G.)	Parboiled Rice Mill	8.5	1.0	3.5	2.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 3.5	Yes	-
72	M/S Atul Rice Mill, Dhamtari, District - Dhamtari (C.G.)	Parboiled Rice Mill	43.0	2.5	17.0	14.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 17.0	Yes	-
73	M/S Mahalaxmi Chanwal Udyog, Arjuni, District - Dhamtari (C.G.)	Parboiled Rice Mill	19.0	1.5	7.5	6.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 7.5	Yes	-
74	M/S Dhan Laxmi Chanwal Udyog, Village- Arjuni, District - Dhamtari (C.G.)	Parboiled Rice Mill	19.0	1.0	7.5	6.5	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for Closure/ disconnection of electricity supply issued dated 14.06.2017
75	M/S Devshree Agrotech PrivateLimited, Unit-2, Arjuni, District - Dhamtari (C.G.)	Parboiled Rice Mill	9.5	1.0	4.0	3.2	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for Closure/ disconnection of electricity supply issued dated 14.06.2017
76	M/S Vardan rice industries, village -arjuni, District - Dhamtari (C.G.)	Parboiled Rice Mill	12.5	1.0	5.0	0.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
77	M/s P.B.S. Oil Industries Limited Industrial Area Arjuni, Dhamtari, District- Dhamtari (C.G.)	Oil Unit	6.0	2.0	2.5	1.6	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 2.5	Yes	-
78	M/S Savitri Parboiling, Village-Arjuni, District - Dhamtari (C.G.)	Parboiled Rice Mill	7.5	1.0	3.0	2.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 3.0	Yes	-
79	M/S Ashok Paddy Industries, Industrial Ward, Village- Arjuni, District - Dhamtari (C.G.)	Parboiled Rice Mill	8.5	1.0	3.5	3.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 3.5	Yes	-
80	M/S Surya Rice Mill, (Raj Parboiling Unit), Village- Arjuni, District - Dhamtari (C.G.)	Parboiled Rice Mill	6.0	0.5	2.5	0.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 2.5	Yes	-

Annexure – 2

List of industries having ETP installed, performance of captive ETP's and details of utilization of treated effluent in Gobra Navapara town

S.No.	Name and Address of the Industry	Nature Of Industry	Quantity of Water Utilized (KLD)		Quantity of generated raw effluent (KLD)		Effluent treatment facility		Quality of the treated industrial effluent	Quantity (KLD) and method of the Recycle / Reuse of treated industrial effluent	Status of zero discharge of industrial effluent into the river Yes/No	Remark
			Industrial	Domestic	Industrial	Domestic	Industrial	Domestic				
1	M/s Shree Shyamji Rice Mill Nawapara, District - Raipur (C.G.)	Parboiled Rice Mill	9.5	1.0	4.0	0.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 4.0	Yes	-
2	M/s Mohan Foods Village- Nawapara, District - Raipur (C.G.)	Parboiled Rice Mill	3.0	0.5	1.0	0.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 1.0	Yes	-
3	M/s Mahaveer Dhan Prakriya Kendra, Village- Paragaon, District - Raipur (C.G.)	Parboiled Rice Mill	8.0	2.5	3.0	2.0	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for closure/disconnection of electricity supply issued dated 14.06.2017
4	M/s Ujjwal Rice Mill, Village- Paragaon, Nawapara, District – Raipur (C.G.)	Parboiled Rice Mill	13.0	1.5	5.0	1.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
5	M/s Amit Parboiling, Village- Chhata Road ,Nawapara, District – Raipur (C.G.)	Parboiled Rice Mill	6.0	1.0	2.0	0.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 2.0	Yes	-
6	M/s Shri Ram Rice Mill, Village- Nawapara, District – Raipur (C.G.)	Parboiled Rice Mill	1.0	0.5	0.5	0.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 0.5	Yes	-

7	M/s Yash Parboiling Unit, Village- Nawapara, District – Raipur (C.G.)	Parboiled Rice Mill	9.0	1.0	4.0	0.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 4.0	Yes	-
8	M/s Sagri Agro Product PrivateLimited P.H.No. 41, Kh. No. 336, Village- Kurra, Tehsil- Abhanpur, District – Raipur (C.G.)	Parboiled Rice Mill	26.5	3.0	10.5	2.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 10.5	Yes	-
9	M/s Sandeep Paddy Processing Unit Village –Kurra, Post- Patewa, Nawapara, District - Raipur (C.G.)	Parboiled Rice Mill	39.5	3.0	16.0	2.1	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 16.0	Yes	-
10	M/s Madhu Parboiling Industries Bus Stand, Kholipara,Nawapara, District - Raipur (C.G.)	Parboiled Rice Mill	9.5	1.0	4.0	0.8	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for closure/disconnection of electricity supply issued dated 14.06.2017
11	M/s Agrawal Rice Mill Dhamtari Road, Abhanpur, District - Raipur (C.G.)	Parboiled Rice Mill	12.5	1.5	5.0	1.2	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for closure/disconnection of electricity supply issued dated 14.06.2017
12	M/s Kavita & Company Nawapara, District - Raipur (C.G.)	Parboiled Rice Mill	25.0	2.0	10.0	1.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 10.0	Yes	-
13	M/s Bajrang Parboiling Raipur Road, Abhanpur, District - Raipur (C.G.)	Parboiled Rice Mill	15.5	1.5	6.0	1.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 6.0	Yes	-
14	M/s Anant Rice Industries Unit-2 Arang, District – Raipur (C.G.)	Parboiled Rice Mill	21.5	2.0	8.5	1.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 8.5	Yes	-
15	M/s B.S.Parboiling Unit Village-Paragaon, Post- Nawapara, District – Raipur	Parboiled Rice Mill	19.0	2.0	7.5	1.5	ETP	Septic Tank / Soak	Complying With the prescribed	Recycle / Reuse- 7.5	Yes	-

