

**Before the Green Tribunal, Eastern Zone Bench at Kolkata**

**MEMORANDUM OF APPLICATION**

**[ Under Section 18 (1) read with sections 14 & 15 and under  
Section 18 (2) of the National Green Tribunal Act, 2010 ]**

**Original Application No. .... /2024/EZ**



**Ankur Sharma**

..... Applicant

-Versus-

**The State of West Bengal & Ors.**

..... Respondents

**Compilation – I**

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*Ankur Sharma*

**Ankur Sharma**

**(Applicant-in-person)**

**Contact No. 9433883322**

**E-mail: adv.ankursharma9@gmail.com**

**13 FEB 2024**

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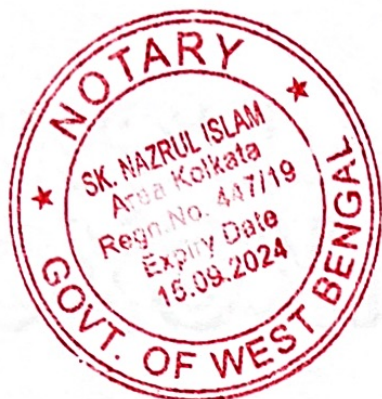
**Ankur Sharma**

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.....Respondents



**Compilation – II**

Sl	Particulars	Annexures and page no.
1.	Photographs of the out fall drains and satellite images.	'P-1' (28-33)
2.	Copy of complaint vide email sent to the authorities.	'P-2' (34 & 35)
3.	Photocopy of the agreement in connection with conservation of rivers and water bodies.	'P-3' (36-47)
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*Ankur Sharma*

Ankur Sharma

(Applicant-in-person)

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**MEMORANDUM OF APPLICATION**

**[ Under Section 18(1) read with sections 14 & 15 and under  
Section 18 (2) of the National Green Tribunal Act, 2010 ]**

**Original Application No. .... /2024/EZ**

IN THE MATTER OF :

Ankur Sharma son of Shri  
Ambooj Sharma, resident of  
13/3, Dr. P. K. Banerjee Road,  
P.O., P.S. & District – Howrah,  
West Bengal, PIN – 711101.

.....Applicant

-VERSUS -

1. The State of West Bengal represented by the Chief Secretary, Government of West Bengal having office at NABANNA (13th Floor), 325, Sarat Chatterjee Road, Shibpur, Howrah - 711102. Email : cs-westbengal@nic.in
2. Ministry of Environment, Forest and Climate Change, Government of India service through its Deputy Director General, Integrated Regional Office, Kolkata, IB-198,



**13 FEB 2024**

Sector-III, Salt Lake City,  
Kolkata – 700106. Email :

iro.kolkata-mefcc@gov.in

3. Central Pollution Control  
Board through its Member  
Secretary having office at  
PARIVESH BHAWAN, East  
Arjun Nagar, Delhi - 110032.

Email : mscb.cpcb@nic.in.

4. Department of Environment,  
Government of West Bengal  
through its Principal Secretary  
having office at Pranisampad  
Bhawan, Block (5th Floor),  
LB-II, Salt Lake, Sector–III,  
Bidhannagar, Kolkata – 700  
106. Email :

prsecy.env.wb@gmail.com

5. Department of Irrigation &  
Waterways Department,  
Government of West Bengal  
through its Principal Secretary  
having office at Jalsampad  
Bhawan, 1st floor,  
Bidhannagar, Saltlake, Kolkata

- 700091. Email -  
iwd.prsecy@gmail.com



6. Department of Urban Development & Municipal Affairs, Government of West Bengal through its Principal Secretary having office at Nagarayan, DF-8, Sector-I, Salt Lake, Kolkata – 700064.

Email : [secy.ma-wb@gov.in](mailto:secy.ma-wb@gov.in)

7. West Bengal Pollution Control Board represented by its Member Secretary having office at PARIBESH BHAVAN, 10A, Block - L.A., Sector - III, Salt Lake City, Kolkata - 700 106.

Email :

[ms.wbpcb-wb@bangla.gov.in](mailto:ms.wbpcb-wb@bangla.gov.in)

8. The District Magistrate, Howrah having office at 6, Rishi Bankim Chandra Road, Howrah – 711101. Email:

[dmhowrahwb@gmail.com](mailto:dmhowrahwb@gmail.com)

9. Howrah Municipal Corporation through its Commissioner having office at 4, M. G. Road, Howrah - 711101. Email: [Commissioner.howrah@gmail.com](mailto:Commissioner.howrah@gmail.com)

10. National Mission for Clean Ganga through its Director General having office at 1st floor, Major Dhyan Chand National Stadium, New Delhi – 110002.

Email : dg@nmcg.nic.in

.....Respondents

TO

THE HON'BLE CHAIRMAN AND HIS COMPANION  
MEMBERS OF THE NATIONAL GREEN TRIBUNAL.

HUMBLE APPLICATION SUBMITTED BY THE APPLICANT  
ABOVE NAMED

#### Synopsis

The Applicant is an Advocate by profession and has been working, amongst others, for the protection of environment.

The instant Application has been filed by the Applicant against pollution of the river Hooghly being caused and spread by High Drains (outfall drains) and other small surface drains draining toxic domestic sewage and industrial effluents in to the river Hooghly, for example, at Ramkrishnapur Ferry Ghat, Howrah by the Howrah Municipal Corporation. A massive high drain (outfall drain) is found to be draining and dumping toxic sewage, industrial effluents and garbage into the river Hooghly near Ramkrishnapur Ferry Ghat, similarly, another large high drain (outfall drain) is situated at a distance of about 90 metres (north) from Chintamoney Dey Bathing Ghat, Ramkrishnapur. Single use plastic and other garbage are openly drained into the river Hooghly through the high drains (outfall drains) owned and managed by Howrah Municipal Corporation causing massive pollution. Ecology of the river

Hooghly is thus being devastated by Howrah Municipal Corporation who resort to drain sewage into the river without treating such sewage against the much vaunted spirit of Clean Ganga. High drains (outfall drains) and other small drains carry domestic sewage as well as industrial effluents from numerous factories running in the vicinity of the said Ramkrishnapur Ferry Ghat and away. Dumping of plastic and other waste into the river Hooghly through the/similar out fall drains is also causing microplastic contamination in aquatic creatures.

It is submitted that the present application has been made seeking appropriate directions for (i) installation of sewage treatment plant at least near Ramkrishnapur Ferry Ghat to start with by Howrah Municipal Corporation, (ii) direction upon Howrah Municipal Corporation not to drain any sewage or effluent into the river Hooghly without proper treatment, (iii) imposition of exemplary environmental compensation upon Howrah Municipal Corporation, (iv) direction upon the Howrah Municipal Corporation to disclose total number of similar high drains (out fall drains) and other drains within city limit under Howrah Municipal Corporation, and details of all funds received from National Mission for Clean Ganga and other authorities and copies of all utilisation certificates, (v) Direction for investigation of the criminal acts of Howrah Municipal Corporation for registering a case under the Prevention of Money Laundering Act 2005.

Howrah Municipal Corporation being the civic body of Howrah city has miserably failed in treatment of liquid waste in the city. The civic body is flamboyantly draining sewage and effluents into the river Hooghly in broad daylight by showing scant

disregard towards law and various solemn judgments and orders passed by the Hon'ble Judiciary.

This menace of dumping sewage and industrial effluents into the river Hooghly itself is also visible on Google Maps. One could clearly find that a dark coloured liquid is being straightaway discharged into the river Hooghly without being treated as if it is permitted by law that drains of the civic bodies can drain sewage and effluent into rivers without treatment.

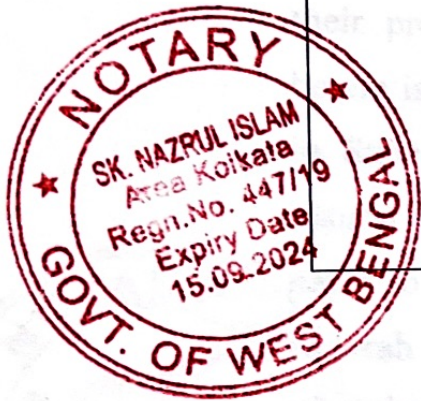
Gross violation of the environmental norms is observed. On one hand, the Central and the State Governments are spending thousands of crores of rupees in cleaning the rivers of the country and on the other hand the civic body in spite of having funds sanctioned for sewage treatment are flamboyantly discharging toxic sewage and effluents into the river Hooghly openly in utter disregard of governments' wishes, policies and endeavour. Sheer inaction of the Respondent Authorities has resulted in this menace to continue for years. In spite of complaint to the authorities no effective step has ever been taken by the Respondent Authorities, and finding no alternatives the Applicant was compelled to approach this Hon'ble Tribunal for justice.

#### List of Dates

12/04/2023	Complaint vide email lodged with : (i) The Chairman, West Bengal Pollution Control Board ; (ii) The Member Secretary, West Bengal Pollution Control Board ;
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	<p>(iii) The Secretary, Ministry of Environment, Forest and Climate Change, Government of India ;</p> <p>(iv) The Director General, National Mission for Clean Ganga ;</p> <p>(v) The Principal Secretary, Department of Environment, Government of West Bengal</p> <p>(vi) The Chief Environment Officer, Department of Environment, Government of West Bengal ;</p> <p>(vii) The District Magistrate, Howrah</p> <p>(viii) The Commissioner, Howrah Municipal Corporation.</p>
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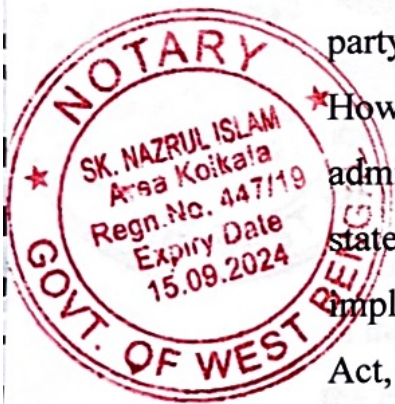
### FACTS IN BRIEF

MOST RESPECTFULLY SHEWETH :

1. That the Applicant is an Advocate. The Applicant is working, amongst others, for the protection of the environment and water bodies and protection of the right to a clean environment for every citizen guaranteed under Article 21 of the Constitution of India, 1950 and in discharge of his duty under Article 51A he has raised his voice in past against many other illegalities throughout State of West Bengal, particularly against air pollution, filling of water bodies, pollution by fish markets, conversion of the cities into concrete jungles, pollution of river Hooghly at Sarenga Howrah, devastation of East Kolkata Wetlands, etc. The Applicant is filing

the instant application under Section 14 and 15 read with section 18 of the National Green Tribunal Act, 2010.

