

**BEFORE THE NATIONAL GREEN TRIBUNAL  
SOUTHERN ZONE, CHENNAI**

**OA No. 180 of 2023 (SZ)**

**IN THE MATTER OF :**

Tribunal on its own motion SUO MOTU

... Applicant

Vs

The District Collector and Ors.

... Respondents

**INDEX TO THE STATUS REPORT FILED BY THE 7<sup>th</sup> RESPONDENT**

<b>S No.</b>	<b>Date</b>	<b>Description</b>	<b>Page No.</b>
1.	<b>02.04.2024</b>	Status Report filed by the 7 <sup>th</sup> Respondent.	<b>1</b>
2.	<b>27.03.2024</b>	Annexure I – WAPCOS Report	<b>9</b>
3.	<b>17.12.2023</b>	Annexure II – EIL review	<b>10</b>
4.	<b>18.12.2023</b>	Annexure III – Worley Review	<b>12</b>
5.	<b>2015</b>	Photos of Flood	<b>15</b>
6.	<b>2023</b>	IIT Preliminary Report	<b>17</b>
7.	<b>20.12.2023</b>	TERI Report	<b>26</b>

DATED AT CHENNAI ON THIS THE 2<sup>ND</sup> DAY OF APRIL, 2024



**M/s. AAV PARTNERS**

**COUNSEL FOR 7<sup>th</sup> RESPONDENT**

74-76, II Floor, Marshall's Encalve, Marshall's Road,  
Egmore, Chennai – 08.

Ph – 9500069660

**BEFORE THE NATIONAL GREEN TRIBUNAL  
SOUTHERN ZONE, CHENNAI**

**OA No. 180 of 2023 (SZ)**

**IN THE MATTER OF :**

Tribunal on its own motion SUO MOTU

... Applicant

Vs

The District Collector and Ors.

... Respondents

**STATUS REPORT FILED BY M/s. CHENNAI PETROLEUM  
CORPORATION LIMITED, THE 7<sup>TH</sup> RESPONDENT (02.04.2024)**

**THE 7<sup>TH</sup> RESPONDENT BEGS TO SUBMITS AS FOLLOWS :**

1. It is submitted that the present Application has been Suo Motu initiated by this Hon'ble Tribunal with respect to the Oil Leak in the Buckingham Canal and Ennore Creek areas.
2. It is submitted that this Respondent had filed a status report on 14.12.2023, 18.12.2023 and 21.12.2023, 11.01.2024 and the same may be taken as a part and parcel of this present status report.
3. That this Respondent begs to submit this report in reply to the report submitted by the 6<sup>th</sup> Respondent, Water Resources Department dated 26.02.2024, before this Hon'ble Tribunal.
4. That before traversing into the merits of the report, this Respondent hereby vehemently denies all the averments and allegations made in the report except those that are specifically admitted hereunder.



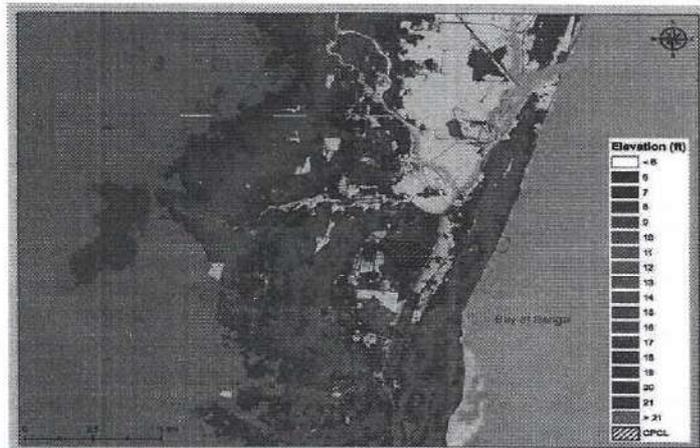
**बी. कोथंडरामन / B. KOTHANDARAMAN**  
मुख्य महाप्रबंधक (एचएसई)  
Chief General Manager (HSE)  
सी पी सी एल/CPCL, चेन्नै/Chennai - 68

### **ELEVATION LEVEL OF CPCL**

5. It is submitted that with respect to the averments made in Para 1 of the report that the CPCL premises is at a much lower elevation compared to Buckingham canal bund level which would have caused flooding in the CPCL campus, is all false and denied. It is humbly submitted that CPCL refinery is at higher elevation compared to Buckingham Canal as evident from various external third party reports. Summary of the reports are furnished here under :

#### **A. Survey conducted by M/s WAPCOS in 2007:**

- i. The survey conducted by M/s WAPCOS, a Central Public Sector Enterprise, indicates that the bottom of Buckingham Canal is at an elevation of (-) 1.2m to (-) 1.5m from Mean Sea Level (MSL) and the level of Refinery is +2.8 to +3.0 m from MSL. Hence, CPCL is at a higher level of 4.0 to 4.5m, compared to bottom of Buckingham Canal.
- ii. Based on image extracted from Survey of India 2009 (see picture below), elevation of CPCL is about 8 to 10 feet above MSL compared to nearby water bodies which are less than 6 ft above MSL. This indicates that CPCL is at a higher elevation than nearby water bodies such as Kosasthalaiyar river and Buckingham Canal.