	(C.G.)							Pit	standards			
16	M/s Banke Bihari Rice Mill Village-Kurra, Tehsil- Abhanpur District – Raipur (C.G.)	Parboiled Rice Mill	18.0	1.5	7.0	1.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 7.0	Yes	-
17	M/s Shivam Industries Village –Kurra, Abhanpur, District – Raipur (C.G.)	Parboiled Rice Mill	15.5	1.5	6.0	1.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 6.0	Yes	-
18	M/s Adarsh Rice Mill Village-Jhanki, Tehsil- Abhanpur, District – Raipur (C.G.)	Parboiled Rice Mill	50.5	4.0	20.0	3.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 20.0	Yes	-
19	M/s R.S. Rice Industries P.H.No. 161, Kh.No. 553/4-5 Village- Gobra -Nawapara, Tehsil- Abhanpur, District – Raipur (C.G.)	Parboiled Rice Mill	6.0	1.0	2.5	0.8	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for closure/disconn ection of electricity supply issued dated 16.03.2018
20	M/s Baba Dhan Prakriya Kendra, Village- Nawapara, District – Raipur (C.G.)	Parboiled Rice Mill	9.5	1.0	4.0	0.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 4.0	Yes	-
21	M/s Shri Mohini Agrotech Unit-2 P.H.No.- 161/34, Kh. No.- 578/(2,4,5,) Village -Nawapara, Tehsil- Abhanpur, District – Raipur (C.G.)	Parboiled Rice Mill	12.0	1.0	5.0	.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
22	M/s Shri Laxmi Paddy Processing Unit Village- Kurra,Nawapara, District - Raipur (C.G.)	Parboiled Rice Mill	26.5	2.0	10.5	1.6	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 10.5	Yes	-
23	M/s Ramesh Parboiling Unit Village – Paragaon, Nawapara, District - Raipur (C.G.)	Parboiled Rice Mill	19.0	1.5	7.5	1.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 7.5	Yes	-
24	M/s Raj Foods Industries Village- Kurra, Abhanpur, District - Raipur (C.G.)	Parboiled Rice Mill	38.5	3.0	15.0	2.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 15.0	Yes	-
25	M/s Chhaparia Agro Industries Village- Bhelwadih, Post- Abhanpur, District - Raipur	Parboiled Rice Mill	19.0	1.5	7.0	1.2	ETP	Septic Tank / Soak	Complying With the prescribed	Recycle / Reuse- 7.0	Yes	-

	(C.G.)							Pit	standards			
26	M/s Siddhi Agro Foods Private Limited, Village- Satpara, Tehsil- Abhanpur, District - Raipur	Parboiled Rice Mill	118.0	9.0	47.5	7.2	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for closure/disconnection of electricity supply issued dated 14.06.2017
27	M/s Satnaam Industires Village- Paragaon, Tehsil- Abhanpur, District - Raipur (C.G.)	Parboiled Rice Mill	26.5	2.5	10.5	2.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 10.5	Yes	-
28	M/s A.M.S. Parboiling Industries (New Name- AadhatMal Rice Mill) Nawapara, District - Raipur (C.G.)	Parboiled Rice Mill	15.5	1.5	6.0	1.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 6.0	Yes	-
29	M/s Balaji Grain & Processing Industries P.O. - Abhanpur, District - Raipur (C.G.)	Parboiled Rice Mill	20.5	2.0	8.0	1.6	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for closure issued dated 21.06.2017
30	M/s Nirmala Rice PrivateLimited Village – Satpara Post- Kondapar, Tehsil- Abhanpur District - Raipur (C.G.)	Parboiled Rice Mill	25.0	2.5	10.0	2.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 10.0	Yes	-
31	M/s Jinkushal Industries Village- Tarri, Nawapara, District - Raipur (C.G.)	Parboiled Rice Mill	12.0	1.0	5.0	0.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-
32	M/s Parag Traders (Unit-II) Village- Patewa, Tehsil- Abhanpur, District - Raipur (C.G.)	Parboiled Rice Mill	50.5	3.5	20.0	2.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 20.0	Yes	-
33	M/s Ambika Rice Industries Village- Bhelwadih, Abhanpur, District - Raipur (C.G.)	Parboiled Rice Mill	6.0	0.5	2.5	0.4	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for closure/disconnection of electricity supply issued dated 30.06.2017
34	M/s Sumit Grain Processing Industries (Unit-2) Village- Kurra, Abhanpur, District - Raipur (C.G.)	Parboiled Rice Mill	25.0	2.0	10.0	1.6	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 10.0	Yes	-

