Setting up of 400 MLD Sea Water Reverse Osmosis Desalination Plant at Perur Along ECR, Chennai, Tamil Nadu, India

Additional details requested by EAC of MoEF&CC for issuing CRZ clearance for 400 MLD Desalination Plant

Chennai Metropolitan water Supply & Sewerage Board

No.1, Pumping station Road, Chintadripet, Chennai - 600002

CONTENTS

MINUTES OF THE 165TH MEETING OF EXPERT APPRAISAL COMMITTEE FOR PROJECTS RELATED TO INFRASTRUCTURE DEVELOPMENT, COASTAL REGULATION ZONE, BUILDING/CONSTRUCTION, INDUSTRIAL ESTATE AND MISCELLANEOUS PROJECTS HELD ON 16-17 JANUARY, 2017 AT THE MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE, NEW DELHI – 3.

Minutes of 165th meeting of Expert Appraisal Committee for Projects related to Infrastructure Development, Coastal Regulation Zone, Building/Construction, Industrial Estate and Miscellaneous projects held on 16-17 January, 2017 at Ministry of Environment, Forest and Climate Change, New Delhi - 3

Day 1: Monday, 16th January, 2017

1. Opening remarks by the Chairman

2. Confirmation of minutes

The EAC was apprised about the last meeting held on 1st December, 2016, and the follow up actions taken accordingly.

3. Consideration of Proposals

3.1	**Construction of Holiday Home resort on Plot bearing Gut No.154 & 155 at Mauje Koproli, Tal. Alibag, District Raigad (Maharashtra) by M/s Smt. Radha Anant Goenka – CRZ Clearance – [F.No.11-33/2016-IA-III]**
3.1.1	*The project proponent did not attend the meeting, and as such the proposal was not considered.*
3.2	**Laying of treated effluent disposal pipeline from their plant to final disposal point in the Gulf of Kutch at Mithapur in Gujarat by M/s Tata Chemicals Ltd - CRZ Clearance - [F.No.11-34/2016-IA-III]**
3.2.1	During the meeting, the project proponent made a presentation and provided the following information to the Committee:- (i) The project involves laying of treated effluent disposal pipeline from their plant to final disposal point in the Gulf of Kutch at Mithapur in Gujarat promoted by M/s Tata Chemicals Ltd. (ii) The proposal involves up-gradation of existing treated waste water discharge system by installation of trestle mounted pipelines and diffuser system to discharge point at marine outfall point suggested by NIO beyond Marine Sanctuary and its Eco-sensitive zone. (iii) The total length of proposed treated waste water disposal pipeline corridor is 3756 m. The length of pipeline in Non CRZ area is 318.75 m and the length of pipeline in CRZ area is 3437.25 m.

Sr. No	Description	CRZ Area (Length of Pipeline corridor in meter)			
		500m to 100m	100m to HTL (CRZ-III)	CRZ-1A (Mudflats, Mangroves & Buffers)	CRZ-IV
1	Pipeline corridor from pumping station to landfall point	435.20	105.90	223.15	-

2	Pipeline corridor from Landfall point to Marine outfall disposal point to landfall point	-	-	-	2673
3	Total Pipeline Corridor	435.20	105.90	223.15	2673
The length of pipeline in Non CRZ area is 318.75m					
The total length of proposed treated waste water disposal pipeline is 3756 m.					

(iv) The details of land use pattern are given below:

S. No.	Location	Area (ha)
1	Pumping System and Pipeline corridor in notified Eco-sensitive zone (Land ward side)	0.711
2	Pipeline corridor in notified Eco-sensitive zone (Sea Side)	0.918
3	Pipeline corridor in notified Marine Sanctuary	11.268

(v) **Total water requirement and its source:** No additional water is required.

(vi) **Waste water generation, treatment and disposal:** The proposal involves up-gradation of existing treated waste water discharge system by installation of trestle mounted pipelines and diffuser system to discharge point at marine outfall point suggested by NIO. Treated waste water 240,000 KLD with existing treatment facilities.

(vii) **Municipal solid waste generated disposal facility**: There will not be municipal solid waste generation due to this improvement proposal.

(viii) **Power requirement and source:** Power Requirement: 2x 1250 KW (1 Working+01 Stand By Pump), 3.3 KV, which will be sourced TCL Captive supply.

(ix) **Investment/Cost of the project:** Rs. 229 Crores.

(x) **Benefits of the project:** Disposal of treated waste water through pipeline and diffuser system will provide better dispersion.

(xi) **Employment potential:** The proposed project will be part of existing operations.

(xii) **Wildlife issues:** Yes, The proposed pipeline corridor in parts would pass through Marine sanctuary.

(xiii) **Eco-Sensitive Zone in 10 km radius area:** Yes, project is within Eco Sensitive Zone Area.

(xiv) **Details of Forest land:** Yes, 11.268 ha area of Marine Sanctuary. This area is also declared Mangrove forest as per Draft notification No. GVN/1999(8)/JJM/1692/1652/K. Settlement order No. K/FSO/T-3/1548/2013-14 of FSO, Junagadh, dated 11/05/2013 is yet to be finalized by Government of Gujarat.

(xv) Tata Chemicals' proposal for Diversion of 11.268 Ha Marine Sanctuary area is approved by NBWL in the 39th Meeting dated 23rd August, 2016.

(xvi) CRZ study has been conducted by Institute of Remote Sensing (IRS), Anna University Chennai.

(xvii) **SCZMA Recommendations:** Gujarat Coastal Zone Management Authority has recommended the proposal from CRZ perspective.

(xviii) **Employment potential**: The proposed project will be part of existing operations.

(xix) **Benefits of the project**: Disposal of treated waste water through pipeline and diffuser system will provide better dispersion.

3.2.2	The EAC, in the first instance, noted that the industrial operations/activities in the plant premises at Mithapur involved manufacturing of Soda ash. The plant also has the captive power generation facility. The proposed pipeline would carry the treated effluent from both the operations/activities at the plant to the disposal point in the Gulf of Kutch in western coast of Gujarat. As such, the proposal remains an integral part of all the industrial operations/activities, including manufacturing of Soda ash, listed separately as the industrial projects/activities in the schedule to the EIA Notification, 2006 and thus requiring prior environmental clearance. The EAC was informed about the provision contained in para 4(i) (b) of the CRZ Notification, 2011, for the projects listed under this Notification and also attracting the EIA Notification, 2006, provides for clearance under the EIA Notification, 2006 only subject to being recommended by the State/UT CZMA. The project proponent further informed the Committee that their proposal for expansion of Soda ash plant has been submitted to the Ministry for grant of EC in terms of the EIA Notification, 2006. Considering the provisions of the CRZ Notification, 2011, the EAC suggested the project proponent to revise the said proposal accordingly for consideration under the EIA Notification only by the sectoral EAC.
3.2.3	*The proposal was, therefore, not taken forward by the EAC with the recommendation to transfer the proposal the concerned sector. However Committee observed that the EIA has glaring gaps especially in the marine biodiversity part. Full EIA report was not presented to the Committee. Executive summery also does not show plume dispersion model. However from the executive summary it is evident that the effluent plume may have serious deleterious effects on the coral reefs of Poshitra, Beyt Dwarka, Paga and Boria islands. Statements made in Wildlife Conservation Plan such as 'The intertidal area of the Gulf of Kutch is muddy and devoid of live corals' are not just misleading but also factually inaccurate. The adjoining areas of the discharge point i.e. Poshitra Bay is last remaining feeding ground of Critically Endangered Dugong whose western Indian population is confined to this part of Gulf of Kutch. Poshitra is also a site of endemism being Point Endemic area for Sakuraeolis gujaratica as well as Type Locality of recently described Anteaeolidiella poshitra both critically endangered molluscs. The Committee therefore suggests indepth assessment of marine biodiversity of the proposed region including Poshitra, Paga, Beyt Dwarka and Boria Islands and impacts of the proposed project on the same before placing for the considering for the concerned sector.*
3.3	**Laying of standby pipeline parallel to exiting pipeline disposal of treated effluent into the river Par estuary from CETP of Atul, District Valsad (Gujarat) by M/s Atul Ltd - Further consideration for CRZ Clearance - [F.No.11-24/2016-IA-III]**
3.3.1	During the meeting, the project proponent made a presentation and pr2ovided the following information to the Committee:- (i) The project involves laying of standby pipeline parallel to exiting pipeline for disposal of treated effluent into the river Par estuary from CETP of Atul, District Valsad (Gujarat) promoted by M/s Atul Ltd. (ii) **Components in CRZ area**: Laying of 630 mm OD HDPE pipeline**.** (iii) The proposed treated effluent discharge pipeline is passing through Par river which is a tidal influenced inland water body. Hence, demarcation of HTL, LTL and coastal regulation zone for 4 Km long pipeline for treated effluent discharge in river

	Par has carried out by Institute of Remote Sensing, Anna University, Chennai. Comprehensive marine EIA study for release of treated effluent from the company and Bio assay test for treated effluent has been carried in detail from NABET accredited consultant M/s. En-vision Enviro Technologies Pvt. Ltd. Surat. (iv) **SCZMA Recommendations:** The Gujarat Coastal Zone Management Authority has recommended the project vide their letter dated 28th June, 2016. (v) **Whether the project is in Critically Polluted area**: No. (vi) **Cost of the project**: Rs.10 crore (Approx.)
3.3.2	The project was earlier considered by the EAC in its 162nd meeting held on 29-30 August, 2016 wherein the Committee desired that project proponent may be first asked for status of compliance of conditions stipulated in CRZ Clearance. The proposal was accordingly deferred.
3.3.3	The EAC, in the first instance, noted that no compliance status for the conditions stipulated in the earlier CRZ clearance, was made available through the Regional Office at Bhopal, which was essentially the requirement as per the last deliberations by the Committee. The Committee further observed that the said proposal was to be considered from the same footing as the earlier one listed at Agenda 2.2 above. Accordingly, the relevant provisions of the CRZ Notification, 2011 would be equally applicable in the instant case also.
3.3.4	*The proposal was, therefore, not taken forward by the EAC with the recommendation to transfer the proposal the concerned sector.*
3.4	**Setting up of an industrial area at Village Kundiya, District Banswara (Rajasthan) by Rajasthan State Industrial Development and Investment Corporation Limited - Further consideration for finalization of ToR - [F.No.21-2/2016-IA-III]**
3.4.1	The project proponent made a presentation and provided the following information to the Committee:- (i) The project involves setting up of an industrial area at Village Kundiya, District Banswara (Rajasthan) by Rajasthan State Industrial Development and Investment Corporation Limited. (ii) The proposed project is the establishment of industrial area with ancillary units in the industrial area with having an area of 115.80 Acres and categorization of industries are made based on the market survey and demand potential and Classification of industries based on the pollution loads approved by State Pollution Control Board. The proposed industrial estate shares a boundary of 10 Km study area with Madhya Pradesh state. (iii) **Justification of Selection of the site**: No alternate sites are considered for the development of Industrial area in Kundiya. The proposed site based in Kundiya is selected based on the environmental factors and also the Economic consideration, as the location is located close to National highway 113 and share the boundary with Madhya Pradesh state which supplements the economic growth for Rajasthan and India. (iv) The main reasons for establishing Industrial area at Kundiya are: • To improve the Industrial Infrastructural facilities in Banswara district, Rajasthan.

	• Availability of skilled manpower at short distance less than 75 km. • Government's positive attitude towards the industrialization (v) The proposal is for the development of industrial area at Kundiya Village, Banswara district, Rajasthan by Rajasthan State Industrial Development & Investment Corporation Limited with a total area of 115.80 Acres. The project component involves Roads, Drainage System, Electrical Lines, Truck Parking, Admin Building, Staff Canteen, Ancillary Units, and Solar Street Lightning. The site is well connected to Ratlam Railway Station 47.2 km E, the main connecting route is through NH-113. (vi) **Investment/Cost:** The total cost of the project including infrastructure setup is Rs.30 Crores. (vii) **Whether project is in critically polluted area**: No, the project and area doesn't classify under CEPI and it's not applicable to the proposed project. (viii) **Forest land:** No forest land and diversion is involved for the proposed Industrial Area. (ix) **Court cases if any**: Not Applicable. (x) **Employment Potential**: The project is going to create some employment. Due to this project activity, some persons in the project area will be recruited as skilled and semi-skilled workers by the company as per its policy. Therefore, some employment and income are likely to be generated for the local people. So, the project will contribute in a positive manner towards direct employment in the project area. (xi) **Benefits of the project**: The Company will supply its product to the domestic market which is likely to improve the regional economy. (xii) **Peripheral Developments**: RIICO intends to take up developmental work in the periphery area. Different such works include the following: • Support existing schools for development of education in the area. • Help in imparting vocational training to local eligible youth. • Provide health facilities by way of medical check-up, by holding medical camps etc. in the neighbourhood. • Thus, the proposed project shall usher in the social and economic upliftment of the persons living in the vicinity of the Project i.e. of society at large.
3.4.2	The project was earlier considered by the EAC in its meeting held on 28-29 June, 2016 wherein the Committee noted the following:- The project proponents have themselves admitted that Form-I as submitted does not appropriately reflect the proposed industries. In fact, the description regarding industries in Form-I is vague and not specific. In his oral submission the project proponent mentioned that he would also be lodging pharmaceutical industries in the nature of bulk drug manufacture. As such, Form-I would need to be amended accordingly and re-submitted for consideration of the proposal for Terms of Reference. The proposal was accordingly deferred that time for want of the desired information.
3.4.3	During deliberations, the project proponent were unable to clarify the details of industrial units/activities to be housed in the proposed industrial area. It was noted that the area falls under Semi Critical Ground Water Areas, and thus permission from Central Ground Water Authority would also be required. .The EAC noted that categorisation of industries remains an essential criteria/parameter to arrive at its jurisdiction for considering the proposal. The revised Form-I submitted by the project proponent was again found deficient, and differing from the presentation during the meeting.

3.4.4	*In view of the above, consideration of the proposal was deferred*.
3.5	**Installation of Proposed Sulphuric acid (2*12500 MT) and Phosphoric acid (2*10000 MT) storage tanks along with unloading facilities and pipelines at the existing fertilizer Wharf of Coromandel International Limited, Visakhapatnam (Andhra Pradesh) by M/s Coromandel International Limited - Further consideration for CRZ Clearance - [F.No.11-35/2015-IA-III]**
3.5.1	While deliberations on the proposal, the EAC was informed about the observations in its earlier meetings and the response of the project proponent, as explained below:- (i) The project was first considered by the EAC in its 154th meeting held on 22-23 December, 2015, wherein the Committee desired for a comprehensive Distaster/Environmental Management Plan to ensure safe and eco-friendly handling of the hazardous chemicals. The project proponent were asked for exploring best practices on risk management and spillage plan, and also to find out if any permission is required from the Indian Coast Guard in this regard. In response, the Disaster/Environment Mangement Plan was submitted by the project proponent. Regarding Best Risk Management Practices, it was informed that well designed pipelines with exapnsion loops would be used. Storage tanks are designed to withstand worst weather conditions, good engineering practices, National standards and applicable codes would be adopted. With regard to permission from Indian Coast Guard, it was reported that thier facility was examined by the Commandant & Dist. Pollution Response Officer for COMDIS-6 (AP) along with his team. It has been recommended to comply with Tier-I capability for ship berthing as per NOS-DCP (National Oil Spill Disaster Contingency Plan). (ii) The EAC in its 157th meeting held on 27-28 April, 2016, was not satisfied with the Disaster Response Plan for acid spillage. The Committee desired that the project proponent shall resubmit the proposal with a provision of dyke spill hold equal to the entire tank capacity within the dyke area, collectively or individually, depending upon the dyke design. This was done in the interest of industrial and public safety. (iii) Further, in its meeting held on 30-31 May, 2016, the EAC took objection to the contents of the letter dated 15th April, 2016 submitted by the project proponent, and observed that the facts therein were misinterpreted and wrongly recorded, directing the proponent to follow the best available international practices. On their request to consider the proposal in the light of the standards prescribed by the BIS and OISD, the Committee opined that standards prescribed by OISD are applicable to Oil Industries, whereas, standards prescribed by BIS are voluntary. The failure of all sulphuric acid storage tanks is possible during natural calamities, or an explosion or mischief, and in that case, it would result huge spillage of harmful and highly hazardous chemicals. Therefore, the Committee was of the firm view that in larger public interest and safety, dyke capacity is to be increased to the total storage capacity of Sulphuric Acid of all the tanks in the tank farm area. During the meeting, the EAC made it categorical that the safety provisions should cover the entire tankage and not just the one tank even if it is the largest tank, and that public safety should not be compromised at any cost, while storing this hazardous chemical, keeping in view some recent accidents and heightened security concerns.

3.5.2	The EAC, in the first instance, observed that the proposal is similar to the earlier one listed at Agenda 3.2 above, and should have been considered under the EIA Notification, 2006 only by the sectoral EAC based on the recommendations of the State CZMA. However, in view of the earlier deliberations, the Committee agreed to consider the proposal from CRZ perspective and send its comments to the concerned sector for further action. The Committee further noted that neither EIA/EMP reports for the proposal nor the detailed response to their earlier observations, were timely circulated and made available to the members. As such, the proposal could not be considered on merits within the jurisdiction of the EAC.
3.5.3	*In view of the facts stated in para 3.5.2 above, consideration of the proposal was deferred.*
3.6	**Conversion of Aviation SEZ to Multi sector SEZ at Rajiv Gandhi International Airport, Shamshabad, District Rangareddy (Telangana) by M/s Hyderabad International Airport Limited - Finalization of ToR - [F.No.21-77/2016-IA-III]**
3.6.1	During the meeting, the project proponent made a presentation and provided the following information to the Committee:- (i) The project involves conversion of Aviation SEZ to Multi sector SEZ at Rajiv Gandhi International Airport in Shamshabad, District Rangareddy (Telangana) promoted by M/s Hyderabad International Airport Limited. (ii) The proposed conversion is within the approved aviation SEZ. Land has already been in possession and converted to industrial use. (iii) **Justification for selection of the site:** GMR Aerospace & Industrial Park layout of 253.85 acres, was established within the airport premises abutting existing airside as the envisaged aviation related activities like MRO, aircraft assembly, etc. mandated airside access to facilitate corresponding processing activities. The said project is an upgradation of the existing sector specific SEZ to Multi sector SEZ to meet the business feasibility and industrial interests received from prospective SEZ customers. (iv) The present proposal is for the change of Aviation SEZ to Multi Sector SEZ that will have industrial units/activities relating to aviation, Pharma, Gems & Jewellery, electronic, etc. No addition land is required as part of the proposed conversion. Entire development will take place within the approved SEZ area of 253.85 acres. (v) Rajiv Gandhi International airport is serving the metropolis of Hyderabad located at Shamshabad, about 22 km south of Hyderabad. The airport is about 40 km from Secunderabad railway station. 11.6 km PV Narasimha Rao Expressway from Mehdipatnam to Rajendranagar provides dedicated high speed travel to the airport and Nehru outer ring road serves as a controlled access highway. (vi) **Cost of the project:** No additional cost is involved. (vii) **Whether the project is in Critically Polluted area:** No (viii) **If the project involves diversion of forest land, extend of the forest land:** No. (ix) **If the project falls within 10 km of eco- sensitive area, Name of eco-sensitive area and distance from the project site:** No. (x) **CETP:** All units will be design as per the Zero discharge concept. For Domestic waste water treatment, state-of-the-art STP has been established. (xi) Domestic water requirement is 672 KLD and the industrial water requirement is 4771 KLD, proposed to be met from the existing water supply.

	(xii) **Power Requirement:** Power requirement for the proposed modernization would be 43 MW which will be met from Telangana Power Transmission Corporation Limited (TSTRANSCO). (xiii) **Water bodies, diversion if any:** No. (xiv) **Court cases if any:** No. (xv) **Employment Potential:** The proposed project will enhance direct & indirect employment for both skilled and non-skilled jobs. (xvi) **Benefits of the project:** GHIAL's SEZ has seen limited growth during lasts 6 years and is presently operating at just 11% occupancy. With the revised sector focus & the business interests received from various related industry segments in the identified sectors, it is perceived that GHIAL would be able to capitalize upon the opportunities in next 3-5 years to make the SEZ fully operational with diverse but coherent industrial units, that will in long run will provide requisite impetus to develop the region as an economic hub of Hyderabad with Airport City as it core.
3.6.2	The EAC noted that the proposal is for development of Multi Sector SEZ in place of earlier proposed Aviation Sector SEZ in the same area of 253.85 acres at Rajiv Gandhi International Airport in Shamsabad, District Rangareddy (Telangana). The proposed Multi-Sector SEZ would be housing industrial units/activities relating to aviation, Pharma (formulation only), gems & jewellery, electronic, etc. During deliberations, the project proponent clarified that none of the units/activities in the proposed Multi Sector SEZ, would be covered either under category A or B as specified in the schedule to the EIA Notification, 2006. As such, since the area involved is much less than 500 ha, the proposal may not be requiring prior EC. The Committee desired that the Ministry may take a view in this regard, if so required. The Committee also felt that bird hazard is a serious concern for aviation sector and comprehensive study must be done by a reputed institution such as SACON, not just for airport, but also for SEZ areas, especially due the fact that multi-sector SEZ can become heaven for birds and if not planned well, can have serious risks to aircrafts.
3.6.3	*In view of the deliberations, the EAC was not inclined to consider the proposal any more, and asked the project proponent to withdraw the same.*
3.7	**Development of Petroleum, Chemicals and Petrochemical Investment Region (PCPIR) at Paradeep encompassing parts of Jagatsinghpur and Kendrapara districts in Odisha by Odisha Industrial Infrastructure Development Corporation - Finalization of ToR - [F.No.21-78/2016-IA-III]**
3.7.1	During the meeting, the project proponent made a presentation and provided the following information to the Committee:- (i) The project involves development of Petroleum, Chemicals and Petrochemical Investment Region (PCPIR) at Paradeep encompassing parts of Jagatsinghpur and Kendrapara Districts in Odisha promoted by Odisha Industrial Infrastructure Development Corporation. (ii) The geographical co-ordinates of the project site are Latitude 20°13'31.76"N to 20°24'40.65"N and longitude 86°26'35.96"E to 86°43'14.71"E. (iii) The study area mainly comprises of agricultural land with settlement areas. It also covers coastal mangrove swamps of Mahanadi & Devi river delta region. There are a number of *Casuarina*, Cashew nut and *Eucalyptus* plantation blocks

	in the non-mangrove areas and coastal sand dunes. A good number of aquaculture areas exists in and around the mangrove swamps. Six to seven forest blocks of Mahanadi & Devi river wetland areas exist towards the bay face of the project area. Forest Department of Odisha is involved in the conservation of coastal mangrove. In the marine zone, diversity of fish is being conserved and other commercial resource exploitation is also being properly regulated. (iv) **Justification for selection of the site:** Some of the key advantages of locating the PCPIR at the said site at Paradeep are: • Existing petrochemical hub with IFFCO-Fertilizer unit, Paradeep Phosphates Limited, Paradeep Carbons Limited (Goa Carbons), Coal to Liquid Project (M/s. SASOL & M/s. Tata Steel), IOCL plant, etc. • Feedstock sourcing and sea connectivity ➢ Proximity to Refinery-cum-Petrochemical Complex, the anchor project of IOCL, proposed as the feedstock source for downstream units ➢ Proximity to Paradeep Port and potential proximity to upcoming Dhamra Port and proposed Astranga Port • Hinterland connectivity ➢ Proximity to NH-5A: Connectivity to Golden Quadrilateral ➢ Proximity to SH-12: Connectivity to Bhubaneswar-Cuttack Metropolitan Region ➢ Proximity to Cuttack-Paradeep and Haridaspur-Paradeep links of East Coast Railway connecting to Chennai-Howrah Trunk Line ➢ Biju Patnaik Airport at Bhubaneswar: proposed to be upgraded to international airport and Greenfield airport proposed in the region • Proximity to water sources in the region: Taladanda and Kendrapara Canals • Land availability • Proximity to coast for marine disposal of treated effluents • Proximity to Central Institute of Plastics Engineering and Technology (CIPET) at Bhubaneswar. • Proximity to urban centres of Paradeep and Bhubaneswar-Cuttack Metropolitan Region (v) PCPIR includes Refinery cum petroleum complex; primary and secondary petrochemical parks; petroleum product parks; Integrated waste management site; multi project SEZ, R&D complex; allied and fine chemicals park; plastic park; commercial hub; captive power plant; township; logistic hub, etc. (vi) Paradeep PCPIR is proposed to be developed in a total area of about 284.15 sq km (28415 ha) falling in Jagatsinghpur and Kendrapara districts. Processing Area is 123.01 sq km, Non-processing Area: 161.14 sq km. (vii) The PCPIR shall cover 26 villages of Ersama Block, 63 villages of Kujang Block, Paradeepgarh town and Paradeep Municipality in Jagatsinghpur district and 52 villages of Mahakalapada Block, 12 villages of Marsaghai Block in Kendrapara District (Odisha). (viii) Paradeep is well connected by roadways to all major cities of the state and the country. The National Highway-5A connects Paradeep to Bhubaneswar. Paradeep is also connected to Cuttack via State Highway-12. A Greenfield road corridor connecting Paradeep to Bhubaneswar is being taken up as a dedicated link to the state capital. (ix) Paradeep Port is the major port in the state of Odisha situated 210 nautical miles south of Kolkata and 260 nautical miles north of Visakhapatnam. Paradeep port has an annual cargo handling capacity of 108.50 MMTPA. (x) Total investment for total infrastructural development is Rs.13,634 crores.

	Investment potential in the project is Rs.2,77,734 Crores. (xi) **Whether the project is in Critically Polluted area:** No. (xii) **Diversion of forest land, extend of the forest land:** No forest land exists within the project area. (xiii) **If the project falls within 10 km of eco-sensitive area:** There is no eco-sensitive area within 10 km. radius area of the project. (xiv) No new port is proposed. (xv) The generated effluents are proposed to be treated in a CETP, followed by disposal to the sea at 3 km away from the shoreline. (xvi) As per the estimation, Process/ industrial solid wastes during the Phase I is about 1500 TPD and during the Phase II, it is about 1100 TPD. The municipal / domestic solid wastes generated are proposed to be subjected to composting and land filling in a sanitary landfill. Hazardous solid wastes will be treated in a common hazardous waste treatment, storage and handling facility (CHWTSDF) consisting of secured land fill, incinerator, etc. (xvii) Total water demand has been estimated at about 620 MLD (Phase 1 water demand: 300 MLD, Phase 2 water demand: 320 MLD). The water demand includes industrial water, domestic water, fire extinguishing and for green area development. Such water will be sourced from Taldanda and Kendrapara canals (River Mahanadi and river Chitrapola). Clearance shall be obtained from the Competent Authority. (xviii) Power (around 2000 MW) will be sourced from the captive gas based power plant (1000 MW) and the balance from the grid. (xix) No ground water will be used in the proposed project. (xx) The Paradeep PCPIR has an average elevation of 3 m above Mean Sea Level and the ground level varies from 1 m to 8 m. The area is quite flat with few undulating depressions and is sloping from North-West to South- East. (xxi) There will be some minor rehabilitation issues in the project, which will be addressed following Nation/ State R&R Policy. (xxii) **Water bodies, diversion if any:** The river Mahanadi, Brahmani and Baitarani along with their distributaries form the drainage system of the Kendrapara district. River Mahanadi flowing from west to east is main water body, forming the northern boundary of Jagatsinghpur district. The river Devi, a tributary to Kathajori and flowing north-northwest to south-southeast with a meandering course also forms a drainage system in Jagatsinghpur district. Together with the rivers Brahmani and Baitarani, river Devi forms a large delta before emptying into the Bay of Bengal at Dhamra. Mahanadi River flows through a vast stretch with numerous perennial and non-perennial streams in the Paradeep area and forms a network of large and small rivers before joining the Bay of Bengal. (xxiii) **Court cases if any:** No. (xxiv) **Employment potential**: 6,48,000 (direct employment 2,27,000; indirect employment 4,21,000). (xxv) **Benefits of the project:** The proposed investment region is one of the PCPIRs approved by the Central Government under the PCPIR Policy. The PCPIR is expected to reap the benefits of co-siting, networking and greater efficiency through the use of common infrastructure and support services. IOCL's 15 MMTPA oil refinery at Paradeep has been identified as the Anchor tenant, which will provide feedstock support to the downstream industries in the value chain. The PCPIR is expected to attract investment to the tune of Rs.2.78 lakh crore with employment potential of 6,48,000 (direct employment 2,27,000; indirect employment 4,21,000).

3.7.2	While deliberations, the EAC noted that the IOCL refinery of 15 MMTPA is already in operation as the Anchor Tenant in the proposed PCPIR covering a total area of 28415 ha. In such a case, and in terms of the EIA Notification, 2006 mandating prior environmental clearance to the identified industrial projects/activities, the proposal for grant of Terms of Reference for the proposed PCPIR needs to be revised at the reduced area (excluding the IOCL complex already in operation).
3.7.3	*The Committee desired that the Ministry may take a final view on admissibility of the proposal in terms of the provisions of the EIA Notification, 2006.*
3.8	**Construction of 6 laning of Bangalore - Chennai Expressway from Bangalore (km 0.000) to Chennai (km 258.800) including spur alignments in the States of Karnataka, Andhra Pradesh and Tamil Nadu by National Highways Authority of India - Extension of validity of ToR - [F.No.10-44/2013-IA.III]**
3.8.1	During the meeting, the project proponent informed the Committee that the proposal for 6 laning of Bangalore - Chennai Expressway from Bangalore to Chennai covering the States of Karnataka, Andhra Pradesh and Tamil Nadu, is presently under revision, and a new alignment is being planned. As such, the instant proposal stands in fructuous. In view of the above, the project proponent decided to withdraw the proposal and to apply afresh after finalization of the project profile.
3.8.2	*The EAC desired that the above proposal for grant of ToR may be declared null and void, and to be delisted.*
3.9	**'Chamarajanagara Industrial Area' at Badanakuppe & Kallambelli Village, Chamarajanagara Taluk & District, Karnataka by Karnataka Industrial Areas Development Board (KIADB) - Environmental Clearance - [F.No.21-58/2015-IA-III]**
3.9.1	During the meeting, the project proponent made a presentation and provided the following information to the Committee:- (i) The project involves setting up of Chamarajanagara Industrial Area at Badanakuppe & Kallambelli Village, Chamarajanagara Taluk & District, Karnataka promoted by Karnataka Industrial Areas Development Board (KIADB). The project is located at 11° 58' 55.70" N Latitude and 76° 52' 59.35" E longitude. (ii) The project is covered under category A of item 7 (c) 'Industrial Estates/Parks/Complexes/Areas, Export Processing Zones, Special Economic Zones, Biotech Parks, Leather complexes in the schedule to the EIA Notification, 2006. (iii) Total area required for the development is 591.04 ha. (1460.47 Acre). (iv) During construction phase, total projected water requirement of 20 KLD is proposed to be met through ground water sources/tankers. During the construction phase, soak pits and septic tanks will be provided for disposal of waste water. Temporary sanitary toilets will be provided during peak labor force. (v) During operational phase, total water demand of the project is expected to be 10068 KLD and the same will be met by the 6117 KLD fresh water & 3951 KLD recycled water. Wastewater generated (4158 KLD) uses will be treated in 2 STPs (2*0.6=1.2MLD capacity) & 1 CETP of 5 MLD capacity. 3951 KLD of treated waste water will be recycled (395 KLD for Industrial use/flushing & 3556 KLD for gardening). After usage remaining treated water (if any) will be disposed in to

	municipal drain. (vi) It is proposed that the industrial park will stick to the Zero Liquid Discharge policy to avoid contamination of the nearby areas and so the groundwater. A systematic CETP and STP are operational 24 Hours to treat the wastewater generation from different systems. Wastewater treated from these facilities will be used as a secondary purpose in the industries and also for the landscape development. (vii) About 9 TPD solid wastes will be generated in the project. The biodegradable waste (6 TPD) will be processed in OWC and the non-biodegradable waste generated (2.8 TPD) will be handed over to authorized local vendor. (viii) Total power requirement during construction phase is 100 KVA and will be met from KPTCL/other sources and total power requirement during operation phase is 6 MW and will be met from KPTCL. (ix) An area of 33% will be left for development of greenbelt from the total project area (including 20% of Individual Industries). 15 m wide along the boundary, 2 m along the internal roads and along the internal boundary of individual industries, and in open areas. Plantation will be taken up immediately after obtaining necessary statutory clearances. Local species of 2 to 3 years old will be used for plantation. (x) Over all RHH from Rooftop rainwater of buildings, roads & greenbelt will be collected in RWH tanks of total with a flow of 65957 m^3/hr capacity for harvesting after filtration. (xi) Truck Parking facility is proposed in 73 acres of industrial area. (xii) Proposed energy saving measures would save about % of power.(as per the procedure). (xiii) **Wildlife issues:** It is not located within 10 km of any Eco Sensitive areas. (xiv) There is no court case pending against the project. (xv) **Investment/Cost**: The total cost of the project is Rs.91 Crores, cost towards environmental mitigation measure is about Rs.26.56 Crores and for CSR activities Rs.1.96 Crores. (xvi) **Employment potential:** Around 17,000 jobs will be generated due to the proposed project. Employment will be given based on the qualifications and minimum pre requisite conditions will be placed before the selection of candidate based on the nature of the job. (xvii) **Benefits of the project**: To development Industrial development in the region, Local employment improvement & Infrastructure & amenities will be developed. (xviii) **ToR Details:** ToR was granted by the MoEF&CC vide letter No.21-58/2015-IA-III dated 19th June, 2015. (xix) **Public Hearing**: Public Hearing was conducted on 20th July, 2016 at the project site i.e. Chamarajanagara Industrial Area, Badanakuppe & Kallambelli Village, Chamarajanagara Taluk & District, Karnataka.
3.9.2	During deliberations, the EAC observed that no details were available regarding industrial units/activities including their categorization (whether A or B), to be housed in the proposed industrial area, and as such, there was partial compliance of the terms of reference issued for the project on 19th June, 2015. The Committee further noted that details are essentially required to justify the efficacy of the proposed CETP, disposal of hazardous waste and also to stipulate the conditions accordingly.
3.9.3	*The proposal was, therefore, deferred for want of the desired inputs from the project proponent.*
3.10	**Development of SEZ for Pharmaceutical and Chemical manufacturing units intake and outfall and for desalination plant at Narasapuram village, Nakkapalli**

	Mandal, Visakhapatnam District (Andhra Pradesh) by M/s Hetero Infrastructure SEZ Ltd. - Amendment in Environmental and CRZ Clearance - [F.No.21-641/2007-IA-III]
3.10.1	The project proponent made a presentation and provided the following information to the Committee:-

(i) Earlier, the Environmental and CRZ Clearance was granted on 25th October, 2010 to the project 'Development of SEZ for Pharmaceutical and Chemical manufacturing units intake and outfall and for desalination plant' at Sy. No. 215, 286/1, 286/2, 283/1, in Ch. Lakshmi Puram, 312/1 to 312/5, 312/10 to 312/12, 313/1 to 313/7 of Rajaiahpet, 19(part) in Pedda Teernala, 117/1 to 117/3, 119/1, 119/2, 120/1, 120/2, 125, 126, 129/1 to 129/9, 138, 142, 150, 512 at Narasapuram village, Nakkapalli Mandal in Visakhapatnam District (Andhra Pradesh) promoted by M/s Hetero Infrastructure SEZ Ltd.

(ii) The project site is located at 18^0 08' 21'' N Latitude and 83^0 39' 25" E Longitude.

(iii) Now, the proposal is for amendment in the Environmental/CRZ Clearance dated 25th October, 2010 due to installation of turbine to generate 6.1 MW power utilizing steam from existing 45 TPH coal fired boiler in existing SEZ.

(iv) Total land area is 138.51 ha. No additional land required for proposed installation of turbine in existing SEZ.

(v) The details regarding present water requirement and waste water generation are as under:-

Description	As per EC	Utilized	Balance
Water Consumption (KLD)	1674	546.15	1127.85
Wastewater Generated (KLD)	1132	264.15	867.85

As such, there shall be no additional usage of water and wastewater generation on account of installation of turbine in existing SEZ, and could be adequately met with the existing arrangement.

(vi) No solid waste would be generated due to installation of turbine to generate 6.1 MW power.

(vii) The proposed installation of turbine will generate 6.1 MW and same will be utilized for API Units located in Hetero Infrastructure SEZ limited.

(viii) **Wildlife issues**: There are no ecologically sensitive areas like national parks, sanctuaries within 10 km radius of the site.

(ix) **Cost/Investment**: Rs.11.45 crores for installation of turbine and other accessories for transfer of power.

(x) **Employment potential:** No additional employment.

(xi) **Benefits of the project:** The project is a net gain, as power is generated with the envisaged utilities only.

(xii) There is no court case pending against the project.

3.10.2	The EAC noted that the proposal is for amendment in the Environmental/CRZ Clearance dated 25th October, 2010 due to installation of turbine to generate 6.1 MW power utilizing steam from existing 45 TPH coal fired boiler in existing SEZ. To take forward such proposals, compliance status of earlier EC/CRZ Clearance conditions is essentially required.

3.10.3	*The EAC asked the project proponent to submit the desired compliance status through the concerned Regional Office of this Ministry for further consideration of the proposal.*
3.11	**150 MLD Sea Water Reverse Osmosis Desalination Plant at Nemmeli, Thiruporur Taluk, District Kancheepuram (Tamil Nadu) by M/s Chennai Metropolitan Water Supply and Sewerage Board Desalination Plant - CRZ Clearance – [F.No.11-36/2016-IA-III]**
3.11.1	The project proponent made a presentation and provided the following information to the Committee:- (i) The project involves 150 MLD Sea Water Reverse Osmosis Desalination Plant at Nemmeli, Thiruporur Taluk, District Kancheepuram (Tamil Nadu) promoted by M/s Chennai Metropolitan Water Supply and Sewerage Board Desalination Plant. (ii) The objective of the project is for augmentation of drinking water supply in the Southernparts of Chennai city with per capita water supply of 135 LPCD as per norms. Chennai is the water stressed city with no perennial source of surface water. Hence to bridge the supply demand gap, CMWSSB resorted to desalination source. (iii) Is on eastern side of East Coast Road (ECR) at 12° 42' 08" North, 80° 13' 29" East and is approximately 40 km south from the city. (iv) **Intake and Outfall system:** The intake and outfall system includes as follows: ∗ One intake structure in sea with depth of 10 m. ∗ One no. of 100 mm opening Duplex screen to exclude larger marine life. ∗ One intake pipe each of 2300 mm (OD) dia PN 6.4 bar and one 1600 mm (OD) PN 6 outfall HDPE ∗ A shock chlorination system in form of Hypo dosing is proposed to minimize marine growth in intake pipes ∗ Lot of HDPE diffuser. ∗ Travelling Band Screens before the Pumps to trap floating materials, sea shells, diatoms etc. ∗ Vertical shaft pumps in Super Duplex Construction for sea water intake (v) **Reverse Osmosis** involves 7 nos individual trains single stage/single pass RO each having dedicated pumping system and Energy Recover Devices (ERDs), Ppermeate storage tanks, RO Clean-In-Place (CIP) system includes all tanks and pumps, All high pressure valves are of Super Duplex with PERN>41 and RO feed water storage tank 1 no. (vi) **Treated Water Sump and Pump Sets:** Treated water sump of 1 no. of 6,800 cum capacity, and 3W+2S Horizontal Centrifugal Split Casing pumps in each of 2100 m3/hr o pump product water. (vii) **Plant Electrical Sub-station:** 110/11 KV indoor sub-station with two incoming lines of 110 KV. (viii) For the Phase III (150 MLD Product Water) plant to be developed in future, the seawater of 18958.33 m^3/hour will be drawn from the sea and about 12708.33 m^3/hour of brine reject will be released into the sea. The seawater intake head will be located at a distance of about 1050 m from the shoreline at 10 m depth. The outfall diffuser will be located at 650 m distance from the shoreline at 7.5 m water depth. The diffuser will have the multiple ports of 10 nos. x 500 mm diameter. This project involves construction of the following activities:

	• Laying of seawater intake pipeline • Laying of outfall pipeline • Construction of seawater intake head • Construction of outfall diffuser • Construction of seawater sump with pump house (ix) The main objective of the study is to ensure that the rejected water does not unduly alter the marine ecosystem by way of changes in salinity levels, chlorine effects and above all temperature variation exceeding the admissible levels. These are studied by simulating the situation in numerical models developed by various institutions, the most popular one being CORMIX model and MIKE 21. (x) It is informed that a diffuser outfall located at 650 m distance into the sea at 7.5 m depth, with 10 ports of 500 mm dia. each, projecting above the bed by 1.5 m with orientation of 30 deg horizontal is adequate to ensure proper mixing and dilution which will not induct any major alteration to the existing marine ecosystem and consequently on marine life. The study on CORMIX model shows the mixing zone will extend for 65 m to achieve 22 times and extending further till 200 m distance to achieve to dilution of 27 times from the disposal location. (xi) **SCZMA Recommendation:** The Tamil Nadu Coastal Zone Management Authority has recommended the project vide their letter No. 845/EC.3/2016- 1 dated 14th January, 2016. (xii) **Investment/Cost**: Rs.1089.48 Cr (2013-14 Price Level) and Rs.1258.88 Cr (2015-16 Price level). (xiii) **Components in CRZ area:** The project is falling under CRZ-III, CRZ –I (Inter Tidal zone) and CRZ IV (sea water area). As per CRZ Notification, 2011, vide para 4 (i) (a), para 8 I CRZ I (i) (b) and para 8 III CRZ IIIA (h) & B (v) the desalination is permitted. (xiv) The marine facilities for the desalination plant will consist of: (a) laying of seawater intake pipeline on the seabed but buried below seabed to a distance of 1050 m into the sea till 10 m water depth (CD), (b) laying of outfall pipeline on the seabed but buried below the seabed to a distance of 650 m into the sea till 7.5 m water depth(CD), (c) construction of seawater intake head, iv) construction of outfall diffuser (xv) The demarcation of LTL/HTL/CRZ along the project shoreline was carried out for the existing operational plant; hence the same has been taken, as the proposed plant is within the premises of the existing operational 100 MLD. (xvi) **Location of intake/outfall and Quantity:** 1 No. Intake at $12^0$41'41" N, $80^0$14'1.6"E and 1 No Outfall at $12^0$41'53.07" N, $80^0$13'52.10"E. (xvii) **Employment Potential:** The primary benefit of the proposed Desalination Plant is that it will assist in securing the supply of drinking water to the metropolitan population well into the future. It can continue to deliver high quality drinking water for consumption, even during periods of drought. It also provides an alternative source of water that will make our overall supply more diverse and less vulnerable to interruption. The provision of a secure water supply for residents and industry within the Chennai metropolitan area which will assist in maintaining living standards and the amenity of the urban area.
3.11.2	The EAC noted that the proposal is for establishment of Desalination Plant of capacity 150 MLD at Nemmeli. It is further observed that same PP is requesting for establishment of another desalination plant of capacity 400 MLD at a distance of 600 m

	approximately. EAC also observed that there is considerable space available at the Perur, East Coast Road, Chennai (proposed site for 400 MLD) which can accommodate both the desalination plants at same location. Also it is noted that there is significant erosion occurred in Nemmeli beach previously while commissioning the desalination plant.
3.11.3	EAC has deferred the project for the want of following information:- (i) As stated by the PP, both the desalination plants of 150 MLD and 450 MLD are situated at a distance of 600 m. EAC has raised a query why the both plants cannot be installed at the same location. The Committee also wanted to know financial as well as environmental implications of two separate units against one single unit with 600 MLD capacity (ii) Impact of shoreline change needs to be performed. (iii) Fresh recommendations from the TNCZMA after examining all the documents as mentioned para 4.2 of CRZ notification 2011 including NOC from concern state PCB.
3.12	**400 MLD capacity Desalination Plant based on sea water Reverse Osmosis at Perur, East Coast Road, Chennai (Tamil Nadu) by M/s Chennai Metropolitan Water Supply and Sewerage Board Desalination Plant - CRZ Clearance – [F.No.11-37/2016-IA-III]**
3.12.1	The project proponent made a presentation and provided the following information to the Committee:- (i) The project involves 400 MLD capacity Desalination Plant based on sea water Reverse Osmosis at Perur, East Coast Road, Chennai (Tamil Nadu) promoted by M/s Chennai Metropolitan Water Supply and Sewerage Board Desalination Plant. (ii) The total area of the proposed site is 87.915 acre out of which the two burial grounds have a combined area of 2.01 acre, therefore net area available is 85.51 acre. The proposed plant shall be spread over approx. 50 acre and rest of the area has been left for future expansion. (iii) The objective of the project is for augmentation of drinking water supply in the Southern and Western parts of Chennai city with per capita water supply of 135 LPCD as per norms. Chennai is the water stressed city with no perennial source of surface water. Hence to bridge the supply demand gap, CMWSSB resorted to desalination source. (iv) The Site is located at Eastern side of East Coast Road (ECR) at 12° 42' 44" North, 80° 14' 26" East and is approximately 40 km south from the city. (v) **Intake and Outfall system:** The intake and outfall system includes as follows: ∗ Two intake structure into the sea at depth of 10 m. ∗ Two no. of 100 mm opening Duplex Frame screen to exclude larger marine life. ∗ Two intake pipe each of 2500 mm (OD) dia PN 6.4 bar HDPE ∗ A shock chlorination system in form of Hypo dosing is proposed to minimize marine growth in intake pipes ∗ One no of 2500 mm (OD) HDPE, PN 6.4 bar pipe conduit for outfall. ∗ Lot of HDPE diffuser. ∗ Travelling Band Screens before the Pumps to trap floating materials, sea shells, diatoms etc.