*[Handwritten signature]*

बी. कोथंडरामन / B. KOTHANDARAMAN

मुख्य महाप्रबंधक (एचएसई)

Chief General Manager (HSE)

CPCL, चेन्नै / Chennai - 600 002

**B. Study conducted by M/s WAPCOS in 2024:**

M/s WAPCOS carried out study in Feb/ March 2024 and has submitted a preliminary report which is as follows :

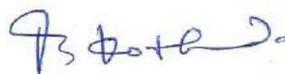
- i. The lowest discharge point level in CPCL premises is +3.15 M compared to Buckimham canal average bund wall level of +2.795 M. Further it is to be mentioned that the designed bed level of Buckimham canal is -1.675 M. Hence the topography of CPCL premises is on higher level compared to Buckimham canal profile and the preliminary observations of WAPCOS are enclosed as **ANNEXURE – I.**

6. That it can be clearly inferred from the above reports that CPCL is located at a higher elevation compared to the Buckingham canal, contrary to the allegations of the 6<sup>th</sup> Respondent and further, the allegation that the CPCL would have discharged the surplus oil spilled floodwater into nearby water bodies are all false and denied.

**STORM WATER SYSTEM OF CPCL**

7. It is respectfully submitted that, being in the industry since 1965, CPCL has developed a robust Storm Water Canal System, which has successfully handled heavy rain during monsoons and earlier cyclones. This has been confirmed by a reputed third party consultant M/s Engineers India Limited (A Public Sector Enterprise) that "The storm water drainage system facilities under all units of Refinery had been designed for hourly designed rainfall intensity as per Design basis". Copy of the report is enclosed as **Annexure-2.**

8. Similarly M/s Worley who have carried out storm water system study for recent expansion projects have also confirmed the adequacy of Storm Water System of CPCL. Copy of the report is enclosed as **Annexure-3.**



बी. कोथंडरामन / B. KOTHANDARAMAN  
मुख्य महाप्रबंधक (एचएसई)  
Chief General Manager (HSE)  
सी. पी. सी. एल./CPCL, चेन्नै/Chennai - 68.

### **FLOODING IN MANALI INDUSTRIAL AREA**

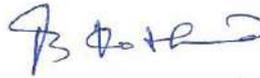
9. It is respectfully submitted that, due to Cyclone Michaung, severe flooding was experienced in the entire Manali industrial belt (**Copy enclosed as Annexure-4**) comprising of around 20-25 Large Industries and more than 200 small and Medium scale industries. It is further respectfully submitted that, most of the industries even were forced to shutdown due to terrible flooding. It is humbly submitted that the grievous flooding may be due to restriction in width of water carrying channels while handling water released from reservoirs inter-alia among other reasons.

10. It is noteworthy to mention that, in this context, a rain water management and disposal study of CPCL Refinery was conducted recently in 2024 by a third party expert, M/s WAPCOS (**Copy enclosed as Annexure-1**) and the observation of the report in this context is reproduced here under for easy reference :

- i. *"From the reconnaissance survey, it is observed that due to encroachment & obstructions in the bank of Kosasthalaiyar river, the flood carrying capacity of the river would have been reduced. However, this can be confirmed only after detailed survey and assessing the sections.*
- ii. *From the reconnaissance survey, it appears that the Buckingham canal is not carrying the designed capacity due to siltation & obstructions. This shall be confirmed after detailed surveys."*

11. It is further submitted that the following are the observations made by IIT Madras on flooding in Manali industrial belt in the year 2021 :

- i. *"Flood discharge from reservoirs and lakes and the capacity of the flood carrier is overwhelmed due to encroachments, siltation, and obstructions thus jumping the course and inundating the nearby areas.*

  
**बी. कोथंडरामन / B. KOTHANDARAMAN**  
 मुख्य महाप्रबंधक (एचएसई)  
 Chief General Manager (HSE)  
 सी पी सी एल/CPCL, चेन्नै/Chennai - 68.

- ii. *Lack of local storm drainage, storm drainage with inadequate capacity, obstructions to local drainage."*

(Copy of the IIT observations is attached in **Annexure 5.**)

**OIL SLICK IN ENNORE CREEK**

**12.** That the allegation in Para 7 of the report that CPCL deliberately engages in leaking oil through its pipelines during the monsoon periods, is false and denied and it is respectfully submitted as follows :

- i. That CPCL is in the industry since 1965 and has been operating relentlessly by following applicable environmental norms of the regulatory authorities and in the process has taken several environment initiatives being a responsible corporate citizen.
- ii. That, being a responsible corporate citizen, CPCL has extended all the best possible support during Cyclone Michaung.
- iii. That, during these critical situations, CPCL being engaged in critical essential area of business and being a responsible corporate citizen, had perceived its responsibility and had ensured operating one out of three Primary units even in the extreme adverse conditions during the floods to maintain uninterrupted fuel supply safely to Tamil Nadu. The Primary unit which was under operation was not affected during the floods.
- iv. CPCL is having well established oil water separation system and the systems are being operated continuously to ensure recovery of any oil and recycling the same for reprocessing.
- v. Moreover, there was no pipeline or tankage failure and integrity of infrastructure was intact during the floods.
- vi. Due to excessive flooding, there might be the possibility of meagre surface oil getting carried over mixed with water when flood waters receded. This is also applicable to all the industries located across Manali industrial area.