35	M/s Ganesh Rice Mill Village - Tarri, Post Office- Nawapara, District - Raipur (C.G.)	Parboiled Rice Mill	14.5	1.5	5.5	1.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.5	Yes	-
36	M/s Vijay &Company Village-Kurra,Tehsil- Abhanpur,District-Raipur (C.G.)	Parboiled Rice Mill	25.0	2.5	10.0	2.0	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 10.0	Yes	-
37	M/s Amar Parboiling Industries Village- Paragaon, Nawapara, District – Raipur (C.G.)	Parboiled Rice Mill	6.0	1.0	2.5	0.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 2.5	Yes	-
38	M/s Shankar Rice Mill (Lessee unit of Shantilal Prakashchand Shrishrimal & Company) Rajim Road, Arang, District – Raipur (C.G.)	Parboiled Rice Mill	38.0	4.0	15.0	3.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 15.0	Yes	-
39	M/s Sai Hanumant Industries, Village-Paragaon, Tehsil- Abhanpur, District -Raipur (C.G.)	Parboiled Rice Mill	48.0	3.0	19.0	2.4	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 19.0	Yes	-
40	M/s Giridhar Gopal Rice Product, Chhata Road, Paragaon, Nawapara, District - Raipur (C.G.)	Parboiled Rice Mill	19.0	4.5	7.5	3.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 7.5	Yes	-
41	M/s Hanuman Agro Industries Limited Village - Paragaon Nawapara, District-Raipur (C.G.)\	Paper Mill unit	12.0	1.0	5.0	0.9	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 5.0	Yes	-

Annexure – 3

List of industries having ETP installed, performance of captive ETP's and details of utilization of treated effluent in Rajim town

S. NO	Name and Address of The Industry	Nature Of Industry	Quantity Of water Utilized (KLD)		Quantity Of generated raw effluent (KLD)		Effluent treatment facility		Quality of the treated industrial effluent	Quantity (KLD) and method of recycle/ reused of treated industrial effluent	Status of zero discharge of industrial effluent into the river Yes/No	Remark
			Industrial	Domestic	Industrial	Domestic	Industrial	Domestic				
1	M/S Chhattisgarh Paddy Processing Industries, Bindranavaganv, District Gariyaband	Parboiled Rice Mill	14.5	1.5	6.0	4.8	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for Closure/disconnection of electricity supply issued dated 14.06.2017
2	M/S Chandresh Agro Industries, Village-Baraunda, Rajim, District Gariyaband	Parboiled Rice Mill	39.5	3.0	16.0	13.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-16.0	Yes	-
3	M/S Rudra Industries, Village-Chaubebandha, Rajim, District Gariyaband	Parboiled Rice Mill	50.5	3.5	20.0	16.8	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-20.0	Yes	-
4	M/S Shammi Agrotech, Dongriganv, District Gariyaband	Parboiled Rice Mill	37.5	2.5	15.0	12.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-15.0	Yes	-
5	M/S Vaibhav Agrotech, Rajim, District- Gariyaband	Parboiled Rice Mill	46.0	3.5	18.5	15.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse-18.5	Yes	-
6	M/S Vikash Industries, Nayapara Rajim, District –	Parboiled Rice Mill	37.5	2.5	15.0	12.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed	Recycle / Reuse-15.0	Yes	-

	Gariyaband								standards			
7	M/S Gurudev Rice Mill, Nayapara, Rajim, District - Gariyaband	Parboiled Rice Mill	38.0	2.5	15.0	12.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 15.0	Yes	-
8	M/S Maa Durge Rice Mill, Chaubebandha, Rajim, District - Gariyaband	Parboiled Rice Mill	32.0	2.0	12.5	10.5	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 12.5	Yes	-
9	M/s Rajiv Lochan Agro Industries, Pitiaband, Rajim, District - Gariyaband (C.G.)	Parboiled Rice Mill	9.5	1.0	4.0	3.2	ETP	Septic Tank / Soak Pit	Complying With the prescribed standards	Recycle / Reuse- 4.0	Yes	-
10	M/s Godawari Rice Mill, Village- Pitaiband, Tehsil- Rajim, District - Gariyaband (C.G.)	Parboiled Rice Mill	5.5	0.5	2.0	1.8	NO	Septic Tank / Soak Pit	-	-	Yes	Direction for Closure/disconnection of electricity supply issued dated 21.06.2017

Annexure – 4

Quality of Nalla Water along with Heavy Metal Analysis in the Kanker, Dhamtari, Gobra Nawapara and Rajim town

Physico – Chemical Characteristics of Nalla Water

S.N.	Sample Collected From	BOD 3 day 27^{O}C	Coliform	Faecal Streptococci	Faecal Coliform
		mg/l	MPN/ 100 ml	MPN/ 100 ml	MPN/ 100 ml
1.	Mukti Dham Nala, Nawapara, Raipur	10.0	46.0	9.2	Absent
2.	Ghatoriya Nala, Rajim Gariabandh	12.0	58.0	12.0	Absent
3.	Shakti Nala, Arang, Raipur	5.0	25.0	4.0	Absent
4.	Amdi Nala, Dhamtari	7.0	–	–	Absent

Heavy Metal Analysis of Nala Water

S.No.	Characteristics	Arsenic (AS)	Cadmium (Cd)	Murcury (Hg)	Zinc (Zn)	Chromium (Cr)	Lead (Pb)	Nickel (Ni)	Iron (Fe)	Copper (Cu)	Fluoride (F)
	Unit	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**
	Sample Collected from										
1.	Mukti Dham Nala, Nawapara, Raipur	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.08	1.6	–
2.	Ghatoriya Nala, Rajim Gariabandh	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.12	2.1	–
3.	Shakti Nala, Arang, Raipur	N.D.	N.D.	N.D.	0.7	N.D.	N.D.	N.D.	0.07	1.0	–