2. That the Respondent no. 1 herein is the head of all other State Respondents. The Respondent no. 2 is the representative of the Government of India which is a party to the agreement between the state government and Howrah Municipal Corporation for conservation of rivers and lakes. The Respondent no. 3 is a body which provides technical assistance and guidance to the State Pollution Control Boards, carry out and sponsor investigation and research relating to problems of water and air pollution, and for their prevention, control or abatement. The Respondent no. 4 herein is responsible for preservation of environment and ecology in State. The Respondent no. 5 is responsible for up-keeping natural waterways of the state. The Respondent no. 6 herein is a party to the agreement between the Government of India and Howrah Municipal Corporation and is responsible for the administration of urban development and municipal affairs in the state. The Respondent no. 7 herein is the regulatory authority for implementation of the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Rules under these Acts. The Respondent no. 8 is responsible for total administration of its District and prepares, publishes and supervises implementation of District Environment Plan. The Respondent no. 9 is the Urban Local Body (ULB) and the polluter which is polluting the river Hooghly by draining untreated toxic sewage through various out fall drains.

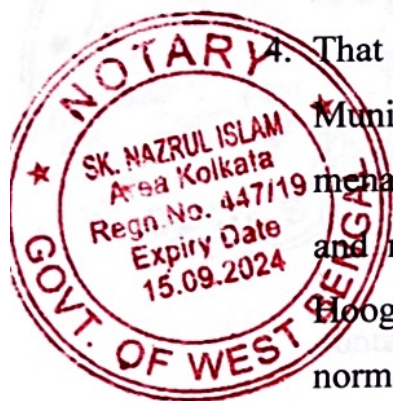


3. That the Applicant is filing this Application against gross pollution and environmental damages being caused steadily due to draining of toxic effluents and sewage into the river Hooghly, for example, at Rakrishnapur Ghat by Howrah Municipal Corporation through numerous drains including two visible high drains (out fall drains) one located near Ramkrishnapur Ferry Ghat and another near Chintamoney Dey Bathing Ghat. The scale of pollution is such great that one could also see black sewage being discharged into the river Hooghly on Google maps.

Photographs of the said drains and a screenshot of Google Earth showing draining of sewage into the river Hooghly are annexed herewith and collectively marked by the letter and figure 'P-1'.

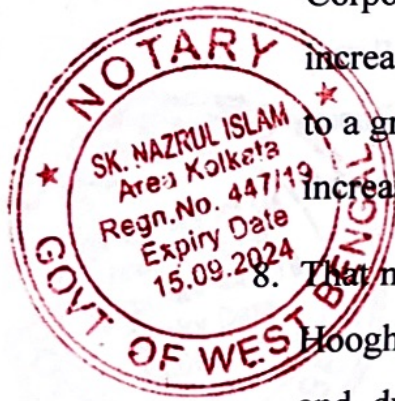
4. That it appears that no attempts have been taken by Howrah Municipal Corporation or any government authorities to stop the menace of dumping toxic sewage and effluents by drains owned and managed by Howrah Municipal Corporation into the river Hooghly. The civic body owned drains shows how environmental norms have been made a hoax, and can be flouted easily especially in the State of West Bengal. Gross pollution is being carried on by the civic body indulged in draining toxic sewage and effluents into the river Hooghly near Ramkrishnapur Ferry Ghat through numerous out fall drains. Curiously and alarmingly, the State authorities have also turned blind eyes towards such unabated and uncontrolled pollution for their own reasons.

5. That most disheartening is the fact that on one hand Howrah Municipal Corporation is draining sewage and effluent in the river Hooghly, and on other hand nearby citizens of the city take bath along the river bank side by side placing themselves irrespective



of age towards risk of danger to health through such contaminated river water.

6. That Howrah was an industrial district during the British Era and was known as Sheffield of India. Due to urbanization population increased but due to rampant corruption within the civic body infrastructural development, if at all any, is at a very slow pace as a result of which sewage and effluents are being dumped by the Howrah Municipal Corporation openly into the river Hooghly.
7. That there has been huge population spurt in Howrah Municipal Corporation area as a result of which sewage generation has increased due to rampant illegal housings in guise of urbanisation to a great extent, and need for proper sewage treatment has further increased rapidly.
8. That not just sewage and effluents are being drained into the river Hooghly but such sewage carry single use plastic and other wastes and dump those into the river Hooghly causing micro plastic contamination affecting the aquatic creatures.
9. That apart from drainage of sewage into the river Hooghly by numerous out fall drains industrial and commercial effluents are also drained into the river Hooghly through such municipal out fall drains causing massive damage to the holy river.
10. That the Howrah Municipal Corporation has a wide network of open drains which carries sewage and effluent from each and every house and industry of the city, and drains major portion of such sewage and effluents into the river Hooghly without treatment.



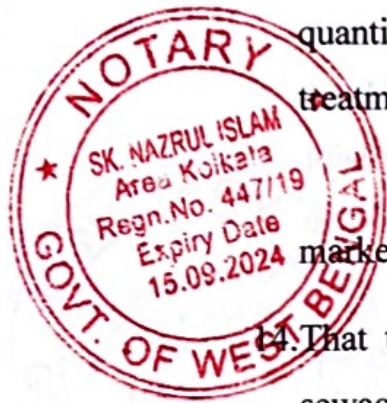
11. That several years ago some Sewage Treatment Plants were set up with funds obtained under Ganga Action Plan. However, such plants are lying in defunct and dilapidated conditions.

12. That on 10.04.2023 while going to the Hon'ble High Court at Calcutta through ferry boat your Applicant noticed that a municipal high drain was draining huge amounts of sewage into the river Hooghly in broad day light.

13. That the Applicant lodged a complaint with the West Bengal Pollution Control Board vide email dated 12.04.2023, inter alia, requesting for directions upon Howrah Municipal Corporation to install a Sewage Treatment Plant (STP) commensurate with the quantity of the sewage and to release sewage only after proper treatment.

A photocopy of the said email is annexed herewith and marked by the letter and figure 'P-2'.

14. That the Applicant on 04.12.2023 during low tide noticed that sewage and wastes are being discharged from the said high drain unabated thereby canvassing that no steps has yet been taken by Howrah Municipal Corporation as if they are immune from all environmental laws and norms. The Applicant also noticed that yellow coloured chemical is being released into the river Hooghly from another out fall drain situated near Chintamoney Dey Bathing Ghat. Your Applicant on 07.02.2024 noticed that another high drain (out fall drain) is draining sewage into the river Hooghly located at a distance of about 90 meters (north) from Chintamoney Dey Bathing Ghat.

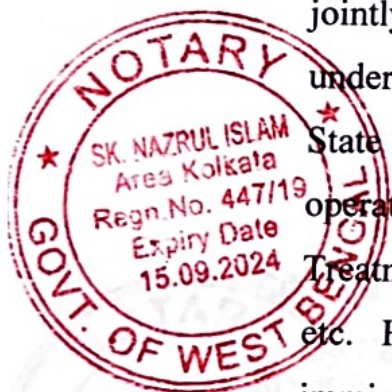


15. Your Applicant states that it is true that tackling wastes is a challenging issue. However, there should be an initiative towards ensuring minimal damage to the environment. In the present case, it is evident that Howrah Municipal Corporation has no interest in stopping pollution of the river nor does it bother for any stricture from the Hon'ble Judiciary which is evident from the fact that the civic body is draining such sewage openly in broad daylight.

16. Your Applicant states that a Memorandum of Agreement dated 18.03.2010 executed by and between (i) Ministry of Environment, Forest and Climate Change, Government of India (ii) Department of Urban Development and Municipal Affairs, Government of West Bengal and Howrah Municipal Corporation over conservation of rivers and lakes wherein the state government and the Urban Local Body (ULB) i.e. Howrah Municipal Corporation jointly are responsible for implementing, monitoring and reporting under the programme, specially, casting responsibility upon the State Government and Urban Local Body (ULB) for proper operation and maintenance of existing facilities like Sewage Treatment Plants, construction of new Sewage Treatment Plants, etc. However, proper utilisation of funds received are not imminent.

A photocopy of the said Agreement is annexed herewith and marked by the letter and figure 'P-3'.

17. Your Applicant states that the Water (Prevention and Control of Pollution) Act, 1974 was enacted in order to provide for prevention and control of water pollution and maintaining or restoring of wholesomeness of water, for the establishment of Boards for the prevention and control of water pollution. There is



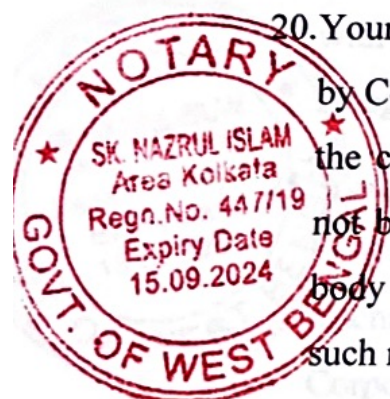
no immunity prescribed under the said Act enabling any civic body to pollute river and water bodies unabated.

