TAMIL NADU WATER SUPPLY AND DRAINAGE BOARD

UGSS TO NAGAPATTINAM MUNICIPALITY

2.96 MLD SEWAGE TREATMENT PLANT

REPORT OF EIA AND EMP

M/S SEKAR DEEPAK CONSTRUCTION LIMITED CHENNAI

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Executive summary

Nagore is one part of Nagapattinam municipality in Nagapattinam District in Tamilnadu . It is bounded by Bay of Bengal on the east, part of Nagapattinam town on the South, Tiruvarur and Thanjavur Districts on the West and River vettaru and Karaikal – Pondicherry on the North. The available official record of census for the year 2001 indicates a population of 92525. The town is not having any proper underground sewerage scheme to abate the environmental pollution inside the town. In order to protect the environment and the Under Groundwater from pollution and also to safe guard the Public Health, the Under Ground Sewerage Scheme to Nagapattinam Municipality was formulated for Nagapattinam municipality under World Bank assistance from the funds received through TNUIFSL at an Estimate Amount of Rupees 49.43 Crores. The project aims at treating the sewage of the town in an identified location and subject the sewage to natural biological treatment without adding any chemicals and to achieve a treated sewage quality as prescribed by the Tamilnadu Pollution Control Board (TNPCB). The work for the construction of treatment plant has been awarded to M/S Sekhar Deepak Constructions Limited (SDCL). Chennai under DBOT basis . To access the environmental impacts of the proposed sewage treatment plant and to propose the mitigation measures for the same, this report is prepared by he contractor. The treatment process proposed is Activated Sludge process – Extended Aeration with sludge handling system.

As required under the contract, the contractor has been assigned to prepare a report of EIA and EMP for the STP based on the following objectives .

(i) establish the environmental baseline in the study area;

(ii) identify and assess the adverse environmental impacts; and provide requisite measures to address these impacts;

(iii) identify the opportunities for environmental enhancements in the project area and provide requisite guidance/plans in this regard;

(iv) wherever relevant integrate the measures (mitigation and enhancement related) in the project planning and design; and

(v) to develop appropriate management plans and codes of practices for implementing, monitoring and reporting of the environmental mitigation and enhancement measures suggested.

The EA has been carried out in line with the Government of India (GoI)'s regulations (EIA Notification), the World Bank's EA guidelines and TNUDF's ESF .

The report comprises existing scenario, environmental assessment based on base line studies, findings, discussions and the required environmental management plan in the succeeding chapters.

The description of Nagapattinam town profile, objectives, scope of the report, findings and futuristic recommendations are explained in the introduction chapter. In brief, the project is environment friendly and a welcome one by the stakeholders.

The STP is designed for 2.96 MLD for the present. The technology used in the STP is called Activated Sludge process (ASP) and widely used in the world and India for decades. The treatment process with the functioning of the units, influent and effluent characteristics has been explained under the project description. The cost of the project is Rs 4.04 crores including the 5 years O&M. On review of the earlier studies, it is found that there are no specific or serious misgivings about the project due its implementation and the disposal of the treated sewage. The Legislative and Regulatory Considerations has also been explained in this chapter.

The local body has applied for getting consent to establish from TNPCB in 2007. After examining the application , the TNPCB informed local body to get CRZ clearance since the required available site proposed for STP construction fall in CRZ under CRZ notification , 1991 issued by GOI .

CRZ means the coastal stretches of seas, bays, creeks, rivers and backwaters are influenced by tidal action in the landward side upto 500 m from HTL (High tide line) . Moreover , the distance shall not be less than 100 m or width of the creek , river or backwaters whichever is less.

For Nagore STP , the proposed site is about 150 m from River Vettaru and 750 m from Bay of Bengal. The site boundary falls under CRZ for rivers since it is located 106 m from HTL of river Vettaru.The proposed site extent of 40 x 60 m for STP construction is located in non-CRZ area only the outfall pipe line falls within CRZ areas such as CRZ-II and CRZ-III as per GOI notification.