**बी. कोथंडरामन / B. KOTHANDARAMAN**  
 मुख्य महाप्रबंधक (एचएसई)  
 Chief General Manager (HSE)  
 सी पी सी एल/CPCL, चेन्नै/Chennai - 68.

**13.** It is respectfully submitted that, CPCL, as a responsible Corporate citizen, took the lead along with State authorities for restoring the Ennore Creek. Clean up activities were initiated on a war footing basis and were completed in a short period of time. Without going into the issue as to who is responsible, CPCL as a body corporate with social responsibility wholly undertook the entire expenditure for the entire cleaning operations as well as the expenditure towards relief and rehabilitation.

**14.** It is submitted that during the operation process, no residue of the products is wasted as any bi-product or the residue is recycled to produce some other final products to be used and therefore there is no scope of letting any residue out of refinery through canal or otherwise.

**15.** It is submitted that as per Field observation carried out by The Energy and Resources Institute (TERI), a reputed third party expert agency on 20.12.2023, there was no oil film or visible oil contamination between the mouth of Ennore creek up to Ennore road bridge. Also, no abnormal conditions like dead fish or oil layers or any loss of flora and fauna were observed at the site. Copy of the TERI observations is attached in **Annexure 6** and the preliminary observation is as follows :

- i. *The team visited Ennore creek and conducted survey by boat from the mouth of creek to mangrove area. It was observed that between the mouth of the creek up to Ennore road bridge there is no oily film or visible oil contamination was noticed.*
- ii. *At the junction of Buckingham canal and Kosasthalaiyar river to Ennore railway bridge the physical observation showed some traces of oily sheen. However, the major cleaning has been achieved and residual cleaning in mangrove area is in progress.*



बी. कोथंडरामन / B. KOTHANDARAMAN  
मुख्य महाप्रबंधक (एचएसई)  
Chief General Manager (HSE)  
सी पी सी एल/CPCL, चेन्नै/Chennai - 68.

- iii. *The TERI team did not observe any abnormal conditions at site like dead fish or oil layers or any loss of flora and fauna. However, the team observed odour which could be of sewage wastewater.*
- iv. *The oil contaminated water collected using skimmers have been collected in barrels and shifted to CPCL Refinery and stored in designated area. Also, the solid waste is also collected in plastic bags and shifted to refinery.*
- v. *The team observed that the oil spread controlling booms have been placed effectively to control the spread of shine from containment zone to sea area.*

**16.** That M/s. TERI has taken survey and taken samples of water, sediments, fish etc at different locations including upstream of CPCL to Ennore creek and the final report is yet to be received.

#### **Mangrove area bio- remediation**

**17.** It is submitted that with respect to the Bio-Remediation, the Water and Sediment pre-sampling at one control and three test locations have been done on 09.01.2024 before starting bioremediation, which is to be carried out by **National Institute of Oceanography, Goa.**

**18.** It is submitted that the process of Bioremediation was commenced on 10.01.2024 and post spray three sets of water and sediment samples were collected on 20.01.24, 05.02.24 & 20.02.2024 and the final report of the same is awaited from the Institute.



बी. कोथंडरामन / B. KOTHANDARAMAN  
मुख्य महाप्रबंधक (एचएसई)  
Chief General Manager (HSE)  
सी पी सी एल/CPCL, चेन्नई/Chennai - 600

**19.** In view of above, it is therefore humbly submitted that this Respondent, has a strong and robust system to operate the refinery in a safe and smooth manner and is capable of handling heavy floods such as in 2015 which was even more severe than the cyclone in 2023 and present unexpected incident during the unprecedented flooding could have resulted from the extreme waterlogging across Manali industries which may be a force majeure and an act of God and no fault can be attributed to this Respondent, as alleged by the Report.

Under the above circumstances, it is humbly prayed that this Hon'ble Tribunal may be pleased to consider the present report and pass such orders as it deems fit and thus render justice.

Dated at Chennai on this the 02<sup>nd</sup> day of April 2024



**7<sup>th</sup> RESPONDENT**

**बी. कोथंडरामन / B. KOTHANDARAMAN**  
मुख्य महाप्रबंधक (एचएसई)  
Chief General Manager (HSE)  
सी पी सी एल/CPCL, चेन्नै/Chennai - 68.

**VERIFICATION**

I, B. KOTHANDARAMAN, Son of M. BALU, aged 56 years, the CGM(HSE) of Chennai Petroleum Corporation Limited, the 7<sup>th</sup> Respondent herein, do hereby verify that the contents of the above paragraphs are true to the best of my personal knowledge and grounds are based on legal advice and that I have not suppressed any material fact.

Verified at Chennai on this the 02<sup>nd</sup> day of April 2024



**7<sup>th</sup> RESPONDENT**

**बी. कोथंडरामन / B. KOTHANDARAMAN**  
मुख्य महाप्रबंधक (एचएसई)  
Chief General Manager (HSE)  
सी पी सी एल/CPCL, चेन्नै/Chennai - 68.