Annexure – 5

Ground Water Quality in Catchment Area for the Samples Collected on August, 2020 with Heavy Metal Analysis

S.No.	Characteristics	Arsenic (AS)	Cadmium (Cd)	Murcury (Hg)	Zinc (Zn)	Chromium (Cr)	Lead (Pb)	Nickel (Ni)	Iron (Fe)	Copper (Cu)	Fluoride (F)
	Unit	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**
	Sample Collected from										
1.	Handpump water at Rajiv lochan temple, Rajim, Gariyaband	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.05	0.8	–
2.	Borewell water at near Shri Leelaram Sahu house, Nayapara, Raipur	N.D.	N.D.	N.D.	N.D.	N.D.	0.01	N.D.	0.07	1.2	–
3.	Borewell water at Nursery, Arang, Near National Highway, Raipur	N.D.	N.D.	N.D.	0.07	N.D.	0.03	N.D.	0.09	2.3	–
4.	Hand pump water, Amdi School, Dhamtari	N.D.	N.D.	N.D.	N.D.	N.D.	0.03	N.D.	0.18	1.8	–

N.D. – Not Detected

REVISED ACTION PLAN FOR THE REJUVENATION OF POLLUTED RIVER STRETCH OF RIVER SEONATH

(BEMTA TO SIMGA)

PRIORITY – IV

APPROVED BY:

RIVER REJUVENATION COMMITTEE, CHHATTISGARH

(Constituted in compliance of order of the Hon'ble National Green Tribunal)

SUBMITTED TO:

CENTRAL POLLUTION CONTROL BOARD, DELHI

TABLE OF CONTENT

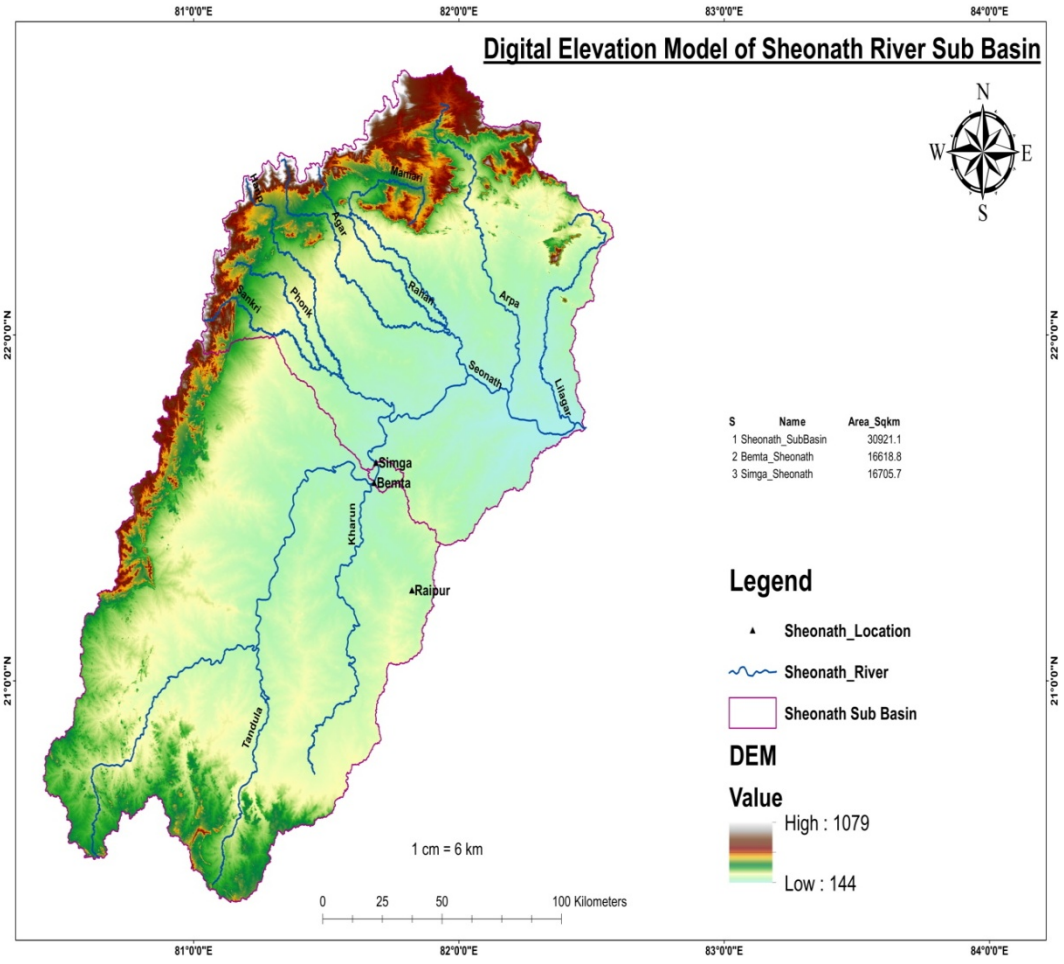
S.No.	Content	Page No.
1.	Executive Summary	03
2.	Introduction	04
3.	Achievable Targets as per Hon'ble NGT Directions	04
4.	Water Quality Reports for the Year 2016-2019	04
5.	Identified Polluted River Stretches in the State	06
6.	Action Plan for Restoration of Polluted River Stretch of River Seonath (Priority-IV)	07
7.	Major Towns And Industries in the Catchment of River Seonath	08
8.	Major Drains Contributing Pollution into River Seonath	08
9.	Latest Water Quality Characteristics of River Seonath	09
10.	Identification of Sources of Pollution	09
11.	Components of Action Plan	10
12.	Detailed Gap Analysis	11
13.	Ground Water Quality Monitoring	14
14.	River Seonath Rejuvenation Plan	14
15.	Monitoring of the Action Plans	15
16.	Action Plan	16
17.	Annexure	20

1. EXECUTIVE SUMMARY

There is Simga town is located in the catchment of the polluted river stretch from Bemta to Simga.