Hence , The local body submitted proposal for seeking Environmental clearance (CRZ) to District Coastal Zone Management Authority and the proposal was forwarded to Director,Dept of Environment on 11.12.2007 with recommendations to issue CRZ clearance .

The proposal was placed in the State Coastal Zone Management Authority meeting through Dept of Environment held on 13.04.2010 , the committee recommended the proposal to Government of Tamilnadu. Based on this recommendations , the Principal Secretary , Department of Environment & Forests , Government of Tamilnadu forwarded the proposal to Chairman , National Coastal Zone Management Authority (NCZMA) , Ministry of Environment & Forests , GOI , NewDelhi on 20.05.2010. The proposal was placed in 90th Expert Appraisal Committee meeting held on 20-08-2010 at Fazal hall , Scope complex , NewDelhi and the EAC of IA-III division , Ministry of Environment & Forests , GOI, NewDelhi formally accepted to issue CRZ clearance. After reviewing the proposal and EAC recommendations , the CRZ clearance was issued by the Director, IA-III Division, Ministry of Environment & Forests , Government of India , NewDelhi on 31-01-2011. The copy of clearance letters are available with state Pollution control Board and can be seen in the Ministry of Environment & Forests, GOI , website at http://www.envfor.nic.in

In the base line study, the environmental parameters like air, noise water and soil have been studied around the STP area and it has been found that air , noise or soil are not having any adverse impacts on environment at present. The water quality parameters like physical, chemical and biological have been analysed and it has been observed that the biological parameters like BOD,COD clearly indicate the quality of waste water flowing at present in the Vettaru where the treated effluent will be discharged and the treated effluent after completion of STP will replace the existing quality parameters with desirable parameters of BOD,COD etc., Under the biological environment it is found that none of the flora and fauna recorded belongs to endangered category.

The present STP site is farthest from the town. The issue of the STP impacting the environment especially the localized baseline around the STP site becomes non-existent based on the base line studies conducted around STP area. Similarly, the environment impacting the STP is also non-existent because, the STP is not drawing upon the resources of the environment.

Under the determination of potential Impacts the screening has been tabulated and it is observed that none of the items has been found under yes category.

The social assessment done indicates that basically, there is no negative attitude towards the proposed STP and though economically, the population are not affluent, still, they are aware that the stagnating sewage will soon vanish and are willing to pay tax for STP.

Though the site is at the farthest point of town and the site is left vacant by municipality necessary stakeholder consultations have been conducted and

based on response of public to the treatment process and the recommendations of Technical Standing committee, the municipality resolved a resolution to take up the scheme and allocate the present site.

The possible impacts and mitigation measures have been tabulated during pre construction, construction and operation phases along with necessary compliance reporting. Necessary environment enhancement, monitoring plans have also been included. The green belt to be developed along with required species have been included and the cost of environmental measures during the pre construction, construction and operation and maintenance period has been worked out to Rs 15,95,750/-

To conclude, it may be seen that there are no major concerns of any adverse impacts on the environment by the STP.

The treated effluent from the STP after proper primary, secondary and tertiary treatment will meet the proposed, more stringent emission limit guide lines

Chapter-1
INTRODUCTION

1.1 Basis of This Report

An Underground sewerage scheme was formulated for Nagapattinam municipality covering Nagapattinam and Nagore under World Bank assistance from the funds received through TNUIFSL. To treat the collected sewage and to dispose treated effluent in prescribed standards, two sewage treatment plants under the process of Activated Sludge have been proposed separately , one for area covering in Nagapattinam town and another for area covering Nagore . The work for the construction of treatment plant in Nagoore has been awarded to M/S Sekhar Deepak Constructions Limited (SDCL) Chennai under DBOT basis.