18. Your Applicant states that section 48 of the Water (Prevention and Control of Pollution) Act, 1974 states that – “Where an offence under this Act has been committed by any Department of Government, the Head of the Department shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly. Provided that nothing contained in this section shall render such Head of the Department liable to any punishment if he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence”.

19. Your Applicant states that Howrah Municipal Corporation being the civic body of the city ought to create infrastructure to treat sewage before draining them into the river Hooghly but instead it is flamboyantly draining toxic sewage into the river by violating environmental norms and laws.

20. Your Applicant states that though crores of rupees are disbursed by Central Government for cleaning polluted river stretches across the country including for the river Hooghly. Yet, such money is not being properly utilised or it can be ascertained that the civic body and other wings of the state government are siphoning off such money.

21. Your Applicant states that it is obligatory on part of the civic body to ensure that it does not pollute that river Hooghly. The civic body collects hefty amounts of taxes and receives grants from the state government. However, it shows little to no respect for the river Hooghly which is the lifeline of the city of Howrah.



22. Your Applicant states that there a proverb that “ Jal Hai to Jeevan Hai” meaning if there is water there is life. However, due to the acts of the civic body of Howrah water is being rampantly polluted in broad daylight which is not only posing threat to the aquatic marine life but also to the worshippers of river Hooghly who usually drinks water of river Hooghly daily as a form of “prasad” after morning prayer. Your Applicant is also one of such devotees.

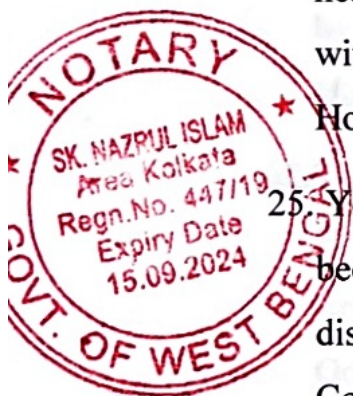
23. Your Applicant states that studies also revealed that due to rampant pollution of water streams marine creatures are digesting micro plastic. Such micro plastic are brought on the dining plates of the citizens through micro plastic ‘infested’ fishes and ultimately pushes citizens into risk of developing various types of cancers.

Photocopies of some informative articles are annexed herewith and collectively marked by the letter and figure ‘P-4’.

24. Your Applicant states that a plain look at the high drain located near Ramkrishnapur Ferry Ghat will reveal how plastics along with sewage is being discharged by the civic body in the river Hooghly flamboyantly.

25. Your Applicant states that no Sewage Treatment Plant has yet been constructed near Ramkrishnapur Ferry Ghat to treat sewage discharged from drains owned by the Howrah Municipal Corporation.

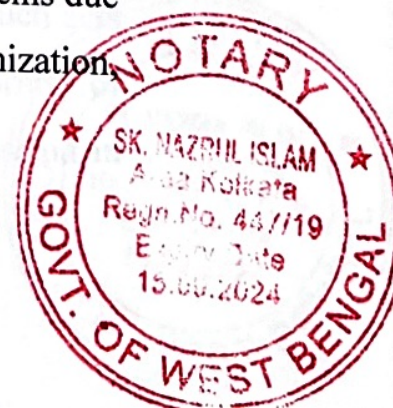
26. Your Applicant states that just beside Ramkrishnapur Ferry Ghat Chintamoney Dey Bathing Ghat is situated where numerous devotees take dip in the Holy water sewage from the out fall drains



- often flows towards such devotees making them prone to numerous types of diseases.
27. Your Applicant states that such heinous act on part of the civic body must be countermand immediately.
28. Your Applicant states that large scale non-compliance of environmental norms is continuing which is resulting in irreversible damage to the environment.
29. Your Applicant states that pollution can only be abated if there is an intention so to do. The civic body of Howrah has no intention to take steps to abate environmental pollution at all.
30. That the Applicant states that an inspection of the river banks located on the west of river Hooghly will reveal that the city of Howrah is either not equipped with sufficient Sewage Treatment Plant at all or does not have any functional Sewage Treatment Plants.
31. That due to huge quantity of sewage and toxic effluents discharged by Howrah Municipal Corporation the condition of the river Hooghly is deteriorating badly day by day.
32. That due to the rampant flouting of environmental norms by Howrah Municipal Corporation and inaction of the Department of Irrigation and Waterways, and Department of Environment, Government of West Bengal and other statutory authorities, the environmental yard sticks in the State of West Bengal have become a hoax to violate compared to other states of the country.
33. That the ecology of the river Hooghly is devastated due to mismanagement and negligence by the state authorities.



34. The Statutory Authorities who are entrusted with the duty to prevent damage to the environment must monitor and take actions where they find any breach of law. In stead, they are sitting tight in spite of receiving repeated complaints. The civic body has itself took the marshal to pollute the river Hooghly by rampantly discharging effluents in to the river Hooghly through various out fall drains. No other authority bothered to stop the menace of daylight dumping of sewage and toxic effluents into the river Hooghly. Your Applicant wonders that there is hardly any seriousness of the government in ensuring pollution free rivers in the state.
35. That the Department of Environment, Government of West Bengal and the West Bengal Pollution Control Board ought to have been active in stopping such gross violation of the environmental norms and laws.
36. That it can hardly be disputed that environmental pollution is a huge threat to man's physical surroundings, his health and those of other living species. The issue of pollution of rivers and water bodies ought to be dealt with utmost strictness by the authorities of the state. However, in the present case the civic body i.e. Howrah Municipal Corporation itself is polluting the river Hooghly. River Hooghly is being devastated by "actions" of Howrah Municipal Corporation and "inaction" of the respondent authorities.
37. That environmental problems are often considered to be phenomena of highly developed and industrialized countries. However, developing countries suffer environmental problems due to population growth, unabated and unplanned urbanization.

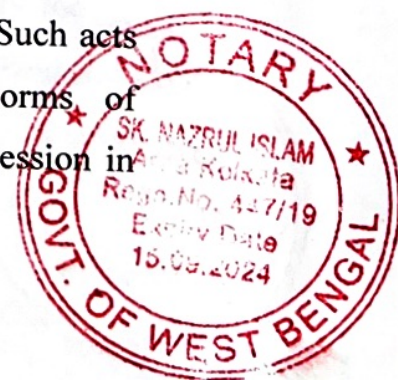


callous approach of civic bodies towards the environment and lack of environmental belongingness of the concerned state authorities.

38. The Hon'ble Supreme Court of India has extended the dimension of Article 21 of the Constitution of India by declaring the right to a decent and clean environment as a Fundamental Right. The framers of the Constitution even prescribed duty upon the citizens to make every effort to keep the environment clean and to protect its forests, rivers, water-bodies, and to have compassion for the living creatures. That is the object of our holy constitution in relation to protection of environment with particular reference to rivers and water bodies.

39. Appropriate directions of varied dimensions and of serious consequences in accordance with the law are required to be passed by this Hon'ble Tribunal to protect the holy river Hooghly and such other or further orders to penalize the polluters, and take remedial measure for restoring the ecology of the river Hooghly to its original status in terms of water quality, purity and its bio-diversity. The Hon'ble Tribunal may kindly like also to issue strict directions upon the Howrah Municipal Corporation i.e. the Respondent no. 9 herein who has callously and continuously been polluting the river Hooghly.

40. It can hardly be disputed that a major part of the State of West Bengal is eco-sensitive and geologically fragile. Indiscriminate, unabated mass dumping of sewage and toxic effluents by civic bodies into rivers and water bodies will be opposed to the geographical and ecological characteristics of the State. Such acts would be completely opposed to the expected norms of 'Sustainable Development' which finds a statutory expression in



the provisions of Section 20 of the National Green Tribunal Act, 2010. Every civic body should take steps to ensure that sewage is treated before being dumped into water streams keeping in mind the limitation and responsibilities expressed by nature itself. Rivers throughout our country are being polluted affecting marine ecosystem dangerously. Therefore, there should be a priority to conserve and protect river and other water bodies, and reinforce their ecosystem.

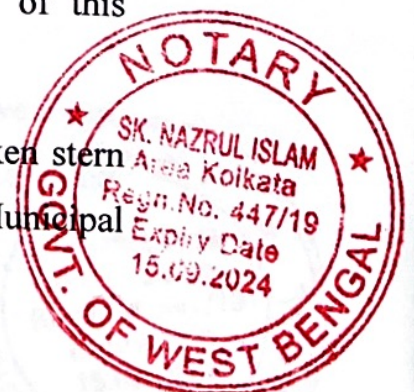
41. It is submitted that conducts of the Respondent Authorities are contrary to every environmental legislation and principles of environmental protection. In spite of getting knowledge about damages being done to the river Hooghly, the authorities chose to sit tight over the issue for their own reasons.
42. It is submitted that due to the rampant mass draining of sewage and toxic effluents in to the river Hooghly it is causing huge damage to the environment.
43. It is submitted that the respondents are oblivious to the fact that rampant mass draining of sewage and toxic effluents in to river Hooghly is a grave concern which needs no elaboration.
44. It is submitted that due to aforesaid activities the river Hooghly is turning toxic and will render to be unfit to support any life form only to sabotage the Clean Ganga Mission of the Government of India.
45. It is submitted that the Respondent Authorities have turned a blind eye to the pollution and damages caused to the river Hooghly for their own reasons, may be, only to sabotage the Clean Ganga Mission of the Government of India similarly, in league.