Simga Town

Simga is the major town located on the bank of river Seonath in this stretch. Simga is located at 21.63°N 81.7°E. It has an average elevation of 262 m above MSL. The total area of Simga is 14.3 sqkm. Simga is a town located 51 KM towards North from Raipur in Baloda Bazar – Bhatapara District. It is a Tehsil head quarter. Aurethi (3 KM), Kachlone (4 KM), Lanja (4 KM), Bansankra (4 KM), Bemta (5 KM) are the nearby Villages to Simga. Simga is surrounded by Bemetara district towards West, Tilda Tehsil towards South, Berla Tehsil towards West, Nawagarh Tehsil towards North. The map showing details are enclosed.



2. INTRODUCTION

The River Seonath originates from high land of Rajnandgaon district near protected forest having grid references 80° 37.5'E Longitude and 20° 5' N Latitude. After meandering for about 40 km it touches Durg town. Further the river travels about 200 km before meeting to Mahanadi River at Khargahni in Bilaspur District in Chhattisgarh State.

3. ACHIEVABLE TARGETS AS PER HON'BLE NGT DIRECTIONS

The main objective of the action plan is to bring polluted river stretches to be fit at-least for bathing purposes (i.e. BOD < 3 mg/l and FC < 500 MPN/100 ml) on or before 30/06/2021.

4. WATER QUALITY REPORTS FOR THE YEAR 2016, 2017, 2018, 2019

The river water quality at different locations is shown below.

Table No. 01

pH	Simga	
	Minimum	Maximum
2016	7.2	7.82
2017	7.74	7.86
2018	7.82	7.85
2019	7.46	7.8

Table No. 02

DO	Simga	
mg/L	Minimum	Maximum
2016	6.9	7.8
2017	6.2	7.2
2018	6.4	7.3
2019	6.2	6.9

Table No. 03

BOD	Simga	
mg/L	Minimum	Maximum
2016	2.2	2.8
2017	2.6	3.4

Table No. 04

Coliform	Simga	
MPN/100ml	Minimum	Maximum
2016	110	300
2017	240	350
2018	240	240

River Flow in Polluted River Stretch:

Water Resource Department had prepared standard operating procedures (SOP) for the polluted river stretches for maintaining e-flow in the rivers and the same is being followed. Gate discharge stations have been provided for the measurement of flow in rivers. These stations are operated by Central Water Commission. As per data from Water Resources Department, Government of Chhattisgarh, the flow observed in Seonath River during last three years are as follows:-

Table No. 05

River / Location	Month	Flow (in Cumecs)			Daily e-flow (in Cumecs)
		2015-16	2016-17	2017-18	
Seonath / Simga	June	2714.364	0.000	0.000	8.93
	July	7271.138	9292.720	5364.487	56.77
	August	3984.065	11827.739	6847.840	57.56

	September	10152.73	17488,836	7933.681	74.09
	October	1242.507	14983.376	7060.599	10.09
	November	570.303	807.436	0.000	3.29
	December	167.992	0.000	0.000	2.09
	January	69.257	0.000	0.000	1.63
	February	10.375	0.000	0.000	1.28
	March	16.649	0.000	0.000	0.58
	April	0.225	0.000	0.000	0.28
	May	0.000	0.000	0.000	0.88

5. IDENTIFIED POLLUTED RIVER STRETCHES IN THE STATE

Central Pollution Control Board has identified polluted river stretches state wise and priority wise. On the basis of water quality data under National Water Quality Monitoring Programme for the year 2016 and 2017 following river stretches of Chhattisgarh have been identified as polluted stretches:-

River stretches have been categorized in five priority classes based on BOD concentration. River stretches having BOD between 6 to 10 mg/l have been kept under category “IV”. Similarly river stretches having BOD between 3 to 5 mg/l have been kept under category “V”.

Table No. 06

River Name	River Stretch	BOD Range/Max Value (mg/l)	Priority	Towns situated across the stretches	Approx length of the stretch (in km)
Hasdeo	Korba to Urga	3.6 – 7.0	IV	Korba	20
Kharoon	Bundari to Raipur	3.3 – 7.2	IV	Raipur	20

Mahanadi	Arrang to Sihawa	3.3 – 8.0	IV	Kanker, Dhamtari, Nawapara, Rajim	70
Seonath	Simga to Bemta	3.4 – 8.4	IV	Simga	10
Kelo	Raigarh to Kanaktora	3.8	V	Raigarh	15

Note:- 1. River stretches have been categorized in five priority classes based on BOD concentration. River stretches having BOD between 6 to 10 mg/l have been kept under category "IV". Similarly river stretches having BOD between 3 to 5 mg/l have been kept under category "V".