	* 6W+1S Vertical shaft pumps in Super Duplex Construction for intake of sea water (vi) **Pre-Treatment** involves pH correction unit, Coagulation & flocculation unit, 24 nos of Lamella clarifier for removal of large amount of relatively coarse material, 32 nos of Dissolved Air Flotation (DAF) to skim off, the lighter material with desired SDI, 40 nos of Dual Media Gravity filters with blowers and back wash pumps and all valves in pre-treatment are with MOC of Body - DI with Ebonite Lining/GGG-40; Disc and Shaft of ASTM-A-890Gr.5A/UNS 32750/254 SMO. (vii) **Reverse Osmosis** involves 17 nos individual trains single stage/single pass RO each having dedicated pumping system and Energy Recover Devices (ERDs), two permeate storage tanks, RO Clean-In-Place (CIP) system includes all tanks and pumps, All high pressure valves are of Super Duplex with PERN>41 and RO feed water storage tank. (viii) **Treated Water Sump and Pump Sets** involves Treated water sump of 1 no. of 35,000 cum capacity and 6W+2S Horizontal Centrifugal Split Casing pumps in each of 2800 m3/hr @ 65 m head to pump product water. (ix) **Plant Electrical Sub-station:** 110/11 KV outdoor sub-station with two incoming lines of 110 KV. (x) For the proposed 400 MLD Product Water plant, the seawater of 47791.66 m^3/hour will be drawn from the sea and about 31125 m^3/hour of brine reject will be released into the sea. The seawater intake head will be located at a distance of about 1150 m from the shoreline at 10 m depth. The outfall diffuser will be located at 750 m distance from the shoreline at 8 m water depth. The diffuser will have the multiple ports of 18 nos. x 600 mm diameter. This project involves construction of the following activities offshore: • Laying of seawater intake pipeline • Laying of outfall pipeline • Construction of seawater intake head • Construction of outfall diffuser • Construction of seawater intake sump with pump house (xi) It is informed that a diffuser outfall located at 750 m distance into the sea at 8 m depth, with 18 ports of 600 mm dia. each, projecting above the bed by 1.5 m with orientation of 30 deg horizontal is adequate to ensure proper mixing and dilution which will not induct any major alteration to the existing marine ecosystem and consequently on marine life. The study on CORMIX model shows the mixing zone will extend for 75 m to achieve 57 times and extending further till 200 m distance to achieve to dilution of 65 times from the disposal location. (xii) **Investment/Cost**: Rs.2891.70 Crores. (xiii) **Components in CRZ area:** The project is falling under CRZ-III, CRZ –I (Inter Tidal zone) and CRZ IV (sea water area). As per CRZ notification 2011, vide para 4 (i) (a), para 8 I CRZ I (i) (b) and para 8 III CRZ IIIA (h)& B (v) the desalination is permitted. The marine facilities for the desalination plant will consist of: i) laying of seawater intake pipeline on the seabed but buried below seabed to a distance of 1150 m into the sea till 10 m water depth (CD), ii) laying of outfall pipeline on the seabed but buried below the seabed to a distance of 750 m into the sea till 8 m water depth (CD), iii) construction of seawater intake head, iv) construction of outfall diffuser. (xiv) **Location of intake/outfall and Quantity:** 2 Nos. Intake at $12^0$42’39” N, $80^0$14’20.69”E, & $12^0$42’30.24” N, $80^0$14’17.10”E and 1 No Outfall at

	12042'48.823" N, 80014'08.05"E. (xv) **SCZMA Recommendation:** The Tamil Nadu Coastal Zone Management Authority has recommended the project vide their letter No. 844/EC.3/2016- 1 dated 14th January, 2016. (xvi) A Sewage Treatment Plant is proposed in the facility to treat Sewage generated within the facility and reuse treated sewage for non-potable usages. (xvii) **Power requirement and source:** 85 MVA, Source is TNEB substation. All Street lights and building lights to best possible extent are Solar lighting proposed. (xviii) **Benefits of the project:** The primary benefit of the proposed Desalination Plant is that it will assist in securing the supply of drinking water to the metropolitan population well into the future. It can continue to deliver high quality drinking water for consumption, even during periods of drought. It also provides an alternative source of water that will make our overall supply more diverse and less vulnerable to interruption. The provision of a secure water supply for residents and industry within the Chennai metropolitan area which will assist in maintaining living standards and the amenity of the urban area.
3.12.2	The EAC noted that the proposal is for establishment of Desalination Plant of capacity 150 MLD at Nemmeli. It is further observed that same PP is requesting for establishment of another desalination plant of capacity 400 MLD at a distance of 600 m approximately. EAC also observed that there is considerable space available at the Perur, East Coast Road, Chennai (proposed site for 400 MLD) which can accommodate both the desalination plants at same location. Also it is noted that there is significant erosion occurred in Nemmeli beach previously while commissioning the desalination plant.
3.12.3	EAC has deferred the project for the want of following information:- (i) As stated by the PP, both the desalination plants of 150 MLD and 450 MLD are situated at a distance of 600 m. EAC has raised a query why the both plants cannot be installed at the same location. The Committee also wanted to know financial as well as environmental implications of two separate units against one single unit with 600 MLD capacity (ii) Impact of shoreline change needs to be performed. (iii) Fresh recommendations from the TNCZMA after examining all the documents as mentioned para 4.2 of CRZ notification 2011 including NOC from concern state PCB.
Day 2nd: Tuesday, 17th January, 2017	
3.13	**Construction of Beach Resort at R.S. Nos.205/4, Manapet Revenue village, Bahour Commune Panchayat in Puducherry by M/s Trishul Buildtech and Infrastructures Pvt Ltd – CRZ Clearance – [F.No.11-35/2016-IA-III]**
3.13.1	During the meeting, the project proponent made a presentation and provided the following information to the Committee:- (i) The project involves construction of Beach Resort at R.S. Nos.205/4, Manapet Revenue village, Bahour Commune Panchayat in Puducherry promoted by M/s Trishul Buildtech and Infrastructures Pvt Ltd.

	(ii) The total plot area of 66773.19 sqm, built up area will be 7957.18 sqm. The proposal involves construction of 35 nos of villa block, guest rooms, spa, Ball room and pre function area, arrival court, Business centre and all day dining, BOH and staff quarters. The proposal involves G+1floors within CRZ region and G+ 5 Floors outside CRZ region. The maximum building height will be 6 m. (iii) **Project cost:** Rs.20 Crores. (iv) **Whether the project is in critically polluted area**: No. (v) **If the project is for EC under EIA Notification**: No. (vi) **Components in CRZ area: D**evelopment zone (area 200 – 500 m of HTL) is 36170 sq.m and No Development Zone (NDZ) area is (0-200m of HTL) 19424 sqm. (vii) **SCZMA Recommendations:** The Puducherry Coastal Zone Management Authority has recommended the project vide letter dated 18 July, 2016. (viii) If the project involves diversion of forest land: No. (ix) If the project falls within 10 Km of eco sensitive area: No (x) **Waste Management**: 167 KLD of which fresh water is 108 KLD which will be sourced from authorised private tankers. Quantity of sewage generated is 151 KLD which will be treated in STP of 160 KLD. The treated sewage is 151 KLD of which 59 KLD is to be used for flushing and 92 KLD for gardening. (xi) **Solid waste Management:** The organic waste, 1076 Kg/day will be treated in Biometanation plant. Inorganic waste of 1315 kg/day is to be disposed to authorized recyclers. STP sludge 45 kg/day is to be used as manure for Gardening and Landscaping purpose. (xii) The total power requirement for the project is 500 kVA which will be sourced from EB and Power back up through DG sets is 2 x 250 KVA. (xiii) **Energy conservation measures propose:** Solar panels proposed on roof top for all villas - power generated 513.45 kVA. Solar panels for guest rooms - power generated - 47.25kVA. (xiv) **Green belt development**: Proposed in No development area. (xv) **Parking requirement with provision made**: 200 Nos. of car. (xvi) **If the project involves foreshore facilities**: No. (xvii) **Employment potential:** The proposal is for beach Resort and will provide employment in the nearby areas.
3.13.2	While deliberations on the project, the EAC found mismatch of details in respect of location of project site as reflected in the Form-I against that mentioned in the proposal forwarded by the Puducherry CZMA. The project proponent was asked to rectify the same either on their own or through the Puducherry CZMA for further consideration of the proposal.
3.13.3	*The EAC deferred the proposal for want of clarifications.*
3.14	**Shifting of Extra High Voltage Transmission (EHVT) lines for the proposed Navi Mumbai International Airport in Navi Mumbai (Maharashtra) by City and Industrial Development Corporation of Maharashtra Limited – CRZ Clearance – [F.No.11-38/2016-IA-III]**
3.14.1	During the meeting, the project proponent made a presentation and provided the following information to the Committee:- (i) The project involves shifting of Extra High Voltage Transmission (EHVT) lines for the proposed Navi Mumbai International Airport in Navi Mumbai (Maharashtra)

	promoted by City and Industrial Development Corporation of Maharashtra Limited. The proposal is to shift the existing EHVT lines by underground cables along the boundary of the airport and terminate both the ends to the existing overhead lines outside the airport area by installing terminal gantry. These lines belong to Maharashtra State Electricity Transmission Company Ltd. (MSETCL) and Tata Power Ltd. (TPL). (ii) As per CRZ Notification 2011, the proposed project falls under CRZ-I, II and III categories. The total CRZ area involved is 13.17 ha consisting of CRZ I- 10.79 ha, CRZ II- 2.08 ha and CRZ III- 0.3 ha. Out of total, 2.65 ha is mangroves area. Following are the details of cable route: The underground cables of MSETCL of 15 Km would be passing through: a. **Underground ducts**: length 11.38 Km b. **On Stilts**: length 2.2 Km (1.7 Km + 0.5 km) c. **On Bridge**: length 1.42 Km (1.3 Km + 0.12 km) The underground cables of TPL of 9.5 Km would be passing through: a. **Underground ducts**: length 7.14 km b. **On Stilts**: length 1.7 Km c. **On Bridge**: length 0.66 Km Details of the underground cables (MSECTCL & Tata Power) a. **Along road**: Duct length (11.5m wide road- 11 km &Airport periphery road- 7.7 km), Duct width- 2 m b. **On stilt**: Length – 2.2 km, Deck width- 25.3 m, Duct width- 2 m c. **On bridge**: Length – 2.08 km, Deck width- 13.2 m, Duct width- 2 m (iii) The foundation work of stilt will require some dredging but it is very negligible. (iv) **Water Requirement:** Domestic water requirement will be 3 KLD /day (Flushing 4 KLD/day). Total water requirement will be 7 KLD/day. The water will be sourced through CIDCO. (v) **SCZMA Approval**: The Maharashtra Coastal Zone Management Authority (MCZMA) recommended the project vide their letter No. CRZ-2016/CR-152/TC 4 dated 27th September, 2016. (vi) **MSW**: The debris generated from the Construction activities will be reused and remaining waste will be handed over to authorize vender for further disposal. (vii) **Power requirement and source**: Power from Generator. (viii) **Investment/Cost of the project**: Cost of the project: Rs. 1560.87 Crores. (ix) **Benefits of the project**: Re-routing of EHVT lines will enable the development of the proposed international airport activities and make it operation safe. (x) **Employment potential**: Generation of employment opportunity will be provided to local people. 150 workers during construction.
3.14.2	During deliberations, the EAC noted that the instant project involves shifting of EHVT lines from the present alignment along the boundary of the Navi Mumbai International Airport (NMIA) to the underground cabling with switching stations outside the airport area to ensure safe aircraft landing and takeoff operations. Other salient features of the project from CRZ perspective noted by the EAC were as

	under:- (i) The project 'Navi Mumbai International Airport' was granted Environmental and CRZ Clearance by this Ministry vide letter dated 22nd November, 2010 for only airport area of 1160 ha. One of the conditions stipulated therein states that Environmental and CRZ Clearance needs to be separately obtained for airport related activities and other offsite infrastructure project. (ii) One of the airport related activities is shifting of utility services such as Extra High Voltage Transmission (EHVT) Lines, presently running through the airport area. These transmission lines are owned by M/s Tata Power Company Ltd (TPCL) and M/s Maharashtra State Electricity Transmission Company Ltd (MSETCL). (iii) The transmission lines infringe the various surfaces i.e. the inner, outer transition, approach, take-off and conical surfaces, and thus require shifting by the most feasible and cost efficient way to meet the operational requirement of the airport. (iv) CIDCO has proposed to construct a bridge over the creek portion and stilt along the route passing on mangroves. The route of the proposed underground cable would require laying of EHVT cable for a length of 15 km for M/s MSETCL and 9.5 km for M/s TPL lines. The entire underground cabling shall be carried out along and abutting the periphery of the airport boundary, and further on the stilts and bridges to join the existing overhead lines through sub/switching stations. (v) Total CRZ area involved in the project would be 13.17 ha, consisting of CRZ I - 10.79 ha, CRZ II - 2.08 ha and CRZ III - 0.3 ha. Total area of mangroves falling in the route is 2.65 ha. (vi) The MCZMA has recommended the proposal vide their letter dated 27th September, 2016, subject to strict compliance of certain conditions. (vii) The Committee expressed its concern over minimal physical progress achieved, and that too, when the validity of the EC for the NMIA is to expire shortly. (viii) The Committee also took cognizance of the representation from one NGO namely, Conservation Action Trust, sent to the members through mail, alleging destruction of mangroves and no proportionate compensatory afforestation. The Committee desired for the project proponent to respond to the same.
3.14.3	*The EAC, after deliberations and to take the proposal forward, desired inputs and clarifications in respect of the following:-* • *Compliance status of the conditions stipulated in the EC dated 22nd November, 2010 for the MMIA by the Regional Office of MoEF&CC.* • *Diversion of forest land and the compensatory afforestation of the mangroves.* • *Permission required, if any, from the Power Discoms for shifting of EHVT lines.* • *Parawise response on the issues raised in the representation referred above.* *The proposal was deferred for the needful on the above lines.*
3.15	**Construction of pipeline for carrying treated effluent from Tarapur MIDC to Deep Sea at Navapur in Maharashtra by M/s Maharashtra Industrial Development**

	Corporation - CRZ Clearance - [F.No.11-39/2016-IA-III]
3.15.1	During the meeting, the project proponent made a presentation and provided the following information to the Committee:- (i) The project involves laying 1000 mm OD HDPE Marine outfall pipeline from Landfall point to outfall point (Diffuser) in Arabian Sea from MIDC Tarapur to Deep Sea at Navapur in Maharashtra. (ii) Total length of the pipeline from the Landfall Point to the suggested Offshore Point works out to be 7.1 km. Geographical Coordinates: 19°48'21".59"N ; 72°37'25".35"E. (iii) Project components: The components of the project are as follows: • Pipeline (HDPE) of 1000mmdiameter to release 75 MLD treated effluent from Tarapur Industrial area into Arabian Sea(Navapur) • Construction of 3.5 m wide temporary approach road using initial lining of 2mm Geo textile film • Conducting marine Hydro-graphic (Bathymetry) survey • 1000 mm dia Polyethylene Pipes with 6 kg/cm^2 design pressure. 7.1 km (0.9 km intertidal) long line will be laid using 12 m long PP pipes sections, 2.5 m below the sea bed. • Providing erecting and placing RCC primary and secondary blocks as per design • Deploying suitable dredging equipment and carrying out in-water dredging in the open sea Stringing, Block fixing, floating, aligning and sinking on the pre-excavated trench bed/sea bed (iv) To cater for the present needs and also the expected expansion two different quantities of effluents (80 MLD & 120 MLD) were considered for modeling purpose. The location was selected in the coastal waters off Tarapur with the geographical co-ordinates19°48'21".59"N; 72°37'25".35"E with a depth of 12m below CD. The model was run for 10 days by introducing BOD concentration of 100mg/l at proposed Disposal Point by considering ambient BOD is 1 mg/l. The maximum BOD concentration at 100m distance from proposed outfall would be around 1mg/l above ambient for 80 MLD & 1.5 mg/l above ambient for 120 MLD. At the edge of 200 m near ambient conditions would prevail. (v) **Water requirement:** Water will be required for construction phase. Same will be made available through tankers. (vi) **Solid Waste Management**: Total excavation of sea Floor shall be about 2, 50,000 Cubic Meters. Within the Intertidal zone, the trench will be excavated by Earth moving Machines. Interlocking Sheet Piles will be driven on the Sea Bed to prevent collapse of the Trench up to a length of 900 Meters from the HTL. The excavated material shall be temporarily stored on the Sea Floor in an evenly distributed manner and the same material shall be used for refilling the trench after laying pipeline. Surplus excavated material (sand-about 7,000 Cubic Meters) after Backfilling, will be disposed in to the nearby sea area in an evenly distributed manner to avoid obstruction to navigation. (vii) **Cost of the project:** Rs.105.45 Crores. (viii) **Whether the project is in Critically Polluted area:** No. (ix) **Components in CRZ area**: CRZ IB and CRZ IVA. Layout on CRZ map of 1: 4000 scale prepared by Institute of Remote Sensing, Anna University, Chennai. (x) **SCZMA Recommendations:** The Maharashtra Coastal Zone Management Authority (MCZMA) recommended the project vide their letter No. CRZ 2016/CR 197/TC 4 dated 27th October, 2016.

	(xi) **Employment Potential**: Workers shall be employed in construction phase. (xii) **Benefits of the project**: Site of disposal identified for adequate dispersion of pollutants and proposed pipeline will lead to proper disposal of treated effluent in Arabian sea at Navapur.
3.15.2	During deliberations, the EAC noted the following:- (i) MIDC is the nodal agency for providing infrastructural facilities required for smooth operations of different industrial projects/activities in the Tarapur industrial area. These include treatment of industrial effluents and its safe disposal to the recipient water body/sea. (ii) The existing effluent treatment facility is through one CETP of 25 MLD capacity followed by disposal into coastal water off Navapur. In order to meet the increased industrial requirements and thus to augment the effluent treatment infrastructure, a new CETP of 50 MLD capacity is under installation/progress. Also, one pipeline 7.1 km long is proposed to carry the treated effluent from the Tarapur MIDC to deep sea at Navapur. (iii) The water quality monitoring carried out by MPCB for the presently operational CETP of 25 MLD, run by Tarapur Environment Protection Society, reveals that treated effluents are not meeting the discharge standards in terms of core parameters, and thus defeating the very purpose of CETP, which amounts to violation of the Environment (Protection) Act. 1986. This can have grave consequences on the health of locals and local livelihoods. The EAC desired for a clarification in this regard and asked MIDC to provide the details of individual units operating in the Tarapur MIDC, and whether complying with the prescribed discharge standards. It was also directed to collect data on input and output points of each unit on various pollutants. The Committee also recommended independent study to be conducted by some academic institution on criticality of the pollution levels. (iv) The EAC also sought for the compliance status of the conditions stipulated in the EC for the existing CETP of 25 MLD capacity, and also clearances obtained for the proposed CETP of 50 MLD capacity. (v) Tarapur industrial area being one of the identified critically polluted areas, it was desired to seek inputs from MPCB on the corrective actions taken at their end to ensure treatment and disposal of industrial effluents in conformity with the statutory provisions. (vi) The Committee also observed that as per the CRZ Notification, 2011, MCZMA is to reconsider the proposal and their recommendations after the inputs and the No Objection Certificate from the MPCB.
3.15.3	*The EAC deferred the proposal for want of clarifications and inputs from the regulatory agencies namely MPCB, MCZMA. Also, the MIDC to coordinate and submit the details as explained above for further consideration of the proposal.*
3.16	**Construction of resort building at Sy.No.701/1, 701/2 of Varkala village, District Thiruvanathapuram (Kerala) by M/s Sea Cliff Resorts Pvt Ltd - CRZ Clearance - [F.No.11-40/2016-IA-III]**

3.16.1	*The project proponent did not attend the meeting, and as such the proposal was not considered.*
3.17	**Setting up of Lidar based offshore structure in an area in territorial waters off the Coast of Jhakhau, District Kutch (Gujarat) by M/s Samiran Udaipur Windfarms Limited - CRZ Clearance - [F.No.11-41/2016-IA-III]**
3.17.1	During the meeting, the project proponent made a presentation and provided the following information to the Committee:- (i) The project involves setting up of Lidar based offshore structure in an area in territorial waters off the Coast of Jhakhau, District Kutch (Gujarat) promoted by M/s Samiran Udaipur Windfarms Limited. (ii) Ministry of New and Renewable Energy has identified significant wind potential along coast of Tamil Nadu and Gujarat. MNRE has announced offshore wind policy in 2015 which allows interested Private agencies to get involved in obtaining site specific wind speeds and met-ocean data for feasibility studies for development of offshore projects. In this regard, M/s Samiran Udaipur Wind Farm Ltd (SUWL) along with technical support from NIOT intend to set up data collection platform in Gulf of Kutch, Gujarat coast. (iii) The LiDAR based offshore wind data collection platform is to be erected at 23° 07' 24.42"N and 68° 27' 48.24"E, which is about 16 km off coast of Jakhau. The proposed structure is a 1.2 m diameter monopile with 5m diameter LiDAR support platform on top at about 7.5m above MSL. The 1.2 m diameter monopile is to be driven up to about 25 m below seabed, at a water depth of 10m (CD). (iv) The LiDAR based offshore data collection platform proposed by SUWL is 18 km off coast of Jakhau in Gulf of Kutch. The project site falls under CRZ-IV category based on CRZ Notification, 2011. (v) There will not be any dust emission during pile driving in sea water. There will not be onsite burning of any waste arising from construction activities. As the construction phase is for short period and also the number of workers involved is of less quality impact on water quality is negligible. There are not much commercial fish trawling operations off Jakhau port. The platform is to be erected only for observation and is free from the Navigational route. (vi) **Investment/Cost**: The cost of the project is Rs.4 crore. (vii) **SCZMA Recommendation**: The Gujarat Coastal Zone Management Authority has recommended the project vide their letter No.ENV-10-2016-59-E dated 28th June, 2016.
3.17.2	During deliberations, the EAC noted the following:- (i) The proposal is for setting up of LiDAR based offshore structure for the wind measurement project for survey, investigation, exploration, data acquisition and other related technical studies in territorial waters off the Jhakhau coast in District Kutch (Gujarat). (ii) The project site is 18 km from the shore having geographical coordinates Latitude 23^0 07' 24.42" N and Longitude $68^0$27' 48.24" E. (iii) The LiDAR based offshore met mast is to be located at a water depth of 10 m with a tidal variation of 5 m on the platform of 5 m dia at about 7.5 m from the MSL. The data collection platform shall consist of instruments for collecting different

	parameters required for wind potential studies and design of structure for wind turbine. (iv) As per the CRZ map prepared by NIOT, Chennai, the project site falls in CRZ-IV category requiring offshore facility, and thus considered to be permissible in terms of the provisions of the CRZ Notification, 2011. (v) The GCZMA has recommended the project vide their letter dated 28th June, 2016 subject to strict compliance of certain conditions. (vi) National Institute of Wind Energy (NIWE) under the Ministry of New and Renewable Energy, is the nodal agency for the project for ensuring single window clearance from all the regulatory and security agencies, before the project is made operational.
3.17.3	*The EAC, after deliberations, recommended the project for grant of CRZ clearance subject to strict compliance of all the conditions stipulated by the GCZMA in their letter dated 28th June, 2016, and the additional conditions as under:-* • *The project shall be taken up only after necessary clearances/permissions are obtained from the Ministry of Defence, Ministry of Home Affairs, Gujarat Maritime Board, etc.* • *The offshore structure shall be decommissioned after two years of the desired data collection, ensuring adequate safety measures as employed during the construction phase with the minimal impact on noise and marine environment.*
3.18	**Laying of 400 kV Double Circuit (Quad Moose) Dedicated Transmission line from JSW Energy Generating station at Jaigad-Ratnagiri to JSW Steel Plant at Dolvi in District Raigad (Maharashtra) by M/s JSW Energy Ltd – CRZ Clearance – [F.No.11-42/2016-IA-III]**
3.18.1	The project proponent made a presentation and provided the following information to the Committee:- (i) The project is for laying of 400kV Double Circuit (Quad Moose) Dedicated Transmission line from JSW Energy Generating station at Jaigad-Ratnagiri to JSW Steel Plant at Dolvi- Raigad in Maharashtra. (ii) JSW Steel plant at Dolvi in Raigad District with existing Plant capacity of 5.0 MTPA is on verge of expansion up to 15 MTPA by end- 2020-21. The proposed expansion will result in increase of demand of electricity. The JSW steel plant has also acquired a company Amba River Coke Limited (ARCL). (iii) The present power requirement of both existing plants is to the tune of 358 MW. Considering the proposed expansion at Dolvi Steel plant up to 15MTPA, the power demand will substantially increase to around 900MW after exhausting all its captive generation. (iv) Since, all steel plants face very high investment costs and electricity represents vital share in production cost. Every brief interruption of power or fluctuations in the quality of power can have grave consequences. This makes reliable and cost effective power supply a key factor in a steel industry economic stability. Thereby, M/s JSW Energy Ltd has proposed to construct a dedicated 400kV D/C (Quad) Transmission line of about 187 kM from existing 1200 MW Thermal Power Plant located at Jaigad, Dist.-Ratnagiri to JSW steel plant located at Dolvi in Dist.-Raigad.

	(v) In total, 525 towers are proposed for laying of transmission line. Of which, 506 are in Non CRZ area and 19 locations are falling under CRZ zone, categorized as 9 under CRZ I and 10 under CRZ III. (vi) Out of 19 locations, 7 towers fall under CRZ IA, 2 under CRZ I B and 10 under CRZ III Zone as per CRZ Notification 2011. (vii) **Cost of the project** – Rs.678.89 Crore. (viii) **Whether the project is in Critically Polluted area** – No. (ix) **SCZMA Recommendations:** The Maharashtra Coastal Zone Management Authority (MCZMA) has recommended the project vide their letter No.CRZ A 2015/CR 427/TC-4 dated 25th October, 2016. (x) **Forest land**: Total area of Forest land proposed for diversion is approx. 34.2121 ha. (xi) Water required only during construction phase. Water requirement will be met through local tankers. (xii) **Solid Waste Management**: A debris generation quantity will be around 21250 m^3 during excavation of constructional pits. However, 80% of debris generated during construction will be backfilled after completion of tower foundation. Remaining 20% (4250 $m^{3)}$ debris will be utilized for construction of approach roads. Hence, there will be no impact on air quality or marine ecology due to debris generation. (xiii) **Hazardous Waste Management**: Debris types generated during construction of HT lines may include, Woody and tree material – from cut mangrove stands, Silt and mud excavated for foundations of Towers, Discarded pole material and wires, Civil construction materials – cement bags. Collection of debris material at source forms an effective tool for management. Sites should be designated at nearest possible point of construction site. However, it should be located outside CRZ area. (xiv) **Details of tree cutting** – Approx. 1700 no of trees (including 617 no. of mature mangrove trees, as mentioned in BNHS report). (xv) **Employment potential**: Total number of workers employed in construction phase will be 105 numbers. (xvi) **Benefits of the project:** It will provide relief to an existing Intra-state transmission network in the tune of 900 MW. It will provide more reliable & stable source of supply. Also power to other connected consumers around Nagothane, both in public & private sectors will be stable due to improved system availability. The power supply through dedicated transmission lines will cause significant saving in transmission charges and hence, economical.
3.18.2	During deliberations, the EAC noted that the proposal involves laying of 400 kV double circuit (Quad Moose) dedicated transmission line of about 187 km from the existing 1200 MW thermal power plant at Jaigad, District Ratnagiri to JSW steel plant at Dolvi in District Raigad (Maharashtra), to meet the increased power demand due to proposed expansion of steel plant from 5 MTPA to 15 MTPA. The Committee further noted the following:- (i) In total 525 towers are proposed for laying of transmission line of which 506 are in non-CRZ area and 19 locations are falling under the ambit of CRZ. (ii) Out of 19 tower locations in CRZ areas, 7 would be under CRZ-1A, 2 in CRZ-1B and the remaining 10 under CRZ-III. (iii) The total forest area involved under the project and proposed to be diverted in

	terms of the Forest Conservation Act, 1980 is 34.21 ha, including mangrove forest. (iv) Total number of trees proposed to be cut is approx 1700, including 617 matured mangrove trees. The loss of mangrove is proposed to be compensated through plantation of 5000 mangrove saplings at suitable locations. (v) The MCZMA has recommended the proposal vide their letter dated 25th October, 2016 subject to strict compliance of certain conditions. (vi) The project proponent has sought approval from the State Government u/s 68 and 164 of the Electricity Act for laying of dedicated transmission lines.
3.18.3	*After deliberations, the EAC decided to seek inputs in respect of the following:-* • *Compliance status of the EC conditions through Regional Office of MoEF&CC for the thermal power plant with the present capacity of 1200 MW and JSW steel plant of 5 MTPA.* • *Approval of the State Government or the Ministry of Power as applicable, and as requested by the project proponent in terms of the Electricity Act.* • *Parawise response to the representations from the NGO handed over during the meeting, alleging widespread loss of mangroves due to the project.*
3.19	**Construction of water supply structure on Gadi River, Navi Mumbai, Maharashtra by M/s City & Industrial Development Corporation – Amendment in CRZ Clearance – [F.No.11-95/2012-IA-III]**
3.19.1	During the meeting, the project proponent made a presentation and provided the following information to the Committee:- (i) Based on the recommendations of the Maharashtra Coastal Zone Management Authority (MCZMA) vide their letter No.CRZ-2011/CR-71/TC-2 dated 4th December, 2012, the Ministry of Environment & Forests had granted the CRZ Clearance to the project vide letter No.11-95/2012-IA-III dated 15th March, 2013. (ii) CRZ Clearance dated 15th March, 2013 was for only bridge over Gadi River. However, the proposed pipeline is further passing through CRZ area on North bank of Gadi River for which clearance was not obtained in earlier proposal. Hence, CIDCO intend to obtain amendment in CRZ clearance for entire stretch of pipeline passing through CRZ area. (iii) CIDCO intends to provide 1500 mm diameter water supply pipeline from MBR Vahal to Kalamboli junction. This water supply line will cater to the Navi Mumbai's nodes like Kharghar. Kalamboli, Kamothe, Panvel and to Navi Mumbai International Airport. (iv) **Components in CRZ area**: CRZ I and CRZ II. Pipeline will be passing through CRZ I, CRZ II and CRZ IV area at Gadi River. There will be no impact on drainage pattern (v) A bridge will be constructed across Gadi river to carry the water supply line. Total length of pipeline will be nearly 12.50 km out of which only 780 m will be passing through CRZ I and CRZ II area at Gadi River. (vi) Total length of bridge will be 300 m, Span over land will be 50 m on each side, there are 9 columns proposed in the total length. The superstructure of the bridge shall be in structural steel with epoxy painting. Two trusses shall be provided on each side of the bridge. Cross members shall be provided between the two

	trusses at top and bottom level of the bridge. Width of the bridge will be 6 m i.e. distance between two trusses is 6 m. (vii) Total cost of project (for 12.50 km) will be Rs.81.90 Crores, Cost of bridge across Gadi river will be Rs.8.40 Crores, Cost of the project passing through CRZ area will be Rs.4.50 Crores. (viii) **SCZMA Recommendations:** The Maharashtra Coastal Zone Management Authority (MCZMA) has recommended the amended project vide their letter No.CRZ-2016/CR-149/TC 4 dated 29th September, 2016. (ix) **Whether the project is in Critically Polluted area:** No. (x) **Forest land –** 0.40 ha. Forest application submitted and is under scrutiny at CCF, Thane, Maharashtra. (xi) **If the project falls within 10 km of eco- sensitive area**: Not applicable (xii) **Solid Waste Management**: Construction debris can be either sold to waste handlers or disposed in landfill. Site Specific Approach shall be adopted for filling, handling, and management of materials at the construction site. (xiii) **Hazardous Waste Management:** Segregation of wastes at source; Ensure any hazardous wastes (e.g. used oils, lead-acid batteries) are securely stored and transferred to appropriate facilities; Ensure all wastes are properly contained, labelled and disposed of in accordance with National/local regulations; and an inventory shall identify the consumption of products/material, ensuring wastes traceability, and identifying potential wastage and overconsumption. (xiv) **Energy conservation measures with estimated saving**: construction vehicles will be maintained to achieve optimum performance. During operational phase no activity envisaged at site. (xv) **Employment potential**: Total number of workers employed in construction phase will be 20 numbers. (xvi) **Benefits of the project**: Proposed pipeline is for basic necessity of drinking water.
3.19.2	The EAC noted that the proposal is for amendment in CRZ clearance for the project 'Construction of water supply structure on Gadi River' in Navi Mumbai (Maharashtra) granted by this Ministry vide letter dated 15th March, 2013. The EAC further observed that there was no clarity in the CRZ map presented by the project proponent, in respect of demarcation of CRZ and non-CRZ areas. Also, no details were provided for the proposed alignment of the pipeline in CRZ-I & II areas. Physical progress of the project achieved so far could also not be reported by the project proponent.
3.19.3	*The Committee, after deliberations, desired for the following:-* • *Layout of the proposed pipeline superimposed on the CRZ map and clearly showing different coastal regulation zones. That should also explain the earlier proposal i.e. the construction of pipeline over the bridge for which CRZ clearance already obtained, and the alignment proposed in the revised proposal.* • *Compliance status of the conditions stipulated in the CRZ clearance dated 15th March, 2013.* • *Parawise response to the representations from the NGO handed over during the meeting, alleging widespread loss of mangroves due to the project.* *The proposal was, therefore, deferred.*

3.20	**Construction of a resort building at Kottukal Panchayath in Thiruvananthapuram (Kerala) by M/s Officina Builders and Realtors Pvt Ltd - Further consideration for CRZ Clearance - [F.No.11-21/2016-IA-III]**
3.20.1	The project proponent made a presentation and provided the following information to the Committee:- (i) The project involves construction of a resort building at Kottukal Panchayath in Thiruvananthapuram (Kerala) promoted by M/s Officina Builders and Realtors Pvt Ltd. (ii) The project is located at Chowara (in between Kovalam and Vizhinjam), Survey Nos.- 363/3, 363/1-1, 1-2, 3-2, 364/6, 16,17,20,21,18,16-1, 6-1,18-1,21-1,19 and 17-1, Kottukal Village, Neyyattinkara Taluk, Thiruvananthapuram district and the Latitude and longitude of the site are 80 23' 57'' N and 760 58' 54'' respectively. (iii) Total plot area is 17118.81 sqm. FSI area is 8499.04 sqm/17118.81 sqm = 0.49 sqm and total construction area of 13220.05 sqm. The project will comprise of 20 blocks. Total 16 villas and 44 rooms shall be developed. Maximum height of the building is 8.9 m from ground level. (iv) During construction phase, total water requirement is expected to be 10 KLD which will be met from water supply system of the Kanjiramkulam Division of Kerala Water Authority and during the construction phase, soak pits and septic tanks will be provided for disposal of waste water. Temporary sanitary toilets will be provided during peak labor force. (v) During operational phase, total water demand of the project is expected to be 17 KLD and the same will be met from the water supply system of the Kanjiramkulam Division of Kerala Water Authority and from Recycled Water. Wastewater generated (14 KLD) uses will be treated in STP of total 25 KLD capacity. 13 KLD of treated wastewater will be recycled (7 KLD for flushing, 6 for gardening). (vi) About 120 kgs of solid waste will be generated in the project per day. The biodegradable waste (about 90 kgs) will be processed in Bio-gas Plant and the non-biodegradable waste generated (30kgs) will be handed over to authorized local vendor (Kudumbashree/ Clean Kerala Mission units). (vii) The total power requirement during construction phase is 20 KVA and will be met from Kerala State Electricity Board and total power requirement during cooperation phase is 200 KVA and will be met from Kerala State Electricity Board and 250 KVA DG Set. (viii) Rooftop rainwater of buildings will be collected in a RWH tank of 105500 liter capacity for harvesting after filtration. (ix) Parking facility for 115 four wheelers and 440 sqm of space for two wheelers is proposed to be provided against the requirement of 92 and 345 sqm respectively (according to local norms). (x) Proposed energy saving measures would save about 24% of power. (xi) **Wildlife issues**: It is not located within 10 km of Eco Sensitive areas. (xii) There is no court case pending against the project. (xiii) **Investment/Cost**: The cost of the project is Rs. 15 crores excluding the land value. (xiv) **Employment potential**: Around 150 direct employment and around 200 indirect employment. (xv) **Benefits of the project**: Direct and indirect employment opportunity to professionals, skilled and semi-skilled persons etc. (150 direct employment and 200 indirect employment), propagation of indigenous Indian medical sciences like Siddha Vaidyam and Ayurvedam and health care facility of the highest order

	based on Siddha Vaidyam and Ayurveda for people from all over the world. (xvi) Kerala State Pollution Control Board conducted an enquiry/public hearing on 8th July, 2013 at the site and no major issues were raised during the enquiry/public hearing. (xvii) **SCZMA Recommendation:** The Kerala Coastal Zone Management Authority has (KCZMA) has recommended the project vide their letter dated 5th February, 2016.
3.20.2	The project was earlier considered by the EAC in its meeting held on 28-29 June, 2016, wherein the Committee made the following observations:- i) The contour map of the site with a transpose of the proposed construction plan particularly of basement parking on the contour map, is required to ensure that no excavation takes place in CRZ area. The project proponent may also give a statement that the project would be entirely residential for Siddha Vaidyam, and shall not attract any day visitors as adequate parking for the same is not available. ii) A perusal of the google map indicates thick vegetation on the project site. The project lay out should indicate whether and to what extent the existing vegetation would be damaged due to the project. A tree census of the site may be provided so as to evaluate the extent of damage to the existing vegetation. The proposal was deferred for want of the desired information.
3.20.3	During deliberations, the EAC noted the guidelines contained in Annexure-III of the CRZ Notification, 2011, providing that the total covered area on all floors shall not exceed 33% of the plot size. In the first instance, the project proponent could not confirm the total covered area proposed under the project and insisted for taking the total plinth area as the covered area. However, the Committee observed that in any case, the project would be exceeding the FSI of 0.33, and may not be allowed.
3.20.4	The *Committee asked the project proponent to confirm the project configuration in terms of the provisions of Annexure-III of the CRZ Notification, 2011, and get the same endorsed through the KCZMA.*
3.21	**Development of New Industrial Area at Salarpur District Alwar (Rajasthan) by Rajasthan State Industrial Development & Investment Corporation Ltd (RIICO) - Further consideration for Environmental Clearance - [F.No.21-1/2014-IA-III]**
3.21.1	The project proponent made a presentation and provided the following information to the Committee:- (i) The project involves development of an Industrial Area at Salarpur, District Alwar (Rajasthan) of Rajasthan State Industrial Development & Investment Corporation Ltd. The proposed industrial estate has been envisaged to have 291 nos. of industrial units, 262 nos. of residential and 188 nos. Commercial plots in a total area of 389.696 ha. (ii) The project is located at $28^0$8'17.77" N Latitude and $76^0$47'22.49" E longitude. (iii) Maximum area, i.e., 195.820 Ha of land is reserved for development of industrial plots followed by area under roads (80.005 Ha) and 47.23 Ha for H.T. Corridor. Area of 7.920 ha is left along the nallah as buffer and will be utilized for development of green cover. 4.568 ha is reserved for green belt plantation which

	will be done along the project site boundary (wherever possible) & along each road of the Industrial area. It will be mandatory for each industry to maintain green area within the plot. Area of 0.435 ha is reserved for hospital along with 0.484 ha. which is reserved for development of schools. (iv) RIICO will source water from ground during construction. It is estimated that water requirement for construction phases will be about 1000 KLD including 27 KLD domestic water requirements for workers (90 LPCD for 300 workers). (Basis: Water requirement per acres – 1000 gallons/day) respectively. Industrial zone: During operation phase, one time water requirement of Industrial zone of proposed project would be 3672 KLD and recurring water requirement is 1510 KLD. Water requirement of green area (1260 KLD) will be fulfilled by domestic water treated by STP. CETP having treatment capacity upto reuse level is also proposed in Industrial zone. 900 KLD CETP treated water shall also be re-circulated into the system to minimize requirement of fresh water. Separate distribution network shall be provided for recirculation of CETP/STP treated water. Residential zone: Water requirement of residential zone of proposed project is 2360 KLD. Water requirement of green area (110 KLD) will be fulfilled by treated Domestic waste water (treated by STP). Recurring water requirement is 2250 KLD only. Separate distribution network shall be provided for recirculation of STP treated water for use in green area. (v) Waste during construction activity relates to excess cement mix or concrete left after work is over, rejection caused due to change in design or wrong workmanship etc. These are normally re-used as filling at the same site after completion of excavation work. Demolition and/or construction waste will be utilized in road construction wherever possible. Excavated earth during the civil works including road construction, fencing, drainage, site 31evelling etc., shall be utilized within the project site. Topsoil shall be conserved and will be utilized in the areas earmarked for greenbelt development. Approximately 70 to 90 kg of municipal solid waste will be generated from the project site during the construction phase. This will be collected and disposed off in a fenced pit dugout at the site and covered properly after completion of construction activity. During the operation phase of the project, waste management would be the responsibility of individual industries. Individual industry will provide system for municipal solid waste collection, storage and disposal. Each industry shall have to comply with the Municipal Solid Waste Management Rules, 2000 and amendments thereof. Approximately 9,000 persons will be involved during the operation phase of the project. Taking into consideration approximately 0.15 kg/person/day of municipal solid waste generation, the total municipal waste generation in the proposed industrial area will be about 1,350 kg/day. In addition to that due to the floating population of about 20,000 people, taking into consideration approximately 0.025 kg/person/day of municipal waste generation, the MSW generation will be about 500 kg/day. Therefore, total municipal waste generation due to the project during operation phase will be about 1,850 kg/day. Individual industry will provide system for safe disposal of non-hazardous waste disposal as per the consent to be provided by SPCB. (vi) Total power requirement during cooperation phase is 10,000 KVA and will be met from Grid Sub-Station (GSS) by JVVNL. (vii) Rooftop rainwater of buildings will be collected in 22 RWH tanks of total 1474.43 . KLD capacity for harvesting after filtration. (viii) Parking provision for commercial and personal vehicles will be the responsibility of individual occupant. (ix) Provision of solar lighting will also be made for street lighting for conservation of

	energy. A total 508 solar power street light are proposed to be installed along the roads so that 1/3 of street lights are solar energy based. Provision of these solar street lights will result in saving of energy worth approximately Rs 6.2 lacs per annum. (x) The total area has been divided into following zones: • Automobiles Industry Zone • Commercial & Residential (Khatedars only) zone • Areas for S.T.P., C.E.T.P., hospital, waste disposal, water harvesting , D.F.C. Corridor, roads, green area development & other services • 4.857 ha of land is reserved for future planning. • Roads proposed are of width 45 m, 30 m, 18 m, 12 m and 6 m ROW. • 80.05 ha (20.54 % of project area) has been kept as service area which includes parking facility. (xi) **Wildlife issues**: It is not located within 10 km of Eco Sensitive areas (xii) There is no court case pending against the project. (xiii) **Investment/Cost** of the project is Rs.1036.7629 crore. (xiv) **Employment potential**: 107163 No. (xv) **Benefits of the project**: The proposed project is for development of infrastructure for sitting the industrial area with residential and commercial facilities, which will provide a total of 291 industrial plots, with different plot sizes. This infrastructure development will provide a support for the upliftment of the overall area. Hence, due to the project the overall area will get better road connectivity and other supporting infrastructure. It is proposed to develop the Salarpur Industrial Area as a, Automobile, General Engineering and Other Miscellaneous industries which are less polluting industries. (xvi) **ToR Details:** The ToR for the project was granted vide letter No.21-1/2014-IA-III dated 26th May, 2014. (xvii) **Public Hearing**: Public Hearing was conducted on 15th July, 2015 at the Collectorate office, Tehsil Tapukara, Tijara. Major issues raised during the public hearing include compensation and employment. These were addressed by the project proponent. (xviii) As per CGWA guidelines, the area falls under over exploited zone for ground water withdrawal. The project proponent has applied for obtaining permission from CGWA for the same. It was also informed they have undertaken hydrological assessment of the area planned for ground water withdrawal and rain water harvesting.
3.21.2	The project was earlier considered by the EAC in its meeting held on 28-29 March, 2016, wherein the EAC asked the project proponent to clarify/furnish the following:- • whether the proposed project/activity is in conformity with the land use notified in the NCR zoning plan. • whether the nearest National Highways and connecting roads have been accounted for/upgraded for taking up this extra load. • Proper demarcation of adequate green belt between industrial area and the residential area. • Ground water availability duly cleared by CGWA. The proposal was deferred for want of the information.