46. It is submitted that despite complaint, no stern actions were taken by the Respondent Authorities and effluents are still being drained into the river Hooghly rampantly. The Respondent Authorities have miserably failed in performance of their duties.
47. The Respondents are in violation of several environmental laws and norms in so far as the manner in which sewage and toxic effluents are still being drained into the river Hooghly is concerned.
48. That having felt it necessary to protect the river Hooghly, environment, ecology of the city of Howrah which is getting devastated as a result of inaction and negligence of the Respondent authorities your Applicant begs to move the present application on the following amongst other grounds :

#### GROUND

- A. For that the Respondent authorities have miserably failed to perform their duties as per the statute by way of allowing Howrah Municipal Corporation to drain untreated sewage and toxic effluents into the river Hooghly.
- B. For that the Applicant has enough evidence to prove the devastation of the river Hooghly caused by Howrah Municipal Corporation.
- C. For that the Applicant has drawn the attention of the concerned government authorities vide email to awaken their conscience which is enclosed for kind consideration of this Hon'ble Tribunal.
- D. For that government authorities ought to have taken stern legal actions against the concerned officers of Howrah Municipal



Corporation behind the unholy illegal act of polluting the holy river Hooghly, specially, when it aims at sabotaging Clean Ganga Mission of the government itself.

E. For that government authorities have neglected to treat sewage and other effluents before discharging those into the river Hooghly for decades.

F. For that the Respondent Authorities have a duty under the law to protect river Hooghly and safeguard it from pollutants, and maintain the river free from any contamination.

G. For that the inaction of the Respondent Authorities to perform their duties has resulted in the present predicament and violation of several environmental laws.

H. For that the Respondent Authorities ought to have considered that draining of toxic effluents in to river Hooghly is against environmental laws.

I. For that the Respondent Authorities ought to have prevented Howrah Municipal Corporation from draining untreated sewage and toxic effluents into river Hooghly who candidly thwarted their authority itself.

J. For that the Respondent Authorities ought to have taken stern lawful steps against the concerned officer/s of Howrah Municipal Corporation being the perpetrators to prevent the ecology of the river Hooghly from devastation and steps to restore the river Hooghly.

K. For that the Respondent Authorities ought to have been more vigilant in monitoring drainage of effluents and sewage



from various drains into the river Hooghly, and not sitting tight even after receiving information of violations.

L. For that the respondents ought to have maintained the ecology of the river Hooghly in its original nature, form and character to ensure healthy quality of water.

M. For that the failure of the respondents is violative of several environmental laws. It is also against the concept of sustainable development.

N. For that the approach of the respondent authorities not to move an inch without any stricture from this Hon'ble Tribunal must be countermand.

O. For that section 18 (1) read with section 14 & 15 of the National Green Tribunal Act, 2010, the Hon'ble Tribunal has ample jurisdiction to adjudicate this matter.

P. For that under section 18(2) of the National Green Tribunal Act, 2010, your Applicant is competent to file this application before the Hon'ble Tribunal.

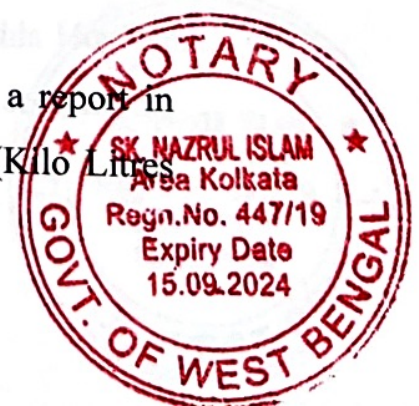
#### **LIMITATION:**

The Applicant declares that as per the National Green Tribunal Act 2010 this application is well within the prescribed time since there is continuous cause of action.

#### **INTERIM RELIEF :**

Pending disposal of the Application, the Applicant prays that this Hon'ble Tribunal be pleased to :

A. Direct Howrah Municipal Corporation to submit a report in the form of an Affidavit disclosing (i) Daily KLD (Kilo Litres



per day) of Sewage discharged into river Hooghly, (ii) total number of STPs (Sewage Treatment Plants) installed and in commission along with their present status and capacity, (iii) total funds received from various authorities for installing STPs and drainage lines / Sewage lines from 2010 to 2023, (iv) utilisation certificates of all such funds received from 2010 to 2023.

B. Constitute a committee comprising of officials from West Bengal Pollution Control Board, Central Pollution Control Board, Ministry of Environment, Forest and Climate Change, Government of India, Department of Irrigation and Waterways, Government of West Bengal and District Administration to immediately cause inspection of the river bank near Ramkrishnapur Ferry Ghat and identify all drainage outlets with calculation of sewage and effluents and collect samples of sewage from the discharge points for detailed test in any laboratory and submit report before this Hon'ble Tribunal, ;

C. Direct the Respondents to immediately issue directions upon Howrah Municipal Corporation to install Sewage Treatment Plant (STP) and ensure that any water/liquid drained from drains of the civic body of Howrah is pure and non-toxic ;

D. Direct the Respondent authorities and/or Committee so constituted to submit an Action Plan for stopping the pollution of river Hooghly due to draining of sewage and toxic effluents by Howrah Municipal Corporation.

E. And pass any such further order or orders as this Hon'ble Tribunal may deem fit proper and necessary up on considering the facts and circumstances of the case.



## PRAYER

For the reasons stated above, it is humbly prayed that this Hon'ble Tribunal may be pleased to :

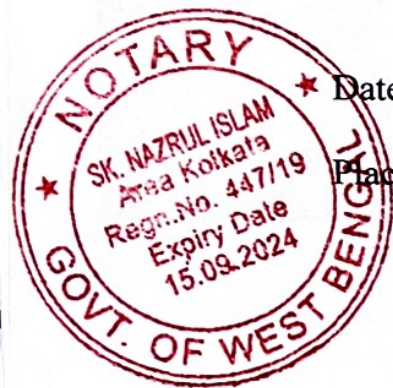
- A. Admit the Application and issue notice upon the Respondents ;
- B. Direct the Respondent authorities to immediately cause inspection of the river bank near Ramkrishnapur Ferry Ghat and identify all drainage outlets with calculation of sewage, and to collect samples of sewage from the discharge points by the inspecting team for detailed test in any laboratory, and submit report before this Hon'ble Tribunal ;
- C. Direct the Howrah Municipal Corporation to disclose total number of outfall drains draining sewage and effluents into the river Hooghly under areas falling within Howrah Municipal Corporation, and disclose details of all funds received from National Mission for Clean Ganga and other authorities, and copies of all utilisation certificates by way of an Affidavit ;
- D. Direct the Respondent authorities to issue directions upon Howrah Municipal Corporation i.e. the Respondent no. 9 herein to ensure installation of Sewage Treatment Plants having continuous online monitoring system connected with the web server of West Bengal Pollution Control Board / Central Pollution Control Board to ensure that the statutory authorities as well as common public are aware about the quality of sewage discharged in to the river Hooghly ;
- E. Direct the Respondent Authorities to ensure that no untreated sewage is discharged into the river Hooghly ;

- F. Direct the Respondent Authorities to take remedial measures for reversing the damage caused to the river Hooghly ;
- G. Direct the Respondent Authorities to plant saplings on the banks of river Hooghly near Ramkrishanpur Ghat and/or develop bio-diversity parks for common public use ;
- H. Direction to impose exemplary penalty upon the polluter being Howrah Municipal Corporation in consonance with the concept of "Polluter pays Principal" for discharging untreated sewage into the river Hooghly ;
- I. Direct the Respondent Authorities to take all steps to ensure that the ecology of the river Hooghly is restored ;
- J. Issue an order constituting a high level committee to monitor installation of Sewage Treatment Plants (STPs) and restoration of the river Hooghly and submit periodical reports to this Hon'ble Tribunal ;
- K. Direct the Respondent Authorities to take all steps to ensure that the ecology of the river Hooghly is restored and quality, healthy quality of water is maintained ;
- L. Direction upon the Directorate of Enforcement to register a case under section 3 and 4 of the Prevention of Money Laundering Act, 2005 against concerned officer/s of Howrah Municipal Corporation who committed scheduled offence/s under the Environment (Protection) Act, 1986 and the Water (Prevention and Control) Act, 1974 and book all offenders.

And pass any such further order or orders as this Hon'ble Tribunal may deem fit proper and necessary upon considering the facts and circumstances of the case.

## VERIFICATION

I, Ankur Sharma son of Shri Ambooj Sharma, aged about 26 years, residing at 13/3, Dr. P.K. Banerjee Road, P.S. & District – Howrah, West Bengal, PIN – 711101 state that I am the Applicant of this Application. I do hereby verify the contents of paragraphs no. 1 to 23, and the rest are true to the best of my knowledge, and are my humble prayers before your Lordship and I have not suppressed any material facts herein.



Date: 12/02/2024

Place: Kolkata

Ankur Sharma  
Applicant

## AFFIDAVIT

I, Ankur Sharma son of Shri Ambooj Sharma, aged about 26 years, residing at 13/3, Dr. P.K. Banerjee Road, P.S. & District – Howrah, West Bengal, PIN – 711101 state that I am the Applicant of this Application and I am well conversant with the facts and circumstances of the instant Original Application and I am competent to swear and affirm this Affidavit. I do hereby verify the contents of paragraphs no. 1 to 23, and the rest are true to the best of my knowledge, and are my humble prayers before your Lordship and I have not suppressed any material facts herein.