2. The polluting stretches as defined by CPCB in their document titled "River Stretches for Restoration of Water Quality" needs review on account of improper description of location. In fact the polluted stretches of these rivers are as below:-

Table No. 07

Polluted Stretches of Rivers

River Name	River Stretch
Kharoon	Bhatagaon to Bendari
Mahanadi	Sihawa to Arrang
Seonath	Bemta to Simga

6. ACTION PLAN FOR RESTORATION OF POLLUTED RIVER STRETCHES OF RIVER SEONATH (PRIORITY-IV)

The Biochemical Oxygen Demand (BOD) is one of the most common measures of pollutant organic material in water. BOD indicates the amount of permissible organic matter present in water. As per the water analysis report on Seonath River, it states that the organic pollution measured in terms of BOD varying on different points or sources. There are no major

polluting industries that discharge effluents to cause serious contamination. Therefore, the main source of pollution is due to domestic waste and municipal sewage which is being dumped and flows into the nallahs & river. All sorts of waste and untreated sewage are released randomly into the Seonath River in absence of a sewage treatment facility. It is an important aspect for revival of River Seonath in context of its utility as it is an important Perennial River. Under the present status, it appears that River Seonath may serve the purpose of drinking, bathing and irrigation and for this objective municipal sewage generated should be treated properly.

7. MAJOR TOWNS AND INDUSTRIES IN THE CATCHMENT OF RIVER SEONATH

The Simga Town is divided into 15 wards. The Simga Nagar Panchayat has population of 16,027. Presently all houses dispose their domestic sewage in open channel. These channels are connected with nallas to dispose off their sewage in these nallas. Finally these nallas dispose their sewage in Seonath River at five different locations. The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 1.94 MLD. STP having capacity of 2.8 MLD is proposed considering the future requirement. There is no water polluting unit in the catchment area of this polluted river stretch. There is no common effluent treatment plant in this region.

Action Against Non-Complying Industries:-

Industries are complying with the effluent discharge standards. In case of non-compliance with respect to discharge of treated / untreated industrial effluent outside the premises and / or not complying to the discharge standards prescribed, CECB takes appropriate actions against non-complying units either by issuing closure direction or filing of court case against management.

8. MAJOR DRAINS CONTRIBUTING POLLUTION INTO RIVER SEONATH

There is only one major nalla for Simga town. The nalla water quality for sample collected during August, 2020 in Simga town is as follows:-

S.N.	Sample Collected From	BOD 3 day $27^{O}C$	Coliform	Faecal Streptococci	Faecal Coliform
		mg/l	MPN/ 100 ml	MPN/ 100 ml	MPN/ 100 ml
1.	Simga Nala, Nagar Panchayat Simga, Balodabazar-Bhatapara	4.6	34	7.0	Absent

9. LATEST WATER QUALITY CHARACTERISTICS OF RIVER SEONATH

The latest water quality characteristic of River Seonath for the year 2019 is as below:

Table No. 08

River Seonath (Bemta to Simga) – P – IV

Monitoring Location		Road Bridge Bemetara Simga
BOD (mg/l)	Minimum	2.33
	Maximum	3.8
Fecal Coliform (MPN/100ml)	Minimum	2
	Maximum	17

10. IDENTIFICATION OF SOURCES OF POLLUTION

Seonath River is polluted due to dischargeof untreated sewage of Simga town into the river. Various steps like construction of sewage treatment plant, cleaning of drains, removal of encroachment, In-situ bioremediation of drains, waste management (Solid waste, Hazardous waste, C&D waste, Bio- Medical Waste), maintenance of e-flow, Watershed management, rain water harvesting, adoption of good irrigation practices etc. with definite timelines and the implementing agency with budget estimates are included in action plan.

11. COMPONENTS OF ACTION PLAN

11.1 Channelization, treatment, utilization and disposal of treated domestic sewage:

(a) Identification of towns and villages in the catchment of polluted river stretch and estimation of quantity of sewage generation.

(b) Storm water drains carrying sewage and sullage joining river and interception and diversion of sewage to STPs.

(c) Treatment and disposal of septage and controlling open defecation.

(d) Identification of towns and villages for installing sewerage system and further sewage treatment plants.

11.2 Waste Management:

(a) Collection, segregation, transportation, disposal and treatment of municipal solid wastes generated from town in accordance of provisions of the Solid Waste Management Rules, 2016.

(b) Restriction of illegal disposal of solid waste along the river bank and flood plain zones.

(c) Burning of solid waste should be strictly prohibited.

(d) Construction and demolition wastes should be disposed in designated areas and no case it should be disposed into river beds or flood plain zone.

11.3 Industrial Pollution Control: There is no water polluting industry in this stretch.

11.4 Flood Plain Zone:

(a) Regulating activities in flood plain zone.

(b) Management of Municipal, Plastic, Domestic Hazardous, Hazardous and Bio-medical.

(d) Improve irrigation practices.

11.5 Ecological/Environmental Flow (E-Flow):

(a) Measurement of flow of river.

(b) Requiement of flow of river.

(c) Mainatainance of flow of river.

12. DETAILED GAP ANALYSIS

Detail gap analysis with regard to sewage, industrial effluents, waste (municipal solid waste, domestic hazardous waste, industrial hazardous waste, biomedical waste, plastic waste and construction and demolition waste) waste management is mentioned below:

12.1 Sewage Management: The water supply in Simga town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 1.94 MLD. STP having capacity of 2.8 MLD is proposed considering the future requirement.