3.21.3	*During deliberations, the EAC noted that the required approval from the CGWA for ground water availability is yet to be obtained, although recommended by the Regional Office of the CGWB at Jaipur. The Committee further observed that more than 70% of the industrial plots (covering 195.820 ha area) would be allotted to automobile industries. Whereas, for rest of the industrial plots it might not be possible for the project proponent to provide the details/categorization of industrial units proposed to come up in the near future. However, the Committee insisted for providing categorization of the proposed industrial units to arrive at its jurisdiction to consider the proposal anymore. The proposal was, therefore, deferred.*
3.22	**Marine disposal of treated effluent through dedicated pipeline to Bay of Bengal from existing Bulk Drug nit at IDA, Pydibhimavaram (Andhra Pradesh) by M/s Saraca Laboratories Limited - Amendment in CRZ Clearance - [F.No.10-47/2007-IA-III]**
3.22.1	The EAC noted that the proposal is for amendment in environmental clearance dated 17th September, 2007 under the CRZ Notification, 1991 accorded to the project 'Marine disposal of treated effluent through dedicated pipeline' to Bay of Bengal from existing bulk drug unit at IDA, Pydibhimavaram in Hyderabad promoted by M/s Saraca Laboratories Ltd based on the recommendations of APCZMA vide their letter dated 31st May, 2007. It has been claimed by the project proponent that their proposal was for laying of combined pipeline, also catering to their group company/sister unit M/s Andhra Organics Limited, and the same was recommended by APCZMA. While deliberations, the Committee observed that the proposal for amendment in the environmental clearance due to the change in treated effluent disposal arrangement, would amount to change in scope of work and thus need fresh recommendations of the State CZMA. Further, in view of the provisions of the CRZ Notification, 2011, the Committee desired that the proposal should be considered by sectoral EAC based on the recommendations of the State CZMA.
3.22.2	*The proposal was, therefore, deferred.*
3.23	**4/6 laning of package II, km 43.000 to 96.714 from Kerala/Tamil Nadu Border to Kanyakumari of NH-47 and Nagercoil-Kavalkinaru section of NH-47B by NHAI - Amendment in Environmental Clearance - [F.No.5-59/2007-IA-III]**
3.23.1	The project involves 4/6 laning of Kerala/Tamil Nadu Border (km 43.000) to Kanyakumari (km 96.714) Section of NH-47 and Nagercoil (km 0.000) to Kavalkinaru (km 16.376) Section of NH-47 B, promoted by NHAI. After the ToR issued for the project in the year 2007 and the public hearing on 21st August, 2010 at Nagecoil, the environmental clearance for the project was granted by this Ministry vide letter dated 9th September, 2010 for a total length of 70.36 km (50.70+16.60) as new alignment passing through 25 villages in Kanyakumari District.
3.23.2	During land acquisition process, Writ Petitions were filed in Madurai Bench of Hon'ble High Court of Madras during 2010-12, challenging the environment clearance granted by MoEF&CC, which were subsequently transferred to the National Green Tribunal

(South Zone) at Chennai.

NGT vide order dated 14th September, 2016 directed ordered as under:-

'*Application No. 104,111, and 112 of 2013 are partly allowed with a direction that the EC granted by MoEF&CC to the project proponent dated 9.9.2010 shall be kept in abeyance for a period of six months within which time the MOEF&CC shall refer the entire matter back to the EAC for reappraisal, which shall, after taking into consideration of the above said facts particularly the objections raised at the public consultation processes and referring to revenue records, as stated in the RTI information elicited above and, if necessary, to depute a team of its members to visit the place before making appropriate recommendations and pass appropriate orders and thereafter the regulatory authority viz. MOE&CC to pass appropriate orders. The entire process shall be completed within six months*.'

The project was earlier considered by the EAC in its meeting held on 1st December, 2016. Given the directions of the NGT, the EAC decided for a site visit to be undertaken by a team consisting of one of its members Shri K. Gowarappan and one member from the Regional Office of MoEF&CC of Chennai to assess the ground situation, especially in respect of ensuring protection of water bodies, feasibility of the structures proposed, and minimizing the trees to be cut along the project alignment.

3.23.3 *During the meeting, the EAC was informed that the proposed site visit by the team has not been conducted so far. As such, the proposal may not be considered for the present.*

3.24 **'Naidupeta Industrial Park' at Menakuru & Konetirajupalem Villages, Naidupeta Mandal of District S.P.S.R. Nellore (Andhra Pradesh) by Andhra Pradesh Industrial Infrastructure Corporation Limited - Environmental Clearance - [F.No.21-140/2015-IA-III]**

3.24.1 The project proponent made a presentation and provided the following information to the Committee:-

(i) The project involves development of Naidupeta Industrial Park (IP) at Konetirajupalem and Menakuru Villages, Naidupeta (M) in S.P.S.R.Nellore District, Andhra Pradesh.

(ii) Total land required for the proposed development of Naidupeta IP is 503.44 ha, with the land use details as under:-

S. No.	Land Use	Area (Acres)	Hectares (Ha)	Percentage (%)
1.	Plotted Area	933.81	377.90	75.07
2.	Road Area	103.56	41.91	8.32
3.	Open Space	124.88	50.54	10.03
4.	CFC Area	15.20	6.15	1.23
5.	Buffer + Green Belt	66.57	26.94	5.35
Total		**1244.02**	**503.44**	**100**

(iii) Total water requirement during the construction phase for the proposed IP is estimated to be 0.5-1.0 MLD, which would be supplied through road tankers/local municipal bodies. During operation phase, water requirement of 6.4 MLD of water

will be met from Telugu Ganga Canal (TGC). APIIC has already obtained approval from the Irrigation and Command Area Development of the State Government to tap water from the TGC.

(iv) Naidupeta IP envisages to have mixed industrial use with the total waste water generation estimated as 4.5 MLD (sewage 0.7 MLD and industrial effluent of 3.8 MLD), when fully operational. Nearly 0.45 MLD (10%) of effluent will be generated from proposed IP during Initial stage of operation. 1.0 MLD capacity of CETP is proposed in the initial stage to treat the industrial effluents for the entire cluster. It is proposed that the CETP will be a Zero Liquid Discharge (ZLD) system. A part of the treated wastewater will be used for maintaining the greenbelt within the Cluster and the balance will be reused at the units as non-potable water for various applications.

(v) **Municipal solid waste generated disposal facility**: Biodegradable Waste will be 4.84 TPD, part converts will be disposed to bio compost and rest will be disposed to local municipal bins. Total Recyclable Waste will be 19.16 TPD, this will be sold to Authorized recycling vendors.

(vi) **Power requirement and source**: The power demand estimation for various uses in the Naidupeta IP is 48.67 MVA which will be sourced from APSPDCL 132KV/33 KV substation located in Naidupeta IP through a 33 KV Overhead double line circuit up to 33/11 KV substations in Naidupeta IP.

(vii) **Proposed energy saving measures**: Solar Power harnessing potential has been estimated for Naidupeta IP. Based available roof tap area it is estimated approximately 28 MW can be harnessed. Individual industries of IP will be installing the Solar PVs to extent possible. In addition, it is expected that individual units in the IP will be installing mechanical equipment's/process/ electrical appliances/ instrumentation systems etc., with inbuilt energy conservation measures.

(viii) **RWH**: The proposed harvesting and recharge structures in IP are Roof-top rainwater harvesting, Storage ponds/tanks of 15 number, Recharge pits of five number and Recharge shafts/wells of five number. Estimated RWH potential for Naidupeta IP is as follows:-

S. No.	Land Use Distribution in Naidupeta IP	Volume of run-off harvested (m^3 /day)
1.	Roof top Area	33294
2.	Roads Area	6462
3.	Open Space	3339
4.	CFC Area	203
5.	Buffer + Green Belt Area	1187
Total		**44485**

(ix) **Investment/Cost of the project**: The approximate cost for development of infrastructure is Rs. 94.77 Crores.

(x) **Car parking**: In Naidupeta IP, Parking area of 12.25 ha is provided with 573 parking bays.

(xi) **Benefits of the project:** This project is going to benefit the entire region. The overall development of the region could be manifold. In order to augment the growth, the state has planned multitude of development options in all sectors (tourism, Water resources, Agriculture, urban development, education, etc.) including industrial sector. The proposed IP is one such development to improve

	economy and employment generation. (xii) **Employment potential**: During the three year construction phase a total of 350 employees will get employment. During the operation phase the Industrial Park is expected to bring a direct employment for 17,442 personnel with an indirect employment for 4500 personnel. (xiii) **Eco-Sensitive Zone in 10 km radius area**: No. (xiv) **Wildlife issues: No.** (xv) **Details of Forest land involved, if any**: No forest land is involved. (xvi) **ToR details**: ToR was granted to the project vide letter No.21-140/2015-IA.III dated 29th February, 2016. (xvii) **Public Hearing**: Public hearing was conducted on 20th September, 2016. (xviii) **Undertaking to the effect that no activity has since been taken up**: Eleven nos of industrial establishments are already in operation in Naidupeta IP. These industries were also covered under Naidupeta IP Master Plan and are having a valid EC, Consent to Establish and Consent to Operate from APPCB.
3.24.2	While deliberations, the EAC noted that the project site proposed in a total area of 503.44 ha, is not a contiguous plot, but in two parts separated by some industrial establishments already in operation having independent ECs. At the same time, the project proponent have given an undertaking that the said industries are in operation in the proposed Naidupeta Industrial Park, and also covered under the Master Plan for Naidupeta IP. As such, there seems to be a contradiction and needs to be clarified by the project proponent for further consideration of the proposal. The EAC was also not convinced with the proposed hazardous waste disposal arrangements from the CETP, and desired for a clarification and firm mechanism for compliance of the Hazardous Waste Management and Handling Rules, 2016.
3.24.3	*In view of the desired clarifications and inputs as above, the proposal was deferred.*
3.25	**Setting of LiDAR based offshore structure at Gulf of Khambat Off Gujarat coast in Gujarat by M/s National Institute of Wind Energy – CRZ Clearance – [F.No.11-1/2017-IA-III]**
3.25.1	During the meeting, the project proponent made a presentation and provided the following information to the Committee:-
3.25.2	During deliberations, the EAC noted the following:- (i) The proposal is for setting up of LiDAR based offshore structure for the wind measurement project for survey, investigation, exploration, data acquisition and other related technical studies in territorial waters off the Jhakhau coast in District Kutch (Gujarat). (ii) The project site is 18 km from the shore having geographical coordinates Latitude 23^0 07' 24.42" N and Longitude $68^0$27' 48.24" E. (iii) The LiDAR based offshore met mast is to be located at a water depth of 10 m with a tidal variation of 5 m on the platform of 5 m dia at about 7.5 m from the MSL. The data collection platform shall consist of instruments for collecting different parameters required for wind potential studies and design of structure for wind turbine.

	(iv) As per the CRZ map prepared by NIOT, Chennai, the project site falls in CRZ-IV category requiring offshore facility, and thus considered to be permissible in terms of the provisions of the CRZ Notification, 2011. (v) The GCZMA has recommended the project vide their letter dated 28th December, 2016 subject to strict compliance of certain conditions. (vi) National Institute of Wind Energy (NIWE) under the Ministry of new and renewable energy, is the nodal agency for the project for ensuring single window clearance from all the regulatory and security agencies, before the project is made operational.
3.25.3	*The EAC, after deliberations, recommended the project for grant of CRZ clearance subject to strict compliance of all the conditions stipulated by the GCZMA in their letter dated 28th December, 2016, and the additions conditions as under:-* • *The project shall be taken up only after necessary clearances/permissions are obtained from the Ministry of Defence, Ministry of Home Affairs, Gujarat Maritime Board, etc.* • *The offshore structure shall be decommissioned after two years of the desired data collection, ensuring adequate safety measures as employed during the construction phase with the minimal impact on noise and marine environment.*
3.26	**Construction of Retaining wall, Service road, relocation of Bharatnagar Police Chowki along the banks of Mithi River Mumbai by Mumbai Metropolitan Region Development Authority (MMRDA) - Re-consideration for CRZ Clearance - [F.No.11-64/2012-IA-III]**
3.26.1	At the outset, the EAC was informed about the earlier directions of the NGT at Pune, and subsequent orders of Hon'ble Supreme Court on 28th October, 2016 as under:- (i) The Ministry had accorded CRZ Clearance vide letter dated 4th December, 2012 in favour of M/s MMRDA for construction of retaining wall, service road along the banks of river Mithi in Mumbai. (ii) The NGT, Principal Bench at New Delhi vide order dated 31st May, 2016 in Appeal No.7/2015 in the matter of 'Jalbiradari & Othrs Vs MoEF & Othrs' has given the following directions:- • The CRZ Clearance granted through the impugned communication of moEF dated 4th December, 2012, is kept in abeyance for a period of 4 months, and the matter is remanded back to the MoEF to place it before the EAC for its re-appraisal, without any prejudice after ascertaining the factual physical progress of various works, various reports on the record including CWPRS and NEERI, and other material on record, • The MoEF shall take decision on the CRZ Clearance for this project within 4 months. If no such decision is taken in such period, the CRZ impugned clearance will be deemed as quashed and set aside. • MoEF shall particularly identify the damage caused to blasting activity and submit a detailed report on remediation along with costs within 4 months to this Tribunal, (iii) Given the directions of the Tribunal, the proposal was listed for consideration in

	the 162nd EAC meeting held on 29 - 30 August, 2016. Since, the project proponent did not attend the meeting, the proposal could not be considered. The Committee desired that the Ministry may have a meeting with the project proponent and the MCZMA to resolve the issues to comply with the directions of the Tribunal in letter and spirit. There being no response, the proposed meeting could also not be held. (iv) Aggrieved with the orders of the NGT, MMRDA filed a Civil Appeal No. before Hon'ble Supreme Court in October, 2016. Hon'ble Supreme Court vide order dated 28th October, 2016 directed as under: (v) However, this Ministry came to know about the orders only in the first week of January, 2017 through a mention about the same in the orders of NGT, Principal Bench at N Delhi. Neither any persuasion nor any information in this regard was provided by the MMRDA to this Ministry to enable timely compliance of the orders of Hon'ble Supreme Court. (vi) Given the directions of Hon'ble Supreme Court, the proposal has been placed before the EAC to arrive at the line of action for timely compliance in letter and spirit.
3.26.2	During the meeting, the project proponent made a presentation and provided the following information to the Committee:- (i) In view of the unexpected deluge in Mumbai in July, 2005, MMRDA took up the development works of Mithi River and Vakola Nalla for flood mitigation under the guidance of Central Water and Power Research Station (CWPRS) and Chitale Committee (Fact Finding Committee). The Mithi River Protection and Development Authority under the administrative control of MMRDA has undertaken the development works in its jurisdiction for 6 km length of Mithi River and 1.8 km length of Vakola Nalla in two phases. The works comprises of widening, deepening, retaining wall, service road and beautification etc. (ii) In Phase-I, desilting and widening works of Mithi River and Vakola Nalla costing about Rs.34.50 crores were completed during the period from March, 2006 to June, 2006. As a result, Mithi River was widened by an average of 30 m and Vakola Nalla by 10 m. Also, the water carrying capacity and water holding capacity of Mithi river was improved by 1.5 times resulting in increase of flushing activity and decrease in pollution level of the river. (iii) For Phase-II, the administrative approval (revised) amounting to Rs.570.76 crores was accorded. Against that, total expenditure incurred so far is Rs.459.55 crores, with the component wise details of works undertaken as under:-

S. No.	Item	Works Completed	% progress
1.	Deepening	2769274 cum	100%
2.	Widening	746136 cum	90%
3.	Rock excavation	256010 cum	58%
4.	Retaining wall	7.77 km	92%
5.	Service road	4.46 km	73%
6.	Beautification	1.12 km	100%

At present, overall progress is reported to be 92%.

(iv) In Phase-II, Mithi River and Vakola Nalla were widened by an average width of 5 m and 10 m respectively. Also, carrying capacity of Mithi river was increased by three times and water holding capacity by two times, resulting in reducing the pollution levels. The same was vetted by CWPRS in their report dated 11th November, 2011. From the year 2013, pre-monsoon desilting works of Mithi River and Vakola Nalla was handed over to MCGM.

(v) While construction of retaining wall and widening work along Mithi river and Vakola nalla, demolition of hutments was carried out at some places. During Phase-I, 2600 no. of hutments were demolished, and in Phase-II, 1128 no. of hutments were demolished. The demolition of total 367 hutments at Valmiki Nagar along Vakola nalla is still remaining.

(vi) The site for construction of retaining wall and service road falls under the CRZ-II zone, and thus requiring CRZ Clearance by the MoEF in terms of the provisions of the CRZ Notification, 2011. MCZMA forwarded the proposal to MoEF on 19th June, 2012 with the recommendations to grant CRZ Clearance to the project. Considering the recommendations of MCZMA, the project was granted CRZ Clearance on 4th December, 2012 in favour of MMRDA.

(vii) Further developments were informed as under:-

Date	Particulars
19.10.2012	Work order for undertaking underwater blasting work granted by the MMRDA to RE Infra Pvt. Ltd.
06.11.2012	PIL No.131 of 2012 filed by the Jalbiradari and Vanashakti before the Hon'ble High Court of Judicature at Bombay, falsely alleging that the MMRDA had, inter alia, undertaken unauthorised blasting operations in the Mithi River and that the same were having an adverse effect on the surrounding environment.
04.12.2012	MoEF issued the CRZ clearance to MMRDA.
24.01.2013	Approvals obtained from the Petroleum and Explosives Safety Organization of the Government of India and the Office of the Commissioner of Police, Brihan Mumbai for controlled blasting activities in the Mithi River.
05.02.2013	Jalbiradari and Vanashakti were permitted by the Hon'ble High Court of Judicature at Bombay to withdraw the PIL No. 131 of 2012 and file an appeal before the NGT.
13.02.2013	Jalbiradari and Vanashakti approached the NGT by way of the Appeal No.8 of 2013, inter alia, challenging the CRZ Approval granted to the MMRDA, along with an application seeking condonation of the delay in filing the said appeal. No orders were passed in pursuance of filing the said application for condonation of delay. The said appeal before the NGT was for a cause of action distinct from the one argued under the abovementioned PIL No. 131 of 2012.
02.03.2013, 03.03.2013 and 06.03.2013	CWPRS Pune monitored the blasting activity to ensure the safety of the nearby structures against the blast vibrations.

22.04.2013	A fresh no objection for controlled blasting activities obtained from the Office of the Commissioner of Police, Brihan Mumbai.
23.04.2013	A fresh approval was obtained from the Petroleum and Explosives Safety Organization of India to conduct blasting operations
03.10.2013	Observation note issued by Central Water and Power Research Station recommending that the blasting patterns followed at the site during March 2013 be continued for the further widening and deepening of the Mithi River
08.10.2013	The National Green Tribunal (Western Zone) Bench, Pune arrived at a prima facie opinion that an EIA study would be required to be conducted in order to determine the effects of the blasting operations on the river and ecology.
14.03.2014	EIA Report on the rock blasting activity in the Mithi River issued by the National Environmental Engineering Research Institute recommending that the blasting activity be discontinued due to its alleged impact on the biodiversity and ecosystem.
20.05.2014	CWPRS recommended that removal of impediments like rock outcrops was essential to maintain a proper river bend gradient and that river channelization by way of widening and deepening of the Mithi River and the Vakola Nalla was recommended.
22.01.2015	The Hon'ble Expert Member and the Hon'ble Judicial Member of the National Green Tribunal (Western Zone) Bench, Pune passed differing orders.
31.05.2016	Hon'ble Chairperson, NGT, upon a reference under Section 21, held that, inter alia, the CRZ Approval granted to the MMRDA be kept in abeyance, the MMRDA be made liable to pay environmental compensation and that the Respondent Nos. 3 and 5 re-examine the Mithi River Project.
01.09.2016	The MMRDA challenged the above orders of the NGT by way of the WP (Civil) No.10631 of 2016 before the Hon'ble Court of Judicature at Bombay.
30.09.2016	The Hon'ble High Court of Judicature at Bombay was of the view that the challenge to the NGT orders be heard by this Hon'ble Court and permitted the MMRDA to withdraw the writ petition, while granting it liberty to approach this Hon'ble Court.

(viii) The Appeal No.7/2015 in the matter of 'Jalbiradari & othrs Vs Union of India & othrs' filed before the National Green Tribunal (WZ) at Pune, was alleging that rock blasting work caused immense damages to flora and fauna in the vicinity of blasting areas, damages to marine and aquatic life, and also construction of retaining wall along Vakola Nalla caused damages to the surrounding mangroves. The prayers made before the Tribunal included to pass orders to quash and set aside the Environment Clearance Certificate dated 4th December, 2012 issued by MoEF in favour of MMRDA, demolition of Retaining walls and any concretization within the river bed on the banks of the river that have been constructed within the Mithi River and to restore the river to its original position, stoppage of blasting operations being conducted in the Mithi River,

restoration and restitution of the river to its original pristine state, etc.

(ix) MMRDA's pleading before NGT

Controlled blasting work:

The work of controlled blasting was included in the list forwarded to MCZMA on 07-12-2010 and subsequently to MoEF&CC, in the work listed at Sr.No.4 as deepening of Mithi River from Ch.0.0m (Mahim Causeway) to Ch.2140.0m which is specified in tender at item no.3. The rock hump were available at scattered locations near the mouth of Mithi River at Mahim Causeway, which were very sporadic. Therefore, there was no separate mention of work in the list submitted to MoEF&CC. All statutory permissions from the Petroleum and Explosives Safety Organisation and the Commissioner of Police were obtained prior to start of rock blasting work.

MMRDA has ensured that no adverse environmental impact caused due to the use of mild controlled blasting of rock during the process. Once the rock is fragmented, it is manually removed with equipment.

Deepening and widening of Mithi River is very much in interest of the environment and also in public interest to mitigate danger of deluge like 26th July 2005. Also, the mild blasting is not affecting any marine flora and fauna. The blasting work was carried out under the expert guidance of Central Institute of Mining and Fuel Research, which has stated in its report dated 30-10-2012 that no damages to flora and fauna would occur due to this mild blasting.

Retaining wall and other works

While executing these works of deepening, widening and construction of retaining walls including service roads, MMRDA had not damaged any mangroves or flora and fauna or marine life. CIMFR in their report dated 30th October, 2012 and CWPRS report dated 3rd October, 2013, have endorsed the same. All the works were executed as per the directions of CWPRS, Pune vide their report of January, 2006 and Fact Finding Committee's report of March, 2006. In fact, construction of retaining wall was essential to provide better tidal exchange, increase discharging capacity during floods, control the encroachments, train the river, restrict filling of debris, maintain the designed waterway, protect the banks from erosion and to channelize the flow.

As regards the pipes laid in the stretch of Vakola Nalla for feeding water to mangroves, CWPRS in its report has stated that the sufficient quantity of water is being supplied to mangrove areas in the stretch of Vakola Nalla from Ch.705.0m to Ch.1005.0 m and survival and growth of mangroves is satisfactory.

(x) Mithi River protection works were undertaken on priority as flood mitigation measure, as per the orders dated March, 2006 of Hon'ble Bombay High Court in PIL No.2116/2005. Hon'ble Court had appreciated the works executed by MMRDA in Phase-I, and further in January, 2007 directed that the Phase-II works like deepening, widening and construction of retaining walls shall be undertaken on priority and complete the same to avoid flooding in future.

(xi) The NGT in their order dated 31st May, 2016 observed as under:-

	'MMRDA has started the project without compliance to the relevant provisions of law. It caused environmental degradation and even the blasting work was carried in violation to the relevant laws in force. Consequently, MMRDA is liable to pay environmental compensation. At this initial stage, it is directed that MMRDA shall pay Rs.25 lakhs as Environmental Compensation, which will be subject to final adjustment upon submissions of the report by the expert body including the money required for taking restorative and remedial measures.' More directions contained in the said order are stated in para 2.26.1 above. (xii) Since MMRDA has not done any damage to environment such as mangroves, flora and fauna, marine life etc. due to controlled blasting and other works executed so far, MMRDA has challenged the orders of the NGT, Principal Bench at Pune before Hon'ble Supreme Court of India, with the prayers as below:- (a) The works executed by MMRDA as stated in pre-page under Phase-I and Phase-II, were carried out pursuant to orders passed by Hon'ble High Court dated 01-03-2006 and 17-01-2007 to prevent loss of life and injury to the public in the light of the floods. Also all the works were executed under the guidance of CWPRS, Pune and CIMFR. (b) The works of rock blasting was carried out under the strict supervision and guidance and after design of the blasting charge by the CIMFR. Thereafter the CWPRS has also been asked to study the blasted site. Accordingly, CWPRS had visited the site and vetted that no damages have been occurred to the surroundings vide their report dated 31-10-2013. (xiii) Few actual photographs of site were also shown. The balance work of retaining wall in the stretch of Valmiki Nagar, where the retaining wall is not executed, it is seen that the encroachments are cropped up in the waterway obstructing the flow of water and at the same time where the retaining wall works are completed no encroachments are seen and flow of water is also smooth.
3.26.3	*The EAC, in view of the directions contained in the order dated 31st May, 2016 of NGT, Principal Bench at Pune, and further orders dated 28th October, 2016 of Hon'ble Supreme Court, decided to first conduct a site visit in the last week of January, 2017 on a mutually convenient date. The proposal, thereafter, shall be placed before the EAC for re-appraisal. The Committee also firmly decided to conclude the proceedings as per the orders of Hon'ble Supreme Court.*

List of the Members

1. Dr. Deepak Arun Apte, Chairman and Director, Bombay Natural History Society (BNHS), Mumbai (Maharashtra)

2. Dr. E. Vivekanandan, Plot 1, Sarathy Nagar, 5th Street, Velachery, Chennai – 42.

3. Dr. S. W. A Naqvi, Former Director, NIO-CSIR, Goa

4. Dr. S.G. Bhave, Associate Dean Forestry, Konkan Krishi Vidyapeeth, Dapoli, Maharashtra

5. Dr. Anuradha Shukla, Central Road Research Institute (CRRI), CRRI, Mathura Road, New Delhi-25

6. Shri N.K. Gupta, Central Pollution Control Board, Parivesh Bhawan, CBD-Cum Office Complex, East Arjun Nagar, Delhi -110 032

7. Shri Y. Chandrasekhar Iyer, Commissioner (FM), MoWR, RD &GR

8. Shri S.K. Srivastava, Scientist E, Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, 3rd Floor, Vayu Wing, Jor Bagh Road, Aliganj, N Delhi -3

Note: Dr. Deepak Apte, Chairman excused himself from agenda point 3.14 and 3.18 for conflict of interest (being Director of BNHS who has undertaking bird study for the Navi Mumbai Airport and conducted mangrove assessment for JSW transmission line). The agenda items were chaired by Shri Gupta and Dr. Bhave respectively.

REPLY FOR THE QUERIES RAISED BY EAC

Report on financial as well as environmental implications of two separate units (150 MLD & 400 MLD capacities) against one single unit with 600 MLD capacity

Query by EAC : As stated by the PP, both the desalination plants of 150 MLD and 450 MLD are situated at a distance of 600 m. EAC has raised a query why the both plants cannot be installed at the same location. The Committee also wanted to know financial as well as environmental implications of two separate units against one single unit with 600 MLD capacity

Chennai is water stressed city. The main water supply sources are four surface reservoirs namely Poondi, Cholavaram, Chembarambakkam & Redhills, Veeranam and Krishna Water (neighboring State- imported water), ground water from northern well fields and two Desalination plants at Nemmeli & Minjur. Of which, all but the desalination plants are rain dependent and not perennial. The augmentation of these sources, though, have got its own limitations / constraints, would require considerable time and cost. Besides, improvement of surface reservoirs, further extraction of ground water in different phases, getting assured quantum of Krishna water etc would involve long procedure and inter-state issues. Further, realization of water from Mettur Dam across Cauvery River, as per Master plan, involves inter districts & social issues and higher cost besides it would take another 10 years for implementation.

In this connection, it is also to be stated that the water demand for the city's population of 9.20 million is 1562 mld (Yr2016) against the available supply was only 855 mld and hence there was supply demand gap of 707 mld. However, with failure of both Northeast & Southwest monsoon during the last year (2016) , the city is presently facing severe drought and CMWSS Board is somehow managing the drought situation with supply of 500 mld only from the existing sources such as Krishna water, desalination plants, bore wells and with meagre surface water.

Under these circumstances and considering the gap between the water demand and water source availability, it was imperative to go ahead with the reliable and perennial source of augmentation i.e the proposed 2 desalination plants viz., 150 MLD and 400 MLD Desalination Plants by the GOTN at different stages as detailed below:

Setting up of 400 mld Desalination Plant at Perur

Government of Tamil Nadu Vide Go No 166 dt 02.11.2011, Municipal Administration Water supply Department accorded approval for conducting investigation for setting up of the 400 mld desalination plant at Pattipulam which is 3.0 km away from Nemmeli in line with Budget speech of 2011-12. The land identified belongs to Arulmigu Alavandar Trust, maintained by the Hindu Religious & Charitable Endowment Board, GOTN. Based on this, a consultancy tender was floated for conducting prefeasibility studies, preparation of DPR & Bid documents and the work was awarded to a consultant on 03.12.2012. Subsequently, it was noticed there was a legal litigation in the identified land at Pattipulam. Hence, as advised by the Govt. pleader, alternate land was identified at Perur for an extend of 85.51 Acres belonging to the same trust "for lease basis" (Only available land with such an extent on lease along East Coast Road as the cost of land in this area is very exorbitant). Moreover, the Honourable CM of Tamilnadu, announced in Assembly on 16.04.13 under section 110 that the 400 mld capacity Desalination plant would be completed in four years.

Based on this, the consultancy work was completed and the DPR was submitted at a cost of Rs 4070.67 Crore for the same plant with a change of location at Perur which is 600 m away from the existing plant at Nemmeli.The DPR was however, appraised by MoUD at a cost of Rs.2891.70 Crore with funding pattern of 85% loan from JICA and 15% grant from GoTN

Subsequently, various discussions were held by JICA and its study team with officials of CMWSSB & GoTN to finalize the proposals. The Fact finding Mission of JICA firmed up the project proposal in Dec'16 at a cost of Rs 5865.60 Cr (based on current Schedule of rates for the year 16-17). Further discussion is being held with JICA to arrive at the commitment of Japanese loan for this proposal. Subsequently, based on the suggestions of MoH&UA, GoI, the Revised Detailed Project Report prepared for this project was modified at a cost Rs. 5159.02 Crores and is in advanced stage of final appraisal. It is expected that MoH&UA, GoI, will forward its recommendations shortly to Dept. of Economic Affairs, Ministry of Finance, GoI for finalizing the Project Proposal and the Financial Assistance from JICA for implementing this project.

Setting up of 150 mld Desalination Plant at Nemmeli

In view of the expansion of Chennai City from 174 sq.km to 426 sq.km resulting increasing water demand for Chennai City, the Honourable CM of Tamilnadu, announced in

Assembly on 16.04.13 under section 110 that a 150 mld capacity Desalination plant at a cost of Rs 1000 Crore would be set up in 10.05 acres of vacant land available within the existing 100 mld plant at Nemmeli which was installed in 40 acres of land “on lease basis for 30 years” belonging to the same Trust. The consultancy work for this proposal was awarded to the same consultant who was already appointed for 400 mld DSP, as a supplementary work. The DPR prepared by the consultant at the estimated cost of Rs 1371.86 cr was submitted to GOTN on 28.02.14

TN Govt vide GO MS No 47 dated 09.03.15 accorded Administrative Sanction for this proposal with funding pattern of 50% grant from MoUD and 50% from KfW. Subsequently, MoUD appraised the DPR at an estimated cost of Rs1089.46 Crore and forwarded to DEA seeking 60% loan from KfW and 40% from grant from GOTN. Considering this, during the visit to Chennai on 09.10.15 the Appraisal Mission of KfW agreed in principle to extend financial assistance to the tune of 100 Million Euros and for the balance part of the amount, it was decided to meet out from AMRUT/GOI funds. The loan agreement was subsequently signed by GOI and KfW on 28.06.16 and the tenders were called for fixing the due date for submission of bids as 19.01.17 which was later extended initially on 08.02.17 and then finally to 15.09.17 based on the request from the prospective bidders. On 15.09.2017, 5 bids have been received and under evaluation.

Further, it is informed that the immediate construction of 150 DSP is quite inevitable due to the following reasons:

a) 10.05 Acre vacant land within the existing 100 mld DSP is already in possession with CMWSSB.

b) As part of O&M, CMWSSB incurs an amount of Rs 50.00 Crore each drought year towards erection of deep bore wells/HDPE tanks, transportation of water by mobile lorry, Hiring of Agricultural wells/Diesel Engines etc which could be considerably curtailed on commissioning of the plant. Besides, this could be the one of the permanent ways to meet out the recurring drought.

c) As per the loan agreement, the CMWSSB is eligible to get 1st tranche of loan disbursement amount of Rs 17.00 million Euro within 12 months of signing the

agreement. Keeping this in view, the work order will be issued shortly and the work could be expected to be commenced within a span of six months.

d) On commissioning of this Plant by 2021, it is expected that the water demand of the southern part of the city would reduce sizably.

As already stated, the Revised DPR prepared for the 400 MLD Desalination Plant project considering the suggestions of JICA, the Funding Agency and MoH&UA, GoI, has been modified and is in advance stage of final appraisal at MoH&UA. It is expected that the recommendations of MoH&UA will be forwarded to DEA, MoF, GoI shortly for finalizing the Financial Assistance from JICA for implementing this project.

With regard to environmental implications of two separate units of 150 MLD & 400 MLD capacities against one single unit with 600 MLD capacity, it is to be stated that , both 400 mld & 150 mld have been conceived taking into account of impact of the existing intake /brine discharge of 100 mld plant at Nemmeli. Besides, exhaustive studies on EIA conducted for the both plants more specifically on discharge of brine and its dispersion have been already furnished to MoEF. As per the study conducted using CORMIX model and detailed study of secondary dispersion characteristics using MIKE 21 model, it is observed that there is no merging between the outfalls of all the three plants. The study also shows that the brine discharged into the shoreline do not reach the shore and there will be bo shoreline connection and no contamination of water near the coast.

Therefore, while taking into consideration the above plants either operational or proposed, the below operational scenarios were made

1. Operational 100 MLD Nemmeli SWRO and Proposed 150 MLD SWRO are operating at a given time together
2. Operational 100 MLD Nemmeli SWRO and Proposed 400 MLD SWRO are operating at a given time together
3. Operational 100 MLD Nemmeli SWRO and Proposed 400 and 150 MLD SWRO are operating at a given time simultaneously

The Dispersion model was carried with the above three scenarios, wherein the secondary dispersion was estimated using DHI-MIKE 21-FLOW-AD model. The MIKE 21 flow simulation study showed that the tide induced flow in the project region during fair weather is of the order of 0.12 m/s. The increase in turbulence due to stronger currents (> 0.25 m/s) induced by monsoon winds and rough seas would enhance the mixing during the southwest and northeast monsoons. The currents during the southwest monsoon are observed to be stronger (> 0.25 m/s) than the remaining period of the year, leading to higher rate of mixing. The plumes of 2 ppt salinity difference spread from different outfalls do not merge with each other and they get diluted with their respective mixing zone. On the other hand the plumes having difference in salinity of 1 ppt is found to merge with other outfalls. However during the monsoon, the dilution is very high and there is no merging of plumes at all over at < 1 ppt. The study also shows that the brine reject discharged into the shoreline do not reach the shore and there will be no shoreline connection and no contaminations of the water near the coast. Further it is noticed that there is no recirculation of discharged water into the intake.

The Detailed results along with output of dispersion are enclosed as Annexure-I to the said report.

In this context, combining these two desalination plants and locating in one location would virtually not only defeat the purpose of addressing water scarcity of Chennai City as it is reeling under severe water scarcity presently but also delay the solution to the water starving city inordinately.

Setting up of 400 MLD Sea Water Reverse Osmosis Desalination Plant at Perur Along ECR, Chennai, Tamil Nadu, India

Model study report of dispersion of reject from the existing 100 MLD Desal Plant, 150 MLD Desal Plant & proposed 400 MLD Desal Plant

Chennai Metropolitan water Supply & Sewerage Board

No.1, Pumping station Road, Chintadripet, Chennai - 600002

ANNEXURE – I

6. DIFFUSER DESIGN – CORMIX MODEL

The dilution of any return water released in a natural water body takes place in 2 stages, viz., i) initial dilution due to jet mixing, and ii) secondary dispersion due to turbulence. The extent of initial dilution is controlled by the engineering design of the diffuser. For a proposed design of the diffuser port the behaviour of the return water jet plume is designed and estimated using **CORMIX** model. Once the return water rises to the water surface as the water moves away from the outfall location the subsequent dilution takes place by larger scale turbulence in the horizontal direction. This second stage is controlled by the prevailing currents and turbulence that exist in the coastal region. Such secondary dispersion is estimated using **DHI-MIKE 21- FLOW -AD** model.