To assess the environmental impacts of the proposed sewage treatment plant and to propose the mitigation measures for the same, this report is prepared by the contractor. The treatment process proposed is Activated Sludge process – Extended Aeration with sludge handling system

1.2 Location of Nagore

The place is one part of Nagapattinam Municipality in Nagapattinam district in Tamilnadu state of India as shown in Fig.1

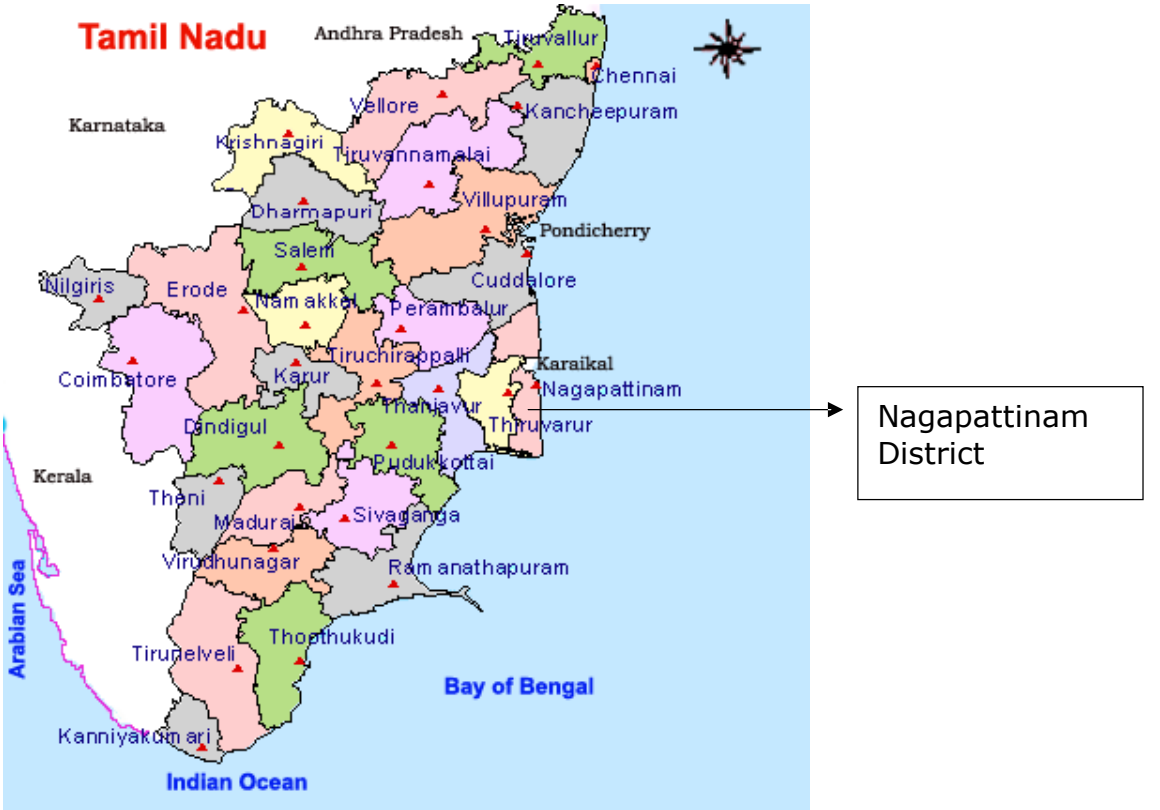


Fig.1. Location of Nagapattinam District in Tamilnadu

Nagore town lies 12 km north of Karaikal Town of Puduchery State, 25 km west of Tiruvarur Town, 19 km south of Velankanni and along east of Bay of Bengal. It lies between 10.10° and 11.20° North latitude and 79.15° and 79. 50° East longitude. It is bounded by Bay of Bengal on the east, the Nagapattinam town on the South, Tiruvarur and Thanjavur Districts on the West and Northwest and River vettaru and Karaikal – Pondicherry on the North. Nagoore town lies at an area of 3.19 Square kilometres.