# वाष्कोर 9 लिमिटेड WAPCOS LIMITED

(भारत सरकार का उपक्रम)  
जल शक्ति मंत्रालय  
(A Government of India Undertaking)  
Ministry of Jal Shakti

Annexure 1  
75  
Azadi Ka  
Amrit Mahotsav  
GSTIN: 33AAACW0764A1ZW

WAPCOS Lr No. /CPCL/ /2024/

27.03.2024

To

The Deputy General Manager,  
(Projects & Engg. Services)  
Engineer – In – Charge,  
536, Anna Salai, Teynampet,  
Chennai - 600018.

**Sub:-** Consultancy Services for Rain Water Management and Disposal Study in Manali Refinery of CPCL – **Observations submitted - Reg.**

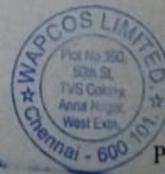
**Ref:-** Work Order vide CPCL Lr.No. CPCLH24031 dated 13.01.2024

Sir,

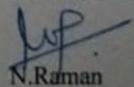
With reference to the above, we would inform that the prima-facia observations noticed during the topographic survey of CPCL premises are given below for kind perusal.

- The lowest discharge point level in CPCL premises is +3.15 m compared to Buckingham canal average bund level of +2.795m. Further it is to mention that the designed bed level of Buckingham canal is -1.675m. Hence the topography of CPCL premises is on higher level compared to Buckingham canal profile.
- CPCL is having designed storm water system in their premises which is currently functioning.
- The existing storm water system appears to be adequate to carry the discharge. However, it shall be confirmed after finalizing the hydrology.
- From the reconnaissance survey, it is observed that due to encroachment & obstructions on the banks of Kosathalayar river, the flood carrying capacity of the river would have been reduced. However, this can be confirmed only after the detailed survey & accessing the sections.
- From the reconnaissance survey, it appears that the Buckingham canal is not carrying the designed capacity due to siltation & obstructions. This shall be confirmed after detailed surveys.

Thanking and assuring of our best services at all times.



Very truly yours,



N. Raman

Project Manager (WRD)

न.990, 50वीं स्ट्रीट, टीवीएस कॉलोनी, अन्ना नगर वेस्ट एक्सटेंशन, चेन्नई 600 101

दूरभाष: 044-26540477, फ़ैक्स: 044-26541376, ईमेल: [chennai@wapcos.co.in](mailto:chennai@wapcos.co.in)

No.990, 50<sup>th</sup> Street, TVS Colony, Anna Nagar West Extension, Chennai-600 101.

Telephone: 044-26540477, Fax: 044-26541376, Email: [chennai@wapcos.co.in](mailto:chennai@wapcos.co.in)

## Annexure 2

Review of adequacy of Storm water drainage system at CPCL Manali Refinery - reg  
Anilsahni to ShankarP 18-12-2023 18:42

History:

This message has been forwarded.

-----Forwarded by Anilsahni/Cpcl on 12/18/2023 06:54PM -----

To: Anilsahni/Cpcl@Cpcl, K Rajasekaran/Cpcl@Cpcl  
From: Sivasankaran S-Proj ES/Cpcl  
Date: 12/17/2023 08:38AM  
Cc: S Sadagopan/Cpcl@Cpcl, I mahendran/Cpcl@Cpcl, vikas/Cpcl, H Shankar-DT/Cpcl@Cpcl  
Subject: Fw: Re: Review of adequacy of Storm water drainage system at CPCL Manali Refinery - reg

Sir

Confirmation of storm water system adequacy provided by EIL, Engineering consultant is forwarded

Regards

S.Sivasankaran  
GM (Projects & Engg Services)  
Chennai Petroleum Corporation Ltd  
Manali Chennai 68  
044-2594 4474

-----Forwarded by Sivasankaran S-Proj ES/Cpcl on 12/17/2023 03:16AM -----

To: [ssadagapan@cpcl.co.in](mailto:ssadagapan@cpcl.co.in)  
From: "SAMIR KUMAR NASKAR" <[sk.naskar@eil.co.in](mailto:sk.naskar@eil.co.in)>  
Date: 12/16/2023 04:05PM  
Cc: "CMD EIL Management" <[cmd@eil.co.in](mailto:cmd@eil.co.in)>, "RAJIV AGARWAL" <[rajiv.aggarwal@eil.co.in](mailto:rajiv.aggarwal@eil.co.in)>, [shankarh@cpcl.co.in](mailto:shankarh@cpcl.co.in), [shiva@cpcl.co.in](mailto:shiva@cpcl.co.in), "NAVEEN PARASHAR" <[naveen.parashar@eil.co.in](mailto:naveen.parashar@eil.co.in)>  
Subject: Re: Review of adequacy of Storm water drainage system at CPCL Manali Refinery - reg

Dear Sir,

Refer to the queries raised in your trailing mail, our reply is as Below:  
The storm water drainage system of facilities under Refinery-I, Refinery-II, Refinery-III and BS-IV project (within EIL scope of work) had been designed for hourly designed rainfall intensity as per Design basis.