The Cornell Mixing Zone Expert System (CORMIX) is a software module for the analysis, prediction, and design of aqueous toxic or conventional pollutant discharges into diverse water bodies. It is a widely accepted and recommended analysis tool in US on granting permission for industrial, municipal, thermal, and other point source discharges to receiving waters. It is used to predict the geometry and dilution characteristics of the initial mixing zone and also the behaviour of the discharge plume at larger distances.

6.1. Methodology

The highly user-interactive CORMIX system is organized with three subsystems: (i) CORMIX1- for the analysis of submerged single port discharges, (ii) CORMIX2- for the analysis of submerged multiport diffuser discharges and (iii) CORMIX3- for the analysis of buoyant surface discharges. Several post-processing options are available like, CORJET (the Cornell Buoyant Jet Integral Model) for the detailed analysis of the near-field behaviour of buoyant jets, FFLOCATR (the Far-Field Plume

Locator) for the far-field delineation of discharge plumes in non-uniform river or estuary environments, and CMXGRAPH, a graphics package for plume plotting.

Hydrodynamic Mixing Processes: The mixing behaviour of any effluent discharge is governed by the interplay of ambient conditions in the receiving water body and by the discharge characteristics. The **ambient conditions** in the receiving water body are described by the water body's geometric and dynamic characteristics such as: plan shape, vertical cross-sections, and bathymetry, especially in the discharge vicinity. Dynamic characteristics are given by the velocity and density distribution in the water body, again primarily in the discharge vicinity. The **discharge conditions** relate to the geometric and flux characteristics of the submerged outfall installation. For a single port discharge the port diameter, its elevation above the bottom and its orientation provide the geometry; for multiport diffuser installations the arrangement of the individual ports along the diffuser line, the orientation of the diffuser line, and construction details represent additional geometric features; and for surface discharges the cross-section and orientation of the flow entering the ambient watercourse are important. *The distinction between near-field and far-field is made purely on hydrodynamic grounds and it is unrelated to any regulatory mixing zone definitions.*

6.2. Design details

The total volume of return water that would be discharged into the sea during Phase III is 305 MLD (12708.33 m^3/hour ≈3.53 m^3/s). The outfall diffuser will have the multi ports of 10 nos.x 500 mm diameter placed at 650 m distance in to the sea. All the ports will be oriented 30° to the horizontal. The water depth at the disposal location will be 7.5 m and the diffuser height will be 1-1.5 m above the seafloor. In addition 2 nos. x 500 mm dia. ports will be provided as standby. The design outfall discharge volume is taken as 12708.33 m^3/hour (3.53 m^3/s). The various input parameters for the CORMIX models are given below.

Volume of discharge	=	12708.33 m^3/hour (3.53 m^3/s)
No. of Ports	=	10 nos. x 500 mm dia.
Inclination of ports	=	30° to horizontal

CORMIX SESSION REPORT:

CORMIX MIXING ZONE EXPERT SYSTEM
CORMIX Version 8.0GTH
DYDRO : Version-5.0.0.0 April,2012

SITE NAME/LABEL	: NEMMELI
DESIGN CASE	: Metro water
FILE NAME	: C:\Users\PCM\Desktop\Nemmeli phase 3.prd
Using subsystem BCORMIX2	: Multiport Diffuser Brine Discharges
Start of session	: 1st December, 2014--17:28:40

AMBIENT PARAMETERS:		
Cross-section		= unbounded
Average depth	HA	= 7.0 m
Depth at discharge	HD	= 7.5 m
Ambient velocity	UA	= 0.15 m/s
Wind velocity	UW	= 2 m/s
Stratification Type	STRCND	= U
Surface density	RHOAS	= 1023.34 kg/m^3
Bottom density	RHOAB	= 1023.34 kg/m^3

DISCHARGE PARAMETERS	:	Submerged Multiport Diffuser
Discharge		
Diffuser type	DITYPE	= unidirectional perpendicular
Diffuser length	LD	= 30 m
Nearest bank		= left
Diffuser endpoints	YB1	= 620 m; YB2 = 650 m
Number of openings	NOPEN	= 10
Number of Risers	NRISER	= 10
Spacing between risers/openings	SPAC	= 3.33 m
Port/Nozzle diameter	D0	= 0.5 m
Equivalent slot width	B0	= 0.0654 m
Total area of openings	TA0	= 1.9635 m^2
Discharge velocity	U0	= 1.79 m/s
Total discharge flowrate	Q0	= 3.53 m^3/s
Discharge port height	H0	= 1.5 m
Nozzle arrangement	BETYPE	= unidirectional without fanning
Vertical discharge angle	THETA	= 30 deg

Discharge density	RHO0	= 1050 kg/m^3
Density difference	DRHO	= -26.6600 kg/m^3
Discharge concentration	C0	= 31000 mg/l

NON-DIMENSIONAL PARAMETERS:

Port/nozzle Froude number	FRD0	= 4.6

D-CORMIX PREDICTION FILE:

FLOW CLASSIFICATION

X-Y-Z COORDINATE SYSTEM:

ORIGIN is located at the SURFACE and at the diffuser mid-point

X - Axis points downstream
S - Hydrodynamic average dilution

X	S
0.0	1.0
1.5	5.5
3.0	7.0
4.5	8.5
6.0	9.5
7.5	10.5
9.0	11.5
10.5.	12.5
12.0	13.2
13.5	13.9
15.0	14.5
65.0	22.0
110.0	24.0
160.0	26.0
200.0	27.0

Cumulative travel time = 1min

Discussion on Initial dilution

The study on CORMIX model shows the mixing zone will extend for 65 m to achieve 22 times and extending further till 200 m distance to achieve to dilution of 27 times from the disposal location. Thereafter the initial dilution, the secondary dispersion take place due to convection currents and undergoes further dilution. The secondary dispersion characteristics are studied in detail using MIKE 21 model.

7. MIKE 21 DISPERSION MODEL

The tide and wind induced flow field over the project area is determined using the MIKE 21 hydrodynamic module (HD) and the return water diffusion using the Advection-Dispersion module (AD). These models have been developed by Danish Hydraulic Institute (DHI), Denmark and are being used worldwide for many coastal engineering applications.

7.1. Methodology

Mike 21 Flow Module (HD): The MIKE 21-Flow module is a multi-dimensional 2D or 3D (present case 2D), hydrodynamic flow simulation model, which solves shallow-water equations for given boundary conditions to compute non-steady flow fields in response to a variety of environmental forcing and processes in natural water bodies. The environmental forcing and processes include: *bottom shear stress, wind shear stress, barometric pressure gradients, Coriolis force, momentum dispersion, sources and sinks, evaporation, flooding and drying and wave radiation stresses.*

This model uses an Alternate Direction Implicit (ADI) Finite Difference Method on staggered orthogonal grids and also has the option to use Finite Element Method. The basic shallow-water equations in the Cartesian co-ordinate system used in the MIKE 21 HD flow module are:

Continuity equation:

$$\frac{\partial \zeta}{\partial t} + \frac{\partial p}{\partial X} + \frac{\partial q}{\partial Y} = S - e$$

Momentum equations in x- and y- directions:

$$\frac{\partial p}{\partial t}+\frac{\partial}{\partial X}\left[\frac{p^2}{h}\right]+\frac{\partial}{\partial Y}\left[\frac{p\,q}{h}\right]+gh\frac{\partial \zeta}{\partial X}+F_{bx}-K_a WW_X-\frac{h}{\rho_W}\frac{\partial p_a}{\partial X}-\Omega\, q-F_{EX}=S_{iX}$$

$$\frac{\partial q}{\partial t}+\frac{\partial}{\partial X}\left[\frac{p\,q}{h}\right]+\frac{\partial}{\partial Y}\left[\frac{q^2}{h}\right]+gh\frac{\partial \zeta}{\partial Y}+F_{by}-K_a WW_Y-\frac{h}{\rho_W}\frac{\partial p_a}{\partial Y}+\Omega p-F_{EY}=S_{iY}$$

Symbol list

$$F_{EX}=\left[\frac{\partial}{\partial X}\left[\varepsilon_X h\frac{\partial u}{\partial X}\right]+\frac{\partial}{\partial Y}\left[\varepsilon_Y h\frac{\partial u}{\partial Y}\right]\right]$$

$$F_{EY}=\left[\frac{\partial}{\partial X}\left[\varepsilon_X h\frac{\partial u}{\partial X}\right]+\frac{\partial}{\partial Y}\left[\varepsilon_Y h\frac{\partial u}{\partial Y}\right]\right]$$

$$F_{bx}=\frac{g}{C^2}\sqrt{\frac{p^2}{h^2}+\frac{q^2}{h^2}}\frac{p}{h}$$

$$F_{by}=\frac{g}{C^2}\sqrt{\frac{p^2}{h^2}+\frac{q^2}{h^2}}\frac{q}{h}$$

ζ (x, y, t)	-	Water surface level above datum (m)
p(x, y, t)	-	flux density in the x-direction ($m^3/s/m$)
q(x, y, t)	-	flux density in the y-direction ($m^3/s/m$)
h(x, y, t)	-	water depth (m)
S	-	source magnitude per unit horizontal area ($m^3/s/m^2$)
S_{iX} , S_{iY}	-	source impulse in x and y-directions ($m^3/s/m^2.m/s$)
e	-	evaporation rate (m/s)
g	-	gravitational acceleration (m/s^2)
C	-	Chezy resistance No. ($m^{1/2}/s$)
K_a	-	$C_w\frac{\rho_{air}}{\rho_{Water}}$
C_w	-	wind friction factor
W, W_X, W_Y(x, y, t)	-	wind speed and components in x- and y-directions (m/s)

p_a (x, y, t)	-	barometric pressure (Kg/m/s^2)
ρ_w	-	density of water (kg/m^3)
Ω	-	Coriolis coefficient (latitude dependent) (s^{-1})
ε(x, y)	-	eddy or momentum dispersion coefficient (m^2/s)
x, y	-	space coordinates (m)
t	-	time (s)

Advection and dispersion model

The advection-dispersion module (AD) of the MIKE 21 model suite simulates the spreading of return water in an aquatic environment under the influence of the fluid transport and associated natural dispersion process. The dispersing substance may be conservative or non-conservative, inorganic or organic: e.g. salt, heat, dissolved oxygen, inorganic phosphorus, nitrogen and other such water quality parameters. Applications of the MIKE 21 AD module are in principle essential for two types of investigations, viz., i) cooling water recirculation studies for power plants and salt recirculation studies for desalination plants, and ii) water quality studies connected with sewage outfalls and non-point pollution sources.

This module determines the concentration of the dispersing substance by solving the equation of conservation of mass for a dissolved or suspended substance. The concentration of the substance is calculated at each point of a rectangular grid covering the area of interest using a two-dimensional finite difference scheme. Information on the transport, i.e. currents and water depths at each point of the grid, are provided by the MIKE 21 HD module. Other data required in the model include effluent volume discharged, the concentration of the pollutant, initial and the boundary conditions.

Governing equation

The MIKE 21 AD module solves the advection-dispersion equation for dissolved or suspended substances in two dimensions. This is in reality the mass-conservation equation to which quantities of substances discharged and their concentrations at source and sink points are included together with their decay rate.

$$\frac{\partial}{\partial t}(hc)+\frac{\partial}{\partial x}(uhc)+\frac{\partial}{\partial y}(vhc) = \frac{\partial}{\partial x}\left[hD_x\frac{\partial C}{\partial x}\right]+\frac{\partial}{\partial y}\left[hD_y\frac{\partial C}{\partial y}\right]-Fhc+S$$

Symbol List

C	-	compound concentration (arbitrary units)
u, v	-	horizontal velocity components in the x, y directions (m/s)
h	-	water depth (m)
D_x, D_y	-	dispersion coefficients in the x, y directions (m^2/s)
F	-	linear decay coefficient (1/s)
S	-	Q_s . (C_s – C)
Q_s	-	Source / sink discharge per unit horizontal area ($m^3/s/ m^2$)
C_s	-	concentration of compound in the source / sink discharge.

Information on u, v and h at each time step is provided by the MIKE 21 HD module.

7.2. Units and Conventions used

Units: Units of all parameters and variables in the model study are according to international SI conventions. Coordinate system: The coordinate system used for model grid generation and other horizontal positioning was UTM based on WGS 84 spheroid. Vertical reference level: The depth information used in the tidal flow models is relative to Mean Sea Level (MSL); depths below MSL are defined negative.

Directions: Current – Ocean current directions refer to the direction **towards** which the flow is taking place. Directions of the flow are always given clockwise with respect to North. The Unit is degrees, where 360 degrees cover the circle. Wind - Wind directions refer to the direction **from** which the wind is approaching. Directions of the wind are always given clockwise with respect to North. The Unit is degrees, where 360 degrees cover the circle.

7.3. Model setup

The model domain in the study area, stretches between the longitudes 80° 12' 13.08" E to 80° 19' 44.06" E and latitudes 12° 39' 15.06" N to 12° 45'49.05" N and, an area of approximately 12 km x 13.5 km (Fig. 7.1). The grid spacing is 50 m in both directions. A rectilinear grid system was used for the simulation of flow field in the study region. In these region, the tide and wind induced flow fields over the study area for two lunar tidal cycles (28 days) were simulated for different monsoons, viz., Fair weather (April), SW monsoon (July) and NE monsoon (November).

Depth Schematization: For the schematization of depths in the flow model, the depths of the sea were extracted from different sources viz., i) DHI - MIKE 21 – *C Map* data base, ii) Indian Naval Hydrographic Charts corresponding to this region and iii) the bathymetry measured at the site by Indomer in 2013.

Depth schematization or setting up bathymetries at model grid points has always been one of the most tedious, expensive and yet crucial part of any coastal modelling problem. It is now possible to greatly reduce the time and effort required to this task with the MIKE C-MAP's worldwide electronic chart database. This database and the program to extract the bathymetric data over the selected area with as much detail as possible have been developed jointly by DHI and C-MAP, Norway.

Boundary conditions: The coarse resolution model is forced by the tidal water level variations along the open sea boundaries. For the generation of these boundary conditions, the MIKE 21 *C-Map* data base can be used. These boundary conditions for the coarse resolution model are prescribed as time series of tidal water level variations along the open boundaries of the model.

If the tidal constituents along the boundaries of the coarse resolution model are available, then the boundary conditions are represented by:

$$h_t = A_0 + \sum_{i=1}^{n} f_i A_i \cos(\omega_i t + (v_0 + u)_i - g_i)$$

With:

h_t	=	water level at time = t
A_o	=	mean value of the signal
A_i	=	amplitude of component i
f_i	=	nodal amplitude factor of component i
ω_i	=	angular frequency of component i
$(v_0+u)_i$	=	astronomic argument of component i
g_i	=	phase lag of component i

For the modelling domain, the MIKE 21 *C-Map* tides derived for Pondicherry have been applied along the southern boundary and Chennai for the northern boundary. Along the eastern boundary the tide levels linearly interpolated between Pondicherry at south and Chennai at north have been assigned.

Calibration: The model is calibrated using the tides measured from 27.07.13 to 15.08.13. Good agreement is observed among the simulated and the measured data.

Seasons: The flow simulations were done for **fair weather**, i.e. when there is no wind and it leads to minimum mixing condition ('*conservative scenario*') with the prevalence of larger mixing zone having difference in salinity into the sea. The simulations were also carried out with wind forcing representing **southwest monsoon** and **northeast monsoon** conditions. In the presence of wind, the sea becomes more turbulent with high waves and the flow becomes stronger which then leads to good mixing with less mixing zone.

The tidal effects on currents in the nearshore region particularly in the study area are small and the currents are generally dominated by wind. By the onset of southwest monsoon, the coastal currents turn gradually and tend to prevail consistently towards north. Consequently, on the commencement of northeast monsoon, the nearshore currents tend to be consistently northward. Hence during monsoons, the discharge released through the diffuser tends to travel in coast parallel direction, towards south in NE monsoon and north during SW monsoon.

To represent monsoon seasons, the normal wind conditions expected during the southwest and northeast monsoons, i.e. 10 m/s, corresponding to 25% exceedence was used in the model. For the flow simulation during the fair weather, no wind was introduced in the model. In the secondary dispersion studies, the discharge of return water introduced at any grid cell is assumed to be uniformly dispersed over the entire volume of water in this grid cell.

Input to AD Model

Details of intakes: The existing seawater intake laid for Phase I draws 260 MLD ≈ 10833 m^3/hour of seawater. For the Phase II, i.e., the proposed seawater intake system will draw 1147 MLD ≈ 47791.66 m^3/hour of seawater. There is a proposal to establish Phase III unit in future, which will have a separate intake system to draw the seawater of 455 MLD ≈ 18958.33 m^3/hour.

Details of Outfall: The existing outfall laid for Phase I discharges 160 MLD ≈ 6667 m^3/hour of return water. For the Phase II, i.e., the proposed outfall will discharge 747 MLD ≈ 31125 m^3/hour of brine reject. There is a proposal to establish Phase III unit in future, which is expected to discharge 305 MLD ≈12708.33 m^3/hour through a separate outfall.

Distance between outfalls: The outfalls distance between the Phase II to Phase I ≈ 1260 m and Phase III to Phase I ≈ 550 m.

Salinity of return water: The brine reject will have the salinity of 71 ppt which will be 33 ppt higher than the ambient seawater salinity (38 ppt). There will no change in other water quality parameters compared to the ambient values.

Modelling scenarios: In the present case, for the discharge of Phase II development, the model study has been conducted for the two scenarios as detailed below.

Case 1: Phase I (Existing) + Phase III (future)
Case 2: Phase I (Existing) + Phase II + Phase III (future)

7.4. Simulations

In each simulation the flow field and the mixing pattern were obtained for a period of one lunar month (i.e. 28 days). The total number of simulations carried out is six as detailed below.

Number of simulations = $I1 \times I2 \times I3 = 6$

Where,

Number of dispersing substance	$I1 = 1$
Number of seasons	$I2 = 3$
Number of scenarios	$I3 = 2$

The instantaneous flow and mixing patterns corresponding to flood and ebb phases during spring and neap tide periods are presented in the report.

8. RESULTS

Fair weather

The flow simulation and the corresponding secondary dispersion of the return water for fair weather with no wind condition (representing conservative mixing scenario) are presented.

Spring tide

Flow field: The tide induced flow fields under no wind condition during the *flood and ebb phases on a spring tidal day* close to the project region are presented in Fig. 8.1. The magnitude of currents over a major portion of the project region was around 0.12 m/s with the direction of flow towards north during the flood phase and towards south during the ebb phase.

Dispersion due to Phase I and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged 600 m and 750 m offshore in Phase I and Phase III respectively is shown in Fig. 8.2. The brine discharged in the nearshore waters undergoes dilution around the outfall point such that the difference in salinity of 2 ppt was observed to occur at 80 m and 100 m from phase I and phase III outfalls respectively in the shore parallel direction. The modelling results reveal that the there is no merging between the outfalls.

Dispersion due to Phase I, Phase II and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged from phase I, phase II and phase III is shown in Fig. 8.3. The brine discharged in the nearshore waters undergoes dilution

around the outfall point such that the difference in salinity of 2 ppt was observed to occur at 80 m, 250 m and 100 m from phase I, phase II and phase III outfalls respectively in the shore parallel direction. The modelling results reveal that the there is no merging between the outfalls.

Neap tide

Flow field: The tide induced flow field under no wind condition during the *flood and ebb phases on a neap tidal day* close to the project region is presented in Fig. 8.4. The magnitude of currents over a major portion of the project region was around 0.10 m/s with the direction of flow towards north during the flood phase and towards south during the ebb phase.

Dispersion due to Phase I and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged at 600 m and 750 m offshore in Phase I and Phase III respectively is shown in Fig. 8.5. The brine discharged in the nearshore water undergoes dilution around the outfall point such that the difference in salinity of 2 ppt was observed to occur at 90 m and 120 m from phase I and phase III outfalls respectively in the shore parallel direction. The modelling results reveal that the there is no merging between the outfalls.

Dispersion due to Phase I, Phase II and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged from phase I, phase II and phase III is shown in Fig. 8.6. The brine discharged in the nearshore waters undergoes dilution around the outfall point such that the difference in salinity of 2 ppt was observed to occur at 80 m, 300 m and 120 m from phase I, phase II and phase III outfalls respectively in the shore parallel direction. The modelling results reveal that the there is no merging between the outfalls.

Southwest monsoon

Spring tide

Flow field: The flow field due to tide and southwest monsoon wind during the *flood and ebb phase on a spring tidal day* for close to the project region is shown in Fig. 8.7. The magnitude of currents over major portion of the project region remains around 0.25 m/s with the direction of flow towards north.

Dispersion due to Phase I and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged at 600 m and 750 m offshore in Phase I and Phase III respectively is shown in Fig. 8.8. The brine discharged in the nearshore water undergoes dilution around the outfall point such that the difference in salinity of 1 ppt was observed to occur at 50 m and 90 m from phase I and phase III outfalls respectively in the shore parallel direction. The modelling results reveal that the there is no merging between the outfalls.

Dispersion due to Phase I, Phase II and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged from phase I, phase II and phase III is shown in Fig. 8.9. The brine discharged in the nearshore waters undergoes dilution around the outfall point such that the difference in salinity of 1 ppt was observed to occur at 50 m, 500 m and 90 m from phase I, phase II and phase III outfalls respectively in the shore parallel direction. The modelling result reveals that the there is no merging between the outfalls.

Neap tide

Flow field: The flow field due to tide and southwest monsoon wind during the *flood and ebb phase on a neap tidal day* close to the project region is presented in Fig. 8.10. The magnitude of currents over major portion of the project region remains around 0.20 m/s with the direction of flow towards north.

Dispersion due to Phase I and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged 600 m and 750 m offshore in Phase I and Phase III respectively is shown in Fig. 8.11. The brine discharged in the nearshore waters undergoes dilution around the outfall point such that the salinity of 1 ppt above the ambient condition was observed to occur within 60 m and 100 m from phase I and phase III outfalls respectively in the shore parallel direction. The modelling results reveals the there is no merging between the outfalls.

Dispersion due to Phase I, Phase II and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged from phase I, phase II and phase III is shown in Fig. 8.12. The brine discharged in the nearshore waters undergoes dilution around the outfall point such that the difference in salinity of 1 ppt was observed to occur at 60 m, 550 m and 100 m from phase I, phase II and phase III outfalls respectively in the shore parallel direction. The modelling results reveal that the there is no merging between the outfalls.

Northeast monsoon

Spring tide

Flow field: The flow field due to tide and northeast monsoon wind during the *flood and ebb phase on a spring tidal day* close to the project region is presented in Fig. 8.13. The magnitude of currents over major portion of the project region remains around 0.19 m/s with the direction of flow towards south.

Dispersion due to Phase I and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged 600 m and 750 m offshore in Phase I and Phase III respectively is shown in Fig. 8.14. The brine discharged in the nearshore waters undergoes dilution around the outfall point such that the difference in salinity of 1 ppt was observed to occur at 50 m and 70 m from phase I and phase III outfalls respectively in the shore parallel direction. The modelling results reveal that the there is no merging between the outfalls.

Dispersion due to Phase I, Phase II and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged from phase I, phase II and phase III is shown in Fig. 8.15. The brine discharged in the nearshore waters undergoes dilution around the outfall point such that the difference in salinity of 1 ppt above was observed to occur at 50 m, 180 m and 70 m from phase I, phase II and phase III outfalls respectively in the shore parallel direction. The modelling results reveal that the there is no merging between the outfalls.

Neap tide

Flow field: The flow field due to tide and southwest monsoon wind during the *flood and ebb phase on a neap tidal day* close to the project region is presented in Fig. 8.16. The magnitude of currents over major portion of the project region remains around 0.17 m/s with the direction of flow towards south.

Dispersion due to Phase I and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged 600 m and 750 m offshore in Phase I and Phase III respectively is shown in Fig. 8.17. The brine discharged in the nearshore waters undergoes dilution around the outfall point such that the difference in salinity of 1 ppt was observed to occur at 50 m and 80 m from phase I and phase III outfalls respectively in the shore parallel direction. The modelling results reveal that the there is no merging between the outfalls.

Dispersion due to Phase I, Phase II and Phase III outfalls: The mixing pattern of the brine reject in the nearshore water discharged from phase I, phase II and phase III is shown in Fig. 8.18. The brine discharged in the nearshore waters undergoes dilution around the outfall point such that the difference in salinity of 1 ppt was observed to occur at 50 m, 210 m and 80 m from phase I, phase II and phase III outfalls respectively in the shore parallel direction. The modelling results reveal that the there is no merging between the outfalls.

9. DISCUSSION AND CONCLUSION

The existing seawater intake laid for Phase I draws 260 MLD ≈ 10833 m^3/hour of seawater. For the Phase II, i.e., the proposed seawater intake will draw 1147 MLD ≈ 47791.66 m^3/hour of seawater. There is a proposal to establish Phase III unit in future, which will have a separate intake system to draw the seawater of 455 MLD ≈ 18958.33 m^3/hour and it was included in this report.

The existing outfall laid for Phase I discharges 160 MLD ≈ 6667 m^3/hour of return water. For the Phase II, i.e., the proposed outfall will discharge 747 MLD ≈ 31125 m^3/hour of brine reject. There is a proposal to establish Phase III unit in future, which is expected to discharge 305 MLD ≈12708.33 m^3/hour through a separate outfall. This expected discharge included in this report.

The brine reject will have the salinity of 71 ppt which will be 33 ppt higher than the ambient seawater salinity (38 ppt). There will be no change in other water quality parameters compared to the ambient values.

The MIKE 21 flow simulation study showed that the tide induced flow in the project region during fair weather is of the order of 0.12 m/s. The increase in turbulence due to stronger currents (> 0.25 m/s) induced by monsoon winds and rough seas would enhance the mixing during the southwest and northeast monsoons. The currents during the southwest monsoon are observed to be stronger (> 0.25 m/s) than the remaining period of the year, leading to higher rate of mixing.

Based on the Mike 21 Modelling studies, it is indicated that the brine undergoes dilution to a difference in salinity of 2 ppt above the ambient condition. The plumes of 2 ppt salinity difference spread from different outfalls do not merge with each other and they get diluted with their respective mixing zone. On the other hand the difference in salinity of 1 ppt is found to merge with other outfalls. However during

the monsoon, the dilution is very high and there is no merging of plumes at all over at < 1ppt.

The study also shows that the brine reject discharged into the shoreline do not reach the shore and there will be no shoreline connection and no contaminations of the water near the coast.

Further it is noticed that there is no recirculation of discharged water into the intake.

Shoreline along the project region - 2012

Shoreline along the project region - 2013

Shoreline along the project region - 2014

Shoreline along the project region - 2016

FIG. 1. SATELLITE IMAGERY OF THE DESALINATION PLANT REGION

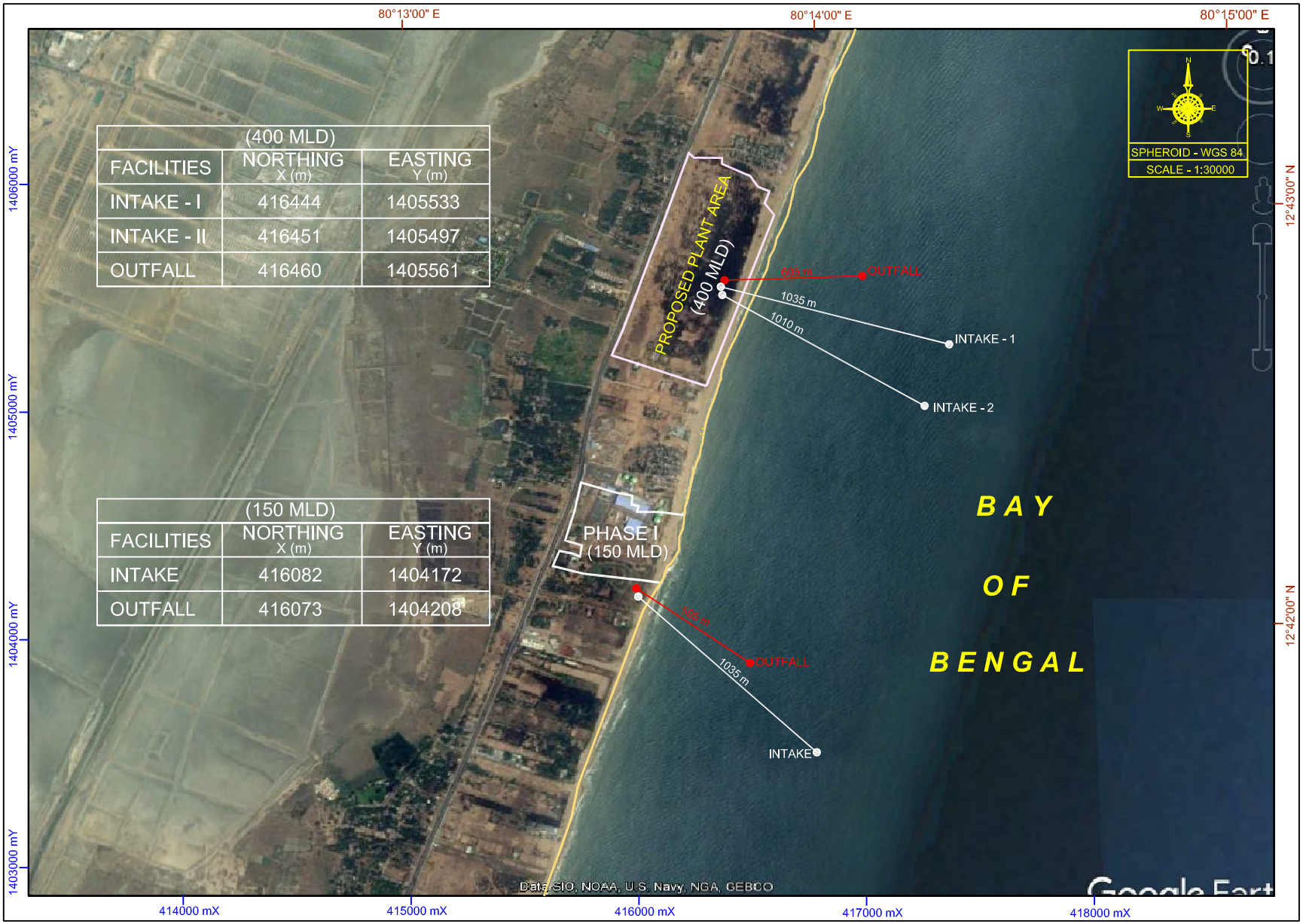

FIG. 2. LOCATION MAP OF THE INTAKES & OUTFALLS

Setting up of 400 MLD Sea Water Reverse Osmosis Desalination Plant at Perur Along ECR, Chennai, Tamil Nadu, India

Study on Shoreline Impact

(Modelling on impact on shoreline due to laying of submarine pipelines for 150 MLD and 400 MLD Sea water Desalination Plants)

Chennai Metropolitan water Supply & Sewerage Board

No.1, Pumping station Road, Chintadripet, Chennai - 600002

EAC Query (ii): Impact of shoreline change needs to be performed.

INTRODUCTION

Chennai Metropolitan Water Supply & Sewerage Board (CMWSSB) is operating a 100 MLD R.O. desalination plant at Nemeli, south of Chennai in order to meet the acute drinking water supply of the southern part of the Chennai city. Now CMWSSB has proposed to augment the drinking water supply by setting up additional seawater desalination plant of 400 MLD capacity as Phase II. There is a future plan to set up a desalination plant of 150 MLD capacity as Phase III. These plants are proposed in one kilometer vicinity of the existing RO plant, i.e., at Neemeli Village along ECR Road falling under Kanchipuram District in Tamilnadu. The project location is shown in Fig. 1.

The marine facilities for the desalination plants will consist of: i) laying of seawater intake pipeline on the seabed but buried below seabed, ii) laying of outfall pipeline on the seabed but buried below the seabed, iii) construction of seawater intake heads, iv) construction of outfall diffusers and v) construction of seawater sump

The details of intake and Outfall pipelines for Phase II and Phase III development are given in Table 1 and 2.

Table 1. Details of Intake and Outfall for Phase II development (400 MLD)

Facilities	Volume (m^3/hour)
Intake head - I Dist.= 1035 m Depth = 9.5 m	23896 (573.5 MLD)
Intake head - II Dist.= 1010 m Depth = 10 m	23896 (573.5 MLD)
Outfall diffuser Dist.=605 m Depth = 7.5 m	31125 (747 MLD)

Table 2. Details of Intake and Outfall for Phase III development (150 MLD)

Facilities	Intake volume (m^3/hour)
Intake head Dist.= 1035 m Depth = 10 m	18958 (455 MLD)
Outfall diffuser Dist.= 595 m Depth = 7.5 m	12708 (305 MLD)

Morphology of the coast

The coastline is comprised of long and straight sandy beach exposed to open sea with elevated backshore and dune vegetation. The coastal region is backed up with wide sand dunes upto 500 m distance inland. ECR is running immediately adjoining this shore. The strip of coastal stretch between ECR and sea is more urbanized and well developed with tourist resorts, hotels, cottages, farm houses and intermittent pockets of fishing hamlets. The stretches under the possession of Government remain as a plain and barren land with thorny bushes and at places protected with Casuarina farms. The nearshore remains relatively steeper due to the action of high waves during monsoon season. The seabed at nearshore primarily comprises of sand and silty clay with the spread of submerged rocky patches.

The coastline between Madras port and Thiruvanmiyur shows accretional trend due to the construction of breakwaters at Chennai port. The widest part of the beach, having horizontal spread of 600 m is seen at Marina beach.

Between Thiruvanmiyur and Uthandi, beach is stable and not much subjected to human activities.

This stretch showed urbanized development with an average width of 100 m foreshore and sand dunes reaching a height of 2 m.

From Uthandi to Mahabalipuram towards the south wherein the present desalination plant region is located, rocky outcrops are prominent in the nearshore waters. The stretch between Covelong and Mahabalipuram, is widely used for recreation. Due to the construction of semi-circular breakwater around the Mahabalipuram Shore temple, the shoreline over a stretch of 3 km towards the north is exposed to erosion. Many beach resorts are situated in this region.

Longshore Sediment Transport

Longshore Sediment transport is the major reason for the shoreline stability and the changes along the coast which is primarily influenced by the Wave Characteristics on:

i) Wave height,
ii) Wave direction and
iii) Wave period.

The data compiled based on the ship observed deep-water waves over the region between the latitude 10°N - 15°N, and longitude 80°E - 85°E is considered for the present project. It is observed that the significant wave heights varied between 0.5 and 1 m during February to April, 1 and 3.0 m during May to September and, between 1 and 2 m during rest of the year. The zero crossing period of the waves varied between 5 and 8 s. The project region is located on the region which is

significantly influenced during the northeast monsoon. The wave climate remains rough from November to January. The occurrence of storms and depressions during northeast monsoon often increase the wave activity in this region.

The longshore sediment transport rate at the study region was estimated using the following equation (Shore Protection Manual, CERC, US Army, 1975).

$$Q = 1290(\frac{\rho g^2}{64\pi})T(H_0 K_r)^2 \sin 2\alpha_b$$

Where,

Q	=	longshore sediment transport rate in m^3/year,
ρ	=	mass density of the sea water in kg/m^3,
g	=	acceleration due to gravity,
H_o	=	deepwater wave height in m,
T	=	wave period in seconds,
K_r	=	refraction coefficient, and
α_b	=	wave breaking angle.

Month	Quantity (m^3 / month)
January	155790
February	84199
March	7376
April	-91894
May	-198016
June	-178516
July	-125861
August	-149160
September	-157813
October	-76053
November	68486
December	196906
Net transport	**-464566**
Gross transport	**1490070**

**(-) Transport in northerly direction*

The sediment transport rates were high (>1.98 x 10^5 m^3/month) in May and December. It was lowest (< 0.75 x 10^5 m^3/month) in March. The littoral drift was

towards north from April to October and towards south during the remaining months of the year. The annual northerly transport is 0.98 x 10^6 m^3/year and the annual southern transport is 0.51 x 10^6 m^3/year.

Shoreline change

Normally, the changes take place when there is an obstruction for the longshore sediment transport.

The coastal stretch near the project region is a stable coast. The littoral transport along the region is northerly direction during most part of the year. During the period of 2012 – 2013 the coastline of the project region experienced erosion of nearly 25 m due to the construction of temporary bund across the shore for laying of intake and outfall pipelines. The bund created an obstruction to the northerly littoral transport passing the plant location. This led to the accumulation of the sediments on the southern side of the bund. Being sediment deprived the waves started carrying the sediments from northern side of the bund leading to serious erosion upto 1 km along the coast.

After laying the intake and outfall pipelines the bund was removed and the littoral transport was restored. The littoral sediment transport regained its normal drift attaining a balance in the flow of sediment movement leading to a stable coast in 2014.

Impact of the present development on shoreline

In the present development of Phase II and Phase III desalination plants, construction of bund does not arise as the pipeline is going to be buried. The intake and outfall pipelines will be buried in the seafloor at a depth of minimum 1.0 m below the seafloor. The littoral drift will not be obstructed due to the burial of pipelines.

Hence there will not be any impact on the shoreline and erosion due to the proposed development.

SUPPLEMENTARY REPORT ON

MATHEMATICAL MODELLING ON IMPACT ON SHORELINE DUE TO LAYING OF SUBMARINE PIPELINES FOR 150 MLD AND 400 MLD SEAWATER DESALINATION PLANTS AT NEMMELI, CHENNAI

AECOM INDIA PRIVATE LIMITED
GURGAON

MAY 2017

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1. INTRODUCTION

Chennai Metropolitan Water Supply & Sewerage Board (CMWSSB) is operating a 100 MLD R.O. desalination plant at Nemmeli, south of Chennai in order to meet the acute drinking water supply of the southern part of the Chennai city. Now CMWSSB has proposed to augment the drinking water supply by setting up additional seawater desalination plant of 400 MLD capacity as Phase II and 150 MLD capacity as Phase III. These plants are proposed also at Nemmeli along ECR Road falling under Kancheepuram District in Tamil Nadu. The project location is shown in Fig. 1 and the satellite imagery is shown in Fig. 2.

During the presentation to TNCZMA Committee, the members suggested to take up shoreline impact study due to laying of intake and outfall submarine pipelines. A mathematical modelling study was carried out to understand the impact on shorelines after laying the intake and outfall pipelines.

This report presents the details of the model studies undertaken, methodology adopted and results obtained.

2. LITTORAL DRIFT

The DHI- LITPACK model suite is a convenient tool for studying the coastal processes related sediment transport in the wave breaking zone. The different modules in DHI-LITPACK model suite are LITSTP, LITDRIFT, LITLINE, LITTREN, LITPROF, which are used respectively to estimate the non-cohesive sediment transport, longshore current, littoral drift, shoreline evolution, sedimentation in trenches and cross-shore profile evolution. In the present study, the littoral sediment transport along the coast has been evaluated using the LITDRIFT model.

2.1. Model Description

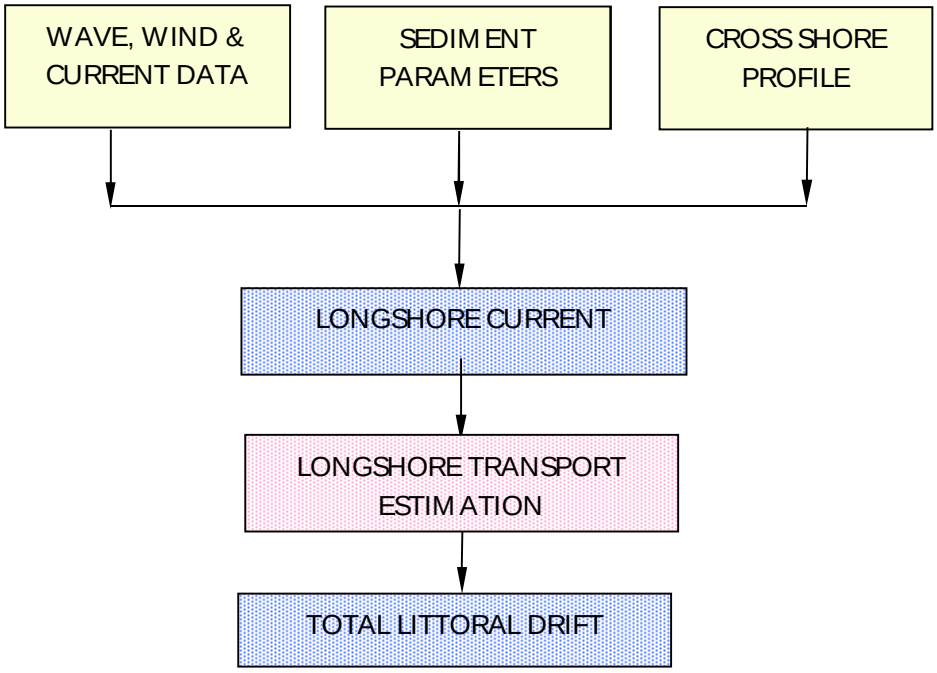
MIKE 21 LITDRIFT is used for estimating the longshore sediment transport.

This model includes propagation, shoaling and breaking of waves, calculation of the driving forces due to radiation stress gradients, momentum balance for the cross-shore and longshore direction giving the wave setup and the longshore current velocities. The model can be applied on complex coastal profiles with longshore bars. In the case of a longshore bar the broken waves can reform in the trough onshore of the bar.

Having computed the longshore current by the hydrodynamic module, points are selected across the coast, which are representative for the littoral drift estimation. The sediment transport calculations carried out by the module are made to reflect the local conditions with respect to the energy dissipation, the percentage of non-breaking waves and the *rms* values of wave heights.