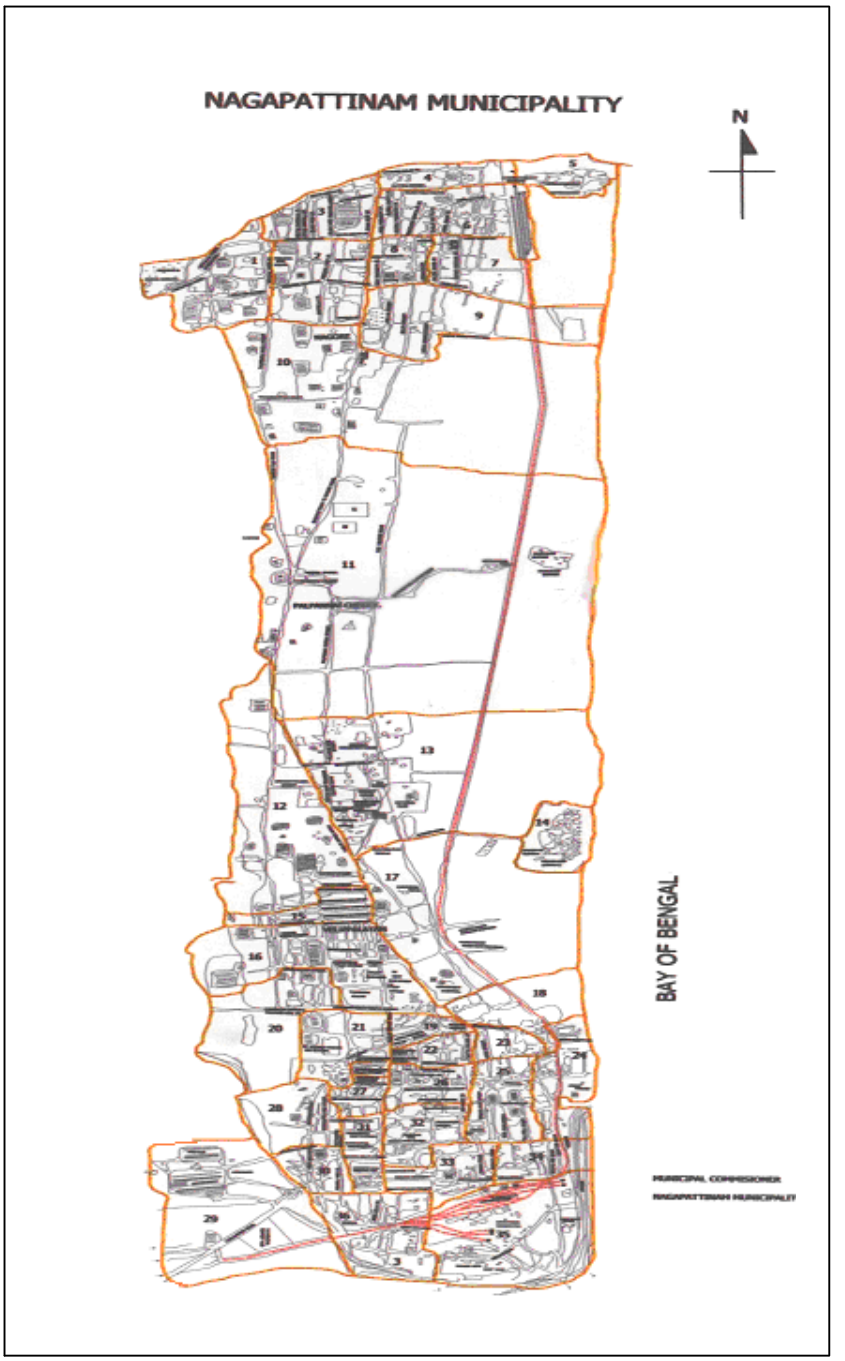


Fig.2 . Setting of Nagapattinam Municipality

1.3 Objectives of this Report

As required under the contract, the objectives of the report are

(a) To identify and assess any potential negative environmental and social impacts and to facilitate the planning of preventive and remedial measures as the case may be.