With Best Regards

Samir Kumar Naskar  
Chief General Manager I मुख्य महाप्रबंधक  
Head of Department | विभागाध्यक्ष  
General Civil Department | सामान्य सिविल इंजीनियरिंग विभाग

Engineers India Limited, Gurugram Office Complex, Tower - 1, Ground Floor, Sector-16, Haryana I  
इंजीनियर्स इंडिया लिमिटेड, गुरुग्राम कार्यालय परिसर, टॉवर - 1, भू तल, सेक्टर - 16, हरियाणा

( Main: +91 124 289-1901, Mobile: 9818692531)  
e-mail I ईमेल: [sk.naskar@eil.co.in](mailto:sk.naskar@eil.co.in) | [www.engineersindia.com](http://www.engineersindia.com)

हर काम देश के नाम

----- Original Message -----

From: "RAJIV AGARWAL" <[rajiv.aggarwal@eil.co.in](mailto:rajiv.aggarwal@eil.co.in)>  
 To: "SAMIR KUMAR NASKAR" <[sk.naskar@eil.co.in](mailto:sk.naskar@eil.co.in)>  
 Cc: "CMD EIL Management" <[cmd@eil.co.in](mailto:cmd@eil.co.in)>  
 Sent: Saturday, December 16, 2023 9:14:09 PM  
 Subject: Fwd: Review of adequacy of Storm water drainage system at CPCL Manali Refinery - reg

For n.a please.

Best Regards, Rajiv Agarwal Director (Technical) Engineers India Limited, 1, Bhikaiji Cama Place New Delhi 110066, India Phone + 91 (011) 26762518, 26763494

----- Forwarded Message -----

From: [ssadagopan@cpcl.co.in](mailto:ssadagopan@cpcl.co.in)  
 To: RAJIV AGARWAL <[rajiv.aggarwal@eil.co.in](mailto:rajiv.aggarwal@eil.co.in)>  
 Cc: [shankarh@cpcl.co.in](mailto:shankarh@cpcl.co.in), NAVEEN PARASHAR <[naveen.parashar@eil.co.in](mailto:naveen.parashar@eil.co.in)>, [mdoffice@cpcl.co.in](mailto:mdoffice@cpcl.co.in), [shiva@cpcl.co.in](mailto:shiva@cpcl.co.in)  
 Sent: Sat, 16 Dec 2023 18:47:05 +0530 (IST)  
 Subject: Review of adequacy of Storm water drainage system at CPCL Manali Refinery - reg

Dear Sir

This has reference to telecon of our MD with CMD, EIL and our DT with your good self on urgent requirement for study of storm water system at CPCL, Manali Refinery.

The storm water system of CPCL Refinery I, Refinery II, Refinery III & BS VI units has been designed by EIL during the project stage of respective facilities. In the recent rain during Michaung Cyclone, heavy flooding has occurred inside CPCL premises. In this regard, You are requested to confirm that the storm water drainage system has been suitably designed for design rainfall intensity (Max. hourly rainfall).

With Best Regards,

S. Sadagopan

CGM - Logistics & Projects

Chennai Petroleum Corporation Limited

044-25944211 / 25941192 / 9840505678, [ssadagopan@cpcl.co.in](mailto:ssadagopan@cpcl.co.in)

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अस्वीकरण: यह संदेश सी पी सी एल मेसेजिंग गेटवे, भारत से भेजा गया है। इस इलेक्ट्रॉनिक संदेश में निहित जानकारी और इसके साथ कोई भी संलग्नक केवल प्रेषित व्यक्ति (यों) के लिए ही है और इसमें स्वामित्व, गोपनीय या विशेषाधिकार प्राप्त जानकारी हो सकती है। यदि आप वांछित प्राप्तकर्ता नहीं हैं तो आपको इस ई-मेल को प्रसारित, वितरित या कॉपी नहीं करना चाहिए। कृपया इसकी सूचना तुरंत प्रेषक को दें और इस संदेश की सभी प्रतियां और सभी संलग्नक नष्ट कर दें।

Review of adequacy of Storm water drainage system at CPCL Manali Refinery - reg

anilsahni to ShankarP

19-12-2023 17:30

Sent by Anilsahni

-----Forwarded by Sivasankaran S-Proj ES/Cpcl on 12/18/2023 06:19PM -----

=====  
 To: "shiva@cpcl.co.in" <shiva@cpcl.co.in>  
 From: "Sharma, Rahul (Mumbai)" <Rahul.S.Sharma@worley.com>  
 Date: 12/18/2023 05:58PM  
 Cc: "Wadhvani, Pankaj V. (Mumbai)" <Pankaj.Wadhvani@worley.com>,  
 "Venkateshwarlu, G (Mumbai)" <G.Venkateshwarlu@worley.com>, "Prasad, Arun  
 (Mumbai)" <Arun.Prasad@worley.com>, "lmahindran@cpcl.co"  
 <lmahindran@cpcl.co>, "deepakpa@cpcl.co.in" <deepakpa@cpcl.co.in>,  
 "ssadagopan@cpcl.co.in" <ssadagopan@cpcl.co.in>, "vikas@cpcl.co.in"  
 <vikas@cpcl.co.in>  
 Subject: RE: Review of adequacy of Storm water drainage system at CPCL  
 Manali Refinery - reg  
 =====

Dear Sir,

Further to your query regarding the design of Storm Water Drainage , this is to confirm you that Storm Water Drainage of Resid upgradation Project ( under Worley scope ) is designed for the maximum hourly rainfall intensity as per the Design Basis (44NC:4600/C.02/0001).