The total sediment transport is dominated by transport contributions from areas where wave breaking occurs. In case of a bar-profile, the sediment calculation points

will have to be located on the bars where waves are breaking. This gives the distribution of sediment transport across the profile, which is integrated to obtain the total longshore sediment transport rate. By considering the variation in the hydrodynamic climate (e.g. the yearly wind, wave, tide, storm surge and profile conditions) it is possible to determine the net gross littoral climate at a specific location. The flowchart of LITDRIFT module is:



The annual drift is evaluated by the contribution of transport from each of the incident wave occurring over the year. When calculating the annual drift, the wave climate in LITDRIFT is described at specified intervals in a time series file where each data set describes the characteristics of incident waves. The duration of the wave incident is given as a fraction of a year. Then the total annual drift Q_{annual} is calculated as the sum of the contributions from all incident waves,

$$Q_{annual} = \sum_{i=1}^{NSETS} Q_S(i).Duration(i)$$

2.2. Model input

The input data for the LITDRIFT module is described below,

i) Orientation of the coast
ii) Bathymetry of the cross shore profile
iii) Time series of wave climate
iv) Sediment parameters

Coastal Orientation: The orientation of shoreline near the proposed pipeline location is shown in Fig. 2. It is oriented nearly in N 20° E direction. In the littoral drift estimation all the existing geomorphologic features has been considered in the LITDRIFT model.

The monthly volume of littoral drift is presented in Table 1. Longshore Sediment transport is the major reason for the shoreline stability and the changes along the coast which is primarily influenced by the

Wave Characteristics:

The occurrence of predominant wave characteristics is given below. It is observed that the significant wave heights varied from 0.5 m to 1 m during February to April, from 1 m to 3.0 m during May to September and from 1m to 2 m during rest of the year. The zero crossing periods of the waves varied between 5 and 8 s. The project area is located on the region which is significantly influenced during the northeast monsoon. The wave climate remains rough from May to November. The occurrence of storms and depressions during northeast monsoon often increases the wave activity in this region.

Monthly wave characteristics off Chennai

Month	Hs (m)	Tz (s)
January	1.0 – 1.5	5 – 7
February	0.5 – 1.0	5 – 6
March	0.5 – 1.0	5 – 6
April	0.5 – 1.0	5 – 6
May	1.0 – 2.5	5 – 7
June	1.0 – 2.5	5 – 8
July	1.0 – 2.5	5 – 6
August	1.0 – 3.0	5 – 6
September	1.0 – 2.5	5 – 6
October	0.5 – 2.0	5 – 6
November	1.0 – 2.0	5 – 6
December	1.0 – 2.0	5 – 6

Littoral Drift: The littoral drift at the study region was verified using the following equation (Shore Protection Manual, CERC, US Army, 1975).

$$Q = 1290\left(\frac{\rho g^2}{64\pi}\right) T (H_0 K_r)^2 \sin 2\alpha_b$$

Where,

Q	=	longshore sediment transport rate in m^3/year,
ρ	=	mass density of the sea water in kg/m^3,
g	=	acceleration due to gravity,
H_o	=	deepwater wave height in m,
T	=	wave period in seconds,
K_r	=	refraction coefficient, and
α_b	=	wave breaking angle.

The longshore sediment transport rate along Chennai coast is given in Table 1. The sediment transport rates were high (>1.98 x 10^5 m^3/month) in May and December. It was lowest (< 0.75 x 10^5 m^3/month) in March. The littoral drift was towards north from April to October and towards south during the remaining months of the year. The annual northerly transport is 0.98 x 10^6 m^3/yr and the annual southern transport is 0.51 x 10^6 m^3/yr.

3. SHORELINE CHANGES

The DHI- LITPACK model suite is a convenient tool for studying the coastal processes in the wave breaking zone. The different modules LITSTP, LITDRIFT, LITLINE, LITTREN, LITPROF are one-line models used to study the non cohesive sediment transport, longshore current, littoral drift, coastline evolution, sedimentation in trenches and cross-shore profile evolution. In the present study, the littoral sediment transport of project region has been evaluated using the DHI- LITPACK- LITLINE model.

3.1. Model Description

MIKE 21 LITLINE is used for estimating the shoreline changes.

This model includes propagation, shoaling and breaking of waves, calculation of the driving forces due to radiation stress gradients, momentum balance for the cross-shore and longshore direction giving the wave setup and the longshore current velocities. The model can be applied on complex coastal profiles with longshore bars. In the case of a longshore bar the broken waves can reform in the trough onshore of the bar.

Having computed the longshore current by the hydrodynamic module, points are selected across the coast, which are representative for the littoral drift estimation. The sediment transport calculations carried out by the STP module are made to reflect the local conditions with respect to the energy dissipation, the percentage of non-breaking waves and the *rms* values of wave heights.

The annual drift is evaluated by the contribution of transport from each of the incident wave occurring over the year. When calculating the annual drift, the wave climate in LITDRIFT is described at specified intervals in a time series file where each set of items describes the characteristics of incident waves. The duration of the wave

incident is given as a fraction of a year. Then the total annual drift Q_{annual} is calculated as the sum of the contributions from all incident waves:

$$Q_{annual} = \sum_{i=1}^{NSETS} Q_S(i).Duration(i)$$

Where NSETS is the total number of incident waves. The measured three hourly wave data are used as input.

3.2. Model input

The input data for the LITDRIFT module is described below,

v) Orientation of the coast
vi) Nearshore bathymetry
vii) Cross shore profile
viii) Time series of wave data
ix) Sediment parameters
x) Layout of obstruction

Based on the estimated littoral drift and shoreline configuration, the changes in shoreline will be evaluated using MIKE 21 LITLINE model.

3.3. Shoreline Changes

The change in shoreline after 5 years, 10 years, 25 years and 50 years are shown in Fig. 3. It is seen that virtually there are no change in the shoreline configuration due to the placement of pipeline on the seabed. The reason is that, the entire stretch of the pipeline is buried below the seabed and there is no obstruction across the surf zone to alter the existing littoral drift. **Therefore, there will not be any impact on the shoreline and there will not be any erosion/deposition due to proposed development.**

4. MODEL ON SEABED CHANGES

The change in seabed due to placement of intake and outfall pipelines on the seabed has been studied.

MIKE 21 ST, a module in the MIKE 21 application suite, calculates *combined current and wave induced* non-cohesive sediment transport rate at offshore beyond wave breaking zone. This module can estimate the initial rates of bed level changes, which will identify the potential areas of erosion or deposition.

4.1. Model description

The Bijker's method for the total-load sediment transport is chosen in the MIKE 21 ST module. According to Bijker, the total-load sediment transport, *qt*, is the sum of bed-load transport, *qb*, and suspended load transport, *qs*.

$$qt = qb + qs = qb(1 + 1.83\ Q)$$

Q is a dimensionless factor defined as,

$$Q=\left[I_2 \ln\left(\frac{33h}{r}\right) + I_2\right]$$

where *h* is the water depth, *r* is the bed roughness and I_1 and I_2 are Einstein's integrals, which must be evaluated numerically on the basis of the dimensionless reference level A = r/h and z*, defined as:

$$z^*=\frac{w}{kU_{f,wc}}$$

W = the settling velocity of the suspended sediment,
κ = Von Karman's constant
$U_{f, wc}$ = the shear velocity under combined waves and current.

The influence of the waves on the suspended-load transport is therefore taken into account through the shear velocity, $U_{f,\,wc}$. The roughness, r, is related to the Chezy number, C, through

$$C = 18\log\left(\frac{12h}{r}\right)$$

Following Bijker, the shear velocity in combined waves and current $U_{f,wc}$ is found as:

$$U_{f,wc} = U_{f,c}\sqrt{1+\frac{1}{2}\zeta\frac{\hat{u}_b}{V}} = \frac{\sqrt{gV}}{C}\sqrt{1+\frac{1}{2}\zeta\frac{\hat{u}_b}{V}}^{\,2}$$

Where, $U_{f,c}$ is the current-related shear velocity, V is the depth-averaged current velocity, $\hat{u}b$ is the amplitude of the wave-induced oscillatory velocity at the bottom, and ζ is a dimensionless factor that can be expressed in terms of the wave friction factor f_w and Chezy's number C.

$$\zeta = C\sqrt{\frac{f_w}{2g}}$$

The wave friction factor fw is calculated according to Swart as

f_w = wave friction factor
a_b = the amplitude of the wave motion at the bottom

The bed load transport, qb, and suspended load transport, qs, are calculated according to,

$$q_b = Bd_{50}U_{f,c}\exp\left(-\frac{0.27\Delta d_{50}g}{\mu U^2_{f,wc}}\right)$$

B is a dimensionless bed load transport coefficient, Δ is the relative density of sediments and μ is the so-called "ripple factor".

4.2. Model input

Currents: The flow field simulated using MIKE 21 HD module has been used as input in MIKE 21 - ST module. The quantity of sediment flux/transport as bed load and suspended load above the seabed and the consequent change in bed level are estimated. The transport phenomenon without pipeline and with pipeline has been calculated and the net effect on the seafloor has been estimated through the model.

4.3. Sediment transport and Bed level changes

Without pipeline: The current induced average sediment transport fluxes and seabed level changes without pipeline over the period of one year is shown in Fig. 4. The simulation shows that the estimated sediment flux is less than 10 m^3/yr/m width over most of the coastal region.

With pipeline: The current induced average sediment transport fluxes and seabed level changes with pipeline over the period of one yare is shown in Fig. 5. The simulation shows that the sediment flux near pipeline is negligibly small of the order of less than 12 m^3/yr/m width. It shows that there is a very small change in sediment transport flux of the order <10 m^3/yr/m width near the pipelines.

Net changes after laying pipeline

The net change in sediment transport flux and bed level changes with and without pipelines are shown in Fig. 6. The simulation shows, there will be a negligible deposition at the rate of 0.0002 m/yr over the seabed near the pipeline. Such changes is very insignificant and it will not cause any major changes in the seabed.

Hence, the mathematical modelling study shows that, there is no change in sediment transport flux and inturn no changes in bed level due to the laying of intake and outfall pipelines. Further the pipeline will be buried below the seabed and hence the bed profile will maintain its equilibrium conditions. Therefore the laying of pipelines will not cause any change in coastal morphology and the seabed. Also it will not cause any significant change in the current flow.

Table 1. Longshore sediment transport rate along Chennai coast

Month	Volume of littoral drift (m^3 / month)
January	155790
February	84199
March	7376
April	-91894
May	-198016
June	-178516
July	-125861
August	-149160
September	-157813
October	-76053
November	68486
December	196906
Net transport	**-464566**
Gross transport	**1490070**

**(-) Transport in northerly direction*

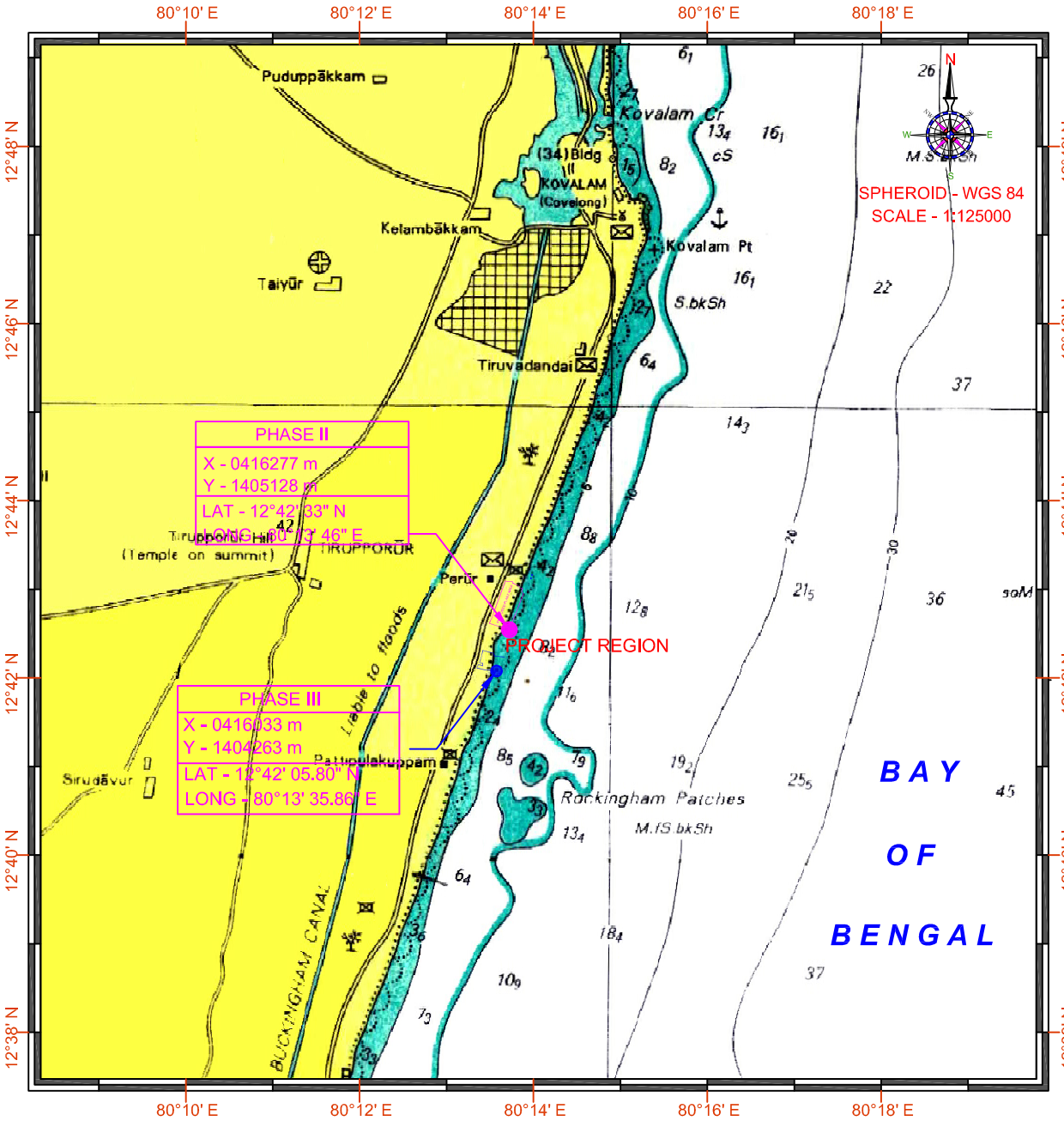


FIG. 1. LOCATION MAP

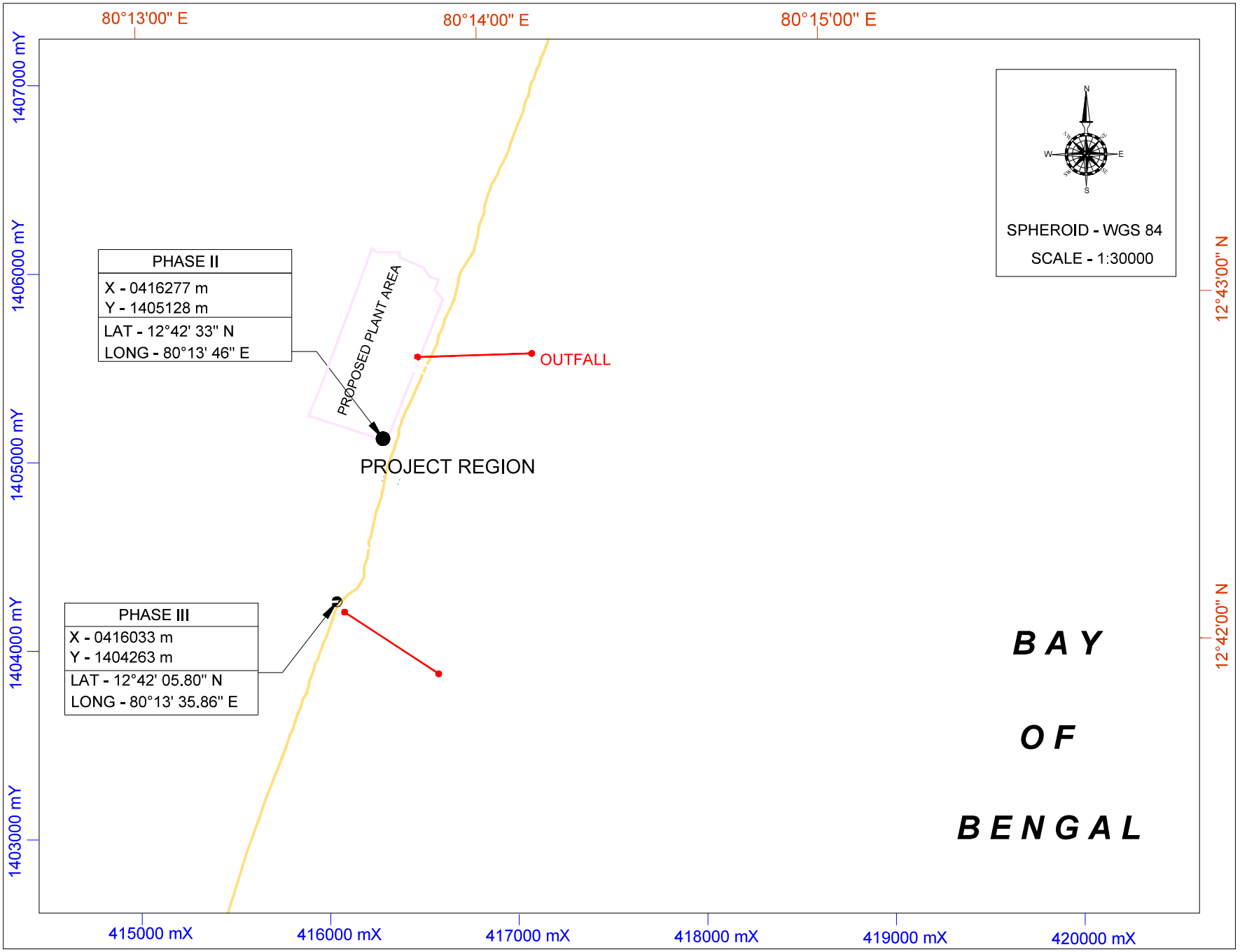


FIG. 2. SATELLITE IMAGERY OF THE PROJECT REGION

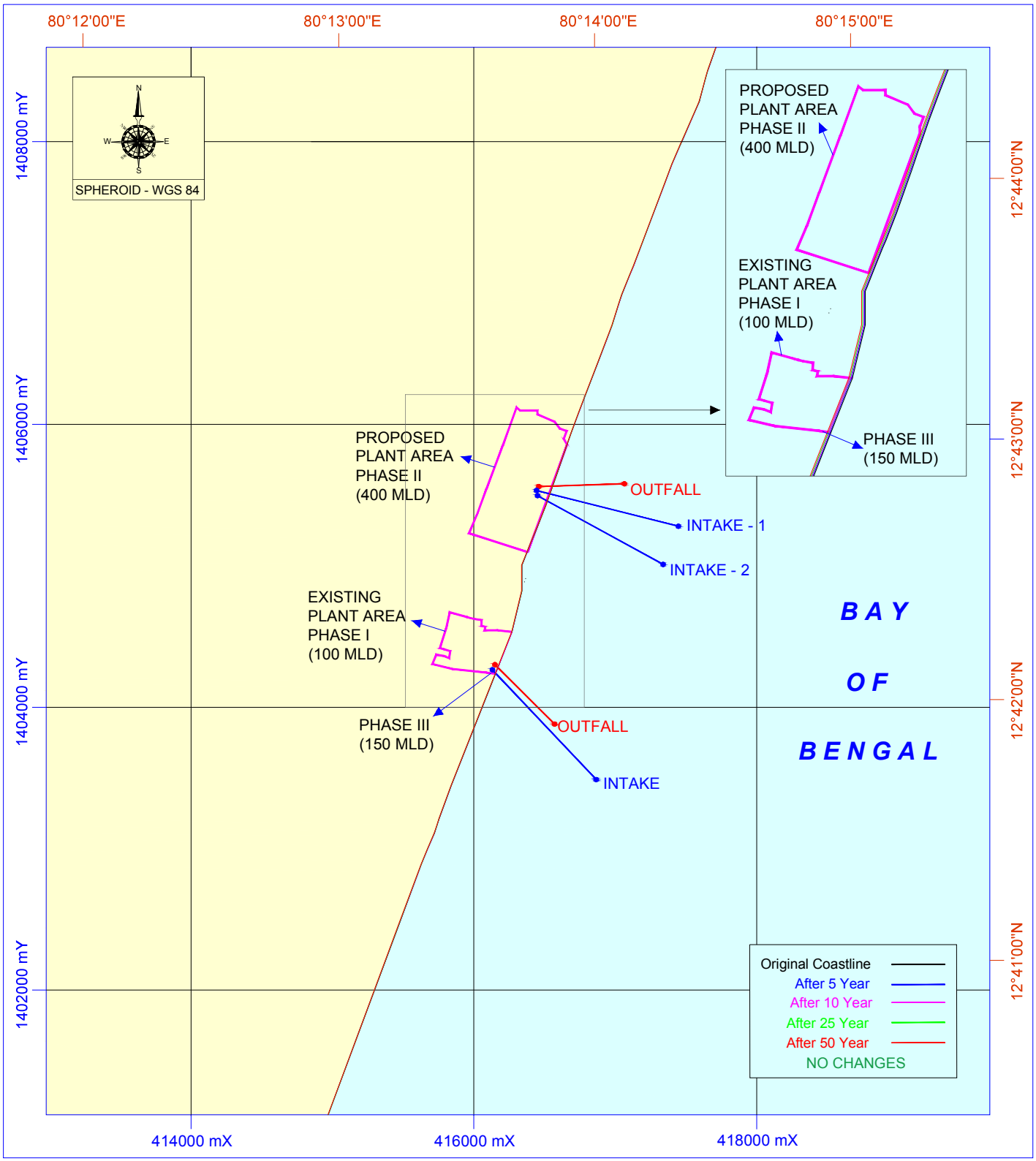


FIG. 3. NET EFFECT OF THE SHORELINE CHANGES

Without pipeline

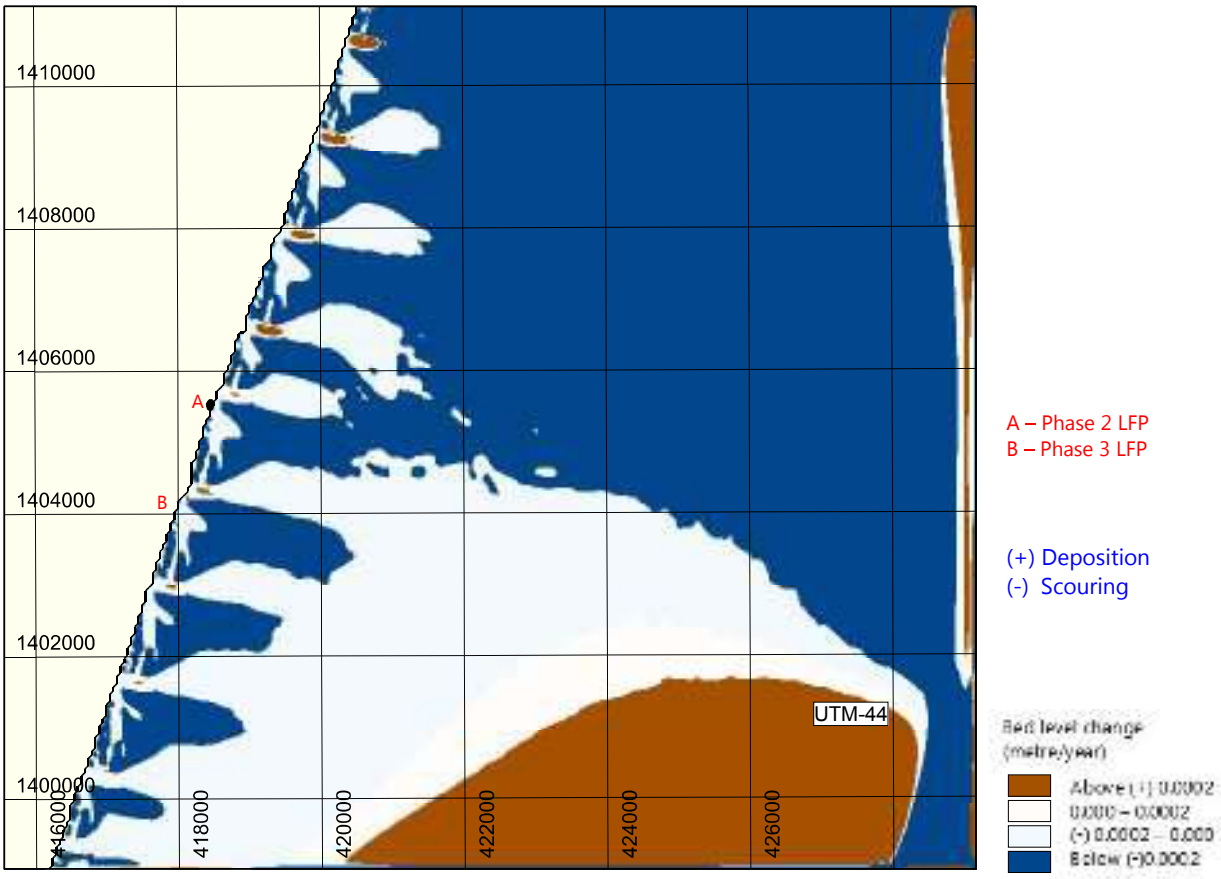


Fig. 4. Change in bed level – without pipeline

With pipeline

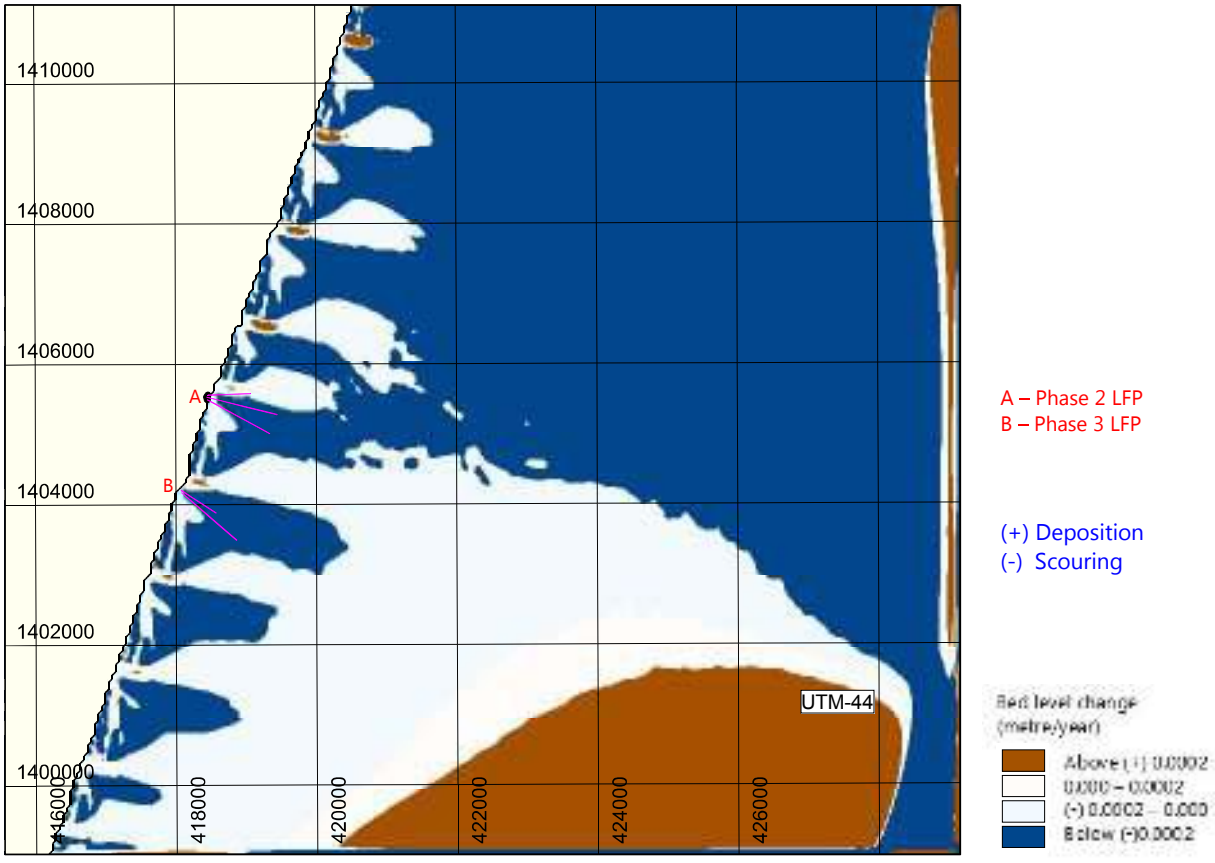


Fig. 5. Change in bed level – with pipeline

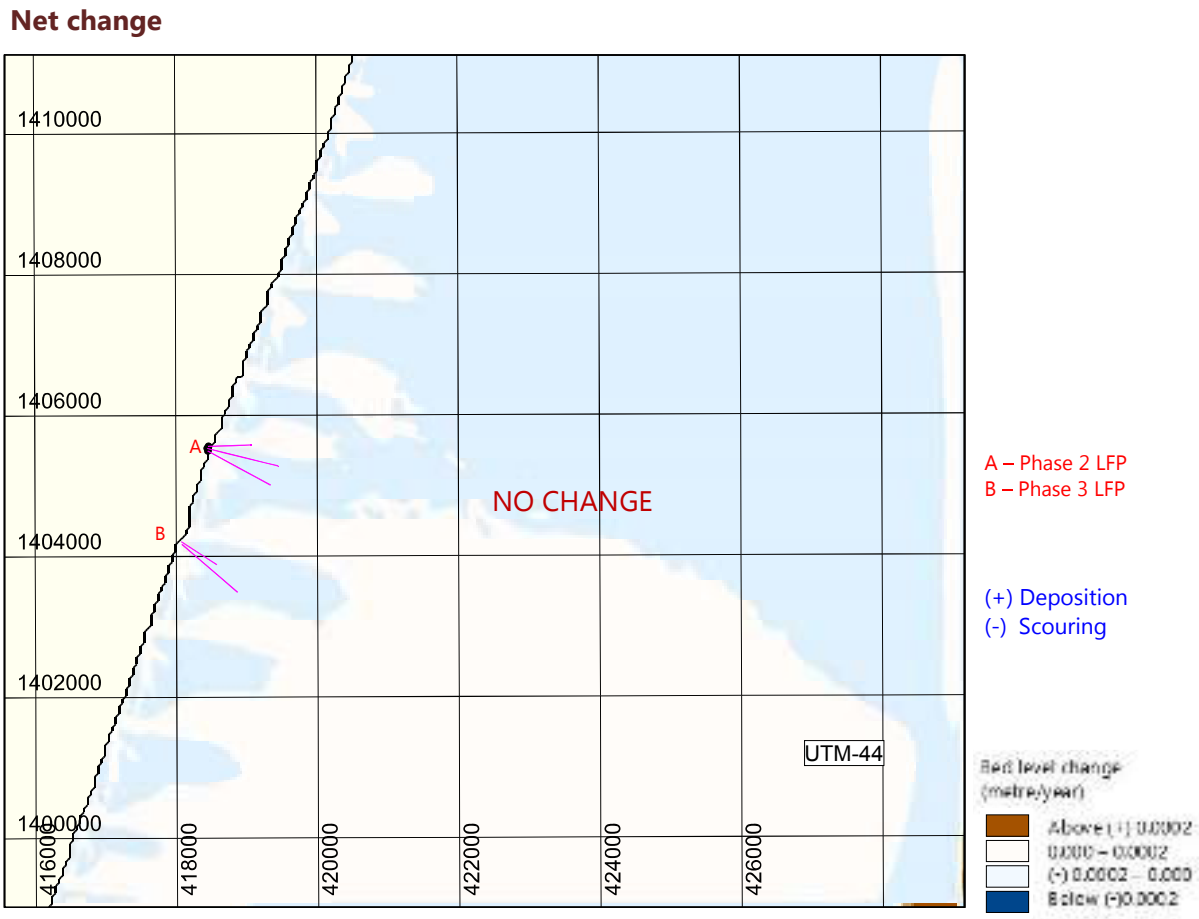


Fig. 6. Net changes in seabed- pre and post laying

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TAMILNADU POLLUTION CONTROL BOARD

Office of the Managing Director, C.M.W.S.S.Board, Ch-2 * 27 MAR 2017

From

Thiru. Atulya Misra, I.A.S.,
The Principal Secretary /Chairman (FAC),
Tamilnadu Pollution Control Board,
76, Mount Salai,
Guindy,
Chennai – 600032

To

The Managing Director,
Chennai Metropolitan Water Supply
and Sewerage Board (CMWSSB),
No. 1, Pumping Station road,
Chintadripet,
Chennai – 600 002

Lr. No.: TNPCB/F.06421/CMWSSB/Desalination/NOC/2017 Dated: 27.03.2017

Sir,

Sub: TNPCB – CMWSSB – 150 MLD Sea Water Reverse Osmosis Desalination Plant at Nemelli village, Thiruporur Taluk, Kancheepuram District & & 400 MLD Sea Water Reverse Osmosis Desalination Plant at Perur village, Thiruporur Taluk, Kancheepuram District – NOC issued – Reg.

Ref: Your letter No. CMWSSB/SE(Desal)/400 MLD & 150 MLD – SWRO Desal plants/SPL/2017 dt. 13.03.2017.

I am to invite attention to the reference cited, wherein the CMWSSB has been requested to issue NOC of the Board for the proposed projects of 150 MLD Sea Water Reverse Osmosis Desalination Plant at Nemelli village, Thiruporur Taluk, Kancheepuram District & 400 MLD Sea Water Reverse Osmosis Desalination Plant at Perur village, Thiruporur Taluk, Kancheepuram District.

In this regard, it is informed that TNPCB has **no objection to establish** the projects of 150 MLD Sea Water Reverse Osmosis Desalination Plant at Nemelli village, Thiruporur Taluk, Kancheepuram District & & 400 MLD Sea Water Reverse Osmosis Desalination Plant at Perur village, Thiruporur Taluk, Kancheepuram District subject to the following conditions,

1. The NOC issued for the purpose of only obtaining Clearance under CRZ Notification, 2011 form the MoEF&CC, GoI, New Delhi.
2. The NOC issued shall not be construed as Consent or Authorisation of the Board.
3. The unit shall apply and obtain consent for establishment under the Water (P&CP) Act, 1974 as amended and Air (P&CP) Act, 1981 as amended before start of any establishment work.
4. The unit shall provide sewage Treatment plant to treat and dispose the sewage to be generated from the unit.
5. The unit shall ensure that sewage to be generated from the unit during construction / operation period should not affect the ground water quality.

TAMILNADU POLLUTION CONTROL BOARD

6. The unit shall ensure that no Ground water shall be extracted within the CRZ area.
7. The unit shall carryout a study on the characteristics of the intake / outlet through National Institute of Oceanography (CSIR), Goa.
8. The water quality of return water to sea will confirm the discharge standard.

The receipt of this letter may be acknowledged.

27/2/17

For/Chairman

27/2/17

Copy to

The District Environmental Engineer,
Tamil Nadu Pollution Control Board,
Maraimalai Nagar.

Setting up of 400 MLD Sea Water Reverse Osmosis Desalination Plant at Perur Along ECR, Chennai, Tamil Nadu, India

Flora, Fauna and Turtle nesting conservation Plan around the Project area

Chennai Metropolitan water Supply & Sewerage Board

No.1, Pumping station Road, Chintadripet, Chennai - 600002

Report on the impact of eco system (flora and fauna) due to the intake and outfall pipelines and the mitigation measures taken on the adverse impacts		
Parameter	Effect	Mitigation
Intake Head	Improper design of intake head may cause vortex formation on the upper surface of the sea and also cause danger for the boats moving around the vicinity.	The intake head is proposed to be designed with a very low velocity of less than 0.15m/sec to avoid vortex formation. The intake head can be designed in cylindrical form to avoid interference of currents. It should not cause any hazard to the boats and fishermen sailing in the vicinity. The intake shall have appropriate screens/ trash bars with small openings to minimize the entry of small marine organisms, fish larvae and fishes (entrapment and impingement). A marker buoy has to be placed close to the intake head as per the norms of Directorate General of Lighthouses and Lightships. This will also help boats to avoid collision while en-route. The route of pipelines laid on the seafloor has to be furnished to Naval Hydrographic Office, Dehradun in order to mark on the Naval Hydrographic Charts as a warning for navigation.
Trenching for burial intake and outfall pipelines	Entrainment and removal of organisms, increased turbidity near the dredging location, organic matter enrichment.	In order to minimize the effects on sub-tidal benthic community such as organic matter enrichment, fish injury, removal of organism etc., the dredging will be carried out in controlled manner confined to only pipeline corridor. Further to mitigate the increase in turbidity, the turbidity induced during the dredging shall be minimized using controlled dredging techniques using appropriate cutter suction dredger. The net enclosures with booms may be placed around the dredging area in order to control the spread of the turbid plume. The dredged materials can be used as back fill after laying the pipeline in the trench.
Construction of outfall diffuser	Improper design of outfall diffuser may reduce the mixing and increase the distance of mixing zone.	The outfall shall be designed with multiple ports, which can enhance the jet mixing of the brine with the seawater. In this case, it has been designed with 10 nos. x 500 mm diameter of ports. This will ensure faster dilution of brine to ambient levels of salinity within short distance and there will not be impact on marine organisms including fish catch in the nearby zone, as fishing activity takes place deep in the sea about 5 km into the sea, whereas the diffusers shall be within 650 m of the coast. The outfall diffuser should not have any sharp projection and should not pose any risk for the boats and fishermen moving around this region. The part of the outfall pipelines before the diffuser port may suitably be placed and buried to avoid

		hindrance for fishing and the movement of the boat. The diffuser ports should be placed appropriately, so that they do not cause obstruction to the movements of boats and crafts. A marker buoy has to be placed close to the outfall as per the norms of Directorate General of Lighthouses and Lightships. This will also help boats to avoid collision while enroute. The route of pipelines laid on the seafloor has to be furnished to Naval Hydrographic Office, Dehradun in order to mark on the Naval Hydrographic Charts as a warning for navigation.
Primary Producers:	The phytoplankton is the primary producer that needs optimum salinity conditions for their growth and survival.	The outfall has been designed at water depth of 7-7.5m, to have efficient dispersal, with adequate number of ports. The Model output states that the salinity reaches the ambient within a radius of 100 m.
Zooplankton:	Zooplanktons, which are pelagic, move with the water current, and residual chlorine present in the return water would also affect the population.	The residual chlorine in return water shall be kept below 0.5 mg/l and shall be monitored regularly.
Macrophytes:	Macrophytes are multicellular plants which are attached to submerged rocks on the seabed.	The outfall has been designed at water depth of 7-7.5m, which is approx. 650 m from the cost, whereas the submerged rocks are deeper into the sea as per the sea bed analysis.
Fishes and shellfishes:	Besides the effects of salinity changes, the dissolved oxygen content also affect the fish and shellfish lives. Most fish including shellfish can tolerate salinities outside their normal range for a period of minutes to hours; however, extended periods may cause impact in fish life. Many shellfish (Clams, Oyster etc) are unable to move freely, but they can take protective action by temporarily closing their shells when exposed to abnormal salinities. Several instances of major losses of bivalves have been reported as a result of larger variations of salinity.	The intake head is proposed to be designed with a very low velocity of less than 0.15m/sec to prevent entrapment of marine species and provide them with natural movement. Also outfall diffusers are designed so as the salinity reaches the ambient within a radius of 100 m.
Benthic animal community:	As the benthic community is sedentary in nature they will be affected by environmental changes more than the other communities. Like other animal population, they are also sensitive to the drastic changes in saline conditions, which may affect their body physiology. The noticeable effects are alteration of community structure resulting in the reduction of species	The intake head is proposed to be designed with a very low velocity of less than 0.15m/sec to prevent entrapment of marine species and provide them with natural movement. Also outfall diffusers are designed so as the salinity reaches the ambient within a radius of 100 m.

Turtle nesting conservation plan around the Project area

Background

Tamil Nadu has a coastal length of 1076 km (13% of the country's coastline) and a continental shelf of approximately 41,412 sq.km, and is one of the leading states in marine fish production. The State has a fishermen population of 1.05 million of which 0.20 million fishermen are actively engaged in fishing from 591 marine fishing villages scattered along 13 coastal districts.

The Chennai Metropolitan Development Authority (CMDA) is the nodal agency responsible for planning and development of Chennai Metropolitan Area, which is spread over an area of 1,189 Sq. km, covering the Chennai district and parts of Tiruvallur and Kanchipuram districts. The CMDA has drafted a second Master Plan that aims to develop satellite townships around the city. The city's contiguous satellite towns include Mahabalipuram in the south, Chengalpattu and Maraimalai Nagar in the southwest, and Sriperumpudur, Arakkonam, Kanchipuram and Tiruvallur to the west.

Chennai has 25.6 km of sea coast which is flat and sandy for about a km. from the shore. The Coast in Kancheepuram district under which the present site comes, has 87 Km of sea coast wherein 44 fishing villages with 2 major and 37 minor fish landing centers exist. The proposed site is 43 KM away from Chennai city.

Chennai coast is characterised by fairly wide sandy beaches like the Marina, Elliot's, Neelangarai beach, Thiruvanmiyur and Valmiki Nagar beaches. The sand texture is soft and suitable for sea turtle nesting.

Sea turtles are important for maintaining the health of marine ecosystems. Every year, thousands of sea turtles also fall victim to active or abandoned modern fishing gear such as trawler nets, longlines or gill nets. According to the IUCN's Red Data Book, persistent over-exploitation, especially of adult female turtles on the nesting beaches and the widespread poaching of eggs are also responsible for the endangered status of five species and vulnerable status of the sixth. Their habitat is being destroyed because of oil spills, plastics, chemical wastes, coastal development and ocean-based tourism. Sea turtles being migratory animals are affected by problems prevalent over a large geographic area.

Turtles of Indian waters

Five of the seven known species of sea turtles: Leatherback turtle (*Dermochelys coriacea*), Hawksbill turtle (*Eretmochelys imbricate*), Loggerhead (*Caretta caretta*), Green turtle (*Chelonia mydas*) and Olive Ridley turtle (*Lepidochelys olivacea*) are reported from the Indian waters. Except for the Loggerhead turtle, all four other species are known to nest along the coast of mainland and the Bay Islands of India.

Sea turtle population

Four species of sea turtles; olive ridley, hawksbill (*Eretmochelys imbricate*), green turtle (*Chelonia mydas*), and leatherback turtle (*Dermochelys coriacea*) were recorded during the course of various studies conducted along the Indian coast. Olive Ridley turtles, the smallest and the most numerous of the seven species are famously known for their unique behavior of forming enormous nesting aggregations - a phenomenon known as “arribada” (Spanish for arrival).