(b) To identify possible environmental enhancements in the project setting and lay down the action plans

(c) To develop a set of environmental monitoring and management plans compliant with the relevant codes, statutes & social norms.

(d) Outstanding issues needing resolution

1.4 Scope of the Report

a. To assess the baseline of air, water, land, soil and noise environment around the STP in relation to the town by collecting the samples of air, water, soil and noise in the project setting and analyzing for the recognized parameters as per local statutory regulations and prepare the baseline document and to predict the potential impacts by the STP in a 1 km radius.

b. Arising from 1-3-a, to develop a set of practices to be followed during pre-construction, construction and post construction periods in order to avoid the foreseeable negative impacts.

c. To identify the potential impact by the STP on related environmental issues like wildlife, bird sanctuaries, flora & fauna,

public health, social uplift, archeological monuments, heritage structures and bring up the appropriate preventive & remedial procedures without compromising the objective of STP per se.

d. In keeping with the operational policy of the World Bank 4.01, go through a process of public consultation and transparently appraising the public of the foregoing and securing their concerns, evolving mutually agreeable measures to all the concerns, document the same and ensuring a periodic and continual follow up with project persons and the public.

e. Record the foregoing as an easily understandable and monitoring system of reporting, review and alerting as may be needed.

1.5 Findings of the Report

a. The public welcomes the STP wholeheartedly as a long felt need being fulfilled and mitigating the widespread sewage stagnation all over the town and meandering sewage flows around.

b. The STP project, being a process driven by biological treatment wherein the organic matters of the sewage are metabolized by the biomass grown in the sewage itself under aerobic oxygen conditions is the closest to nature and does not liberate any harmful or foul odour gases and the issues of air pollution arising there from are set at rest.

c. The STP project solid residue is that of the biomass which have become spent therein and dewatered and compacted as a cake can be

used as soil filler in land legally as per the Indian Manual of Sewerage and Sewage Treatment by the GOI.

d. The STP project liquid residue is the treated sewage duly meeting the specified guidelines of Biochemical Oxygen Demand (BOD) Suspended solids (SS) and pH as laid down by the Pollution Control Board (PCB) and as of now is dischargeable into the nearby river course which incidentally does not have any drinking water source or agriculture or fisheries in its d/s as it meanders to the Bay of Bengal.

e. There are no negative impacts on wildlife, bird sanctuaries, flora & fauna, public health, social uplift, archeological monuments, heritage structures etc. In fact when eventually arboriculture develops around STP, the area may well be a bird sanctuary of sorts in course of time.

f. The quality of the treated effluent discharging river which has already been polluted and saline in nature due to sea water back intrusion will be improved by dilution due to discharging the treated effluent into rivers and the flow will be regular and dissolved oxygen level will be more. Hence, the fishing activity can be developed and other water based activities may also take place.

g.Arising from the above, though there are no foreseeable negative impacts, still as a matter of abundant precaution, a set of monitoring of the air, water, soil and land around the STP site for a radius of 500 m have been identified, locations defined, periodicity specified and the

group responsible to meet periodically and review the position have been recorded.

h. It is thereby to be inferred that this project is environment friendly and a welcome one by the stakeholders.

1.6 Futuristic Recommendations

The futuristic outlook is a mandatory one in bringing into ground reality any project in the public domain. In so far this project is concerned, the distinctly foreseeable and locally sustainable next step will be to institute a study of arboriculture potential waiting to be exploited especially in the terrain which can be irrigated with the treated nutrient laden treated sewage without "wasting" this resource.

Chapter 2

Scope of Work

Description of Project

Nagore area is not properly covered with environmental infrastructures like storm water drains, sewerage system, etc which lead to unhealthy environmental condition, which in turn can be cause of many diseases . Also stagnation of wastewater around residential areas without proper disposal causes unaesthetic condition with pigs and cattle making merry in these areas. Considering the above factors, Nagapattinam Municipality decided to go in for a sewerage system and detailed project report was prepared for execution of an underground sewerage scheme and submitted for approval. Necessary Administrative sanction was accorded by Government of Tamilnadu vide GO(2D) No 237 / dt 11.12.2007 for Rs 49.43 crores and Revised AS was accorded by GoTN vide G.O(D) No.132 / dt 28.02.2011 for Rs 79.31 crores.The Underground sewerage Scheme will be implemented by getting grant and loan from World Bank through TNUIFSL.