Present generation of sewage	1.94 MLD
Capacity of sewage treatment plant	2.80 MLD
Gap in sewage treatment	NIL

12.2 Septage Management: In the State of Chhattisgarh, all the ULBs have Faecal Sludge Treatment Facilities either by Faecal Sludge Treatment Plant or by Co-treatment with STP for the treatment of faecal sludge generated from the household of the ULBs. The ULB of Simga has the Faecal Sludge Treatment Plants based on Low cost gravity based decentralized Phytorid Technology for the treatment of black water generated in these ULBs. Total fecal sludge generated in this river stretch is 4.6 KLD for which presently there is a capacity of treatment of fecal sludge about 5.0 KLD. This additional capacity is sufficient to treat the future 15 years period fecal sludge generation.

Current faecal sludge generation	4.60 KLD
Current faecal sludge treatment capacity	5.00 KLD
Gap in current faecal sludge treatment	NIL
Projected faecal sludge generation after 15 years	5.00 KLD

12.3 Industrial Effluent Management: There is no water polluting industry in this stretch.

12.4 Municipal Solid Waste Management: Chhattisgarh State has implemented the SWM Rules, 2016 by adopting Mission Clean City Model in 164 ULBs and Integrated waste management facility model in 2 ULBs of the State. Mission Clean City (MCC) is derived from Ambikapur model, which is a low cost, sustainable, decentralized model based on extensive segregation and recycling. It is combined with the benefits of citizen participation and urban livelihood promotion by involving business entities like women SHGs. Involvement of local citizens and Self-Help Groups (SHGs) has helped in 100% source segregation, and 100% door-to-door collection of segregated waste. The segregated waste is brought to the Garbage clinics (SLRM-Solid Liquid Resource Management Centres) using partitioned containers mounted on Tricycles, E-Rickshaws and Mini Tippers for secondary and tertiary segregation. The recyclable inorganic waste is segregated into various categories and sold to the authorized recyclers. The non-recyclable combustible waste is stored separately to be transported either to cement plants, power plants, Waste to Energy plants or other industries as Alternate Fuel and Raw material (AFR). The organic waste is manually sorted to recover certain resources such as egg shells, orange peels etc. which are processed into useful products. The organic waste is further fed to animals and the remaining waste goes to compost shed for composting. In this polluted river stretch, total 03 tonnes per day of municipal solid waste is generated which is processed/ treated by Mission Clean City Model.

Present generation of solid waste	03 TPD
Processing and treatment of solid waste	03 TPD
Gap in processing and treatment of solid waste	NIL

Details of case registered and amount of fines collected for dumping of waste till August, 2020:

Name of ULB	No. of cases registered	Amount of fines collected
Simga	06	Rs. 1,400

12.5 Domestic Hazardous Waste Management: The domestic hazardous waste is being collected separately in a black bag or in separate compartment in the tricycles/ mini tippers. Then the domestic hazardous waste is stored temporarily in the SLRM Centres of the ULBs and handed over to the authorized agency for its proper disposal as per CPCB guidelines. In this polluted river stretch, total 335 kg per day of domestic hazardous waste is generated which is collected by the municipal authorities regularly.

Present generation of domestic hazardous waste	335 Kg/day
Collection of domestic hazardous waste	335 Kg/day
Gap in domestic hazardous waste collection	NIL

12.6 Industrial Hazardous Waste Management: There is no major hazardous waste generating unit situated in this stretch.

12.7 Biomedical Waste Management: Bio medical waste is being treated and disposed by deep burial method.

12.8 Construction & Demolition Waste: In this polluted river stretch, total 0.3 tonnes per day of construction and demolition waste are generated which is collected and primarily processed by the municipal authorities regularly.

Present generation of construction and demolition waste	0.30 TPD
Collection and processing of construction and demolition waste	0.30 TPD
Gap in processing of construction and demolition waste	NIL

12.9 Removal of Encroachment: There are 04 encroachments have been identified by the local body in this stretch which has been removed.

Encroachments identified	04
Encroachments removed	04
Encroachments to be removed	NIL

12.10 Rain water harvesting: The status of installation and action plan for completion of remaining rain water harvesting structure is as follows:

Progress by UAD				
ULB Name	**Target**	**Completed**	**In progress**	**Time line**
Simga	140	79	61	Mar-21

13. GROUND WATER QUALITY MONITORING

Heavy metal analysis result of ground water samples collected in August, 2020 in Simga area is attached as **Annexure – 1 .**

14. RIVER SEONATH REJUVENATION PLAN

14.1 Action Plan for management of sewage: The water supply in town is 135 liter per capita per day. Total sewage generation is estimated as 90% of the water supply, which is at present about 1.94 MLD. STP having capacity of 2.8 MLD is proposed considering the future requirement.

14.2 Action Plan for management of industrial effluents: There is no water polluting industry in this stretch.

14.3 Action Plan for management of utilization of treated sewage: Treated sewage will be utilized for irrigation or agricultural or industrial cooling or construction activities purposes once the STPs become operational. Treated water channel may also link with irrigation network in order to reduce ground water consumption for irrigation uses.