Date: 12/02/2023 Solemnly Affirmed and  
Declared before me U/S 139  
CPC, U/S 297 (C) CrPC

Place: Kolkata

Notary

Ankur Sharma  
Applicant

IDENTIFIED BY ME

Nandipati M V  
ADVOCATE

SK. Nazrul Islam  
Notary, Govt. of W.B.  
Regn. No. 447/19  
City Civil Court, Calcutta

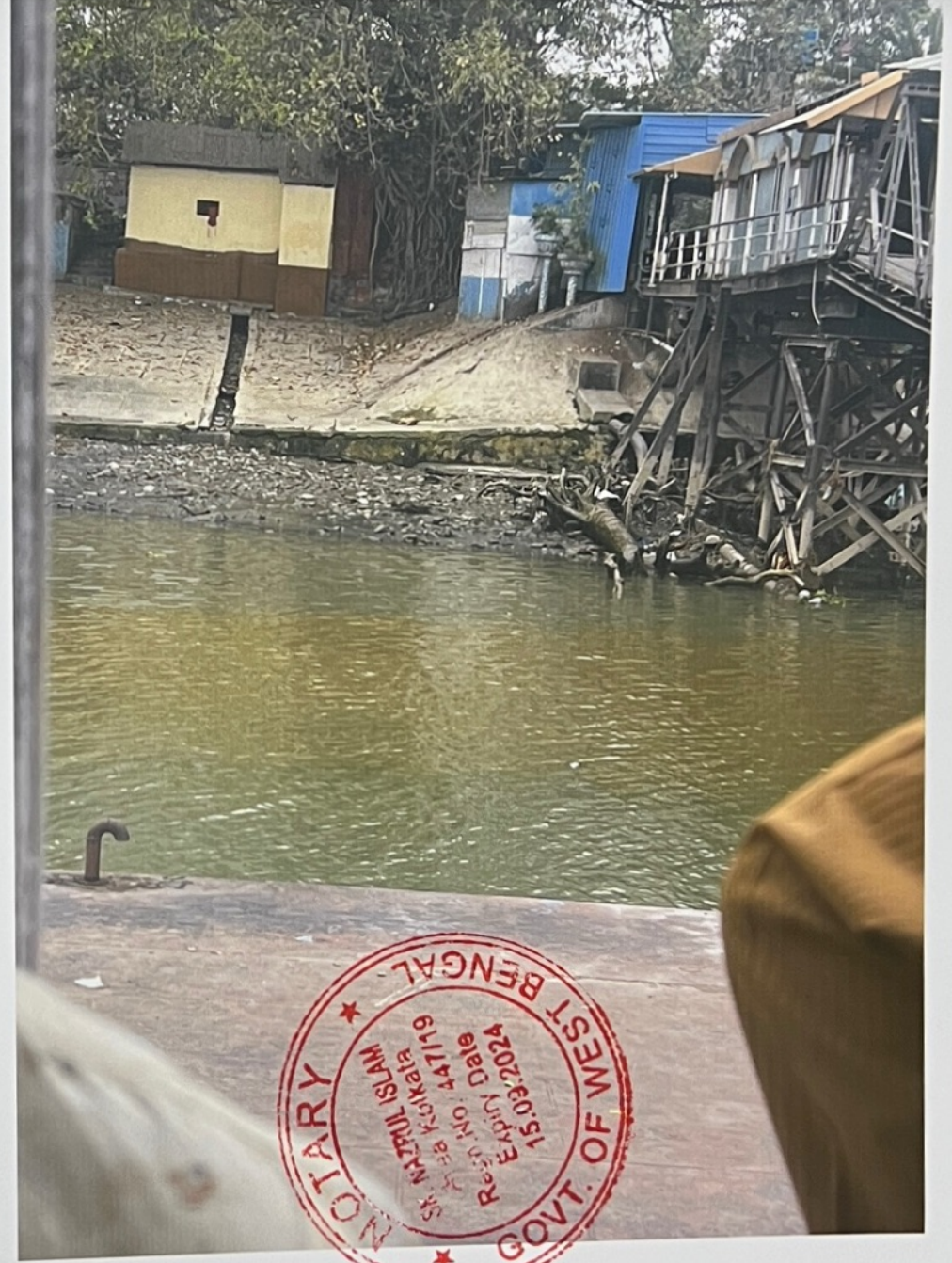
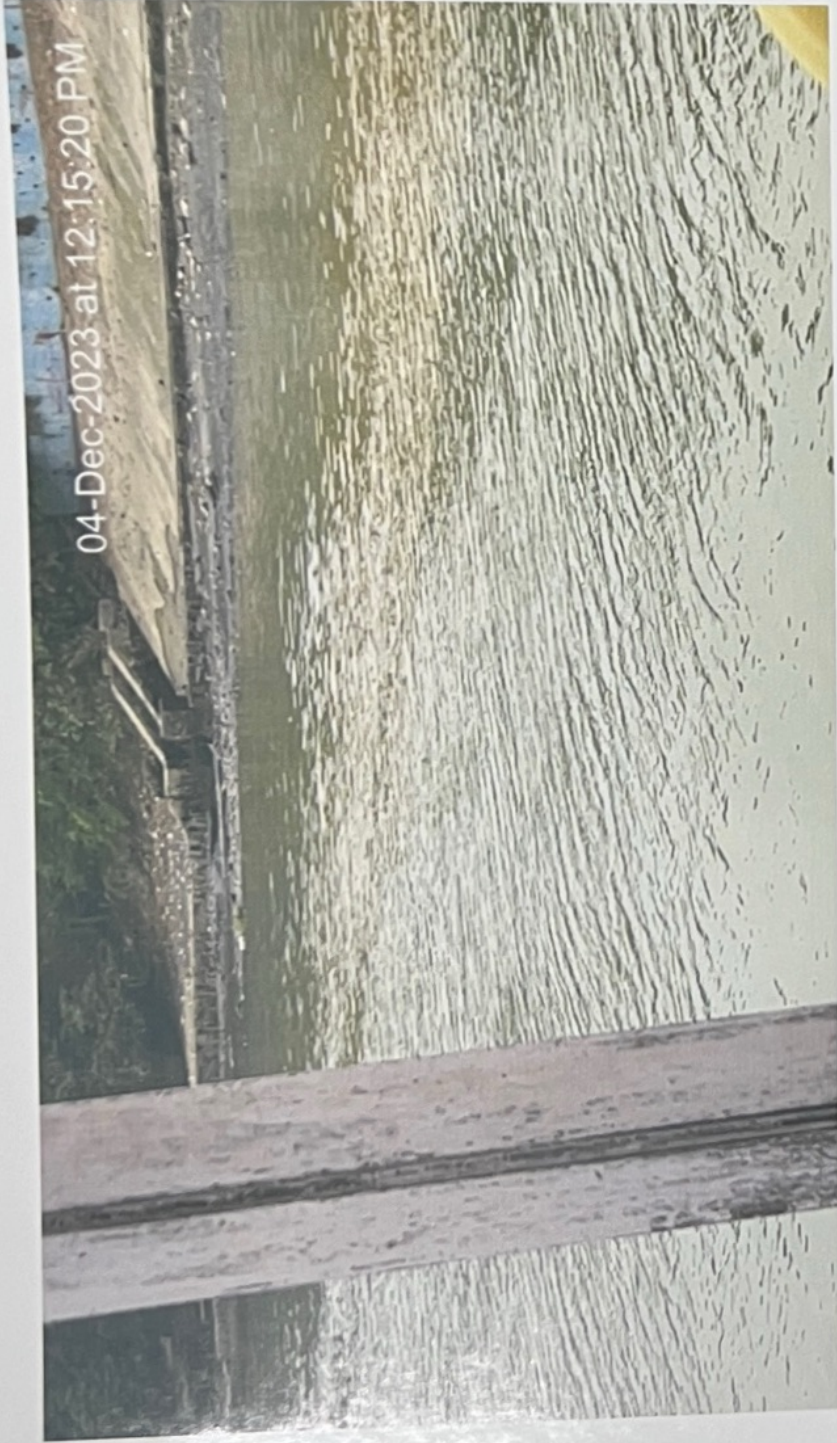
13 FEB 2024



07-Feb-2024 1:12:03 pm  
Howrah Station Road  
Shibpur  
Howrah  
Presidency Division  
West Bengal



07-Feb-2024 1:12:33 pm  
Howrah Station Road  
Shibpur  
Howrah  
Presidency Division  
West Bengal





High drain near Ramkrishnapur Ferry Ghat



**Legend**

- Ramkrishnapur
- Ramkrishnapur Ghat

NOTARY  
GOVT. OF WEST BENGAL  
K. N. TRIPATHI  
447119  
08/08/2024  
Expiry

Google Earth

30 m



### High drain near Ramkrishnapur Ferry Ghat

Legend  
● Ramkrishnapur  
■ Ramkrishnapur Ghat

Ruler  
Line Path Polygon Circle 3D path 3D polygon  
Measure the distance between two points on the ground

Map Length: 0.75 Kilometers  
Ground Length: 0.75  
Heading: 217.31 degrees

Mouse Navigation Save Clear

Labels on map: One Shot Fair, CEAT Shopping, Harilal's Tyre & Co (Howrah), Omnipro Impressions, ISKCON Howrah, Annapurna Furnitures, Bichali Ghat, Jame Masjid Gausia, Exide Industries Limited, Foreshore Road Aloka more, Detailing Devils Howrah, Clubtown River Dale, Foreshore Rd, Upper Foreshore Rd, Kolkata - Howra Ferry, UCO Bank ATM, Hooghly River, GOVT. OF WEST BENGAL, SK. NABIL ISLAM, Kolkata, 47119, Expire Date 15.09.2024, NOTARY

Google Earth  
Image © 2024 Airbus  
200 m





Ankur Sharma &lt;adv.ankursharma9@gmail.com&gt;

**RE : Complaint against draining of untreated sewage and pollution of river Hooghly by Howrah Municipal Corporation at Ramkrishnapur Ghat near Ramkrishnapur Jetty, Howrah.**

Ankur Sharma &lt;adv.ankursharma9@gmail.com&gt;

Wed, Apr 12, 2023 at 5:03 PM

To: chrnmn.wbpcb-wb@bangla.gov.in, ms.wbpcb-wb@bangla.gov.in

Cc: secy-moef@nic.in, dg@nmcg.nic.in, psecy.env.wb@gmail.com, environmentwb@gmail.com, dmhowrahwb@gmail.com, commissioner.howrah@gmail.com

The Chairman  
West Bengal Pollution Control Board

The Member Secretary  
West Bengal Pollution Control Board

Sub : Complaint against draining of untreated sewage and pollution of river Hooghly by Howrah Municipal Corporation at Ramkrishnapur Ghat near Ramkrishnapur Jetty, Howrah.