The olive ridley is classified as Vulnerable according to the International Union for Conservation of Nature and Natural Resources (IUCN), and is listed in Appendix I of CITES. These listings were largely responsible for halting the large scale commercial exploitation and trade of olive ridley skins. The Convention on Migratory Species and the Inter-American Convention for the Protection and Conservation of Sea Turtles have also provided olive ridleys with protection, leading to increased conservation and management for this marine.

Tamilnadu and Andhra Pradesh coasts are considered as the migratory pathways of Olive Ridleys for approaching mass nesting in Odisha.

The three main rookeries or turtle nesting beaches along the 480 km stretch of Odisha coast are the Gahirmatha rookery (Bustard, 1976), between the Brahmini and Baitarani, located north of Paradip; the rookery at the Devi river mouth, about 100 km south of Gahirmatha (Kar, 1982) and the rookery located 320 km south of Gahirmatha, near the mouth of Rushikulya river (Pandav et. al., 1994). The Olive Ridley population in Orissa is of global significance since it is one the major mass nesting rookeries in the world, along with Mexico, and Costa Rica .

Olive Ridley nets sporadically along northern Tamil Nadu Coast and high nesting was observed along Nagapattinam and Chennai Coasts. The Other turtle nesting areas are the coasts between Tranquebar and Pazhayaru, Mahabalipuram and Chennai and Point Calimere and Nagapattinum. Sea turtles congregate on the eastern coastal waters by November – December and nesting is usually between January and end March with peak nesting happening in February.

Sea Turtle Surveys and Monitoring by Research Organisations and NGO’s

Surveys and documentation of sea turtles in India began at two sites, namely Gahirmatha in Orissa, and Chennai (Madras) in Tamil Nadu. In Chennai (Madras), monitoring of status and threats (and hatchery programs for conservation) was initiated by the Madras Snake Park Trust, surveyed much of the Indian coast over the next few years.

Sea turtle monitoring in Chennai has been nearly continuous over the last forty years thanks to the efforts of the Madras Snake Park Trust (1973 –1976), Central Marine Fisheries Research Institute (1977-1981), Tamil Nadu Forest Department (1982 – till now) and Students Sea Turtle Conservation Network (SSTCN) from 1988 till the present. (Shanker, 1995, 2003a).

Detailed surveys were carried out under the GOI UNDP project during 2000 – 2003 in all the coastal states and islands . Following this, monitoring was carried out in many states including Tamil Nadu, under the auspices of a project funded by the Convention on the Conservation of Migratory species, (Salim Ali Centre for Ornithology and Natural History) (Shanker and Andrews, 2006).

According to the Marine Turtle Specialist Group (MTSG) of the IUCN, there has been a 50% reduction in population size since the 1960s. Although some nesting populations have increased in the past few years, the overall reduction is greater than the overall increase.

Protection and Intelligence Gathering -- Staff Strength and Distribution

Each year, during the turtle nesting season, a volunteer group establishes a hatchery at Neelangarai, and every night from end-December through end-March, the same 7 km stretch of beach is patrolled. Since 2009 the Marina stretch too is being monitored making the total length covered 14 km with an additional hatchery in Marina (This area is 42 KM from the Project site).

Every weekend during the season, members of the general public and school and college students from Chennai and other places accompany volunteers on 'turtle walks' where they learn about sea turtles and marine conservation.

Over the years more than 25,000 people have participated in the walks. Many student members have been motivated to pursue careers in ecology, ecotourism, wildlife management and conservation.

Fishermen Communities -- Participation in Protection of Species

Although the fishermen communities were initially suspicious and sometimes hostile towards the work of conservation volunteers every night, their shift in attitude to that of support has been quite dramatic especially in the Marina stretch. The people from the community who used to poach eggs have become protectors of nests. Some even call volunteers' mobile phones to inform them that there is a nest that they need to pick up. It is noteworthy that the fishermen expect nothing in return for their help. If wild nests hatch and hatchlings stray towards the bright lights on the beach, fishermen often call volunteers or our hatchery supervisor (a fisherman himself) for help to track down and release hatchlings before they are picked off by dogs and crows.

Street theatre programmes are organised for fishing communities to spread the message about the need to protect sea turtles and preserve the biodiversity in the ocean.

The Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia puts in place a framework through which States of the Indian Ocean and South-East Asian region, as well as other concerned States, can work together to conserve and replenish depleted marine turtle populations for

which they share responsibility. This objective will be achieved through the collective implementation of an associated Conservation and Management Plan.

Threats to sea turtle

The major threats to the sea turtles are:

i. Fishing by trawlers and Gill netters in nearshore and offshore coastal waters is a vital obstacle for the sea turtles. They are hurt and killed by slashing of propellers of mechanical boats. Most of the turtles including mating pairs die due to suffocation when they are entangled in trawl nets and gill nets.

ii. Artificial lighting from anchoring vessels, ports, harbours, fishing jetties and other coastal developmental activities are known to have impacts on breeding, nesting and hatching as light is known to greatly disorient them while moving.

iii. Introduction of improved beach landing crafts and settlement of migratory fishermen from neighboring states on important nesting beaches resulting in destruction of nesting habitats.

iv. Oil spills and marine pollution will inevitably occur in the event of large port being set up.

v. Erosion of the nesting beach is a common phenomenon after March. By March the arribada gets over at the nesting beaches and hence beach erosion results in loss of large number of turtle eggs.

vi. As a result of beach erosion the nests get exposed thus resulting in the loss of extremely large number of eggs (Courtesy: Wildlife Institute of India, Dehradun - Pandav, B. and B. C. Choudhury (2000).

vii. Changes in the land use pattern of coastal areas in the vicinity of important nesting as well as mass nesting beaches such as beach loss and beach modification, beach littering, casuarinas plantation neat the High Tide Line (HTL), increased lighting in the beaches have been reported have significant impacts. Similarly, changes in the sea use pattern such as increasing fishing activities, increasing ship/boat activities because of developmental activities around breeding grounds, feeding and developmental habitats as well as migratory paths etc. have their influence on sea turtles and their habitats.

viii. Human poaching of turtle eggs and predation of eggs by other animals are the most common activities that result in the loss of turtle population.

Identification of the exact non-breeding grounds of Olive Ridleys nesting

Though Olive Ridleys spend almost six months in a year in the coastal waters off Odisha, till recently nothing was known about the area where they spend the remaining six months. Recovery of 22 turtles tagged in Odisha from Sri Lanka and Gulf of Mannar during this study indicates that this could possibly be the non-breeding grounds for the ridleys migrating to the Odisha coast every winter. Although the tagged turtles have been recovered all around Sri Lanka, most of the recoveries are made from Gulf of Mannar and the west coast of Sri Lanka. Satellite telemetry studies can provide definite answers about olive ridleys non-breeding area. However, with the existing tag returns it is clear that olive ridleys are migrating from as far south as Sri Lanka to breed in Odisha.

Also it is understood that area near Nagapattinam is favored place for nesting and the same is approx. 200 km from the proposed site.

Nesting survey was carried out fortnightly in the stretch between Neelankarai and Uthandi by WWF-India personnel. The survey was conducted from January to March 2012. A total of 6 Olive Ridley nests were recorded during the survey. Uthandi is about 19.2 KM away from the proposed Project site. Hence, the stretch along the proposed site does not have any impact on turtle nesting .

Further, a beach stretch of 50 km from Mahabalipuram to Pondicherry was monitored by WWF-India personnel and a resource person. The nesting survey was carried out on a fortnightly basis and nesting information was recorded. Mahabalipuram is about 9.8 KM away from the proposed Project site and hence the proposed plant does not have any impact on turtle nesting.

During the survey conducted by Indomer along the above said stretches between Neelankarai and Mahabalipuram from February to March 2012, 44 nests of Olive Ridley turtles were observed. The maximum number of nests was observed during 2nd week of February and March 2012 and some areas recorded higher nesting activity, ranging between 12 and 17 nests.

Further , during the survey conducted by the Volunteers of Students Sea Turtle Conservation Network (SSTCN) from January to February 2014, in the stretch between Neelangarai in south and Napier Bridge in North (which is 21 KM away from the Project site) , 332 nests were observed which is comparatively higher than the observations made during the previous years.

Already one 100 MLD SWRO Desalination plant is operating at the same place for last three years and so far no such turtle nesting has been reported so far.

In spite of **no impact** observed on the nesting of Olive Ridley Turtle along the stretch of the proposed Project site, CMWSS Board will extend support to Forest Department/ Students Sea Turtle Conservation Network (SSTCN) for the conservation of Olive Ridley Turtles as required.

Impact of Proposed desalination plant on turtle population

The intake and outfall are proposed at 1000 m and 650 m from the shoreline which is beyond the “active zone” of the turtle population. While intake of seawater is expected not to cause any impact on the turtle population because of it’s location offshore some 650 m away from the coast. Further the intake head is provided with the screens / trash bars to prevent its entry into the same.

Outfall is designed with a multiple port diffuser for faster mixing and dilution of the brine which is expected to have a salinity of 71ppt i.e. 33 ppt higher than the ambient seawater. This increase in salinity gets reduced to 1.0 ppt within 100 m distance from the outfall. The modeling study conducted also confirms that the rate of mixing of brine reject is very effective for outfall located at 650 m distance offshore.

The brine from the desalination plant will only have a higher quantity of salt and it may not bring any adverse effect on the breeding population.

Onshore impacts:

The turtles select sandy beaches for nesting and they normally lay their eggs beyond the HTL. The area where LFP is to be located is free from any nests possibly because of high sand dunes present near the HTL. The backshore region is having 8 to 10 m high sand dunes. The top of intake and outfall pipelines are to be buried almost 1.0 m from the sea bed surface and once they are laid they will not interfere with nesting as the turtles usually dig 30 to 50 cm deep to lay their eggs. So far no reports have been published on the mass nesting of Olive Ridley or other species in this area.

Mitigation

It is proposed to have the pipe laying activity in non-mating season and also the lighting towards the coast should be of low intensity. It is also advisable to avoid Casuarina plantation near the HTL as the sand dunes are very stable and sufficiently high to be a good barrier for natural disasters like tsunami and cyclones.

Setting up of 400 MLD Sea Water Reverse Osmosis Desalination Plant at Perur Along ECR, Chennai, Tamil Nadu, India

Environmental monitoring reports

(Analysis report of reject disposed from 400 MLD plant)

Chennai Metropolitan water Supply & Sewerage Board

No.1, Pumping station Road, Chintadripet, Chennai - 600002

Reject TDS during Diffuser sampling

Year - 2016

Year	Date	Feed TDS-mg/l	Reject TDS at 50 m dispersal - mg/l
Jan-16	09-Jan	33700	35020
Feb-16	09-Feb	35300	36000
Mar-16	10-Mar	36600	37700
Apr-16	04-Apr	36800	37900
May -16	10-May	37000	38200
Jun-16	08-Jun	37100	38300
Jul-16	14-Jul	37100	38200
Aug-16	10-Aug	37200	38300
Sep-16	12-Sep	37100	38200
Oct-16	11-Oct	37000	38100
Nov-16	06-Nov	34500	35600
Dec-16	08-Dec	34700	35800

WABAG	10M35/RW.DP.AN/LAB/011	Date	21-06-2015
	Reject Water Discharge Point Analysis Report For the Month of January-2016	Rev.NO	1
Date of Sampling : 09/01/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.12
2	Temp	* C	27.7
3	TDS	mg/l	35020
4	Tot. Hardness as CaCO3	mg/l	6560
5	Cal.Hardness as CaCO3	mg/l	990
6	Mag. Hardness as CaCO3	mg/l	5570
7	Chlorides	mg/l	17994
8	Boron	mg/l	3.44
9	Sulphate	mg/l	2206

Remarks

Limit : Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 34000 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign	For		
DD/MM/YYYY	10/01/2016	10/01/2016	10/01/2016

WABAG	10M35/RW.DP.AN/LAB/011	Date	21-06-2015
	Reject Water Discharge Point Analysis Report For the Month of February-2016	Rev.NO	1
Date of Sampling : 09/02/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.09
2	Temp	* C	28.6
3	TDS	mg/l	36000
4	Total Hardness as CaCO3	mg/l	6750
5	Calcium Hardness as CaCO3	mg/l	1020
6	Magnesium Hardness as CaCO3	mg/l	5730
7	Chlorides	mg/l	18594
8	Boron	mg/l	3.49
9	Sulphate	mg/l	2280

Remarks

Limit : Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 35000 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign	for S.Af		for
DD/MM/YYYY	10/02/2016	10/02/2016	10/02/2016

WABAG	10M35/RW.DP.AN/LAB/011	Date	21-06-2015
	Reject Water Discharge Point Analysis Report For the Month of March-2016	Rev.NO	1
Date of Sampling : 10/03/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.11
2	Temp	* C	28.8
3	TDS	mg/l	37700
4	Total Hardness as CaCO3	mg/l	6750
5	Calcium Hardness as CaCO3	mg/l	1050
6	Magnesium Hardness as CaCO3	mg/l	5700
7	Chlorides	mg/l	20043
8	Boron	mg/l	3.42
9	Sulphate	mg/l	2045

Remarks

Limit : Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 36600 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign	For		
DD/MM/YYYY	11/03/2016	11/03/2016	11/03/2016

WABAG	*Reject Water Discharge Point Analysis Report* *For the Month of April - 2016*	Date	07-04-2016
Date of Sampling : 04/04/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.12
2	Temp	* C	28.8
3	TDS	mg/l	37900
4	TSS	mg/l	18
5	Total Hardness as CaCO3	mg/l	6780
6	Calcium Hardness as CaCO3	mg/l	1060
7	Magnesium Hardness as CaCO3	mg/l	5720
8	Chlorides	mg/l	20144
9	Boron	mg/l	3.44
10	Sulphate	mg/l	2060

Remarks :

Limit: Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 36800 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign			
DD/MM/YYYY	07/04/2016	07/04/2016	07/04/2016

WABAG	*Reject Water Discharge Point Analysis Report* *For the Month of May - 2016*	Date	10-05-2016
Date of Sampling : 10/05/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.11
2	Temp	* C	28.9
3	TDS	mg/l	38200
4	TSS	mg/l	42
5	Total Hardness as CaCO3	mg/l	6820
6	Calcium Hardness as CaCO3	mg/l	1090
7	Magnesium Hardness as CaCO3	mg/l	5730
8	Chlorides	mg/l	20244
9	Boron	mg/l	3.47
10	Sulphate	mg/l	2080

Remarks :

Limit: Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 37000 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign			
DD/MM/YYYY	12/05/2016	12/05/2016	12/05/2016.

WABAG	*Reject Water Discharge Point Analysis Report* *For The Month of June - 2016*	Date	08-06-2016
Date of Sampling : 08/06/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.12
2	Temp	* C	29.1
3	TDS	mg/l	38300
4	TSS	mg/l	166
5	Total Hardness as CaCO3	mg/l	7690
6	Calcium Hardness as CaCO3	mg/l	1180
7	Magnesium Hardness as CaCO3	mg/l	6510
8	Chlorides	mg/l	21525
9	Boron	mg/l	3.61
10	Sulphate	mg/l	2538

Remarks :

Limit: Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 37100 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign			
DD/MM/YYYY	08/06/2016	08/06/2016	08/06/2016

WABAG	*Reject Water Discharge Point Analysis Report* *For The Month of July - 2016*	Date	14-07-2016
Date of Sampling : 14/07/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.13
2	Temperature	°C	28.8
3	Total Dissolved solids	mg/l	38200
4	Total Suspended Solids	mg/l	120
5	Total Hardness as CaCO3	mg/l	7680
6	Calcium Hardness as CaCO3	mg/l	1170
7	Magnesium Hardness as CaCO3	mg/l	6510
8	Chlorides	mg/l	21493
9	Boron	mg/l	3.57
10	Sulphate	mg/l	2534

Remarks :

Limit: Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 37100 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign			
DD/MM/YYYY	15/07/2016	15/07/2016	15/07/2016

WABAG	*Reject Water Discharge Point Analysis Report* *For The Month of August - 2016*	Date	10-08-2016
Date of Sampling : 10/08/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.09
2	Temperature	°C	28.9
3	Total Dissolved solids	mg/l	38300
4	Total Suspended Solids	mg/l	28
5	Total Hardness as CaCO3	mg/l	7688
6	Calcium Hardness as CaCO3	mg/l	1180
7	Magnesium Hardness as CaCO3	mg/l	6508
8	Chlorides	mg/l	21493
9	Boron	mg/l	3.58
10	Sulphate	mg/l	2539

Remarks :

Limit: Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 37200 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign			
DD/MM/YYYY	11/08/2016	11/08/2016	11/08/2016

WABAG	*Reject Water Discharge Point Analysis Report* *For The Month of September - 2016*	Date	12-09-2016
Date of Sampling : 12/09/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.12
2	Temperature	°C	29.2
3	Total Dissolved solids	mg/l	38200
4	Total Suspended Solids	mg/l	21
5	Total Hardness as CaCO3	mg/l	7680
6	Calcium Hardness as CaCO3	mg/l	1170
7	Magnesium Hardness as CaCO3	mg/l	6510
8	Chlorides	mg/l	21493
9	Boron	mg/l	3.56
10	Sulphate	mg/l	2537

Remarks :

Limit: Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 37100 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign			
DD/MM/YYYY	14/09/2016	14/09/2016	14/09/2016

WABAG	*Reject Water Discharge Point Analysis Report* *For The Month of October - 2016*	Date	11-10-2016
Date of Sampling : 11/10/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.11
2	Temperature	°C	28.9
3	Total Dissolved solids	mg/l	38100
4	Total Suspended Solids	mg/l	19
5	Total Hardness as CaCO3	mg/l	7650
6	Calcium Hardness as CaCO3	mg/l	1150
7	Magnesium Hardness as CaCO3	mg/l	6500
8	Chlorides	mg/l	21393
9	Boron	mg/l	3.54
10	Sulphate	mg/l	2522

Remarks :

Limit: Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 37000 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign			
DD/MM/YYYY	12/10/2016	12/10/2016	12/10/2016

WABAG	*Reject Water Discharge Point Analysis Report* *For The Month of November - 2016*	Date	06-11-2016
Date of Sampling : 06/11/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.03
2	Temperature	°C	28.8
3	Total Dissolved solids	mg/l	35600
4	Total Suspended Solids	mg/l	20
5	Total Hardness as CaCO3	mg/l	7340
6	Calcium Hardness as CaCO3	mg/l	1140
7	Magnesium Hardness as CaCO3	mg/l	6200
8	Chlorides	mg/l	19594
9	Boron	mg/l	3.51
10	Sulphate	mg/l	2358

Remarks :

Limit: Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 34500 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign		FOR G.RAJA	
DD/MM/YYYY	08/11/2016	08/11/2016	08/11/2016

WABAG	*Reject Water Discharge Point Analysis Report* *For The Month of December - 2016*	Date	08-12-2016
Date of Sampling : 08/12/2016			
Sampling Point: 50 meter from Reject Discharge Point			

S.No	Parameter	unit	Results
1	pH		8.06
2	Temperature	°C	27.6
3	Total Dissolved solids	mg/l	35800
4	Total Suspended Solids	mg/l	152
5	Total Hardness as CaCO3	mg/l	6930
6	Calcium Hardness as CaCO3	mg/l	1060
7	Magnesium Hardness as CaCO3	mg/l	5870
8	Chlorides	mg/l	19294
9	Boron	mg/l	3.42
10	Sulphate	mg/l	2054

Remarks :

Limit: Reject water TDS Should not exceed 5% of Sea water

Ro Feed (Sea Water) TDS On the date of Sampling = 34700 mg/l

	Prepared By	Reviewed By	Approved By
Name	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha
Sign			
DD/MM/YYYY	08/12/2016.	08/12/2016	08/12/2016

WABAG

10M35/MON/LAB/005-1

Operation and Maintenance Of 100 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of January-2016

Date	21-06-2015
Rev	1

Date	Sea Water Quality											
	pH	TDS mg/l	Turbidity NTU	TSS mg/l	FRC mg/l	Temp °c	Total Hardness mg/l	Chloride mg/l	Total Alkalinity mg/l	Iron mg/l	Boron mg/l	Sulphate mg/l
01 January 2016	8.11	33700	33.00	118	0.6	27.4	7193	17944	116	0.03	3.41	2196
02 January 2016	8.11	33600	32.00	116	0.6	27.6	7190	17894	113	0.03	3.38	2190
03 January 2016	8.11	33700	34.00	124	0.6	27.7	7193	17944	116	0.03	3.41	2196
04 January 2016	8.12	33800	33.00	118	0.6	27.6	7201	18044	117	0.03	3.43	2202
05 January 2016	8.12	33800	32.00	116	0.6	27.7	7201	18044	117	0.03	3.43	2202
06 January 2016	8.11	33700	33.00	118	0.6	27.7	7193	17944	116	0.03	3.41	2196
07 January 2016	8.11	33800	33.00	118	0.6	27.6	7201	18044	117	0.03	3.43	2202
08 January 2016	8.11	33600	31.60	115	0.5	27.3	7190	17894	113	0.03	3.38	2190
09 January 2016	8.12	33700	33.00	118	0.6	27.7	7193	17944	116	0.03	3.41	2196
10 January 2016	8.11	33600	31.00	112	0.6	27.5	7190	17894	113	0.03	3.38	2190
11 January 2016	8.11	33700	2.00	14	0.6	27.1	7193	17944	116	0.03	3.41	2196
12 January 2016	8.11	33600	4.50	21	0.6	27.3	7190	17894	113	0.03	3.38	2190
13 January 2016	8.11	33700	2.50	16	0.6	27.4	7193	17944	116	0.03	3.41	2196
14 January 2016	8.11	33800	3.20	18	0.6	27.4	7201	18044	117	0.03	3.43	2202
15 January 2016	8.11	33800	5.50	24	0.6	27.3	7201	18044	117	0.03	3.43	2202
16 January 2016	8.11	33800	2.20	14	0.6	27.3	7201	18044	117	0.03	3.43	2202
17 January 2016	8.12	33600	3.00	18	0.6	27.2	7190	17894	113	0.03	3.38	2190
18 January 2016	8.12	33800	2.50	16	0.6	27.4	7201	18044	117	0.03	3.43	2202
19 January 2016	8.11	33800	2.00	14	0.6	27.3	7201	18044	117	0.03	3.43	2202
20 January 2016	8.12	33800	2.00	14	0.6	27.4	7201	18044	117	0.03	3.43	2202
21 January 2016	8.11	33800	1.50	12	0.6	27.1	7201	18044	117	0.03	3.43	2202
22 January 2016	8.11	33800	1.70	13	0.6	27.5	7201	18044	117	0.03	3.43	2202
23 January 2016	8.11	33800	5.70	24	0.6	27.3	7201	18044	117	0.03	3.43	2202
24 January 2016	8.12	33900	31.00	112	0.6	27.3	7206	18061	117	0.03	3.44	2208
25 January 2016	8.11	33900	32.00	116	0.6	27.2	7208	18061	118	0.03	3.43	2207
26 January 2016	8.11	33900	33.10	118	0.6	27.2	7207	18061	117	0.03	3.43	2214
27 January 2016	8.11	34000	2.50	16	0.6	27.1	7214	18094	118	0.03	3.45	2218
28 January 2016	8.11	34000	2.00	14	0.6	27.2	7214	18094	118	0.03	3.45	2218
29 January 2016	8.12	34000	2.50	16	0.6	27.3	7214	18094	118	0.03	3.45	2218
30 January 2016	8.12	34000	2.50	16	0.6	27.4	7214	18094	118	0.03	3.45	2218
31 January 2016	8.12	34000	2.00	14	0.5	27.6	7214	18094	118	0.03	3.45	2218
Average	**8.11**	**33790**	**15.21**	**58**	**0.59**	**27.39**	**7200**	**18010**	**116**	**0.03**	**3.42**	**2202**
Maximum	**8.12**	**34000**	**34.00**	**124**	**0.60**	**27.70**	**7214**	**18094**	**118**	**0.03**	**3.45**	**2218**
Minimum	**8.11**	**33600**	**1.50**	**12**	**0.50**	**27.10**	**7190**	**17894**	**113**	**0.03**	**3.38**	**2190**

	Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha	
SING				
DD/MM/YYYY	03/02/2016.	03/02/2016	03/02/2016	5/2/16

S1

WABAG

10M35/MON/LAB/005-1

Operation and Maintenance Of 100 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of February - 2016

Date	21-06-2015
Rev	1

Date	Sea Water Quality												
	pH	TDS mg/l	Turbidity NTU	TSS mg/l	FRC mg/l	Temp °C	Total Hardness mg/l	Chloride mg/l	Total Alkalinity mg/l	Iron mg/l	Boron mg/l	Sulphate mg/l
01 February 2016	8.12	34200	2.65	16	0.6	27.6	7220	18144	118	0.03	3.45	2220
02 February 2016	8.12	34300	2.60	16	0.5	27.7	7232	18194	119	0.03	3.46	2224
03 February 2016	8.11	34500	2.00	14	0.5	27.4	7242	18344	120	0.03	3.47	2240
04 February 2016	8.11	34600	2.50	15	0.5	27.3	7254	18494	120	0.03	3.48	2252
05 February 2016	8.12	34600	2.60	16	0.5	27.5	7256	18494	120	0.03	3.48	2251
06 February 2016	8.12	34900	2.00	14	0.5	27.5	7284	18944	122	0.03	3.52	2286
07 February 2016	8.12	34900	2.00	14	0.5	27.7	7286	18944	123	0.03	3.51	2284
08 February 2016	8.11	35000	2.00	14	0.5	27.4	7298	18994	123	0.03	3.52	2296
09 February 2016	8.11	35300	2.00	14	0.5	27.3	7320	19244	123	0.03	3.53	2321
10 February 2016	8.11	35600	2.00	14	0.5	27.5	7354	19544	124	0.03	3.54	2358
11 February 2016	8.11	35800	3.30	19	0.5	27.6	7375	19744	123	0.03	3.55	2372
12 February 2016	8.12	36000	2.60	16	0.5	27.7	7400	19994	125	0.03	3.57	2397
13 February 2016	8.12	35900	1.50	12	0.5	27.5	7380	19894	124	0.03	3.55	2380
14 February 2016	8.12	35900	2.00	14	0.5	27.7	7378	19894	124	0.03	3.55	2377
15 February 2016	8.11	36000	1.50	12	0.5	27.9	7402	19994	125	0.03	3.57	2399
16 February 2016	8.11	36000	1.90	14	0.5	28.0	7400	19994	125	0.03	3.57	2400
17 February 2016	8.12	35900	3.00	18	0.5	28.2	7378	19894	124	0.03	3.55	2379
18 February 2016	8.11	36000	2.60	16	0.5	28.1	7402	19994	125	0.03	3.57	2401
19 February 2016	8.11	35900	4.00	20	0.5	28.1	7380	19894	124	0.03	3.55	2380
20 February 2016	8.11	36000	4.70	22	0.5	28.0	7401	19994	125	0.03	3.57	2401
21 February 2016	8.11	36000	5.40	23	0.5	28.2	7399	19994	125	0.03	3.57	2400
22 February 2016	8.11	36000	2.30	15	0.5	28.1	7400	19994	125	0.03	3.57	2401
23 February 2016	8.11	35900	2.20	14	0.5	28.0	7380	19894	124	0.03	3.55	2380
24 February 2016	8.11	36000	2.00	14	0.5	28.3	7398	19994	125	0.03	3.57	2400
25 February 2016	8.11	36000	1.50	12	0.5	28.2	7400	19994	125	0.03	3.57	2401
26 February 2016	8.11	36000	1.90	13	0.5	28.6	7402	19994	125	0.03	3.57	2400
27 February 2016	8.11	36000	2.20	14	0.5	28.8	7400	19994	125	0.03	3.57	2401
28 February 2016	8.11	35900	2.00	14	0.5	28.3	7380	19894	124	0.03	3.55	2384
29 February 2016	8.11	36000	2.00	14	0.5	28.6	7400	19994	125	0.03	3.57	2402
Average	8.11	35555	2.45	15	0.50	27.89	7352	19530	123	0.03	3.54	2351
Maximum	8.12	36000	5.40	23	0.60	28.80	7402	19994	125	0.03	3.57	2402
Minimum	8.11	34200	1.50	12	0.50	27.30	7220	18144	118	0.03	3.45	2220

	For Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha	
SING				
DD/MM/YYYY	02/03/2016	02/03/2016	02/03/2016	

WABAG

10M35/MON/LAB/005-1

Operation and Maintenance Of 100 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of March - 2016

Date	21-06-2015
Rev	1

Date	Sea Water Quality											
	pH	TDS	Turbidity	TSS	FRC	Temp	Total Hardness	Chloride	Total Alkalinity	Iron	Boron	Sulphate
		mg/l	NTU	mg/l	mg/l	°C	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
01 March 2016	8.11	36200	1.20	12	0.5	28.8	7420	20094	122	0.03	3.52	2408
02 March 2016	8.11	36200	1.20	12	0.5	28.8	7418	20094	121	0.03	3.52	2410
03 March 2016	8.11	36200	1.60	14	0.5	29.0	7420	20094	122	0.03	3.51	2410
04 March 2016	8.11	36300	1.80	14	0.5	29.2	7428	20193	123	0.03	3.53	2418
05 March 2016	8.12	36500	2.00	16	0.5	29.0	7446	20443	125	0.03	3.55	2430
06 March 2016	8.12	36500	1.90	15	0.5	28.8	7450	20443	124	0.03	3.54	2430
07 March 2016	8.12	36600	1.90	15	0.5	28.9	7458	20493	125	0.03	3.56	2450
08 March 2016	8.12	36600	4.00	22	0.5	28.8	7460	20493	125	0.03	3.55	2450
09 March 2016	8.12	36600	2.00	16	0.5	28.8	7460	20493	124	0.03	3.56	2450
10 March 2016	8.12	36600	2.50	17	0.5	28.8	7460	20493	125	0.03	3.56	2450
11 March 2016	8.12	36600	2.20	16	0.5	28.6	7460	20493	125	0.03	3.55	2450
12 March 2016	8.12	36700	2.20	16	0.5	29.1	7468	20594	126	0.03	3.57	2460
13 March 2016	8.12	36700	2.10	16	0.5	29.0	7470	20594	125	0.03	3.56	2460
14 March 2016	8.13	36700	3.00	18	0.5	28.9	7469	20594	126	0.03	3.57	2458
15 March 2016	8.12	36800	2.00	16	0.5	28.8	7478	20644	126	0.03	3.58	2467
16 March 2016	8.12	36800	1.50	14	0.5	28.8	7480	20644	125	0.03	3.58	2470
17 March 2016	8.12	36800	1.40	14	0.5	28.7	7478	20644	126	0.03	3.59	2468
18 March 2016	8.12	36800	1.80	15	0.5	28.7	7479	20644	125	0.03	3.58	2467
19 March 2016	8.12	36800	3.00	18	0.5	28.8	7478	20644	126	0.03	3.59	2467
20 March 2016	8.12	36800	2.20	16	0.5	29.0	7480	20644	126	0.03	3.58	2468
21 March 2016	8.12	36800	2.40	16	0.5	28.9	7481	20644	126	0.03	3.58	2469
22 March 2016	8.12	36800	2.00	16	0.5	28.9	7482	20644	125	0.03	3.59	2468
23 March 2016	8.12	36800	1.50	14	0.5	28.8	7481	20644	126	0.03	3.58	2470
24 March 2016	8.12	36800	2.00	16	0.5	28.8	7480	20644	126	0.03	3.58	2468
25 March 2016	8.12	36800	2.00	16	0.5	28.9	7480	20644	126	0.03	3.59	2468
26 March 2016	8.12	36800	2.00	16	0.5	28.8	7480	20644	126	0.03	3.58	2470
27 March 2016	8.12	36800	2.00	16	0.5	28.9	7480	20644	126	0.03	3.59	2468
28 March 2016	8.12	36800	2.00	16	0.5	28.8	7480	20644	126	0.03	3.58	2470
29 March 2016	8.12	36800	2.00	16	0.5	28.9	7480	20644	126	0.03	3.58	2468
30 March 2016	8.12	36700	1.50	14	0.5	28.6	7470	20594	125	0.03	3.56	2456
31 March 2016	8.12	36700	2.00	16	0.5	28.7	7470	20594	125	0.03	3.56	2460
Average	**8.12**	**36658**	**2.03**	**16**	**0.5**	**28.85**	**7465**	**20531**	**125**	**0.03**	**3.57**	**2454**
Maximum	**8.13**	**36800**	**4.00**	**22**	**0.5**	**29.20**	**7482**	**20644**	**126**	**0.03**	**3.59**	**2470**
Minimum	**8.11**	**36200**	**1.20**	**12**	**0.5**	**28.60**	**7418**	**20094**	**121**	**0.03**	**3.51**	**2408**

	Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha	
SING				
DD/MM/YYYY	04/04/2016	04/04/2016	04/04/2016	

WABAG

10M35/MON/LAB/005-1

Operation and Maintenance Of 100 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of April - 2016

Date	21-06-2015
Rev	1

Date	Sea Water Quality											
	pH	TDS mg/l	Turbidity NTU	TSS mg/l	FRC mg/l	Temp °C	Total Hardness mg/l	Chloride mg/l	Total Alkalinity mg/l	Iron mg/l	Boron mg/l	Sulphate mg/l
01 April 2016	8.12	36700	2.00	16	0.5	28.9	7472	20594	125	0.03	3.56	2460
02 April 2016	8.12	36700	2.40	19	0.5	28.7	7470	20594	125	0.03	3.56	2462
03 April 2016	8.12	36800	2.50	20	0.5	28.8	7481	20644	125	0.03	3.58	2470
04 April 2016	8.12	36800	2.20	17	0.5	28.8	7480	20644	125	0.03	3.58	2473
05 April 2016	8.12	36800	4.00	30	0.5	28.4	7483	20644	125	0.03	3.58	2470
06 April 2016	8.12	36800	3.00	26	0.5	28.8	7480	20644	125	0.03	3.58	2472
07 April 2016	8.12	36800	4.00	30	0.5	28.8	7482	20644	125	0.03	3.58	2470
08 April 2016	8.12	36800	3.10	26	0.5	29.0	7480	20644	125	0.03	3.58	2471
09 April 2016	8.12	36800	2.50	20	0.5	28.8	7480	20644	125	0.03	3.58	2470
10 April 2016	8.13	36800	3.00	26	0.5	29.0	7481	20644	125	0.03	3.58	2472
11 April 2016	8.13	36900	2.50	20	0.5	29.1	7486	20693	126	0.03	3.58	2480
12 April 2016	8.12	36900	2.40	19	0.5	29.0	7488	20693	126	0.03	3.59	2482
13 April 2016	8.12	36900	6.50	37	0.5	28.9	7486	20693	125	0.03	3.58	2481
14 April 2016	8.12	36800	8.90	42	0.5	28.9	7480	20644	125	0.03	3.58	2470
15 April 2016	8.12	36900	3.00	26	0.5	28.8	7486	20693	126	0.03	3.59	2482
16 April 2016	8.12	36900	9.80	44	0.5	28.8	7489	20693	126	0.03	3.58	2480
17 April 2016	8.12	36800	4.10	30	0.5	29.4	7480	20644	125	0.03	3.58	2470
18 April 2016	8.12	36800	3.40	27	0.5	28.9	7483	20644	125	0.03	3.58	2470
19 April 2016	8.12	36900	2.90	25	0.5	29.2	7489	20693	126	0.03	3.58	2480
20 April 2016	8.12	36800	3.00	26	0.5	28.9	7481	20644	125	0.03	3.58	2470
21 April 2016	8.12	36900	3.10	26	0.5	28.8	7489	20693	126	0.03	3.58	2480
22 April 2016	8.12	36900	4.20	31	0.5	29.2	7489	20693	126	0.03	3.58	2481
23 April 2016	8.12	36900	3.50	28	0.5	29.0	7489	20693	126	0.03	3.58	2480
24 April 2016	8.12	37000	4.50	32	0.5	29.2	7500	20744	126	0.03	3.59	2484
25 April 2016	8.12	37000	5.20	34	0.5	29.2	7500	20744	126	0.03	3.59	2497
26 April 2016	8.12	37000	4.20	31	0.5	29.1	7500	20744	126	0.03	3.59	2497
27 April 2016	8.12	37000	4.00	30	0.5	29.0	7500	20744	126	0.03	3.59	2497
28 April 2016	8.12	37000	4.00	30	0.5	29.0	7500	20744	126	0.03	3.59	2497
29 April 2016	8.12	37000	3.10	26	0.5	28.9	7500	20744	126	0.03	3.58	2480
30 April 2016	8.12	36900	3.50	28	0.5	29.0	7489	20693	126	0.03	3.58	2478
Average	**8.12**	**36867**	**3.82**	**27**	**0.5**	**28.94**	**7486**	**20677**	**126**	**0.03**	**3.59**	**2497**
Maximum	**8.13**	**37000**	**9.80**	**44**	**0.5**	**29.40**	**7500**	**20744**	**126**	**0.03**	**3.56**	**2460**
Minimum	**8.12**	**36700**	**2.00**	**16**	**0.5**	**28.40**	**7470**	**20594**	**125**	**0.03**		

	Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha	
SING				
DD/MM/YYYY	03/05/2016	03/05/2016	03/05/2016	

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10M35/MON/LAB/005-1

Operation and Maintenance Of 109 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of May - 2016

Date	21-06-2015
Rev	1

Date	Sea Water Quality											
	pH	TDS mg/l	Turbidity NTU	TSS mg/l	FRC mg/l	Temp °C	Total Hardness mg/l	Chloride mg/l	Total Alkalinity mg/l	Iron mg/l	Boron mg/l	Sulphate mg/l
01 May 2016	8.12	37000	3.20	26	0.5	29.2	7492	20744	126	0.03	3.59	2483
02 May 2016	8.13	37000	7.10	38	0.5	29.0	7490	20744	126	0.03	3.59	2482
03 May 2016	8.12	37000	8.10	42	0.5	29.1	7492	20744	126	0.03	3.59	2483
04 May 2016	8.12	37000	8.60	44	0.5	29.0	7491	20744	126	0.03	3.59	2480
05 May 2016	8.12	37100	7.00	38	0.5	28.9	7498	20793	126	0.03	3.60	2489
06 May 2016	8.12	37000	8.50	44	0.5	29.0	7492	20744	126	0.03	3.59	2483
07 May 2016	8.12	37000	5.50	36	0.5	28.8	7492	20744	126	0.03	3.59	2483
08 May 2016	8.12	37000	7.50	40	0.5	29.3	7492	20744	126	0.03	3.59	2482
09 May 2016	8.12	37000	5.50	36	0.5	29.0	7491	20744	126	0.03	3.59	2483
10 May 2016	8.13	37000	7.50	40	0.5	29.3	7492	20744	126	0.03	3.59	2483
11 May 2016	8.12	37000	4.00	30	0.5	29.0	7491	20744	126	0.03	3.59	2480
12 May 2016	8.12	37100	8.10	42	0.5	29.2	7499	20793	125	0.03	3.60	2492
13 May 2016	8.12	37100	12.50	55	0.5	29.0	7498	20793	126	0.03	3.60	2491
14 May 2016	8.12	37000	10.30	48	0.5	29.0	7492	20744	126	0.03	3.59	2480
15 May 2016	8.12	37000	8.60	44	0.5	29.1	7491	20744	126	0.03	3.59	2482
16 May 2016	8.12	37000	31.00	128	0.5	29.6	7492	20744	126	0.03	3.59	2483
17 May 2016	8.12	37000	48.00	176	0.5	29.2	7491	20744	126	0.03	3.59	2483
18 May 2016	8.12	36900	43.00	160	0.5	28.7	7481	20744	125	0.03	3.57	2470
19 May 2016	8.12	37000	33.00	132	0.5	28.2	7492	20744	126	0.03	3.59	2483
20 May 2016	8.12	37000	44.00	164	0.5	28.5	7490	20744	126	0.03	3.59	2482
21 May 2016	8.12	37000	41.00	152	0.5	29.0	7492	20744	126	0.03	3.59	2483
22 May 2016	8.12	37000	40.00	148	0.5	29.0	7490	20744	126	0.03	3.59	2480
23 May 2016	8.12	37100	42.50	154	0.5	28.7	7498	20793	126	0.03	3.60	2491
24 May 2016	8.12	37000	32.90	131	0.5	29.0	7490	20744	126	0.03	3.59	2480
25 May 2016	8.12	37100	33.00	132	0.5	29.2	7498	20793	126	0.03	3.60	2491
26 May 2016	8.12	37100	40.40	149	0.5	29.2	7498	20793	126	0.03	3.60	2491
27 May 2016	8.12	37000	50.00	182	0.5	29.0	7490	20744	126	0.03	3.59	2480
28 May 2016	8.12	37000	31.30	129	0.5	28.9	7490	20744	126	0.03	3.59	2480
29 May 2016	8.12	37000	33.00	132	0.5	29.0	7490	20744	126	0.03	3.59	2480
30 May 2016	8.12	37100	31.00	128	0.5	29.2	7498	20793	126	0.03	3.60	2491
31 May 2016	8.12	37100	32.00	130	0.5	29.1	7498	20793	126	0.03	3.60	2491
Average	**8.12**	**37023**	**23.16**	**95**	**0.5**	**29.01**	**7493**	**20757**	**126**	**0.03**	**3.59**	**2484**
Maximum	**8.13**	**37100**	**50.00**	**182**	**0.5**	**29.60**	**7499**	**20793**	**126**	**0.03**	**3.60**	**2492**
Minimum	**8.12**	**36900**	**3.20**	**26**	**0.5**	**28.20**	**7481**	**20744**	**125**	**0.03**	**3.57**	**2470**

	Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	V.Madhayan Unni	K.Syed Amir Basha	
SING				
DD/MM/YYYY	02/06/2016	02/06/2016	02/06/2016	

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10M35/MON/LAB/005-1

Operation and Maintenance Of 100 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of June - 2016