Regards,

Rahul Sharma  
 Resident Construction Manager  
 www.worley.com<http://www.worley.com/>

[cid:image001.png@01DA31DB.4A904A60]

From: Venkateshwarlu, G (Mumbai) <G.Venkateshwarlu@worley.com>  
 Sent: Monday, December 18, 2023 5:47 PM  
 To: Sharma, Rahul (Mumbai) <Rahul.S.Sharma@worley.com>; Prasad, Arun  
 (Mumbai) <Arun.Prasad@worley.com>  
 Subject: Fwd: Review of adequacy of Storm water drainage system at CPCL  
 Manali Refinery - reg[External Sender]

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From: shiva@cpcl.co.in<mailto:shiva@cpcl.co.in> <shiva@cpcl.co.in<  
 mailto:shiva@cpcl.co.in>>  
 Sent: Monday, December 18, 2023 12:47:32 pm  
 To: Wadhvani, Pankaj V. (Mumbai) <Pankaj.Wadhvani@worley.com<  
 mailto:Pankaj.Wadhvani@worley.com>>  
 Cc: Venkateshwarlu, G (Mumbai) <G.Venkateshwarlu@worley.com<  
 mailto:G.Venkateshwarlu@worley.com>>; lmahendran@cpcl.co.in<  
 mailto:lmahendran@cpcl.co.in> <lmahendran@cpcl.co.in<  
 mailto:lmahendran@cpcl.co.in>>; deepakpa@cpcl.co.in<  
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 >>; ssadagopan@cpcl.co.in<mailto:ssadagopan@cpcl.co.in>  
 <ssadagopan@cpcl.co.in<mailto:ssadagopan@cpcl.co.in>>; vikas@cpcl.co.in<

mailto:vikas@cpcl.co.in> <vikas@cpcl.co.in<mailto:vikas@cpcl.co.in>>  
Subject: Re: Review of adequacy of Storm water drainage system at CPCL  
Manali Refinery - reg[External Sender]

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Sir

Expecting your immediate response please

Regards

S.Sivasankaran  
GM (Projects & Engg Services)  
Chennai Petroleum Corporation Ltd  
Manali Chennai 68  
044-2594 4474

From: Sivasankaran S-Proj ES/Cpcl  
To: "Wadhvani Pankaj V. (Mumbai)" <Pankaj.Wadhvani@worley.com<  
mailto:Pankaj.Wadhvani@worley.com>>  
Cc: "Venkateshwarlu, G (Mumbai)" <G.Venkateshwarlu@worley.com<  
mailto:G.Venkateshwarlu@worley.com>>, S Sadagopan/Cpcl@Cpcl, vikas/Cpcl, l  
mahendran/Cpcl@Cpcl, P A Deepak/Cpcl@Cpcl  
Date: 17-12-2023 09:13  
Subject: Review of adequacy of Storm water drainage system at CPCL  
Manali Refinery - reg

Dear Sir

The storm water system of CPCL refinery for RESID Project has been designed  
by M/s. Worley India during the project stage. In the recent rain during  
Michaung Cyclone, heavy flooding has occurred inside CPCL premises. In  
this regard, You are requested to confirm that the storm water drainage  
system has been suitably designed for the process units / utilities  
covered under Resid Project.

Regards

S.Sivasankaran  
GM (Projects & Engg Services)  
Chennai Petroleum Corporation Ltd  
Manali Chennai 68  
044-2594 4474

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अस्वीकरण: यह संदेश सी पी सी एल मेसेजिंग गेटवे, भारत से भेजा गया है। इस इलेक्ट्रॉनिक संदेश में निहित जानकारी और इसके साथ कोई भी संलग्नक  
केवल प्रेषित व्यक्ति (यों) के लिए ही है और इसमें स्वामित्व, गोपनीय या विशेषाधिकार प्राप्त जानकारी हो सकती है। यदि आप वांछित प्राप्तकर्ता नहीं हैं तो

आपको इस ई-मेल को प्रसारित, वितरित या कॉपी नहीं करना चाहिए। कृपया इसकी सूचना तुरंत प्रेषक को दें और इस संदेश की सभी प्रतियां और सभी संलग्नक नष्ट कर दें।

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**Manali – Ponneri Highway**

**Annexure -4**



**Manali – Thiruvottyur Highway**



**At TPP Salai, Manali**



**At Manali Express Highway,**



## **Proposal to develop Regional and Local Drainage Master Plan for the Manali Industrial Area to mitigate flooding**

Balaji Narasimhan, B.S. Murty, and Ligy Philip

Department of Civil Engineering, IIT Madras

### **Background:**

Manali is a major industrial and economic hub of Chennai housing some of the largest industries in the region such as: Chennai Petroleum Corporation Limited (CPCL), Madras Fertilizers Limited (MFL), Manali Petro Chemical Ltd (MPL), Tamil Nadu Petroproducts Limited (TPL), Sriram Fibres Ltd (SRF), Madras Rubber Factory (MRF), Kothari Petrochemicals Ltd, Balmer Lawrie & Co, Toshiba JSW Power Systems Private Limited and many more. This area is also endowed with many water bodies, and macro drains such as Buckingham canal, Kosasthaliyar river and Redhills surplus course. Despite the access to the waterbodies for effective flood drainage, the area is experiencing frequent flooding due to lack of a drainage master plan for the region, encroachments and bottle necks in the macro drains and inadequate storm water drainage system.