Sir,

I am constrained to bring the following to your kind notice :

1. That on 10.04.2023 while travelling to the Hon'ble High Court at Calcutta through a ferry launch I noticed that untreated sewage was being released in to the river Hooghly by a high drain maintained by the Howrah Municipal Corporation close south near Ramkrishnapur Launch Ghat jetty (photograph attached for reference).
2. That the sewage so discharged was completely black in color and also contained plastic and other non-biodegradable wastes.
3. That said sewage was flowing directly in to the river Hooghly without any trap gate for stopping flow of non-biodegradable wastes in to the river Hooghly.
4. The entire area in and around the said drain was stinking badly due to smell of the sewage.
5. The impugned act of releasing sewage along with other wastes is a gross violation of several environmental norms and laws including the Water (Prevention and Control of Pollution) Act, 1974, etc.

In view of above, you are requested to direct Howrah Municipal Corporation to immediately install a Sewage Treatment Plant (STP) commensurate with the quantity of the sewage and direct them to release sewage only after proper treatment.

May kindly calculate and impose appropriate environmental compensation upon Howrah Municipal Corporation as a penal measure.

Thanking you,  
Yours faithfully,

Ankur Sharma  
13/3, Dr. P.K. Banerjee Road  
Howrah - 711101  
Mob: 9433883322

cc :

The Secretary  
Ministry of Environment, Forest and Climate Change  
Government of India

The Director General  
National Mission for Clean Ganga

The Principal Secretary



Dept. of Environment, Government of West Bengal

The Chief Environment Officer  
Dept. of Environment, Government of West Bengal

The District Magistrate  
Howrah

The Commissioner  
Howrah Municipal Corporation  
- for kind information and necessary steps



Image - 1.jpeg  
118K

HOWRAH MUNICIPAL CORPORATION



# MEMORANDUM OF AGREEMENT

## HOWRAH MUNICIPAL CORPORATION



# **MEMORANDUM OF AGREEMENT**

**Among**

**Ministry of Environment and forests [MoEF]**

**Government of India**

**State Government**

**And**

**Urban Local Body**

**NATIONAL GANGA RIVER BASIN AUTHORITY**

**February, 2010**



**MEMORANDUM OF AGREEMENT (MOA)**

among

**MINISTRY OF ENVIRONMENT AND FORESTS, GOVERNMENT OF INDIA**

**THE STATE GOVERNMENT OF WEST BENGAL**

And

**URBAN LOCAL BODY (ULB) HOWRAH MUNICIPAL CORPORATION**

Abatement of river pollution is an ongoing activity required to be taken up on a continuous basis with the complete involvement of all stakeholders associate with the implementation of the program. This MOA provides a framework of commitments by all stakeholders not only for successful implementation of the program but also for proper operation and maintenance of the assets created. This agreement lays down the conditions which the State Government, the ULB and the implementing agency will undertake on the basis of the financial support provided by Government of India through the Ministry of Environment and Forests (MoEF).

THIS AGREEMENT is made on this 18<sup>th</sup> day of March, 2010 between the Government of India, through the Ministry of Environment and Forests, and

The State Government of (Name of the State) West Bengal through its Urban Dev. (Name of the Department) and

Howrah Municipal Corporation the Urban Local Body identified for implementation of NRCP.



**WHEREAS**

The Ministry of Environment and Forests will provide financial support to the State Government in their efforts to conserve rivers and lakes under their jurisdiction.

The State Government/ULB will commit to provide the State's share of the capital cost of the project and full operation & maintenance (O & M) costs. The State Government/ULB will also provide commitment to fulfill the conditions laid down as Annexure 'A'.

The State Government will also ensure commitment from ULB/implementing agency to take over the assets of the project on certification of project completion by the Implementing Agency.

**NOW THE PARTIES WITNESSED as follows :**

1. Funds will be released upon execution of the MOA and sanction of DPRs by the MoEF.
2. MoEF shall release the first installment of grant through State Level Nodal Agency (SLNA) under NRCP upon signing of this (MoA) and submission of the documents which are annexed with the Agreement as Annexure 'A'.
3. State Government will agree to bear 30% of the cost of the project or their share as decided from time to time.
4. The release of next installments of funds will be performance based, and will depend on submission of physical and financial progress reports and proper Utilization Certificates as well as on fulfillment of commitments as set out in Annexure 'A'.
5. The State Government shall also release their share of funds in proportion to the fund releases made by Government of India from time to time.



6. The State Government will constitute a Project Review Committee headed by the Secretary of the Nodal Department for reviewing the progress of the project on quarterly basis. A representative of MoEF will be a member of this Committee.
7. The State Government will appoint the implementing agency for the projects and the implementing agency will coordinate with the ULBs as well as other agencies to ensure synergy between programs like JNNURM/UIDSSMT and approved components under the NRCP.
8. The State Government and the ULB will be responsible for implementing, monitoring and reporting under the program.
9. The State Government shall be responsible for necessary coordination mechanism between the Implementing Agency and the ULB.
10. The State Government will ensure that the physical progress, expenditure reports and Utilization Certificates are furnished by the Implementing Agency to MoEF on a quarterly basis. In case the Implementing Agency fails to submit such a report, further installment of GoI's share may be withheld, until such submission.
11. MoEF or any agency nominated by it, may undertake periodic site visits to ascertain the progress of the ongoing projects and compliance of the conditions in the Checklist.
12. The responsibility of operation and maintenance will be with the ULB/maintenance agency. The ULB will submit a report regarding the mechanism for raising resources for the operation and maintenance of assets and will provide details of the same while submitting the project report. These may include instruments like user charges, property tax, sanitation charges or innovative PPP options. Schemes will be sanctioned contingent upon evaluation of the O & M Plans submitted by the ULB/implementing agency. Subsequent fund releases would depend on satisfactory progress of implementation of O & M plan.

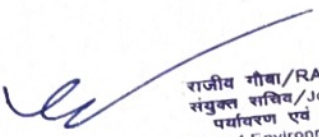


13. The State Government and ULB will be responsible for proper O & M of existing facilities like sewage treatment plants, sewage pumping stations, low cost sanitation, etc.
14. State Government and the Implementing Agency shall institute mechanism to ensure timely completion of projects undertaken under NRCP.
15. The cost overrun due to delay of the project or cost escalation of different items shall be borne by the State Government/ULB.
16. The implementation period can be extended, if so required, due to change in scope of work or other site specific condition. The decision in the matter of extension of time shall be at the discretion of MoEF.
17. MoEF will set up the mechanism for concurrent evaluation and monitoring of the project.
18. The State Government will provide the certification of project completion of the works.
19. In case of dispute between the parties, the matter will be resolved through mutual discussion.
20. In case of any breach regarding the terms and conditions of the MoA, MoEF shall be entitled to withhold release of subsequent installments of the grant.
21. The funds routed through MOA mechanism will be liable to statutory audit by the Controller and Auditor General of India.
22. This Memorandum of Agreement will take effect from the date of signing and would remain operative unless terminated by parties concerned by mutual consent.
23. In WITNESS HERE OF all the parties have agreed to abide by the terms and conditions as laid down in the Memorandum of Agreement in the presence of witnesses:



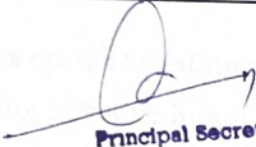
**SIGNATORIES**

For Government of India through Joint Secretary, Ministry of Environment and Forests




राजीव गांधी/RAJIV GAUBA  
 संयुक्त सचिव/Joint Secretary  
 पर्यावरण एवं वन मंत्रालय  
 Min. of Environment & Forests  
 भारत सरकार, नई दिल्ली  
 Govt. of India, New Delhi

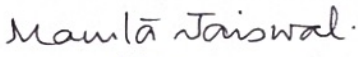
For State Government, State Secretary of Nodal Department



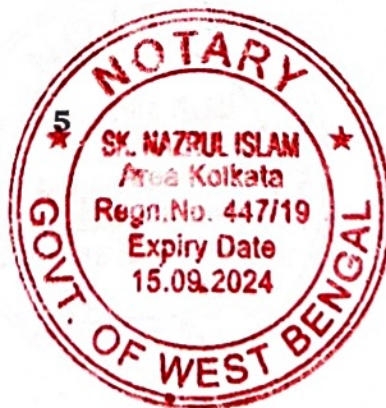
Principal Secretary  
 Urban Development Department  
 Government of West Bengal



For ULB / Mayor / Municipal Commissioner of concerned ULB



Mayor.  
 Howrah Municipal Corporation



## Annexure A

# CHECKLIST OF CONDITIONS

NRCP/NLCP requires certain conditions to be met by states / cities with the objective of securing effective linkages between asset creation and asset maintenance, ultimately leading of self-sustaining delivery of urban services.



### STATE LEVEL

1. Specify agency / agencies involved in planning and delivery of the following civic services,:

Sector	Agency undertaking planning	Agency undertaking delivery of services	Prevailing role of ULB/s
1. Sewerage and Sewage treatment	KMWE SA & ULB	KMWE SA	
2. Solid Waste Management	KMDA & ULB	ULB	OEM
3. Burials and burial grounds, cremations, cremation grounds and electric crematoriums	KMDA & ULB	ULB	OEM.