Date	21-06-2015
Rev	1

Date	Sea Water Quality											
	pH	TDS mg/l	Turbidity NTU	TSS mg/l	FRC mg/l	Temp °C	Total Hardness mg/l	Chloride mg/l	Total Alkalinity mg/l	Iron mg/l	Boron mg/l	Sulphate mg/l
01 June 2016	8.12	37000	13.00	46	0.5	29.2	7490	20694	124	0.03	3.58	2481
02 June 2016	8.12	37100	17.30	60	0.5	28.8	7494	20744	125	0.03	3.59	2485
03 June 2016	8.12	37100	12.00	42	0.5	29.0	7494	20744	125	0.03	3.59	2484
04 June 2016	8.12	37000	26.00	96	0.5	29.2	7491	20694	123	0.03	3.57	2480
05 June 2016	8.13	37100	11.00	40	0.5	29.3	7493	20744	125	0.03	3.58	2485
06 June 2016	8.13	37200	5.20	27	0.5	29.1	7497	20793	126	0.03	3.60	2491
07 June 2016	8.12	37200	30.00	126	0.5	28.8	7498	20793	126	0.03	3.60	2491
08 June 2016	8.12	37100	79.00	284	0.5	28.9	7494	20744	125	0.03	3.58	2485
09 June 2016	8.12	37100	160.00	586	0.5	28.9	7495	20744	125	0.03	3.57	2485
10 June 2016	8.13	37100	86.00	306	0.5	29.2	7494	20744	124	0.03	3.58	2485
11 June 2016	8.13	37100	76.00	272	0.5	29.2	7494	20744	125	0.03	3.57	2485
12 June 2016	8.12	37100	100.00	358	0.5	28.9	7494	20744	125	0.03	3.58	2485
13 June 2016	8.13	37100	64.00	226	0.5	29.2	7495	20744	126	0.03	3.57	2485
14 June 2016	8.13	37100	32.00	130	0.5	28.8	7494	20744	126	0.03	3.58	2485
15 June 2016	8.12	37200	42.00	152	0.5	28.7	7497	20793	126	0.03	3.59	2491
16 June 2016	8.12	37100	21.00	74	0.5	29.6	7495	20744	126	0.03	3.57	2491
17 June 2016	8.12	37200	11.00	40	0.5	29.1	7497	20793	126	0.03	3.60	2490
18 June 2016	8.12	37200	6.60	34	0.5	29.1	7498	20793	126	0.03	3.60	2491
19 June 2016	8.12	37200	5.00	26	0.5	29.1	7498	20793	126	0.03	3.59	2490
20 June 2016	8.12	37300	5.00	26	0.5	29.2	7497	20843	126	0.03	3.60	2491
21 June 2016	8.12	37200	2.10	16	0.5	28.8	7498	20793	126	0.03	3.60	2491
22 June 2016	8.12	37200	2.00	16	0.5	28.6	7498	20793	126	0.03	3.59	2490
23 June 2016	8.12	37200	6.00	30	0.5	28.6	7497	20793	126	0.03	3.60	2491
24 June 2016	8.12	37200	2.50	20	0.5	28.6	7498	20793	126	0.03	3.59	2490
25 June 2016	8.12	37200	6.50	34	0.5	28.6	7498	20793	126	0.03	3.60	2491
26 June 2016	8.12	37200	2.50	20	0.5	28.6	7497	20793	126	0.03	3.59	2490
27 June 2016	8.12	37200	2.00	16	0.5	28.6	7498	20793	126	0.03	3.60	2491
28 June 2016	8.12	37200	2.00	16	0.5	28.6	7498	20793	126	0.03	3.60	2491
29 June 2016	8.12	37200	20.00	72	0.5	28.5	7498	20793	126	0.03	3.60	2491
30 June 2016	8.12	37100	46.00	168	0.5	28.5	7493	20744	125	0.03	3.58	2485
Average	**8.12**	**37150**	**29.79**	**112**	**0.5**	**28.91**	**7496**	**20768**	**126**	**0.03**	**3.59**	**2488**
Maximum	**8.13**	**37300**	**160.00**	**586**	**0.5**	**29.60**	**7498**	**20843**	**126**	**0.03**	**3.60**	**2491**
Minimum	**8.12**	**37000**	**2.00**	**16**	**0.5**	**28.50**	**7490**	**20694**	**123**	**0.03**	**3.57**	**2480**

	Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha	
SING				
DD/MM/YYYY	01/07/2016	01/07/2016	01/07/2016	

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10M35/MON/LAB/005-1

Operation and Maintenance Of 100 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of July - 2016

Date	21-06-2015
Rev	1

Date	Sea Water Quality											
	pH	TDS mg/l	Turbidity NTU	TSS mg/l	FRC mg/l	Temperature °C	Total Hardness mg/l	Chloride mg/l	Total Alkalinity mg/l	Iron mg/l	Boron mg/l	Sulphate mg/l
01 July 2016	8.12	37100	33.00	117	0.5	28.7	7490	20744	125	0.03	3.57	2482
02 July 2016	8.12	37200	28.00	102	0.5	28.7	7498	20793	126	0.03	3.60	2490
03 July 2016	8.12	37100	7.50	36	0.5	29.0	7491	20744	125	0.03	3.57	2483
04 July 2016	8.12	37100	6.30	30	0.5	29.0	7493	20744	125	0.03	3.58	2482
05 July 2016	8.12	37100	5.00	24	0.5	28.6	7490	20744	125	0.03	3.58	2484
06 July 2016	8.12	37200	5.80	28	0.5	28.6	7497	20793	126	0.03	3.59	2492
07 July 2016	8.12	37100	5.80	28	0.5	28.6	7491	20744	125	0.03	3.58	2483
08 July 2016	8.12	37100	7.00	33	0.5	28.4	7490	20744	125	0.03	3.57	2482
09 July 2016	8.12	37100	6.20	30	0.5	28.9	7493	20744	125	0.03	3.58	2481
10 July 2016	8.12	37200	2.90	20	0.5	28.8	7498	20793	126	0.03	3.60	2491
11 July 2016	8.12	37200	8.00	38	0.5	28.9	7497	20793	126	0.03	3.60	2494
12 July 2016	8.12	37100	7.60	36	0.5	28.8	7490	20744	125	0.03	3.58	2485
13 July 2016	8.12	37100	5.50	26	0.5	28.6	7490	20744	125	0.03	3.57	2482
14 July 2016	8.12	37100	54.00	202	0.5	28.8	7493	20744	125	0.03	3.58	2483
15 July 2016	8.12	37200	58.00	215	0.5	28.8	7497	20793	126	0.03	3.59	2491
16 July 2016	8.12	37200	49.00	194	0.5	28.8	7497	20793	126	0.03	3.60	2494
17 July 2016	8.12	37200	35.00	136	0.5	28.8	7497	20793	126	0.03	3.60	2494
18 July 2016	8.12	37200	7.30	34	0.5	28.8	7497	20793	126	0.03	3.60	2494
19 July 2016	8.12	37100	8.00	38	0.5	28.8	7490	20744	125	0.03	3.57	2482
20 July 2016	8.12	37000	5.70	28	0.5	28.8	7482	20693	124	0.03	3.55	2476
21 July 2016	8.12	37000	5.20	26	0.5	28.7	7483	20693	124	0.03	3.54	2478
22 July 2016	8.12	37200	6.80	32	0.5	28.6	7497	20793	126	0.03	3.60	2494
23 July 2016	8.12	37100	8.00	38	0.5	28.6	7490	20744	125	0.03	3.57	2482
24 July 2016	8.12	37200	7.70	36	0.5	29.0	7497	20793	126	0.03	3.60	2494
25 July 2016	8.12	37300	6.00	30	0.5	28.9	7499	20793	126	0.03	3.60	2498
26 July 2016	8.12	37100	6.80	32	0.5	28.8	7490	20744	125	0.03	3.57	2482
27 July 2016	8.12	37100	25.00	96	0.5	28.8	7490	20744	125	0.03	3.57	2482
28 July 2016	8.12	37100	25.50	98	0.5	28.6	7490	20744	125	0.03	3.57	2482
29 July 2016	8.12	37100	35.00	130	0.5	28.8	7490	20744	125	0.03	3.57	2482
30 July 2016	8.12	37200	19.00	62	0.5	28.8	7497	20793	126	0.03	3.60	2494
31 July 2016	8.12	37200	28.00	102	0.5	28.9	7497	20793	126	0.03	3.60	2494
Average	**8.12**	**37139**	**16.73**	**67**	**0.5**	**28.76**	**7493**	**20761**	**125**	**0.03**	**3.58**	**2487**
Maximum	**8.12**	**37300**	**58.00**	**215**	**0.5**	**29.00**	**7499**	**20793**	**126**	**0.03**	**3.60**	**2498**
Minimum	**8.12**	**37000**	**2.90**	**20**	**0.5**	**28.40**	**7482**	**20693**	**124**	**0.03**	**3.54**	**2476**

	Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha	
SING				
DD/MM/YYYY	03/08/2016	03/08/2016	03/08/2016	8/8/16 Asst Nemmeli

WABAG

10M35/MON/LAB/005-1

Operation and Maintenance Of 100 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of August - 2016

Date	21-06-2015
Rev No	1

Date	Sea Water Quality											
	pH	TDS mg/l	Turbidity NTU	TSS mg/l	FRC mg/l	Temperature °C	Total Hardness mg/l	Chloride mg/l	Total Alkalinity mg/l	Iron mg/l	Boron mg/l	Sulphate mg/l
01 August 2016	8.12	37100	9.00	37	0.5	28.8	7490	20744	124	0.03	3.57	2482
02 August 2016	8.12	37200	5.00	23	0.5	28.8	7497	20793	126	0.03	3.59	2492
03 August 2016	8.12	37100	8.80	36	0.5	28.8	7491	20744	125	0.03	3.56	2483
04 August 2016	8.12	37100	5.60	27	0.5	28.9	7493	20744	124	0.03	3.57	2480
05 August 2016	8.12	37100	5.00	23	0.5	29.1	7490	20744	125	0.03	3.58	2484
06 August 2016	8.12	37200	11.50	42	0.5	29.1	7497	20793	126	0.03	3.59	2492
07 August 2016	8.12	37100	9.50	38	0.5	29.1	7491	20744	125	0.03	3.58	2483
08 August 2016	8.12	37100	11.60	42	0.5	29.0	7490	20744	124	0.03	3.57	2482
09 August 2016	8.12	37100	13.00	46	0.5	28.9	7493	20744	125	0.03	3.56	2481
10 August 2016	8.12	37200	5.10	24	0.5	29.0	7498	20793	126	0.03	3.60	2491
11 August 2016	8.12	37200	13.10	46	0.5	28.9	7498	20793	126	0.03	3.60	2491
12 August 2016	8.11	37100	15.60	54	0.5	28.9	7490	20744	125	0.03	3.57	2482
13 August 2016	8.11	37100	6.00	28	0.5	29.0	7490	20744	124	0.03	3.57	2480
14 August 2016	8.11	37100	16.00	55	0.5	29.0	7490	20744	125	0.03	3.58	2482
15 August 2016	8.12	37100	17.50	60	0.5	29.0	7490	20744	124	0.03	3.56	2482
16 August 2016	8.12	37200	12.00	43	0.5	28.9	7498	20793	126	0.03	3.60	2491
17 August 2016	8.12	37100	8.00	34	0.5	29.0	7490	20744	125	0.03	3.57	2482
18 August 2016	8.12	37100	7.00	32	0.5	29.0	7490	20744	124	0.03	3.57	2480
19 August 2016	8.12	37200	11.50	42	0.5	29.2	7498	20793	126	0.03	3.60	2491
20 August 2016	8.12	37200	2.80	15	0.5	29.3	7498	20793	126	0.03	3.60	2491
21 August 2016	8.12	37200	3.00	16	0.5	29.3	7498	20793	126	0.03	3.59	2491
22 August 2016	8.12	37200	19.50	70	0.5	29.2	7498	20793	126	0.03	3.60	2491
23 August 2016	8.12	37100	5.10	21	0.5	28.8	7490	20744	125	0.03	3.57	2482
24 August 2016	8.12	37200	5.30	22	0.5	28.9	7498	20793	126	0.03	3.60	2491
25 August 2016	8.12	37200	15.60	54	0.5	28.8	7498	20793	126	0.03	3.59	2490
26 August 2016	8.12	37100	6.20	30	0.5	28.8	7490	20744	125	0.03	3.57	2482
27 August 2016	8.12	37100	3.60	19	0.5	28.4	7490	20744	125	0.03	3.56	2480
28 August 2016	8.11	37100	6.00	28	0.5	28.9	7490	20744	124	0.03	3.57	2482
29 August 2016	8.11	37200	2.70	16	0.5	28.8	7498	20793	126	0.03	3.59	2490
30 August 2016	8.11	37100	5.00	23	0.5	28.7	7490	20744	124	0.03	3.57	2480
31 August 2016	8.11	37100	4.00	20	0.5	28.5	7490	20744	125	0.03	3.57	2482
Average	**8.12**	**37139**	**8.70**	**34**	**0.5**	**28.93**	**7493**	**20763**	**125**	**0.03**	**3.58**	**2485**
Maximum	**8.12**	**37200**	**19.50**	**70**	**0.5**	**29.30**	**7498**	**20793**	**126**	**0.03**	**3.60**	**2492**
Minimum	**8.11**	**37100**	**2.70**	**15**	**0.5**	**28.40**	**7490**	**20744**	**124**	**0.03**	**3.56**	**2480**

	Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha	
SING				
DD/MM/YYYY	02/09/2016	02/09/2016	02/09/2016	

WABAG

10M35/MON/LAB/005-1

Operation and Maintenance Of 100 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of September - 2016

Date	21-06-2015
Rev No	1

Date	Sea Water Quality											
	pH	TDS mg/l	Turbidity NTU	TSS mg/l	FRC mg/l	Temperature °C	Total Hardness mg/l	Chloride mg/l	Total Alkalinity mg/l	Iron mg/l	Boron mg/l	Sulphate mg/l
01 September 2016	8.12	37100	8.00	29	0.5	28.8	7490	20744	124	0.03	3.55	2484
02 September 2016	8.12	37100	34.00	130	0.5	28.7	7490	20744	125	0.03	3.56	2482
03 September 2016	8.12	37100	61.00	214	0.5	28.8	7490	20744	125	0.03	3.54	2484
04 September 2016	8.11	37100	26.00	98	0.5	28.4	7490	20744	124	0.03	3.53	2482
05 September 2016	8.12	37100	17.00	60	0.5	29.0	7490	20744	125	0.03	3.55	2484
06 September 2016	8.12	37100	7.00	26	0.5	29.0	7490	20744	124	0.03	3.56	2480
07 September 2016	Intake chamber cleaning							SHUTDOWN				
08 September 2016	8.11	37100	12.00	42	0.5	28.4	7490	20744	124	0.03	3.56	2484
09 September 2016	8.11	37100	8.00	29	0.5	29.2	7490	20744	125	0.03	3.55	2482
10 September 2016	8.12	37100	6.30	25	0.5	28.8	7490	20744	124	0.03	3.54	2484
11 September 2016	8.11	37100	7.00	26	0.5	28.8	7490	20744	125	0.03	3.53	2480
12 September 2016	8.11	37100	4.20	20	0.5	28.7	7490	20744	124	0.03	3.54	2484
13 September 2016	8.11	37100	8.10	30	0.5	28.8	7490	20744	125	0.03	3.55	2480
14 September 2016	8.11	37000	2.50	16	0.5	28.7	7480	20694	120	0.03	3.54	2472
15 September 2016	8.11	37000	2.60	16	0.5	28.8	7480	20694	122	0.03	3.53	2470
16 September 2016	8.12	37000	43.00	152	0.5	28.9	7480	20694	120	0.03	3.52	2472
17 September 2016	8.11	37000	40.00	142	0.5	28.8	7480	20694	122	0.03	3.54	2470
18 September 2016	8.11	37000	25.00	94	0.5	28.9	7480	20694	120	0.03	3.52	2472
19 September 2016	8.12	37200	10.00	39	0.5	29.0	7498	20793	126	0.03	3.59	2491
20 September 2016	8.12	37100	17.00	64	0.5	28.9	7490	20744	125	0.03	3.55	2484
21 September 2016	8.11	37100	7.00	26	0.5	28.8	7490	20744	125	0.03	3.54	2480
22 September 2016	8.11	37000	6.00	24	0.5	28.9	7480	20694	122	0.03	3.52	2472
23 September 2016	8.11	37000	2.50	16	0.5	29.0	7480	20694	120	0.03	3.51	2470
24 September 2016	8.11	37100	15.00	56	0.5	29.0	7490	20744	125	0.03	3.54	2484
25 September 2016	8.12	37200	35.00	132	0.5	28.9	7498	20793	126	0.03	3.57	2491
26 September 2016	8.11	37100	22.00	92	0.5	28.9	7490	20744	125	0.03	3.55	2484
27 September 2016	8.11	37000	36.40	135	0.5	28.8	7480	20694	120	0.03	3.51	2470
28 September 2016	8.11	37000	36.00	134	0.5	28.8	7480	20694	120	0.03	3.51	2470
29 September 2016	8.11	37000	37.00	138	0.5	28.9	7480	20694	120	0.03	3.51	2470
30 September 2016	8.11	37000	31.00	121	0.5	28.7	7480	20694	120	0.03	3.51	2470
Average	8.11	37069	19.54	73	0.5	28.83	7487	20728	123	0.03	3.54	2479
Maximum	8.12	37200	61.00	214	0.5	29.20	7498	20793	126	0.03	3.59	2491
Minimum	8.11	37000	2.50	16	0.5	28.40	7480	20694	120	0.03	3.51	2470

	Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha	
SING				
DD/MM/YYYY	03/10/2016	03/10/2016	03/10/2016	

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Operation and Maintenance Of 100 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of October - 2016

Date	21-06-2015
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Date	Sea Water Quality											
	pH	TDS mg/l	Turbidity NTU	TSS mg/l	FRC mg/l	Temperature °C	Total Hardness mg/l	Chloride mg/l	Total Alkalinity mg/l	Iron mg/l	Boron mg/l	Sulphate mg/l
01 October 2016	8.11	37000	40.00	142	0.5	28.7	7480	20694	120	0.03	3.54	2470
02 October 2016	8.11	37000	33.00	120	0.5	28.8	7480	20694	120	0.03	3.54	2472
03 October 2016	8.11	37100	29.00	96	0.5	29.0	7490	20744	122	0.03	3.54	2484
04 October 2016	8.11	37100	20.00	70	0.5	29.0	7490	20744	124	0.03	3.53	2482
05 October 2016	8.11	37100	8.00	32	0.5	29.1	7490	20744	122	0.03	3.55	2484
06 October 2016	8.11	37100	6.00	24	0.5	29.0	7490	20744	124	0.03	3.56	2480
07 October 2016	8.11	37100	4.00	20	0.5	28.9	7490	20744	122	0.03	3.56	2480
08 October 2016	8.11	37100	6.50	27	0.5	28.9	7490	20744	124	0.03	3.56	2480
09 October 2016	8.11	37000	9.00	36	0.5	28.8	7480	20694	120	0.03	3.54	2472
10 October 2016	8.11	37000	2.50	16	0.5	28.9	7480	20694	120	0.03	3.54	2470
11 October 2016	8.11	37000	3.80	18	0.5	28.8	7480	20694	120	0.03	3.54	2470
12 October 2016	8.11	37000	6.40	26	0.5	29.0	7480	20694	120	0.03	3.54	2472
13 October 2016	8.10	37000	6.30	25	0.5	29.0	7480	20694	120	0.03	3.54	2472
14 October 2016	8.11	37000	4.00	20	0.5	28.9	7480	20694	120	0.03	3.54	2470
15 October 2016	8.11	37000	3.00	18	0.5	29.0	7480	20694	120	0.03	3.54	2472
16 October 2016	8.11	36900	2.00	14	0.5	28.8	7470	20644	118	0.03	3.52	2466
17 October 2016	8.11	36800	1.90	14	0.5	28.8	7460	20594	118	0.03	3.51	2462
18 October 2016	8.11	36700	4.50	20	0.5	29.0	7450	20544	118	0.03	3.51	2454
19 October 2016	8.11	36700	2.20	16	0.5	28.9	7450	20544	118	0.03	3.50	2452
20 October 2016	8.10	36700	3.10	18	0.5	29.0	7440	20527	118	0.03	3.50	2444
21 October 2016	8.10	36600	3.00	18	0.5	29.1	7440	20527	118	0.03	3.49	2440
22 October 2016	8.10	36600	6.00	24	0.5	28.9	7430	20494	118	0.03	3.48	2432
23 October 2016	8.11	36600	5.50	22	0.5	28.9	7430	20494	118	0.03	3.48	2432
24 October 2016	8.11	36600	4.00	20	0.5	28.8	7430	20494	118	0.03	3.48	2432
25 October 2016	8.11	36600	3.00	18	0.5	29.0	7430	20494	118	0.03	3.48	2432
26 October 2016	8.10	36600	2.00	15	0.5	29.0	7430	20494	118	0.03	3.48	2432
27 October 2016	8.10	36500	3.10	18	0.5	29.0	7420	20394	118	0.03	3.47	2424
28 October 2016	8.11	36500	5.10	22	0.5	28.8	7420	20394	118	0.03	3.47	2426
29 October 2016	8.11	36500	5.00	22	0.5	28.9	7420	20394	118	0.03	3.47	2426
30 October 2016	8.11	36500	4.00	20	0.5	28.8	7420	20394	118	0.03	3.47	2426
31 October 2016	8.10	36500	3.90	19	0.5	28.8	7420	20394	118	0.03	3.47	2426
Average	**8.11**	**36823**	**7.74**	**32**	**0.5**	**28.91**	**7459**	**20598**	**120**	**0.03**	**3.51**	**2456**
Maximum	**8.11**	**37100**	**40.00**	**142**	**0.5**	**29.10**	**7490**	**20744**	**124**	**0.03**	**3.56**	**2484**
Minimum	**8.10**	**36500**	**1.90**	**14**	**0.5**	**28.70**	**7420**	**20394**	**118**	**0.03**	**3.47**	**2424**

	Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	~~V.Madhavan Unni~~	K.Syed Amir Basha	
SING		FOR G. RAJA		
DD/MM/YYYY	04/11/2016	04/11/2016	04/11/2016	

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Operation and Maintenance Of 100 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of November - 2016

Date	21-06-2015
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Date	Sea Water Quality											
	pH	TDS mg/l	Turbidity NTU	TSS mg/l	FRC mg/l	Temperature °C	Total Hardness mg/l	Chloride mg/l	Total Alkainity mg/l	Iron mg/l	Boron mg/l	Sulphate mg/l
01 November 2016	8.10	36400	3.00	18	0.5	28.9	7420	20344	120	0.03	3.50	2420
02 November 2016	8.10	36400	4.00	20	0.5	28.8	7420	20344	122	0.03	3.49	2421
03 November 2016	8.05	35900	3.80	19	0.5	28.8	7390	19894	120	0.03	3.48	2390
04 November 2016	8.06	35700	23.00	92	0.5	28.9	7370	19694	118	0.03	3.47	2368
05 November 2016	8.05	35000	22.00	86	0.5	28.9	7300	18994	118	0.03	3.48	2302
06 November 2016	8.05	34500	3.00	18	0.5	28.9	7250	18494	118	0.03	3.48	2250
07 November 2016	8.05	34600	7.00	26	0.5	28.8	7260	18544	120	0.03	3.49	2260
08 November 2016	8.06	34600	8.20	32	0.5	28.8	7260	18544	120	0.03	3.49	2260
09 November 2016	8.05	34600	6.00	24	0.5	28.9	7260	18544	120	0.03	3.49	2260
10 November 2016	8.05	34600	9.50	36	0.5	28.8	7260	18544	120	0.03	3.49	2260
11 November 2016	8.05	34600	4.00	20	0.5	28.9	7260	18544	120	0.03	3.49	2258
12 November 2016	8.07	34600	2.80	16	0.5	28.9	7260	18544	120	0.03	3.49	2260
13 November 2016	8.08	34500	2.20	14	0.5	28.9	7250	18494	118	0.03	3.48	2250
14 November 2016	8.09	34400	2.00	14	0.5	28.9	7240	18394	118	0.03	3.48	2240
15 November 2016	8.06	34300	1.50	12	0.5	28.9	7230	18294	118	0.03	3.48	2230
16 November 2016	8.06	34300	2.00	14	0.5	28.9	7230	18294	118	0.03	3.48	2228
17 November 2016	8.08	34300	7.70	29	0.5	29	7230	18294	118	0.03	3.48	2230
18 November 2016	8.06	34200	22.00	82	0.5	28.9	7220	18194	116	0.03	3.47	2218
19 November 2016	8.06	34200	4.00	20	0.5	28.9	7220	18194	116	0.03	3.47	2220
20 November 2016	8.07	34200	5.00	22	0.5	28.8	7220	18194	116	0.03	3.47	2218
21 November 2016	8.05	34300	11.00	40	0.5	28.7	7230	18294	118	0.03	3.48	2230
22 November 2016	8.05	34300	26.80	98	0.5	28.8	7230	18294	118	0.03	3.48	2228
23 November 2016	8.05	34300	37.00	129	0.5	29.0	7230	18294	118	0.03	3.48	2230
24 November 2016	8.07	34400	36.00	128	0.5	29.0	7240	18394	118	0.03	3.48	2240
25 November 2016	8.09	34500	13.00	54	0.5	28.9	7250	18494	118	0.03	3.48	2250
26 November 2016	8.10	34500	2.50	16	0.5	28.8	7250	18494	118	0.03	3.48	2252
27 November 2016	8.09	34600	3.00	18	0.5	28.8	7260	18544	120	0.03	3.49	2258
28 November 2016	8.08	34600	3.50	19	0.5	28.8	7260	18544	120	0.03	3.49	2258
29 November 2016	8.09	34600	2.00	14	0.5	28.6	7262	18544	120	0.03	3.50	2260
30 November 2016	8.09	34600	2.40	15	0.5	28.7	7260	18544	120	0.03	3.49	2258
Average	**8.07**	**34687**	**9.33**	**38**	**0.5**	**28.85**	**7267**	**18661**	**119**	**0.03**	**3.48**	**2267**
Maximum	**8.10**	**36400**	**37.00**	**129**	**0.5**	**29.00**	**7420**	**20344**	**122**	**0.03**	**3.50**	**2421**
Minimum	**8.05**	**34200**	**1.50**	**12**	**0.5**	**28.60**	**7220**	**18194**	**116**	**0.03**	**3.47**	**2218**

	Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha	
SING				
DD/MM/YYYY	05/12/2016	05/12/2016	05/12/2016	

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Operation and Maintenance Of 100 MLD SWRO (Desalination) Plant, Nemmeli

Sea Water Analysis Monthly Cummulative Reports For The Month Of December - 2016

Date	21-06-2015
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Date	Sea Water Quality											
	pH	TDS	Turbidity	TSS	FRC	Temperature	Total Hardness	Chloride	Total Alkalinity	Iron	Boron	Sulphate
		mg/l	NTU	mg/l	mg/l	°C	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
01 December 2016	8.08	34600	51.00	182	0.5	27.6	7260	18594	120	0.03	3.48	2258
02 December 2016	8.05	34600	80.00	305	0.5	28.7	7260	18594	120	0.03	3.49	2258
03 December 2016	8.06	34600	25.00	92	0.5	27.7	7260	18594	120	0.03	3.48	2258
04 December 2016	8.06	34700	13.50	50	0.5	27.4	7270	18694	122	0.03	3.50	2266
05 December 2016	8.07	34700	32.00	120	0.5	28	7270	18694	122	0.03	3.49	2266
06 December 2016	8.08	34700	40.00	144	0.5	28	7270	18694	122	0.03	3.51	2266
07 December 2016	8.07	34600	44.00	156	0.5	27.6	7260	18594	120	0.03	3.49	2258
08 December 2016	8.05	34700	43.00	152	0.5	27.8	7270	18694	122	0.03	3.49	2266
09 December 2016	8.06	34700	45.00	159	0.5	28.2	7270	18694	122	0.03	3.49	2266
10 December 2016	8.07	34700	42.50	147	0.5	27.6	7270	18694	122	0.03	3.51	2266
11 December 2016	8.05	34600	127.00	432	0.5	26.1	7260	18594	120	0.03	3.49	2258
12 December 2016	8.05	34600	88.00	320	0.5	26.3	7260	18594	120	0.03	3.49	2258
13 December 2016	Shutdown (Intake Sump Empty)											
14 December 2016	Shutdown (Intake Sump Empty)											
15 December 2016	Shutdown (Intake Sump Empty)											
16 December 2016	Shutdown (Intake Sump Empty)											
17 December 2016	8.10	34700	42.50	148	0.5	27.5	7270	18694	122	0.03	3.51	2266
18 December 2016	8.07	34800	22.00	78	0.5	27	7280	18794	122	0.03	3.52	2278
19 December 2016	8.06	34800	34.00	120	0.5	27.1	7280	18794	122	0.03	3.53	2278
20 December 2016	8.08	34800	41.00	146	0.5	27.4	7280	18794	122	0.03	3.52	2278
21 December 2016	8.06	34800	23.00	80	0.5	27.4	7280	18794	122	0.03	3.53	2278
22 December 2016	8.05	34800	13.00	48	0.5	27.1	7280	18794	122	0.03	3.53	2278
23 December 2016	8.05	34800	5.00	22	0.5	27.1	7280	18794	122	0.03	3.53	2278
24 December 2016	8.05	34800	2.00	16	0.5	27.2	7280	18794	122	0.03	3.53	2278
25 December 2016	8.07	34800	4.00	20	0.5	27.0	7280	18794	122	0.03	3.53	2278
26 December 2016	8.05	34800	3.00	18	0.5	27.0	7280	18794	122	0.03	3.53	2278
27 December 2016	8.06	34800	11.00	44	0.5	27.0	7280	18794	122	0.03	3.53	2278
28 December 2016	8.06	34800	47.00	165	0.5	27.4	7280	18794	122	0.03	3.53	2278
29 December 2016	8.06	34800	39.00	139	0.5	27.5	7280	18794	122	0.03	3.53	2278
30 December 2016	8.06	34800	32.20	122	0.5	27.2	7280	18794	122	0.03	3.53	2278
31 December 2016	8.08	34800	19.00	72	0.5	27.3	7280	18794	122	0.03	3.53	2278
Average	**8.06**	**34730**	**35.88**	**130**	**0.5**	**27.38**	**7273**	**18724**	**122**	**0.03**	**3.51**	**2270**
Maximum	**8.10**	**34800**	**127.00**	**432**	**0.5**	**28.70**	**7280**	**18794**	**122**	**0.03**	**3.53**	**2278**
Minimum	**8.05**	**34600**	**2.00**	**16**	**0.5**	**26.10**	**7260**	**18594**	**120**	**0.03**	**3.48**	**2258**

	Chief Chemist	Manager-Operation	Head-Operation	CMWSSB
NAME	A.Azmathullakhan	V.Madhavan Unni	K.Syed Amir Basha	
SING				
DD/MM/YYYY	04/01/2017	04/01/2017	04/01/2017	

Reject TDS during Diffuser sampling

Year	*Date*	*Feed TDS-mg/l*	*Reject TDS mg/l*
Jan-15	*06-Jan*	*35500*	*66980*
Feb-15	*10-Feb*	*34000*	*52300*
Mar-15	*09-Mar*	*36300*	*68490*
Apr-15	*02-Apr*	*36100*	*68100*
May-15	*07-May*	*38000*	*71700*
Jun-15	*08-Jun*	*36750*	*69340*
Jul-15	*08-Jul*	*36400*	*67400*
Aug-15	*06-Aug*	*36820*	*59400*
Sep-15	*06-Sep*	*37520*	*70800*

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100 MLD SWRO Desalination Plant-Nemmeli.

Reject Water (In the Sea) Analysis Report For The Month Of October-2014

Sample Point	RO Reject-50 meter Distance From Reject Diffuser in the Sea
Sample Name	Reject Water Sample In The Sea
Sample collected on	07-Oct-2014 @ 16:40 Hrs
Test started on	07-Oct-2014 @ 17:30 Hrs
Test completed on	07-Oct-2014 @ 18:20 Hrs

S.No	Parameters	Unit	Result	Remarks
1	pH		8.15	..
2	Total Dissolved Solids	mg/l	37540	..
3	Temperature	°C	27.9	..

Chief Chemist

Operation Manager

Head-Operation

Data For Pollution Control Board

Date Of Sample Collection:07/12/2014

Sampling Point: 50 meter from Reject Discharge Point

Month	*Dec-14*		
sl.no	*Parameter*	*unit*	*Results*
1	*pH*		*8.13*
2	*Temp*	*deg C*	*26.1*
3	*TDS*	*mg/l*	*35630*
4	*Tot. Hardness as CaCO3*	*mg/l*	*7000*
5	*Cal.Hardness as CaCO3*	*mg/l*	*1150*
6	*Mag. Hardness as CaCO3*	*mg/l*	*5850*
7	*Chlorides*	*mg/l*	*20050*
8	*Boron*	*mg/l*	*3.43*
9	*Sulphate*	*mg/l*	*2184*

Chief Chemist 8/12/2014

Operation Manager 8/12/14

Head Of Operation /C. T. O 8/12/14

Data For Pollution Control Board

Date Of Sample Collection:06/01/2015

Sampling Point: 50 meter from Reject Discharge Point

Month	*Jan-15*		
sl.no	*Parameter*	*unit*	*Results*
1	*pH*		*8.13*
2	*Temp*	*deg C*	*26.1*
3	*TDS*	*mg/l*	*36600*
4	*Tot. Hardness as CaCO3*	*mg/l*	*7200*
5	*Cal.Hardness as CaCO3*	*mg/l*	*1200*
6	*Mag. Hardness as CaCO3*	*mg/l*	*5320*
7	*Chlorides*	*mg/l*	*20100*
8	*Boron*	*mg/l*	*3.45*
9	*Sulphate*	*mg/l*	*2198*

6/1/2015

Chief Chemist *Operation Manager* *Chief Tech. Officer*

Data For Pollution Control Board

Date Of Sample Collection:10/02/2015

Sampling Point: 50 meter from Reject Discharge Point

Month	*Feb-15*		
sl.no	*Parameter*	*unit*	*Results*
1	*pH*		*8.13*
2	*Temp*	*deg C*	*26.3*
3	*##TDS*	*mg/l*	*35830*
4	*Tot. Hardness as CaCO3*	*mg/l*	*6940*
5	*Cal.Hardness as CaCO3*	*mg/l*	*1070*
6	*Mag. Hardness as CaCO3*	*mg/l*	*5860*
7	*Chlorides*	*mg/l*	*19320*
8	*Boron*	*mg/l*	*3.41*
9	*Sulphate*	*mg/l*	*2055*

FOR

Chief Chemist

Op.Manager

Head Of Operation

Ro Feed (Sea Water) TDS On the date of Sampling mg/l **34000**

Data For Pollution Control Board

Date Of Sample Collection:09/03/2015

Sampling Point: 50 meter from Reject Discharge Point

Month	Mar-15		
sl.no	Parameter	unit	Results
1	pH		8.16
2	Temp	deg C	27.9
3	TDS	mg/l	37400
4	Tot. Hardness as CaCO3	mg/l	6750
5	Cal.Hardness as CaCO3	mg/l	1050
6	Mag. Hardness as CaCO3	mg/l	5700
7	Chlorides	mg/l	19450
8	Boron	mg/l	3.65
9	Sulphate	mg/l	2030

Chemist

5/3/2015

Op.Manager

Head Of Operation

Ro Feed (Sea Water) TDS On the date of Sampling mg/l 36300

Data For Pollution Control Board

Date Of Sample (Collection 07/04/2015

Sampling Point: 50 meter from Reject Discharge Point

Month	Apr-15		
sl.no	Parameter	unit	Results
1	pH		8.17
2	Temp	deg C	28.4
3	TDS	mg/l	37200
4	Tot. Hardness as CaCO3	mg/l	7200
5	Cal.Hardness as CaCO3	mg/l	1100
6	Mag. Hardness as CaCO3	mg/l	6100
7	Chlorides	mg/l	20694
8	Boron	mg/l	3.44
9	Sulphate	mg/l	2120

Chief Chemist
10/4/2015

Operation Manager
20/4/15

Head Of Operation

Ro feed (Sea water) TDS On the date of sampling mg/l = 36100

Data For Pollution Control Board

Date Of Sample Collection:07/05/2015

Sampling Point: 50 meter from Reject Discharge Point

Month	*May-15*		
sl.no	*Parameter*	*unit*	*Results*
1	*pH*		*8.16*
2	*Temp*	*deg C*	*29.8*
3	*TDS*	*mg/l*	*39200*
4	*Tot. Hardness as CaCO3*	*mg/l*	*7480*
5	*Cal.Hardness as CaCO3*	*mg/l*	*1160*
6	*Mag. Hardness as CaCO3*	*mg/l*	*6320*
7	*Chlorides*	*mg/l*	*21793*
8	*Boron*	*mg/l*	*3.41*
9	*Sulphate*	*mg/l*	*2480*

Chief Chemist 08/5/2015

FOR *Op.Manager*

Head Of Operation

Ro Feed (Sea Water) TDS On the date of Sampling mg/l ***38000***

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Data For Pollution Control Board

DATE OF SAMPLE COLLECTION:12/06/2015

Sampling Point: 50 meter from Reject Discharge Point

Month	*Jun-15*		
sl.no	*Parameter*	*unit*	*Results*
1	*pH*		*8.17*
2	*Temp*	*deg C*	*28.9*
3	*TDS*	*mg/l*	*37800*
4	*Tot. Hardness as CaCO3*	*mg/l*	*6800*
5	*Cal.Hardness as CaCO3*	*mg/l*	*1100*
6	*Mag. Hardness as CaCO3*	*mg/l*	*5700*
7	*Chlorides*	*mg/l*	*20080*
8	*Boron*	*mg/l*	*3.42*
9	*Sulphate*	*mg/l*	*2050*

Chief Chemist
15/6/2015

Op.Manager
15/6/15

15/6/15
Head Of Operation

Ro Feed (Sea Water) TDS On the date of Sampling mg/l **36750**

WABAG 10M35/RW.DP.AN/LAB/011

Reject Water Discharge Point Analysis Report For the Month of July-2015

Date of Sampling : 50 meter from Reject Discharge Point

Sampling Point:08/07/2015

S.No	Parameter	unit	Results
1	pH		*8.11*
2	Temp	* C	*28.8*
3	TDS	mg/l	*37300*
4	Tot. Hardness as CaCO3	mg/l	*6820*
5	Cal.Hardness as CaCO3	mg/l	*1070*
6	Mag. Hardness as CaCO3	mg/l	*5750*
7	Chlorides	mg/l	*19420*
8	Boron	mg/l	*3.49*
9	Sulphate	mg/l	*2020*

Remarks

Ro Feed (Sea Water) TDS On the date of Sampling = 36400 mg/l

	Prepared By	Reviewed By	Approved By
Name	M. S. Pandiyan	S. K. Gnanavelraj	V. Madhavaneeyan
Sign			
DD/MM/YYYY	09/07/2015	09/07/2015	09/07/2015

WABAG 10M35/RW.DP.AN/LAB/011

Reject Water Discharge Point Analysis Report For the Month of August-2015

Date of Sampling : 50 meter from Reject Discharge Point

Sampling Point:06/08/2015

S.No	Parameter	unit	Results
1	pH		8.02
2	Temp	* C	26
3	TDS	mg/l	37500
4	Tot. Hardness as CaCO3	mg/l	6940
5	Cal.Hardness as CaCO3	mg/l	1120
6	Mag. Hardness as CaCO3	mg/l	5820
7	Chlorides	mg/l	20943
8	Boron	mg/l	3.59
9	Sulphate	mg/l	2210

Remarks

Ro Feed (Sea Water) TDS On the date of Sampling = 36820 mg/l

	Prepared By	Reviewed By	Approved By
Name	M.S. Pandiyan	S.K. Gnanasekaj	V. Madhavanunni
Sign			
DD/MM/YYYY	07/08/2015	07/08/2015	07/08/2015

WABAG

10M35/RW.DP.AN/LAB/011

Reject Water Discharge Point Analysis Report For the Month of September-2015

Date of Sampling : 50 meter from Reject Discharge Point

Sampling Point:06/09/2015

S.No	Parameter	unit	Results
1	pH		*8.15*
2	Temp	* C	*27.7*
3	TDS	mg/l	*38630*
4	Tot. Hardness as CaCO3	mg/l	*7000*
5	Cal.Hardness as CaCO3	mg/l	*1150*
6	Mag. Hardness as CaCO3	mg/l	*5850*
7	Chlorides	mg/l	*21420*
8	Boron	mg/l	*3.59*
9	Sulphate	mg/l	*2260*

Remarks

Ro Feed (Sea Water) TDS On the date of Sampling = 37520 mg/l

	Prepared By	Reviewed By	Approved By
Name	M. S. Pandiyan	S. K. Gnanavelraj	V. Madhavaneesan
Sign			
DD/MM/YYY	07/09/2015	07/09/2015	07/09/2015

CVR Labs (P) Limited

CIN NO: U 74140TN1999PTC043582

Dignity Centre, 2nd Floor, New No. 2/9, Old No. 21 Abdul Razack Street, Saidapet, Chennai - 600 015.

Phone : +91 44 2433 0382 to 85 | E-mail : info@cvrlabs.com | Web : www.cvrlabs.com

Certified by ISO 9001:2008, Recognised by MOEF and OHSAS

T-1711 & T-3108

TEST REPORT

Issued To :

VA Tech Wabag Ltd

Wabag House, Chennai - 600 117.

SUBMITTED SAMPLE

Date of report : 17/03/2017

Received on : 14/03/2017

Commenced on : 15/03/2017

Completed on : 16/03/2017

Report Number : 17030207.01

Sample Description : Sea Water - 50 Meter From Diffuser Point

Customer Reference : Through Phone dated : 14/03/2017

S.No	Parameters	Protocol	Unit	Result
1	Boron as B	APHA 22nd EDI:2012	mg/L	3.52
2	Calcium hardness as CaCO3	APHA 22nd EDI:2012	mg/L	1140
3	Chloride as Cl	APHA 22nd EDI:2012	mg/L	21058
4	Magnesium hardness as CaCO3	APHA 22nd EDI: 2012	mg/L	5970
5	pH @ 25°C	APHA 22nd EDI:2012	-	8.06
6	Sulphate as SO4	APHA 22nd EDI: 2012	mg/L	2398
7	Temperature °C	APHA 22nd EDI:2012	°C	26.4
8	Total dissolved solids (Inorganic) @ 180 ° C	APHA 22nd EDI:2012	mg/L	37510
9	Total Hardness as CaCO3	APHA 22nd EDI:2012	mg/L	7110

***** END OF REPORT *****

For CVR Labs Pvt Ltd

Verified By

Authorised Signatory

D.C. Benjamin

Lab Manager

Terms and Conditions:

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- The test report shall not be reproduced except in full, without written approved of the laboratory
- The tested items will not be retained for more than 15 days from the date of issue of test report except in the case as required by the applicable regulations.