14.4 Action Plan for management of solid waste: The Chhattisgarh State has implemented the SWM Rules, 2016 by adopting Mission Clean City Model in 164 ULBs and Integrated waste management facility model in 2 ULBs of the State. Mission Clean City (MCC) is derived from Ambikapur model, which is a low cost, sustainable, decentralized model based on extensive segregation and recycling. The proper implementation of this mission clean city model will be carried out. Also Urban Administration and Development Department, Government of Chhattisgarh has proposed action plan for prohibition of disposal of municipal solid waste and plastic waste in river as well as in municipal drains and levy of fine in case found violation.

14.5 Action Plan for management of Flood Plain Zone (FPZ): Forest department should identify/demarcate Flood Plain Zone and regulate the activities of plantation in Flood Plain Zone (FPZ) and notification of the Flood Plain Zones.

14.6 Action plan for management of Environmental Flow (E-flow): State Water Resource department will measure the flow and maintain the Environmental Flow (E-flow) as and when required.

15. MONITORING OF THE ACTION PLANS

In compliance of the order dated 20/09/2018 of Hon'ble National Green Tribunal, Principal Bench, New Delhi, Government of Chhattisgarh, Department of Housing and Environment has constituted a committee known as "River Rejuvenation Committee" (RRC) on 22/11/2018 under the Chairmanship of Secretary/Officer on Special Duty, Department of Housing and Environment for preparation of Action Plan for execution, monitoring and development of requisite infrastructure for management of municipal sewage and industrial effluent for rejuvenation of polluted river stretches in Chhattisgarh. The RRC will function under the overall supervision and co-ordination of Principal Secretary, Department of Housing and Environment.

16. ACTION PLAN

ACTION PLAN FOR MANAGEMENT OF SEWAGE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Construction of Sewage Treatment Plants at Simga town of capacity 2.8 MLD for treatment of sewage.	Concerned local body	10.20 Cr.	30/06/2023 (i.e. 3 years after approval of DPR from State Finance Dept.)
ACTION PLAN FOR MANAGEMENT OF INDUSTRIAL EFFLUENTS				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Action against defaulting industries discharging untreated effluent outside the premises.	CECB	–	Immediate
ACTION PLAN FOR MANAGEMENT OF UTILIZATION OF TREATED SEWAGE				
S. No.	**Action Point**	**Organization / Agency Responsible for**	**Estimated project Cost (in Cr.)**	**Time Target**

		Execution of the Action Plan		
1.	Reuse of treated effluent for various purposes i.e. plantation, reuse for industrial purposes, Agriculture etc.	Concerned local body	–	30/06/2023
ACTION PLAN FOR MANAGEMENT OF SOLID WASTE				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Prohibition of disposal of municipal solid waste and plastic waste in river as well as in municipal drains and levy of fine in case found violation.	Concerned local body	–	Immediate / Regularly
ACTION PLAN FOR MANAGEMENT OF FLOOD PLAIN ZONE (FPZ)				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Plantation in flood zone in available spaces.	Forest Department / Concerned local body	–	Next Monson Season
ACTION PLAN FOR MANAGEMENT OF ENVIRONMENTAL FLOW (E-FLOW)				
S. No.	**Action Point**	**Organization / Agency**	**Estimated project Cost**	**Time Target**

		Responsible for Execution of the Action Plan	(in Cr.)	
1.	Measurement of flow of river and records maintained.	State Water Resource Department	–	Regularly
2.	Requirement of E-flow in the river must be maintained.	State Water Resource Department	–	As per requirement
OTHER ACTION POINTS				
S. No.	**Action Point**	**Organization / Agency Responsible for Execution of the Action Plan**	**Estimated project Cost (in Cr.)**	**Time Target**
1.	Cleaning of drains before monsoon.	Concerned local body	–	Immediate
2.	In-Situ Bio-Remediation of Drains.	Concerned local body	Budget will be provided under 15th Finance Commission	31/12/2020
3.	To ensure rain water harvesting by the industrial, commercial and other institutions to promote ground water recharging.	Industry Department / CECB / Concerned local body	–	31/03/2021
4.	Collection of information on irrigation water used per hectare for different crops by Agriculture Department and evaluate whether use of Irrigation water	Agriculture Department	–	Regularly

	per hectare has decreased or not? Based on the data obtained techniques like drip irrigation etc. should be promoted.			
5.	Adoption of good irrigation practices (Adoption of micro irrigation schemes which result in more crop per drop as per the available resources)	State Water Resource Department	–	It is a continuous process and no time target can be fixed. Work is done as per allocation.

ANNEXURES

Annexure – 1

Heavy metal analysis result of ground water samples collected in August, 2020 in Simga area

S.No.	Characteristics	Arsenic (AS)	Cadmium (Cd)	Murcury (Hg)	Zinc (Zn)	Chromium (Cr)	Lead (Pb)	Nickel (Ni)	Iron (Fe)	Copper (Cu)	Fluoride (F)
	Unit	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**	**mg/l**
	Sample Collected from										
1.	Borewell water at Mahamaya Ward, Simga, Balodabazar – Bhatapara	N.D.	N.D.	N.D.	N.D.	N.D.	0.03	N.D.	0.12	N.D.	3.4
2.	Handpump water near Nandghat, National Highway, Balodabazar – Bhatapara	N.D.	N.D.	N.D.	0.07	N.D.	0.02	N.D.	0.06	N.D.	3.9

N.D. – Not Detected