### CITY LEVEL

1. **Preparation of Comprehensive Sewage Disposal Plan**

- Please provide the timeline for preparing this Comprehensive Plan for the city

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. **Preparation of Comprehensive Sewage Disposal Plan**

- Increase in the sewerage network of the city

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Construction of Sewage Treatment Plants to treat the captured sewage

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- Laying of trunk & intercepting sewers for diversion of sewage out falling into the river

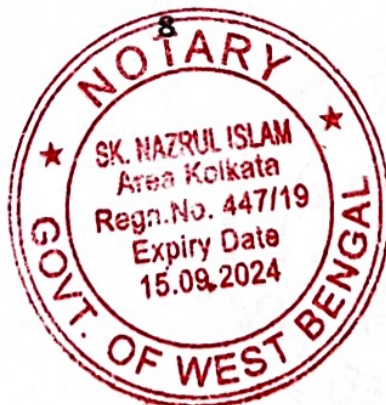
Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- Power connection to Sewage Treatment Plants and Pumping Stations

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- Obtain yearly consent to operate the STP from the concerned State Pollution Control Boards / Committees

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>



4. **Strom Water Drainage (Flowing into the river)**

- Identification of Problem Areas

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Primary Drain Rehabilitation and Improvement Program

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- Monitoring of water quality parameter (in the Drains at confluence with river)

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. **Non point sources of pollution**

- Providing electric / improved wood based crematoria to minimize the river pollution on account of disposal of unburnt dead bodies.

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Improvement of bathing ghats with toilets facilities

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

- Identification of slums adjoining rivers and lakes

- Identification of water and sanitation issues in these slums

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Planning for sustainable water and sanitation solutions for households residing in these slums

Year 1	Year 2	Year 3	Year 4
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



- Extending services of toilets, drainage, solid waste management in these slums

Year 1                      Year 2                      Year 3                      Year 4

- Removal of encroachments within duly demarcated river/lake boundary

Year 1                      Year 2                      Year 3                      Year 4

**5. User Charges**

- Please furnish the costs for providing the following services (total cost as well as per unit cost) and the total and per unit user charges collected in -----

Service	Total O & M Cost (Please specify the unit)		Total user charges collected (Please specify the unit)	
	Per Unit Cost	Total Cost	Per Unit Recovery	Total Recovery
Sewerage	Being	worked out		

- Time table to achieve full recovery of O & M costs from user charges (Please indicate proposed recovery level for each year)

Sewerage

Year 1                      Year 2                      Year 3                      Year 4

**6. Financial Management**

- Earmarking of funds for O & M

Year 1                      Year 2                      Year 3                      Year 4






Mamta  
Mayor.  
Howrah Municipal Corporation






# Micro-plastic pollution along the Bay of Bengal coastal stretch of Tamil Nadu, South India

T.G. Sunitha<sup>a</sup>, V. Monisha<sup>a</sup>, S. Sivanesan<sup>a</sup>, M. Vasanthi<sup>b</sup>, M. Prabhakaran<sup>c</sup>, K. Omine<sup>d</sup>, V. Sivasankar<sup>a</sup>    
A. Darchen<sup>e</sup>

Show more 

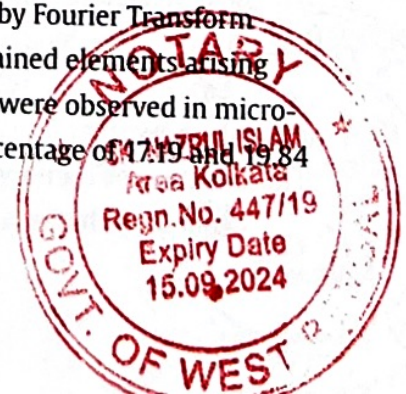
 Share  Cite

<https://doi.org/10.1016/j.scitotenv.2020.144073> 

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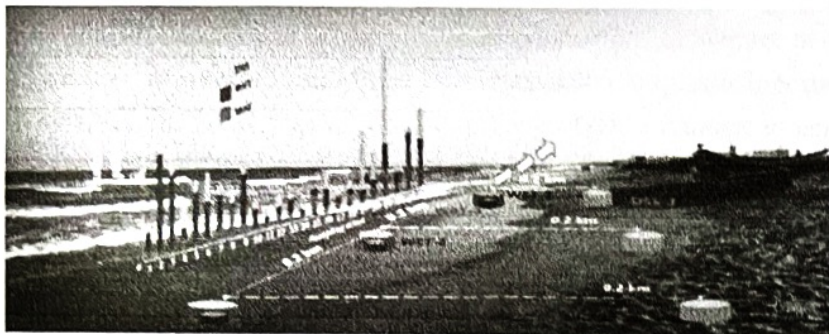
## Abstract

In the present-day context, micro-plastic particles in a marine environment are increasingly ubiquitous and of considerable persistence. In line with the micro-plastic pollution, the present contribution is devoted to the investigation of micro-plastic particles (MPs) along the urban sandy beach called Marina, the renowned longest beach in India. Along the sea coast of about 5 km, the quantification of micro-plastic particles using optical microscope evidenced the granular, filamentous, filmy and tubular fragments in a total of 72 marine samples including those filtered in the marine water column (WAT; 24 samples), those found in wet sediment (WET; 24 samples) and those found in dry sand (DSS; 24 samples). The filamentous-typed plastics of 79%, 57% and 52%, respectively in WET, WAT and DSS dominated over the other granular and tubular types. The micro-plastic particles were in the range of 60–820 items per m<sup>3</sup>, 60–1620 items per kg and 20–1540 items per kg for WAT, WET and DSS, respectively. The standard deviation for the microplastics abundance were 193.1, 396.6 and 364.6 for WAT, WET and DSS respectively. Upon visual inspection, the micro particles were observed in eight different colors and most of the samples were found to contain two different fragment types. Apart from the optical microscopic examination, the micro-plastics particles were studied by scanning electron microscope (SEM) coupled with elemental analysis by energy dispersive spectroscopy (EDS). The energy spectral graphs displayed that the micro-filaments and micro-tubular particles contained polyesters and fluoro-polymers. The presence of few micro-filaments of polypropylene and polyethylene was also evidenced from their atomic percentage values of carbon of about 88% and 93%, respectively. The presence of fluoro-polymers and polyesters was also confirmed by Fourier Transform Infra-Red (FTIR). Excepting the fluoro-polymers, the micro-plastics particles contained elements arising from sea water (Na, Cl, S, Mg, Ca, K). Heavy metals such as Cu, Mn, Mo, Ru and Rh were observed in micro-tubular fragments. Fe and Ti elements were detected with the highest atomic percentage of 17.19 and 19.84



in micro-tubular fragments. All the observations and analyses give a photography of the nature and the spatial distribution of MPs along this Indian beach.

## Graphical abstract



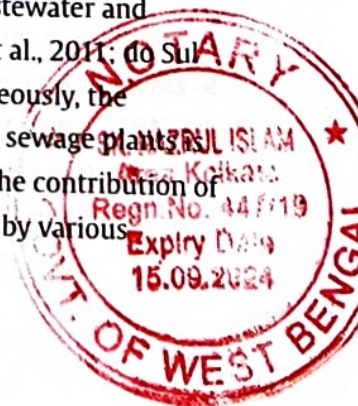
Download : [Download high-res image \(194KB\)](#)

Download : [Download full-size image](#)

## Introduction

The production of plastic materials across the globe in the last seven decades was escalated to about 190 times from 2 million tons in 1950 to 380 million tons in 2015. In addition, the disposal amount also parallelly increased to about 99 million tons and expected to be tripled by 2060 (Geyer et al., 2017; Lebreton and Andrady, 2019). The plastic processing industries in India are about 30,000 units with four million employees. And about 70% of plastic packaging items are turned into waste in a short span. Especially the largest share of plastic waste in India is contributed from chips and confectionary packets (19%) whereas bottle caps and lids (12%), PET bottles (10%), garbage bags (8%), packaging (8%) and the remaining 43% are from the other sources (AIPMA (The All India Plastics Manufacturers Association), n.d.). India generated about 26,000 tons per day in 2017–18 (CPCB (Central Pollution Control Board), n.d.) and from which about 60% were recycled. However, the remaining went as litters on roads, in landfills or in streams. It is estimated that about eight million tons of plastic waste entered into the ocean every year and in particular the river Ganga in India alone contributed to about 115,000 tons of plastic into the ocean in 2015. Ganga is among the top 20 polluting rivers in Asia (Lebreton et al., 2017).

Next to Europe and USA, India contributes to about 5% of the global clothes production. Among the Asian countries, India is the chief producer of synthetic fibers along with China. As a consequence of the plastic waste generation with subsequent fragmentation from all possible sources, the pelagic plastic fragments smaller than 5 mm (microplastics) are destined to open oceans which include polar waters (Isobe et al., 2017), marginal seas (de Lucia et al., 2014) and coastal waters (Isobe et al., 2019). Under the class of primary micro plastics, the synthetic clothing and fabrics could release micro fibers (MFs) in wastewater and about 90% of micro-plastic particles (MPs) are retained during the wastewater treatment process (Ziajahromi et al., 2016). In line with this, studies corroborated the entry of MPs into oceans from the wastewater and undergo further breakdown in surface and deep ocean waters, deep sea sediments (Cole et al., 2011; de Souza and Costa, 2014), oceanic gyres (Cózar et al., 2014) and fauna (Taylor et al., 2016). Simultaneously, the release of non-retained and unaltered MPs into the near shore marine environment from sewage plants is also highly accountable (Gröndahl et al., 2009) for the dilapidation of marine ecosystem. The contribution of primary and secondary MPs to the overall levels in marine environments was investigated by various



researchers (Essel et al., 2015; Lassen et al., 2015; Magnusson et al., 2016). Mehlhart and Blepp (2012) acknowledged that the land-based sources such as coastal populations, industry and agriculture are the major plastic transmitting sources in causing the marine plastic debris. It is likely to attribute the aeolian transport which is able to distribute small MPs that end up with the deposition on the dry and wet seashore sediments.