CVR Labs (P) Limited

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T-1711 & T-3108

TEST REPORT

Issued To :

VA Tech Wabag Ltd

Wabag House, Chennai - 600 117.

SUBMITTED SAMPLE

Date of report : 20/02/2017

Received on : 15/02/2017

Commenced on : 16/02/2017

Completed on : 20/02/2017

Report Number : 17020243.01

Sample Description : Sea Water - 50 Meter From Diffuser Point

Customer Reference : Through Phone dated : 14/02/2017

S.No	Parameters	Protocol	Unit	Result
1	Boron as B	APHA 22nd EDI:2012	mg/L	3.51
2	Calcium hardness as CaCO3	APHA 22nd EDI:2012	mg/L	1110
3	Chloride as Cl	APHA 22nd EDI:2012	mg/L	19798
4	Magnesium hardness as CaCO3	APHA 22nd EDI: 2012	mg/L	5990
5	pH @ 25°C	APHA 22nd EDI:2012	-	8.12
6	Sulphate as SO4	APHA 22nd EDI: 2012	mg/L	2394
7	Temperature °C	APHA 22nd EDI:2012	°C	26.5
8	Total dissolved solids (Inorganic) @ 180 ° C	APHA 22nd EDI:2012	mg/L	37440
9	Total Hardness as CaCO3	APHA 22nd EDI:2012	mg/L	7100

***** END OF REPORT *****

For CVR Labs Pvt Ltd

Verified By

Authorised Signatory
D.C. Benjamin
Lab Manager

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CVR Labs (P) Limited

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TEST REPORT

Issued To :

VA Tech Wabag Ltd

Wabag House, Chennai - 600 117.

SUBMITTED SAMPLE

Date of report : 23/01/2017

Received on : 19/01/2017

Commenced on : 21/01/2017

Completed on : 23/01/2017

Report Number : 17010105.01

Sample Description : Sea Water - 50 Meter From Diffuser Point

Customer Reference : Through Phone dated : 19/01/2017

S.No	Parameters	Protocol	Unit	Result
1	Boron as B	APHA 22nd EDI:2012	mg/L	3.43
2	Calcium hardness as CaCO3	APHA 22nd EDI:2012	mg/L	1081
3	Chloride as Cl	APHA 22nd EDI:2012	mg/L	19324
4	Magnesium hardness as CaCO3	APHA 22nd EDI: 2012	mg/L	5875
5	pH @ 25°C	APHA 22nd EDI:2012	-	8.08
6	Sulphate as SO4	APHA 22nd EDI: 2012	mg/L	2064
7	Temperature °C	APHA 22nd EDI:2012	°C	24.6
8	Total dissolved solids (Inorganic) @ 180 ° C	APHA 22nd EDI:2012	mg/L	35920
9	Total Hardness as CaCO3	APHA 22nd EDI:2012	mg/L	6956

***** END OF REPORT *****

Verified By

For CVR Labs Pvt Ltd

Authorised Signatory

D.C. Benjamin
Lab Manager

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TEST REPORT

Issued To :

VA Tech Wabag Ltd

Wabag House, Chennai - 600 117.

SUBMITTED SAMPLE

Date of report : 04/01/2017

Received on : 26/12/2016

Commenced on : 27/12/2016

Completed on : 29/12/2016

Report Number : 16120195.01

Sample Description : Sea Water - 50 Meter From Diffuser Point

Customer Reference : Through Phone dated : 25/12/2016

S.No	Parameters	Protocol	Unit	Result
1	Boron as B	APHA 22nd EDI:2012	mg/L	3.4
2	Calcium hardness as CaCO3	APHA 22nd EDI:2012	mg/L	1050
3	Chloride as Cl	APHA 22nd EDI:2012	mg/L	19268
4	Magnesium hardness as CaCO3	APHA 22nd EDI: 2012	mg/L	5875
5	pH @ 25°C	APHA 22nd EDI:2012	-	8.05
6	Sulphate as SO4	APHA 22nd EDI: 2012	mg/L	2044
7	Temperature °C	APHA 22nd EDI:2012	°C	25.2
8	Total dissolved solids (Inorganic) @ 180 ° C	APHA 22nd EDI:2012	mg/L	35790
9	Total Hardness as CaCO3	APHA 22nd EDI:2012	mg/L	6925

***** END OF REPORT *****

For CVR Labs Pvt Ltd

Authorised Signatory

D.C. Benjamin

Lab Manager

Verified By

Verified from 05/01/2017

Terms and Conditions:

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CVR Labs (P) Limited

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TEST REPORT

Issued To :

VA Tech Wabag Ltd

Wabag House, Chennai - 600 117.

SUBMITTED SAMPLE

Date of report : 19/11/2016

Received on : 12/11/2016

Commenced on : 12/11/2016

Completed on : 17/11/2016

Report Number : 16110085.01

Sample Description : 50 Meter From Diffuser Point

Customer Reference : Through Phone dated : 11/11/2016

S.No	Parameters	Protocol	Unit	Result
1	Boron as B	APHA 22nd EDI:2012	mg/L	3.5
2	Calcium hardness as CaCO3	APHA 22nd EDI:2012	mg/L	1100
3	Chloride as Cl	APHA 22nd EDI:2012	mg/L	19464
4	Magnesium hardness as CaCO3	APHA 22nd EDI: 2012	mg/L	6200
5	pH @ 25°C	APHA 22nd EDI:2012	-	8.02
6	Sulphate as SO4	APHA 22nd EDI: 2012	mg/L	2350
7	Temperature °C	APHA 22nd EDI:2012	°C	24.6
8	Total dissolved solids (Inorganic) @ 180 ° C	APHA 22nd EDI:2012	mg/L	35500
9	Total Hardness as CaCO3	APHA 22nd EDI:2012	mg/L	7300

***** END OF REPORT *****

Verified By

For CVR Labs Pvt Ltd

Authorised Signatory

D.C. Benjamin
Lab Manager

Terms and Conditions:

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CVR Labs (P) Limited

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TEST REPORT

Issued To :

VA Tech Wabag Ltd

Wabag House, Chennai - 600 117.

SUBMITTED SAMPLE

Date of report : 15/10/2016

Received on : 14/10/2016

Commenced on : 14/10/2016

Completed on : 15/10/2016

Report Number : 16100090.01

Sample Description : 50 Meter From Diffuser Point

Customer Reference : Through Phone dated : 14/10/2016

S.No	Parameters	Protocol	Unit	Result
1	Boron as B	APHA 22nd EDI:2012	mg/L	3.52
2	Calcium hardness as CaCO3	APHA 22nd EDI:2012	mg/L	1190
3	Chloride as Cl	APHA 22nd EDI:2012	mg/L	21392
4	Magnesium hardness as CaCO3	APHA 22nd EDI: 2012	mg/L	6480
5	pH @ 25°C	APHA 22nd EDI:2012	-	8.08
6	Sulphate as SO4	APHA 22nd EDI: 2012	mg/L	2529
7	Temperature °C	APHA 22nd EDI:2012	°C	27.2
8	Total dissolved solids (Inorganic) @ 180 ° C	APHA 22nd EDI:2012	mg/L	38190
9	Total Hardness as CaCO3	APHA 22nd EDI:2012	mg/L	7670

***** END OF REPORT *****

Verified By

For CVR Labs Pvt Ltd

Authorised Signatory
D.C. Benjamin
Lab Manager

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- The test report shall not be reproduced except in full, without written approved of the laboratory
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CHENNAI METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD

No. 1, Pumping Station Road, Chintadripet, Chennai-600 002.

MANAGING DIRECTOR

Lr.No. CMWSSB/SE(Desal)/150 MLD & 400 MLD Desal Plants/Spl/2017 Dated: 12.10.2017

To

The Member Secretary,
Tamil Nadu State Level Coastal Zone
Management Authority &
Director of Environment,
Panagal Building,
No.1, Jennis Road, Ground Floor,
Saidapet, Chennai 15.

Sir,

Sub: CMWSSB – Setting up of a 400 MLD SWRO Desalination Plants at Perur along ECR, Chennai -Tamil Nadu State Level Coastal Zone Management Authority offered recommendations to National Authority for issuing CRZ clearance –The EAC of Mo EF&CC directed to furnish fresh recommendations from TNSCZMA along with NOC from TNPCB – Details required – Furnished - Fresh recommendations from TNSCZMA requested - reg.

Ref:1. Minutes of 87th State Level Coastal Zone Management Authority meeting held on 14.01.2016

2. Lr.No.844/EC.3/2016-1, dt 14.1.2016 from the Principal Secretary, Environment & Forests (EC-3) Dept, GoTN addressed to the Chairman National Coastal Zone Management Authority, Ministry of Environment, Forestry & Climate Change, GoI
3. Minutes of Experts Appraisal Committee meeting of Mo EF & CC held on 16.01.2017 at New Delhi.
4. Letter No: TNPCB/F.06421/CMWSSB/Desalination/NOC/2017 Dated: 27.03.2017 from the Principal Secretary/ Chairman (FAC), TNPCB.
5. Letter No. 12312/EC.3/2017-1, dated 17.07.2017 from the Principal Secretary, Environment & Forests (EC-3) Dept, GoTN addressed to the Chairman National Coastal Zone Management Authority, Ministry of Environment, Forestry & Climate Change, GoI
6. Letter No: CMWSSB/SE(Desal)/150mld SWRO Desal Plant/Spl//2017 Dated: 25.07.2017 to the Chairman, NCZMA, MoEF&CC, GoI.

-oOo-

Kind attention is drawn to the above subject wherein the following details are furnished for kind perusal.

The Hon'ble Chief Minister of Tamil Nadu announced on the floor of the assembly on 16.4.2013 under Rule 110 that a 150 MLD capacity Desalination Plant would be set up in the 10.05 acres of land available within the existing 100 MLD Nemmeli Plant at a cost of Rs.1000.00 Crore and also a 400 MLD Desalination Plant would be completed within 4 years to meet out the increasing water demand in Chennai City.

It is further informed that obtaining CRZ clearance for these projects from National Coastal Zone Management Authority of the Ministry of Environment, Forests & Climate Change is mandatory before commencement of works for both the plants. Hence based on the recommendations of District Coastal Zone Management Authority (issued during its meeting conducted on 09.04.2015) & the recommendations of the 87th meeting of State Coastal Zone Management Authority held on 14.01.2016, the Principal Secretary to Government, Environment & Forests Department, GoTN, vide reference 2nd cited, had already forwarded its recommendation to MoEF&CC on 14.01.2016 for according CRZ Clearance for both the Plants from the National authority. The copies of the same are enclosed herewith.

On perusal of the subject and subsequent to the presentation made on 16.01.2017 before the 165th Expert Appraisal Committee (EAC) for Projects related to Infrastructure Development, Coastal Regulation Zone, Building/Construction, Industrial Estate and Miscellaneous projects at Ministry of Environment, Forests and Climate Change, New Delhi, the EAC had deferred the projects for the want of following information for both the Plants, vide reference 3rd cited:

(i) As stated by the Project Proponent (PP), both the desalination plants of 150 MLD and 400 MLD are situated at a distance of 600 m. EAC has raised a query why the both plants cannot be installed at the same location. The Committee also wanted to know financial as well as environmental implications of two separate units against one single unit with 600 MLD capacity.

(ii) Impact of shoreline change needs to be performed.

(iii) Fresh recommendations from the TNCZMA after examining all the documents as mentioned para 4.2 of CRZ notification 2011 including NOC from concern state PCB.

In continuation to the above, based on the request from CMWSS Board, the Principal Secretary/ Chairman (FAC), Tamil Nadu Pollution Control Board (TNPCB), vide letter 4th cited, conveyed the No Objection Certificate of TNPCB for both the Plants. The copy of the same is enclosed herewith.

It is informed that while seeking fresh recommendations of TNSCZMA, it was decided that since the DPR and funding for the 400 MLD Plant was yet to be finalized, the fresh recommendations from the TNSCZMA will be sought separately for 400 MLD Plant at a later date and to proceed processing the CRZ clearance for 150MLD Plant.

Accordingly, all the details required for the 150 MLD Desalination Plant by EAC of MoEF&CC were placed before the TNSCZMA during its meeting held on 12.04.17 & 22.06.17 for its fresh recommendations to National Authority to issue CRZ clearance. On perusal of the details furnished and based on the recommendations of TNSCZMA, the Principal Secretary to Government, Department of Environment & Forests, Government of Tamil Nadu vide letter dated 17.07.2017, had forwarded the recommendations of Government of Tamil Nadu to the Chairman, National Authority to issue CRZ clearance for the 150 MLD Plant at the earliest.

Further, the details with fresh recommendations of Tamil Nadu State Coastal Zone Management Authority for 150MLD Desalination Plant was already submitted to NCZMA on 25.07.2017 for the early CRZ clearance which is under process at MoEF&CC.

However it is now informed that the revised Detailed Project Report prepared for the 400 MLD Plant is in advanced stage of appraisal at Ministry of Housing & Urban Affairs, GoI for

its recommendations to Department of Economic Affairs, Ministry of Finance, GoI for finalizing the financial assistance from JICA. Hence it has become necessary to seek CRZ clearance from National Coastal Zone Management Authority for implementing the 400 MLD Plant project also.

In the light of the above, all the details as required by the Expert Appraisal Committee (EAC) of MoEF&CC, GoI, the Reports on (i) financial as well as environmental implications of two separate units (i.e. proposed 150 MLD & 400 MLD) against one single unit with 600 MLD capacity, (ii) Impact of shoreline change have been prepared towards setting up of the 400 MLD SWRO Desalination Plant at Perur (iii) the NOC received from TNPCB along with (iv) further details on Mathematical Model Study done for the impact of soil erosion due implementation of 150 MLD and 400 MLD Plants as sought by TNSCZMA are enclosed herewith for kind perusal.

As such, it is requested that necessary actions may kindly be arranged to get the fresh recommendations of Tamil Nadu State Coastal Zone Management Authority, as sought by the Expert Appraisal Committee (EAC) of MoEF&CC, GoI, for seeking CRZ clearance from the National authority for the proposed 400 MLD SWRO Desalination Plant at Perur to be implemented by GoTN / CMWSSB shortly and to communicate the same to this Office, at the earliest, for taking further actions.

MANAGING DIRECTOR 12/10/17

MINUTES OF THE 179th MEETING OF EXPERT APPRAISAL COMMITTEE FOR PROJECTS RELATED TO COASTAL REGULATION ZONE HELD ON 28thNOVEMBER, 2017 AT INDIRA PARYAVARAN BHAWAN, MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE, NEW DELHI

The 179th Meeting of the Expert Appraisal Committee for projects related to coastal regulation zone was held on 28.11.2017 at Brahamputra Hall, Indira Paryavaran Bhawan, New Delhi. The members present were:

1.	Dr. Deepak Arun Apte	-	Chairman
2.	Dr. V.K Jain	-	Member
3.	Dr. M.V. Ramana Murthy	-	Member
4.	Dr. N.K Verma	-	Member
5.	Dr. Anil Kumar Singh	-	Member
6.	Dr. Mohan Singh Panwar	-	Member
7.	Shri. Sharad Chandra	-	Member
8.	Shri. Arvind Kumar Nautiyal	-	Member Secretary

Shri T.P. Singh conveyed his inability to attend the meeting due to his prior commitment. Dr. Anuradha Shukla, Dr. Asha Juwarkar, Shri. N.K. Gupta, Shri. Narendra Surana and Shri. Prabhakar Singh were absent.

Also in attendance: Shri W. Bharat Singh, Joint Director, MoEFCC and Dr. Bhawana Kapkoti Negi, Technical Officer, MoEFCC. The deliberations held and the decisions taken are as under:

2.0 CONFIRMATION OF THE MINUTES OF THE LAST MEETING.

The Committee having noted that minutes of the 178th meeting had taken care of the comments received from members as necessary confirmed the minutes.

3.0 CONSIDERATION OF PROPOSALS:

PROPOSAL FOR RE-CONSIDERATION:

3.1 Construction of 2- Lane Bridge over Middle Strait at Km 107.00 of NH-223 in the Union Territory of Andaman & Nicobar Islands by Andaman Public Works Department- CRZ Clearance [F.NO.10-38/2015-IA.III]- reg.

The proposal of Andaman Public Works Department for construction of 2-Lane Bridge over Middle Strait at Km 107.00 of NH-223 in the Union Territory of Andaman & Nicobar Islands, was earlier considered in the 156th and 162nd meetings of the Committee held during 28-29 January, 2016 and 29th August, 2016 respectively. It was again re-considered in the 175th Meeting of the Committee held on 07.09.2017 but was deferred due to certain shortcomings as reflected in the minutes of the meetings. In the aforesaid meeting, the project proponent had presented and provided the following information to the Committee:

7. Based on deliberations held the Committee recommended the project for CRZ Clearance purely from the considerations of this project being of a National strategic importance, subject to the following conditions:

i) The number of mangroves trees to be felled shall be reduced to about 1200 nos. instead of 1730 nos. and accordingly prior approval for diversion of forests as admissible shall be obtained;
ii) Five times the numbers of mangroves affected shall be regenerated in the region in association with the forest department.
iii) A supplementary EIA report on marine impact assessment shall be submitted, before the project is processed for clearance by the Ministry.
iv) The project proponent shall ensure that the Order of the Hon'ble Supreme Court in the matter of SLP No. 12125 of 2010 is not compromised and status of implementation thereof of the aforesaid order vis-a vis the proposed bridge after operation is regularly submitted to the regional office of the Ministry.

3.2 Setting up of 150 MLD Capacity Desalination Plant Based on Sea Water Reverse Osmosis at Nemmeli, East Coast Road, Chennai, Tamil Nadu by Chennai Metropolitan Water Supply and Sewerage Board - CRZ Clearance [F.NO.11- 36/2016-IA.III] reg.

The proposal M/s Chennai Metropolitan Water Supply and Sewerage Board for Setting up of 150 MLD Capacity Desalination Plant Based on Sea Water Reverse Osmosis at Nemmeli, East Coast Road, Chennai, Tamil Nadu, was earlier considered in the165thMeeting of the Committee held on16-17 January, 2017. In the said meeting, the project proponent had presented and provided the following informationto the Committee:

The project proponent made a presentation and provided the following information to the Committee:

i) The project involves 150 MLD Sea Water Reverse Osmosis Desalination Plant at Nemmeli, Thiruporur Taluk, District Kancheepuram (Tamil Nadu) promoted by M/s Chennai Metropolitan Water Supply and Sewerage Board Desalination Plant.
ii) The objective of the project is for augmentation of drinking water supply in the Southern parts of Chennai city with per capita water supply of 135 LPCD as per norms. Chennai is the water stressed city with no perennial source of surface water. Hence to bridge the supply demand gap, CMWSSB resorted to desalination source.
iii) Is on eastern side of East Coast Road (ECR) at 12° 42' 08" North, 80° 13' 29" East and is approximately 40 km south from the city.
iv) **Intake and Outfall system:** The intake and outfall system includes as follows:
    - One intake structure in sea with depth of 10 m.
    - One no. of 100 mm opening Duplex screen to exclude larger marine life.
    - One intake pipe each of 2300 mm (OD) dia PN 6.4 bar and one 1600 mm (OD) PN 6 outfall HDPE

- A shock chlorination system in form of Hypo dosing is proposed to minimize marine growth in intake pipes
- Lot of HDPE diffuser.
- Travelling Band Screens before the Pumps to trap floating materials, sea shells, diatoms etc.
- Vertical shaft pumps in Super Duplex Construction for sea water intake.

v) **Reverse Osmosis** involves 7 nos. individual trains single stage/single pass RO each having dedicated pumping system and Energy Recover Devices (ERDs), permeate storage tanks, RO Clean-in-Place (CIP) system includes all tanks and pumps, All high pressure valves are of Super Duplex with PERN>41 and RO feed water storage tank 1 no.

vi) **Treated Water Sump and Pump Sets:** Treated water sump of 1 no. of 6,800 cum capacity, and 3W+2S Horizontal Centrifugal Split Casing pumps in each of 2100 m3/hr o pump product water.

vii) Plant Electrical Sub-station: 110/11 KV indoor sub-station with two incoming lines of 110 KV.

viii) For the Phase III (150 MLD Product Water) plant to be developed in future, the seawater of 18958.33 m3/hour will be drawn from the sea and about 12708.33 m^3/hour of brine reject will be released into the sea. The seawater intake head will be located at a distance of about 1050 m from the shoreline at 10 m depth. The outfall diffuser will be located at 650 m distance from the shoreline at 7.5 m water depth. The diffuser will have the multiple ports of 10 nos. x 500 mm diameter. This project involves construction of the following activities:

- Laying of seawater intake pipeline
- Laying of outfall pipeline
- Construction of seawater intake head
- Construction of outfall diffuser
- Construction of seawater sump with pump house

ix) The main objective of the study is to ensure that the rejected water does not unduly alter the marine ecosystem by way of changes in salinity levels, chlorine effects and above all temperature variation exceeding the admissible levels. These are studied by simulating the situation in numerical models developed by various institutions, the most popular one being CORMIX model and MIKE 21.

x) It is informed that a diffuser outfall located at 650 m distance into the sea at 7.5 m depth, with 10 ports of 500 mm dia. each, projecting above the bed by 1.5 m with orientation of 30 deg horizontal is adequate to ensure proper mixing and dilution which will not induct any major alteration to the existing marine ecosystem and consequently on marine life. The study on CORMIX model shows the mixing zone will extend for 65 m to achieve 22 times and extending further till 200 m distance to achieve to dilution of 27 times from the disposal location.

xi) The Tamil Nadu Coastal Zone Management Authority has recommended the project vide their letter No. 845/EC.3/2016- 1 dated 14th January, 2016.

xii) **Investment/Cost**: Rs.1089.48 Cr (2013-14 Price Level) and Rs.1258.88 Cr (2015-16 Price level).

xiii) **Components in CRZ area:** The project falls under CRZ-III, CRZ-I (Inter Tidal zone) and CRZ-IV (sea water area). As per CRZ Notification, 2011, vide para 4 (i) (a), para 8 I CRZ I (i) (b) and para 8 III CRZ IIIA (h) & B (v) the desalination is permitted.

xiv) The marine facilities for the desalination plant will consist of:
   a) laying of seawater intake pipeline on the seabed but buried below seabed to a distance of 1050 m into the sea till 10 m water depth (CD),
   b) laying of outfall pipeline on the seabed but buried below the seabed to a distance of 650 m into the sea till 7.5 m water depth(CD),
   c) construction of seawater intake head, iv) construction of outfall diffuser

xv) The demarcation of LTL/HTL/CRZ along the project shoreline was carried out for the existing operational plant; hence the same has been taken, as the proposed plant is within the premises of the existing operational 100 MLD.

xvi) Location of intake/outfall and Quantity: 1 No. Intake at $12^{0}41'41''$ N, $80^{0}14'1.6''$E and 1 No Outfall at $12^{0}41'53.07''$ N, $80^{0}13'52.10''$E.

xvii) The primary benefit of the proposed Desalination Plant is that it will assist in securing the supply of drinking water to the metropolitan population well into the future. It can continue to deliver high quality drinking water for consumption, even during periods of drought. It also provides an alternative source of water that will make our overall supply more diverse and less vulnerable to interruption. The provision of a secure water supply for residents and industry within the Chennai metropolitan area which will assist in maintaining living standards and the amenity of the urban area.

2. In the said 165th meeting, the EAC had noted that the project proponent is requesting for establishment of another desalination plant of capacity 400 MLD at a distance of 600 m approximately from the instant site of proposed 150 MLD. EAC had also observed that there is considerable space available at the Perur, East Coast Road, Chennai (proposed site for 400 MLD) which can accommodate both the desalination plants at the same location. Further the EAC had noted that there is significant erosion in Nemmeli beach arising due to the desalination plant of 100 MLD capacity commissioned there. The EAC in the said 165th meeting held in January, 2017 has deferred the project for the want of following information:

i) As stated by the PP, both the desalination plants of 150 MLD and 450 MLD are situated at a distance of 600 m. Why the both plants cannot be installed at the same location and financial as well as environmental implications of two separate units against one single unit with 600 MLD capacities.
ii) Impact of shoreline change needs to be performed.
iii) Fresh recommendations from the TNCZMA after examining all the documents as mentioned para 4.2 of CRZ notification 2011 including NOC from concern state PCB.

3. On submission of the clarification of the above, the proposal was again placed before the Committee for its reconsideration. The project proponent informed that the proposed 150 MLD and 400 MLD capacities are being funded by two different external funding agencies and therefore the necessity to have separate entity. *The Committee in response to this observed that the same cannot be reason to justify*

setting up of two separate plants at the cost of damaging the environment. The Committee therefore decided that considering the acute necessity of drinking water shortage in the region only the instant proposal of 150 MLD can be considered. The second proposal for 400 MLD will be dropped for the time being and will be reviewed after a site visit is undertaken.

The Committee noted further that the area is prone to erosion and the project proponent had in the past compromised on this front while setting up of the existing 100 MLD plant. The Committee therefore decided that as a penalty the project proponent shall not only develop a robust shoreline erosion control and management mechanism of the area but shall also submit an undertaking that it shall bear full cost environmental damage due to any erosion arising out of the proposed 150 MLD desalination plant. In pursuance thereof, the project proponent shall submit an undertaking to the TNSCZMA before commencement of work of the proposed plant.

4. Based on deliberations held the Committee recommended the project for CRZ Clearance subject to the following conditions:

i) The project proponent shall develop a robust shoreline erosion control and management mechanism of the area and shall also submit an undertaking to the TNCZMA before commencement of work of the proposed plant stating that it shall bear full cost of environmental damage due to any erosion arising out of the proposed 150 MLD desalination;
ii) The project proponent shall ensure that the temporary structures installed for laying of pipe lines are removed within three months of accomplishment of the work;
iii) The project proponent shall ensure that the structure proposed to be set up is Tsunami resistant;
iv) The project proponent shall furnish documents cited in Environment and Forest Department, Govt. of Tamil Nadu letter no. 12312/EC.3/2017-1, dated 17.07.2017 such as conservation plan for turtle nesting, flora and fauna also to the regional office of the Ministry for compliance monitoring.
v) A 2% of the cost of the project shall be apportioned for marine and coastal biodiversity protection and conservation measures, to be spent by the project proponent towards fulfilling its Corporate Environmental Responsibility (CER) during the currency of the project. Proper record and account of measures taken should be maintained and should also be submitted to the CZMA every six months.

3.3 Setting up of 400MLD capacity desalination Plant based on Sea Water Reverse Osmosis at Perur, East Coast road, Chennai, Tamil Nadu by Chennai Metropolitan Water Supply and Sewerage Board – CRZ Clearance[F.NO.11-37/2016-IA.III]reg.

The proposal M/s Chennai Metropolitan Water Supply and Sewerage Board for Setting up of 400MLD capacity Desalination Plant Based on Sea Water Reverse Osmosis at Perur, East Coast road, Chennai, Tamil Nadu, about 600 m from the site

of the item at No.1 above, was earlier considered in the 165th Meeting of the Committee held on 16-17 January, 2017.

In view of the observation of the Committee on this item while deliberating Item No. 3.2 i.e 150 MLD desalination plant proposed to be located at about 600 m from the instant proposal for a 400 MLD capacity desalination plant, this proposal may be deferred for the present. It was also decided that a team (to be decided) will undertake a site visit before the proposal is taken up for re-consideration at a later stage.

3.4 Proposal for construction of a Resort Building at Survey no.701/1 and 701/2 of Varkala Municipality of Trivandrum, Kerala by M/s Sea Cliff Resorts Private Limited- CRZ Clearance [F.NO.11-38/2017-IA.III] reg.

The proposal of M/s Sea Cliff Resorts Private Limited for construction of a Resort Building at Survey no.701/1 and 701/2 of Varkala Municipality of Trivandrum, Kerala, was earlier placed for consideration in the 178th Meeting of the Committee held on 17.10.2017. In the said meeting, the Committee observed that the project proponent was not prepared to make a presentation and to provide requisite details in specific reference to the provisions under the CRZ Notification, 2011 and therefore decided that in case the proponent is ready by the end of the last item as per the agenda, the proposal could be considered. Committee also observed that considering the geomorphological importance of Varkala cliffs, there is an active proposal to declare Varkala cliffs as a 'National Geopark' under a Geological Survey of India (GSI) initiative to preserve geologically important sites in the country. That with this, Varkala stands a chance to find a place in the UNESCO's world map of geo-heritage sites. It was also observed that Varkala cliff is seriously affected by slumping and unplanned landuse on the Varkala cliff could be detrimental to the stability of the system.The project proponent must submit NOC from concerned authorities on this aspect. However, the proponent could not avail the opportunity given and therefore it was decided that the item may be deferred till the next meeting of the EAC.

2. The proposal was taken up for re-consideration. The project proponent made a presentation and provided the following information:

i) The project will be developed as an environmental friendly resort at South Cliff of Varkala to cater to the growing demand of tourism in the area.
ii) The total plot area will be 4573.0 sq.m and falls in CRZ-II. An existing building area (pre-1991) is located and the proposed structure will be developed on the landward side of the imaginary line of this existing building.
iii) The project will comprise of G+6 upper floors (40 rooms).
iv) Height of the structure will be 24 m and FAR will be 0.91.
v) The proposed area falls in CRZ II as per CRZ 2011 - behind 50 m HTL and not in front of pre-1991 old bldg, as per CZMP, Kerala
vi) The resort is proposed to be built on the landward side from the 50m buffer zone.
vii) Water requirement will be about 50,000 litres.
viii) STP will be constructed over an area of 50 m2.
ix) Treated effluent will be used for irrigation.

97th MEETING

TAMIL NADU STATE COASTAL ZONE MANAGEMENT AUTHORITY

Date: 29.11.2017
Time: 3.00 P.M.

Venue:
Conference Hall of the
Environment and Forests Department,
7th floor, Secretariat,
Chennai – 600 009

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MINUTES OF THE 97th MEETING OF THE TAMIL NADU STATE COASTAL ZONE MANAGEMENT AUTHORITY HELD ON 29.11.2017

AGENDA ITEM NO.01: **Confirmation of the minutes of the 96th meeting of the Tamil Nadu State Coastal Zone Management Authority held on 08.09.2017.**

The minutes of the 96th meeting of the Tamil Nadu State Coastal Zone Management Authority (TNSCZMA) held on 08.09.2017 communicated in Letter No.P1/1044/2015 dated 13.09.2017 of the Director of Environment was confirmed.

AGENDA ITEM NO.02: **The action taken on the decisions of 96th meeting of the Authority held on 08.09.2017**

The Member Secretary briefed the Members about the action taken by the Department of Environment on the decisions taken during the 96th meeting of the Tamil Nadu State Coastal Zone Management authority held on 08.09.2017.

AGENDA ITEM NO.03: **Mining of Rare minerals in mining lease area of 141.33 ha & 7.06 ha at Manavalakurichi, Lakshmipuram and Colachel villages of Kalkulam taluk in Kanniyakumari district proposed by M/s. Indian Rare Earths Limited**

The Authority resolved to recommend the proposal to the Ministry of Environment, Forests and Climate Change, GoI with the following specific conditions:

a) The unit shall adhere to the guidelines / stipulations / conditions of mining lease and shall follow the mining plan.
b) The unit shall not use any explosives for the mining. No blasting or drilling for mining shall be carried out.
c) In inter-tidal zone, Manual mining operations are to be carried out, only by deploying persons using baskets and hand spades for collection of ore or mineral, as per the approved mining plan.
d) The unit shall ensure that the mined area is refilled with the tailings. The aesthetic appeal of the beaches should be retained by avoiding artificial sand-dunes of greater heights.

e) The beach profile shall be monitored periodically with the maintenance of relevant records / measurements / details so as to take appropriate remedial action on the event of any adverse impacts.

f) There shall be no extraction of ground water without permission from the Competent Authority.

g) There should not be any sea water intrusion due to the project activities and periodical water quality monitoring shall be conducted.

h) No road shall be formed in CRZ

i) No liquid or solid waste shall be generated and disposed off in CRZ.

j) The unit shall develop green belt within / outside mining area.

k) The unit shall not establish new mineral separation plant / processing unit within CRZ areas and also there should not be any expansion of existing mineral separation plant/processing unit.

l) The unit shall obtain consents, in appropriate stages, from the Tamil Nadu Pollution Control Board.

AGENDA ITEM NO.04: **Setting up of 400 MLD SWRO Desalination Plant at Perur along ECR, Chennai – Fresh Recommendation requested as per EAC meeting proposed by CMWSSB.**

The Authority resolved to recommend the proposals to the Ministry of Environment, Forests and Climate Change, GoI with the following specific conditions:

The Authority resolved to recommend the proposal to the Ministry of Environment Forests and Climate Change. Government of India subject to the following specific conditions:

a) The conditions imposed already for the project in the 87th meeting of the TNSCZMA held on 14.01.2017 shall be adhered.

b) Besides, turtle conservation plan shall be prepared and implemented during the project period.

Immediate/

By Speed Post

Environment & Forests (EC-3) Department, Secretariat, Chennai – 600 009

Letter No. 24117/EC.3/2017- 1 ,dated: 09/01/2018

From
Thiru. Md. Nasimuddin, I.A.S.
Principal Secretary to Government.

To
The Chairman,
National Coastal Zone Management Authority,
Government of India,
Ministry of Environment,Forests & Climate Change,
Agni Wing, 5th Floor,
Indira Paryavaran Bhawan,
Jor Bag Road, Aliganj,
New Delhi – 110 003. (w.e.)

Sir,

Sub: CRZ – Application for CRZ clearance – Setting up of 400 MLD SWRO Desalination Plant at Perur along ECR, Chennai – Fresh Recommendation requested as per EAC meeting proposed by CMWSSB –Clearance requested under CRZ Notification 2011 - requested – Regarding.

Ref: From the Member Secretary, Tamil Nadu State Coastal Zone Management Authority/ Director of Environment letter No R.C/P1/2410/2017, dated 08.12.2017

I am to enclose a copy of the proposal received from the Member Secretary, Tamil Nadu State Coastal Zone Management Authority/Director of Environment together with its enclosures and to state that the Member Secretary, Tamil Nadu State Coastal Zone Management Authority/ Director of Environment has sent the proposal to establish a 400 MLD Sea Water Reverse Osmosis Desalination Plant at Perur Village, Thiruporur Taluk, Kancheepuram District at a distance of 600 m in the northern side of the existing 100 MLD Seawater Desalination Plant at Nemmeli Village, Thiruporur Taluk, Kancheepuram district, proposed by M/s.Chennai Metropolitan Water Supply & Sewerage Board (CMWSSB) and he has furnished following details:-

A. M/s Chennai Metropolitan Water Supply & Sewerage Board (CMWSSB) has proposed to establish a 400 MLD Sea Water Reverse Osmosis Desalination

Plant at Perur Village, Thiruporur Taluk, Kancheepuram District at a distance of 600 m in the northern side of the existing 100 MLD Seawater Desalination Plant at Nemmeli Village, Thiruporur Taluk, Kancheepuram district. The prime purpose of desalination plant is to remove most of the dissolved solids from filtered seawater to make it potable for supplying the Chennai City. The proposed project involves construction of the following activities:

i. Laying of seawater intake two pipeline
ii. Laying of outfall pipeline
iii. Construction of seawater intake head (offshore construction)
iv. Construction of outfall diffuser (offshore construction)
v. Construction of seawater sump with pump house
vi. Installation of pretreatment & reverse osmosis system.

B. The sea water requirement for the proposed plant will be 47791.66 cu.m/hr (1147 MLD). The sea water will be drawn by laying two submarine pipelines. Both the seawater intake heads will be located at a distance of about 1150 m from the shoreline at 10m CD (Chart Datum) water depth. The water from the intake head will be drawn by gravity flow through the submarine pipeline buried 1 m below the sea floor.

C. The proposed Desalination plant will have an offshore screen, offshore intake and outfall pipe, onshore screen, lamella clarifier, dissolved air floatation, gravity dual media filter, reverse osmosis system, post treatment, administration building, workshop building, chemicals storage building, product water storage & distribution.

D. The backwash and sludge generated at periodic intervals from various treatment units would be discharged into the sea along with brine. The salinity of the return water released into the sea will be 71 ppt, which will have the salinity of the difference of 33 ppt higher than the seawater ambient salinity of 38 ppt. A chlorine dosage of 3ppm will be given to the drawn seawater and the return water discharged into the sea will have the concentration of around 0.2 ppm. The brine water discharged into the sea will be 31125 cu.m/hr (747 MLD). The outfall diffuser will be located at 750 m from the shoreline at the water depth of 8 m CD. The outfall will have a multiple port diffuser arrangement system with 18 Nos. x 600mm diameter. Limited excavation work will be carried out for construction of Civil structures. Some amount of leveling / grading through cut and fill is required to make the land suitable for construction. The domestic solid waste will be suitably disposed and the sewage generated will be treated and the treated sewage will be used for green belt development.

E. The project site is falling in CRZ III, CRZ – I (inter tidal zone) and CRZ-IV (sea water area). The total project cost is Rs. 2891.70 crores. As per CRZ Notification 2011, vide para 4 (i) (a)., para 8 I CRZ I (i) (b) and 8 III CRZ III A (h) & B(v) the above activities are permissible activities. However the project requires clearance from the MOEF., GoI vide para 4 (ii) (h) of CRZ Notification 2011.

F. The District Coastal Zone Management Authority, Kancheepuram district has recommended the project subject to certain conditions.

G. The proposal was placed before the 87th TNSCZMA meeting held on 14.01.2016 and the authority has resolved to recommend the proposal to the Ministry of Environment, Forests and Climate Change, Government of India subject to the certain specific conditions.

H. The above proposal was recommended to the Chairman, National Coastal Zone Management Authority, Government of India, Ministry of Environment, Forests and Climate Change, New Delhi vide Government letter No.844/EC.3/2016-1, dated 14.01.2016.

I. The proposal was placed before the 165th Expert Appraisal Committee on 16.01.2017 and the committee had deferred the projects for the want of the following information.

i. As stated by the Project Proponent (PP), both the desalination plants of 150 MLD and 400 MLD are situated at a distance of 600 m. EAC has raised a query why the both plants cannot be installed at the same location. The Committee also wanted to know financial as well as environment implications of two separate units against one single unit with 600 MLD capacity.

ii. Impact of shoreline change needs to be performed.

iii. Fresh recommendations from the TNSCZMA after examining all the documents as mentioned para 4.2 of CRZ Notification 2011 including NOC from concerned State Pollution Control Board.

J. The CMWSSB has submitted in letter dated 12.10.2017, the followings details with reference to the 400 MLD Desalination Plant and requested fresh recommendation from TNSCZMA to Ministry of Environment, Forests and Climate Change, Govt. of India as indicated in the 165th EAC meeting of MoEF & CC, Govt. of India.

i) Financial as well as environmental implications of two separate units. (i.e. proposed 150 MLD & 400 MLD) against one single unit with 600 MLD capacity.

ii) Impact of shoreline change have been prepared towards setting up of the 400 MLD SWRO Desalination Plant at Perur.

iii) The NOC received from Tamil Nadu Pollution Control Board.

iv) Details on Mathematical Model Study done for the impact of soil erosion due implementation of 150 MLD and 400 MLD plants.

K. The subject was placed before the 97th meeting of the Tamil Nadu State Coastal Zone Management Authority held on 29.11.2017 and the Authority resolved to recommend the proposal to the Ministry of Environment, Forests and Climate Change, Government of India.

3. The Member Secretary, Tamil Nadu State Coastal Zone Management Authority/Director of Environment has sent a copy of proposal along with its enclosures and minutes of the 97th meeting of TNSCZMA held on 29.11.2017 and requested that the proposals may be recommended to the Ministry of Environment, Forests and Climate Change, Government of India, subject to the following specific conditions:

a) The proposed activities should not cause coastal erosion and alter the beach configuration.

b) Untreated chemical waste generated due to membrane protection activity and the sewage generated should not be discharged into the sea.

c) The project activity should not affect the coastal ecosystem including marine flora and fauna.

d) It may be ensured that mercury concentration is not present in the end product.

e) The proponent should ensure that the saline water shall not gain access into ground while conveying or processing the sea water.

f) Marine water quality should be monitored at the outfall area every quarter and results sent to Tamil Nadu State Coastal Zone Management Authority.

g) A system shall be evolved for a close and continuous monitoring during the construction and post construction phases through reputed institutions such as National Center for Sustainable Coastal Management (NCSCM), Anna University, Chennai/NIOT, Chennai / IIT Chennai. Periodical report shall be furnished to the Tamil Nadu State Coastal Zone Management Authority on the site conditions every year so as to take mitigation measures on the event of any adverse impacts on the coast.

h) The impact on the corals, marine organisms, Turtle nesting etc., due to the above constructions, in long run, should be evaluated and monitored through experts, in which, ecologists should be included.

i) The activities such as intake pipeline and outfall line and intake arrangement in sea and the pipeline should not cause hindrance to fishing activities and to boat movement.

j) Marking the intake and outfall pipelines adequately such that fishing vessels and fishermen are made aware of its presence.

k) No blasting or drilling activities in CRZ is permissible.

l) The proponent should not prevent public from easy access to the beach.

m) The proponent shall implement the Green Belt as envisaged in EIA report.

n) Turtle conservation plan shall be prepared and implemented during the project period.

4. In line with the recommendation of the Tamil Nadu State Coastal Zone Management Authority, this Government recommend the proposal of Member Secretary, TNSCZMA/DOE, Chennai to setting up of 400 MLD SWRO Desalination Plant at Perur along ECR, Chennai proposed by M/s. Chennai Metropolitan Water Supply & Sewerage Board (CMWSSB) to the Chairman, National Coastal Zone Management Authority, Government of India, Ministry of Environment, Forests and Climate Change, New Delhi, for clearance under CRZ Notification,2011, subject to the specific conditions mentioned at para 3 above.

Yours faithfully,

12.1.18

For Principal Secretary to Government

12.1.18

Copy to:-

The Member Secretary, TNSCZMA/DOE, Chennai – 15.
The Managing Director, Chennai Metropolitan Water Supply & Sewerage Board, Chennai – 2.
(with a request to furnish 20 copies of the proposal of GoI, MoEF&CC, New Delhi)
SF/SC.