The Manali Industrial Area got heavily flooded during the floods of 2015. It got heavily flooded again during November 2021. Frequent flooding brings this industrial hub to a grounding halt for several days leading to several hundreds of crores of loss to the economy. Further, most of the industries in this region also handle hazardous chemicals; hence, any flooding in this region poses a significant risk of environmental exposure of the hazardous chemicals.

In response to the flooding of 2021, Sri P. Premapriyan Secretary, Manali Industrial Association (MIA), VP - Operations, KPL requested IIT Madras to visit the flood affected areas and give a proposal for flood mitigation. In response to this request and following a virtual meeting on Nov. 26, 2021, Profs. Balaji Narasimhan and B.S. Murty visited the flood affected areas of the Manali Industrial Estate on December 4, 2021. At the end of the site visit, a detailed presentation of the flooding problem was also made by the Dr. Palanivelu Rajmohan, Associate General Manager - Health, Safety & Environment (HSE), of Toshiba JSW Power Systems Pvt. Ltd.

## Observations from the Site Visit:



Photo 1: Stormwater drain outfall from Kothari, MGR nagar, Periyar Nagar, & CPCL ETP plant, Balmer Lawrie leading up to B canal in the East near CPCL. The drain is not completely connected to the B. Canal. The temporary pipe culvert for construction purposes does not appear to be adequate



Map 1: New SWD layout observed in the area. SWD outfall is disconnected from the B. Canal. There are several obstructions for the outfall due to bridge construction and the CPCL pipelines



Photo2: CPCL pipeline networks at the SWD outfall location. The construction of new bridge has completely disconnected the drainage from this region. Further, the Buckingham canal flow capacity is severely compromised due to the bridge construction



Map 2: SWD outfall disconnected from the B. Canal. B. Canal is severely obstructed



Photo 3: The Breach near TTRO plant for enabling discharge of flood waters



Map 3: Site of the breach to dispose the flood waters from Sathangadu lake through Kodungaiyur and ultimately into the B. Canal south of CPCL.



Photo 4: Reduced width of the Redhills surplus channel at the highway bridge site on Manali High Road (North of MFL). This may be one of the reasons for MFL getting flooded



Map 4: Site of the bridge at Manali High Road across the Flood carrier from Red Hills



Map 5: Constricted bridge site and causeway with inadequate capacity may be the reason for flood jumping the channel and inundating SPL and JSW.

The photos from the site visits and the maps from the satellite imagery are presented only for illustrating the variety of obstructions in the region. They are not meant to be comprehensive for effective flood removal. We observed several such pressure points along the flood carrier as well as obstructions to the local drainage across the region.

Any ad-hoc measures to address these flooding and water logging issue for each site locally without considering the regional issues could at best be only a band-aid measure. Further, the flooding may unintentionally be transferred to some other site. Hence, there is a need for a thorough investigation / study by considering the regional and local flooding / drainage issues together for developing a comprehensive and sustainable flood and storm water drainage master plan.

### **Methodology to develop a Regional and Local Drainage Master Plan**

The flooding in a region could be due to two primary reasons:

1. Flood discharge from reservoirs and lakes and the capacity of the flood carrier is overwhelmed due to encroachments, siltation, and obstructions thus jumping the course and inundating the near by areas (e.g. case of SPL, MFL and JSW). This is called Fluvial flooding.

2. Lack of local storm drainage, storm drainage with inadequate capacity, obstructions to local drainage (e.g. case of Kothari, Balmer and Lawrie, and CPCL). This is called Pluvial flooding.

The regional drainage plan will look at flood carrier capacity needed along the different sections of the macro canals (Redhill surplus, B. Canal and Kosasthaliyar river to the North) and size / alignment for arterial storm water drains that would dispose off into these macro drains. Further, the need for flood levees, width at bridge sites, tidal influences, and obstructions until Ennore creek would also be studied.

The local drainage plan will look at the SWD feeder drain alignment and size for different localities (for the roads outside the industry premises) considering any future expansion and growth into account.

The site level drainage plan within each industry premises is also important for outfall into the feeder SWD. But this is not within the scope of this proposal.

For carrying out such a study, we need to adopt a watershed / catchment-based approach for design and sizing of the storm water drains. Hence, a good digital elevation model (DEM) is needed for capturing the natural and man-made terrain features that may facilitate or obstruct the flow of water. The digital elevation models available from the open sources have a coarse spatial resolution (> 30m) and have poor vertical accuracy (greater than  $\pm 2m$ ). As the terrain in this region is very flat, it is important to capture the terrain features in this area (approx. 25 to 30 sq.km) with greater accuracy. The terrain data could be captured accurately with a photogrammetric drone survey merged with terrain-based LIDAR survey and RTK systems. This survey will provide digital elevation model of the terrain at a spatial resolution of < 1m with a vertical accuracy of < 15cm at critical places to be used as a basis for the drainage master plan.