Van Cauwenberghe and Janssen (2014) reported that an average of 11,000 microplastic pieces were consumed by the shellfish. While considering similar plastic ingested sea foods by humans, many diseases such as hormonal disruption, reproductive problems, damage in nervous tissue, liver and kidney (Lamichhane, 2018), respiratory inflammation, pulmonary fibrosis and cancer (Carr, 2017) can occur. In a review report (Mishra et al., 2019), there is an estimated amount of 1.5 trillion of MFs, to date, present in the ocean and ingested by marine animals which make hazardous the lives of aquatic animals. There is a tremendous increase of about 21 times in the MFs (15 to 311 million tons) in the sediment samples of Indian Ocean in the past 50 years (Woodall et al., 2014). There are practical difficulties experienced in the filtering systems or municipal treatment plants due to the small size of MFs that are able to pass through and enter the watershed (Brannan, 2014). The presence of MPs in the stools of participants from different parts of the world revealed that an average of 20 particles quantified per 10g of excreta (Mishra et al., 2019).

MPs act as potential vectors with the dual nature sorption and desorption of organic and inorganic contaminants. The adsorbed contaminants happen to be absolutely detrimental when the microplastics are ingested by organisms at virtually every tropic level which includes zooplanktons, mussels and lugworms, cetaceans, fish, seabirds and large sea mammals (Cho et al., 2019; Sun et al., 2018; Koelmans et al., 2016; Scopetani et al., 2018). The low concentration of organic sorbates favors adsorption onto the surface of MPs (Hartmann et al., 2017). Fred-Ahmadu et al. (2020) detailed the factors which influence the sorption of organic contaminants onto MPs such as polymer type, crystallinity, size, pH of the medium, ionic strength, salinity, age and degree of weathering and the chemical properties of the contaminant. These MPs acting as harmful vectors are regarded as multiple stressors due to their physical and chemical impact on organisms (Rochman, 2013). As a consequence of ingested MPs into the cells by endocytosis, effects such as histological alterations, inflammatory reactions and ecotoxicological responses (at cellular, biochemical and molecular levels) and modulations of physiological functions were observed (Karami et al., 2017; Pedà et al., 2016). Liu et al. (2019) presented the results on the adsorption behavior of pristine and artificially aged microplastics and explored the higher sorption efficiency of aged PS and PVC polymers than of the pristine. Verla et al. (2019) reported a review on the quantified levels of micro-plastics with various implications to human and other living beings.

There are limited studies in view of microplastic exploration in marine samples have been surveyed. The study on beach sediments along the southeast coast covering 25 locations at a stretch of 1076km revealed the domination of line/fibers and the FTIR evidenced the prevailing polyethylene, polypropylene and polystyrene polymers along the coastal tract (Karthik et al., 2018). In the Gulf of Mannar of Rameswaram Island, micro plastics in 20 sediment samples were visually examined along with FTIR characterization. These samples revealed the dominant polypropylene variety among the other polyethylene, polystyrene, nylon and PVC polymers as a main consequence of aeolian transportation (Vidhyasagar et al., 2018). Polyethylene was the most dominating type among the other types at three different locations along the Indian coast (Tiwari et al., 2019). Sathish et al. (2019) quantified the microplastics in five beach sediments of Tamil Nadu and explored the dominance of polyethylene (81%) with the maximum amount of  $309 \pm 184$  items  $\text{kg}^{-1}$  in the sample of Marina beach. The collected yellow colored pellets from Chennai coast by Mugilarasan et al. (2017) revealed their photo oxidative damage and longevity in the marine environment



and found to be more weathered which resemble the adsorption of persistent organic pollutants (POPs) from the environment.

From India, based on the Scopus record, very limited number of 26 publications in the area of microplastics research are published from 2016 to 2020. Microplastics research in water, sediments, fish along the Southeast and Southwest Coasts (Vidhyasagar et al., 2018; Daniel et al., 2020), beaches (Karthik et al., 2018), lakes (Sruthy and Ramasamy, 2017) and rivers (Amrutha and Warriar, 2020) across India were reported. In view of an intense research along the seashore stretch of Marina beach, the present contribution claims to be the main deep investigation on a large beach surface. In the present work, MPs were isolated from 72 marine samples such as water, wet and dry sands at defined transects, they were quantified and observed, and then characterized for ascertaining the chemical structure of those plastic particles.

## Section snippets

### About the study area

Marina beach is the natural urban beach along the Coramandel Coast on the Bay of Bengal which was renovated in 1880s. It is the longest of Indian beaches and the world's second longest beach which extends from the near Fort St. George in the North to Besant Nagar in the South and spans for a distance of 13 km. This sandy beach is with the average width of 300 m and the width at the widest stretch is 437 m. It is one of the most crowded beaches in India which attracts about 20,000 people per day ...

### Consolidated profile of micro plastic particles (MPs) in the marine samples

Based on microscopic investigation (Fig. 1A), the minimum number of MPs were quantified to be 60 items each for WAT (per m<sup>3</sup>; sample #10) and for WET (per kg; sample #14) samples, but the DSS category were recorded with a very minimum of 20 items per kg (sample #15). On the other hand, the maximum items of MPs for WAT, WET and DSS were 820 items per m<sup>3</sup> (sample #23), 1620 items per kg (sample #2) and 1540 items per kg (sample #21) respectively. The abundance of MPs with a standard deviation of...

### Conclusions

This study reports the micro-plastic pollution on 0.92 km<sup>2</sup> of a long beach in the Tamil Nadu. Seventy-two samples have been isolated from the water, wet sand and dry sand. The micro-plastic particles were more abundant in wet sand than in water or dry sand. Three kinds of analysis have been carried out. The first one is a visual observation which gives the localization, the shape and the color of the micro-plastics. Filamentous particles (MFs) and blue and pink fragments were the more abundant...

### CRedit authorship contribution statement

**T.G. Sunitha:** Formal analysis. **V. Monisha:** Investigation. **S. Sivanesan:** Investigation. **M. Vasanthy:** Resources. **M. Prabhakaran:** Formal analysis. **K. Omine:** Supervision. **V. Sivasankar:** Conceptualization, Writing - review & editing. **A. Darchen:** Writing - review & editing.

### Declaration of competing interest



The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper....

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# ALL ABOUT **PALTA PLANT**



(Top) A worker removes plastic that has been clogging the filtration beds; (above) the Palta water plant

**Location** | Barrackpore (on the bank of the Hooghly)

**Capacity** | **230 million gallons** every day

**Serves** | **60%** of Kolkata's population

**The problem** | Planktons & micro plastics choking filtration beds

**When was it noticed** | KMC engineers at Palta plant noticed the problem. Then a team of scientists from Central Inland Fisheries Research Institute (CIFRI) conducted a survey and found that not only planktons, but micro plastic was also responsible for choking the filtration beds



## WHAT ARE PLANKTON?

**Diverse collection of organisms like bacteria, archaea, algae and protozoa that live in large bodies of water and are unable to swim against a current. They provide a crucial source of food to fish. Though many planktonic species are microscopic in size, plankton includes organisms over a wide range of sizes, including large organisms, like jellyfish**



Contamination from micro-plastics (particles smaller than 10 nanometres or one-hundred thousandth of a millimetre) has emerged as a major global concern of late. Plastic pollution has also been identified globally as a major factor behind marine animal deaths and habitat destruction.

But the Kolkata Municipal Corporation water supply department's discovery — of the presence of micro-plastics in the filtration bed of the Palta Waterworks, which supplies potable water to over three-fourths of city homes — has come by a circuitous route.

Engineers were first concerned when they found the volume of water reducing considerably after the filtration process on some days, sometimes as much as by 10%.

Officials then identified plankton as the cause; this choked the filtration beds and hindered the filtration process, allowing only a portion of the water drawn from the Hooghly to filter through.

Palta engineers — alarmed by the reduced efficiency of the plant — sent an SOS to KMC headquarters, leading the latter to contact Central Inland Fisheries Research Institute scientists to probe the issue and suggest a solution. It was during this study that scientists found a huge amount of micro-plastics in water and said that they, too, were to blame for the choking of the filtration beds.

CIFRI scientists met senior KMC water department officials recently to discuss the threat that micro-plastics posed to the city's water supply system. CIFRI scientist R K Manna said the study had found micro-plastic fibres, foam and pellets in raw water drawn from the Hooghly.

"Foam and films have also been found on the Palta filtration beds," Manna said.

A recent CIFRI survey on pollution in the Ganga had found micro-plastic pollution in Balia, Uttar Pradesh; Bhagalpur, Bihar; and Kolkata.

"It is a menace that requires more attention and corrective action," CIFRI director B K Das said.

The plankton count in the Hooghly water, too, has been found to be high (91,497 units of periphyton were found in a litre of raw water at Palta). They, too, can be responsible for choking filtration beds and reducing water supply, but they cause less harm than micro-plastics, say scientists.

River expert and West Bengal Pollution Control Board chairman Kalyan Rudra felt that plankton could affect the efficiency of the water treatment plant, but it was micro-plastic contamination that the Kolkata Municipal Corporation (KMC) needed to worry about more.



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Das was concerned about micro-plastics flowing through pipelines and into homes in Kolkata and felt a comprehensive research needed to be carried out. The KMC water supply department's chief executive officer, Bibhas Maity, agreed. "The KMC will formally write to the CIFRI authorities to take up a research project on combating the presence of micro-plastics in Palta Waterworks," he said.