Nagapattinam municipality is divided into 8 Zones for the purpose of collection system. Based on the contour and topography of the town, Zone I to VI is for Nagapattinam area and Zone VII and VIII is for Nagore area. The collected sewage from Nagapattinam area will be pumped to 9.63 MLD capacity STP to be installed at Nagapattinam from Main pumping station at Kottaivasal through 600 mm Φ Ductile Iron K7 pipes to a length of 600 M. The sewage from Nagoore area will be collected at Main Pumping station in Jaffar park and thereby will be pumped to 2.96 MLD capacity STP through 350 mm Φ Ductile Iron K7 pipes to a length of 100 M.

To treat the collected sewage a Sewage Treatment Plant (STP) for a capacity of 2.96 MLD has been proposed under Activated Sludge Process.

At the time of formulation of the project, various sites have been considered and the required extent of site is selected at Jaffar park in TS No 965 / 1C to an extent of 2 acres since the proposed land for STP is available with local body.

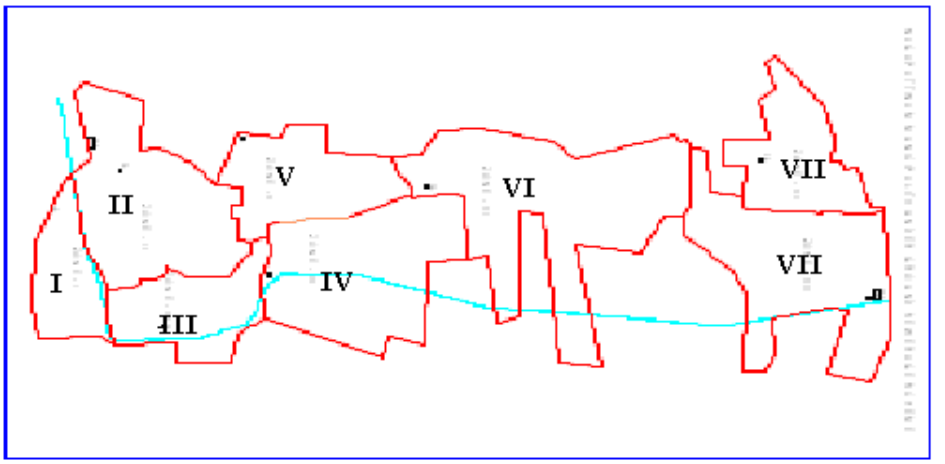


Fig.3 Zones of collection system of Nagapattinam Municipality

The STP is designed for 2.96 MLD for the for the intermediate population (2024) of Nagore area coming under Zone VII to VIII.

Fig.4. Location of Sewage Treatment Plant

The technology used in the STP is called Activated Sludge process(ASP) and widely used in the world and India for decades. It grows the microbes inherent in the sewage itself by facilitating a biological metabolism whereby given the necessary oxygen by way of compressed air, they multiply, disintegrate and consume the organic matter in sewage and finally the microbes are settled down in quiescent conditions and the treated sewage free of the organic matter overflows on the top surface-a process The microbes thus settled out are referred to as sludge and are dewatered mechanically in a closed loop equipment called centrifuge and the water component is returned to the head of the STP and is thus in a loop. The dewatered sludge is called a cake and is mixed with earth and applied in the root zone of the trees where the native soil bacteria is predatory on these dead microbes.