In addition to the DEM, we may need to collect soil samples and conduct infiltration tests to assess the drainage characteristics of the soil. The cross-section survey of the flood carried canal, B. Canal, and the kosasthaliyar river would have to be carried out to design levees or to suggest widening at the bridge sites. The master plan will study design rainfall of 2yr, 5yr, 10yr, 25yr, 50yr and 100yr return periods so that ultimately the design could for an acceptable risk level. The macro canals should typically have a drainage capacity to carry a flood from 25yr rainfall event, whereas the SWDs would typically be designed for 2 yr return period events. However, considering the importance of this industrial hub, we may need to ensure that the macro canals and flood carries are able to safely carry 50 year flood events, whereas the SWDs are able to safely carry and dispose of 5 yr or 10 yr return period events.

The alignment, hydrologic and the hydraulic sizing of the SWDs, improvements needed at the macro canal would be designed using hydrologic / hydraulic and stormwater drainage models.

Another important aspect regarding stormwater runoff from the Industrial area is that it is highly prone to non-point source pollution loads of Chemicals and oil spills with potential to contaminate the receiving water bodies and polluting the fragile Ennore Creek ecosystem. Ideally on-site and instream pollution abatement & treatment measures should also be a part of such a stormwater and flood drainage master plan demonstrating Environmental stewardship of the industries. However, at the moment this aspect is not included in this master plan proposal. If there is interest from the Manali Industrial Association, we can develop this component and include it in the proposal along with appropriate budget provisions.

**Budget**

<b>Item</b>	<b>Budget (INR in Lakhs)</b>
Drone Survey	15.00
Terrestrial LIDAR Survey	15.00
RTK survey, Bathymetry, Cross section	15.00
Soil Survey for infiltration properties	4.50
Data Procurement from other agencies	5.00
Man Power: Modeler (2 no. for 6 months)	7.20
Man Power: Field Staff (2 no. for 6 months)	3.60
Professional consultancy charges for IIT Madras faculty	10.00
Contingencies (5%)	3.77
<b>Sub-total</b>	<b>79.07</b>
Institutional Overheads (20%)	15.81
<b>Total</b>	<b>94.88</b>
GST (18%)	17.08
<b>Grant Total (including GST)</b>	<b>111.96</b>

The budget for undertaking this study by IIT Madras is INR 112 Lakhs for a project duration of 6 months.

**Project Duration (6 months):**

Project Inception & Mobilization: 1 month

Drone and Field Survey: 1 month

Hydrologic and Hydraulic Modelling: 2 months

Preliminary Drainage plan: by 4<sup>th</sup> month

Final Flood and Drainage master plan: by 6<sup>th</sup> month

**Alternatively, you may take-up the study with some other consulting agency and IIT Madras can handhold the design process and vetting of the final design and master plan. The consolidated professional charges for hand-holding the design process and vetting would be INR 25 lakhs.**



**North-Eastern Regional Centre  
Guwahati**  
 Tel: (+91 361) 350 0766  
 E-mail: terine@teri.res.in

**Southern Regional Centre  
Bengaluru**  
 Tel: (+91 80) 2535 6590-94 (4 lines)  
 E-mail: terisrc@teri.res.in

**Western Regional Centre  
Goa**  
 Tel: (+91 832) 245 9306, 245 9328  
 E-mail: teriwrc@teri.res.in

**Western Regional Centre  
Mumbai**  
 Tel: (+91 22) 2758 0021, 4024 1615  
 E-mail: terimumbai@teri.res.in

**Himalayan Centre  
Mukteshwar**  
 Tel: +91 94100 96074, 99901 28101  
 E-mail: praveen.sharma@teri.res.in

**TERI Japan  
Kanagawa**  
 Tel: (+81 46) 855 3700  
 E-mail: yonetani@iges.or.jp

## Annexure 6

20.12.2023

### Field Observation Report

The environmental team from The Energy and Resources Institute (TERI), New Delhi have visited Ennore oil contaminated site on 20.12.2023 to assess the status of area and restoration process of oil spill area.

#### TERI Team Members:

Dr. Veeranna Channashettar

Dr. K.Nanthakumar

The team observed the following

1. The team visited Ennore creek and conducted survey by boat from the mouth of creek to mangrove area. It was observed that between the mouth of the creek up to Ennore road bridge there is no oily film or visible oil contamination was noticed.

2. AT the junction of Buckingham canal and Kosasthalaiyar river to Ennore railway bridge the physical observation showed some traces of oily sheen. However, the major cleaning has been achieved and residual cleaning in mangrove area is in progress.

3. The TERI team did not observe any abnormal conditions at site like dead fish or oil layers or any loss of flora and fauna. However, the team observed odour which could be of sewage wastewater.

4. The oil contaminated water collected using skimmers have been collected in barrels and shifted to CPCL Refinery and stored in designated area. Also, the solid waste is also collected in plastic bags and shifted to refinery.

5. The team observed that the oil spread controlling booms have been placed effectively to control the spread of shine from containment zone to sea area.

6. The TERI team recommended that CPCL undertake the sampling and analysis of water, sediment and biological organisms after completion of cleanup process to know the efficiency of restoration.

7. TERI informed that they shall undertake further assessment, sampling and analysis study at Ennore site within a couple of days know the actual conditions after the completion of clean-up activities.

(Veeranna Channashettar)

(K.Nanthakumar)