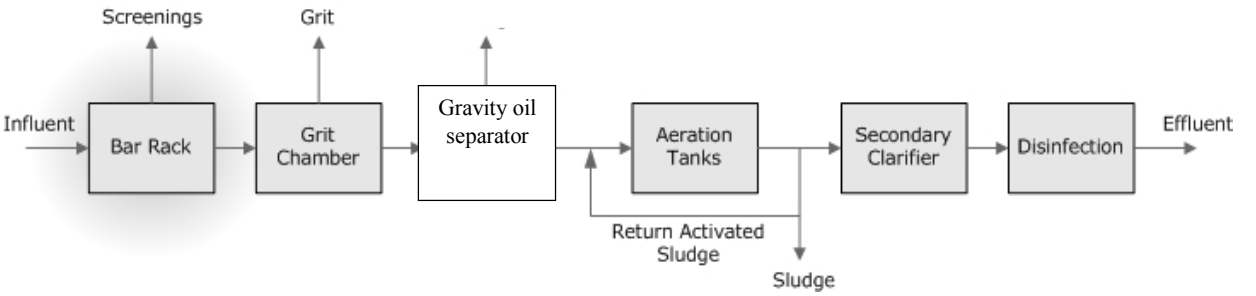


Fig. 5 Simplified Flow Diagram for Activated Sludge Process

2.2 Project Proposal

The STP has been designed for 2.96 mld . The technology proposed in the STP is called Activated Sludge process (ASP).The simplified flow diagram of Activated Sludge Process is shown in Figure.5

2.2.1 Receiving of Sewage

Raw Sewage will be received through 350mm Φ x7 Ksc Ductile Iron pipes from MPS at a hydraulic head of 7.2 m into Inlet Chamber of 2mx2m from where it will be taken into down stream screens. The function of the Receiving Chamber is to reduce the incoming velocity.

2.2.2 Coarse Screening

After the receiving chamber two numbers of coarse screens of 6mx0.6mx0.5m are provided for removal of floating and oversized material coming with the sewage. One is mechanically operated and the other is Manual screen as standby. The coarse screens will be capable to screen out most of the medium & large floating and oversized material such as plastic rags, debris, weeds, paper, cloth, rags etc which could clog the waste water pump impellers. The coarse screen shall be inclined bar screen. The screening material as collected will drop automatically into a wheelbarrows for its disposal.

2.2.3 Fine Screening

Fine screen channels of 6mx0.6mx0.5m will be provided in the up stream of Grit removal system and two numbers of Fine screens will be provided for removal of fine floating material coming with the sewage. It shall be mechanically operated one number of Manual fine screen will be as a standby. The fine screens should be capable to screen out most of the medium & fine floating and material such as hair, debris, weeds, paper, rags etc. which could clog the downstream units. The screening materials as collected will drop automatically into a wheelbarrows for its disposal.

2.2.4 De-gritting

Two numbers of Grit separator tanks of 2x2x0.8 m LD will be provided for removal of grit and small inorganic particulars matter of specific gravity above 2.65 and particle size above 150 microns. The Grit separator tank shall be of RCC construction complete with mechanical internals and square in size. The grit separated will be properly collected and be transferred for disposal. The de gritted sewage shall flow through open channels from the grit separators and confluence into a single channel of suitable width.

2.2.5 Flow Measurement

A Flow measurement channel of 0.25x0.75x3.5m with ultrasonic flow transmitter shall be provided to measure the flow.

2.2.6 Secondary Treatment Process.

2.2.6.1 Combination Tank (aerator & secondary clarifier)

Following is Combination tank designed in circular consisting aeration tank of 32.6 m Φ (OD) and 18.6 m Φ (ID) x4m LD on outer basin with secondary clarifier of 18.6 m Φ with 2.0 SWD in the inner. Prior to aeration tank , the influent will be made to flow through a Gravity oil separator which is a baffled wall system where the floating oil and grease in form of scum will be removed periodically .The influent from Gravity oil separator will enter into the aeration tank and is mixed and aerated for reduction of BOD. By aerating the mixed liquor the aerobic processes will be stimulated, the growth rate of bacteria will be must faster.

Because the bacteria deplete the substrate, flocculation takes place. The soluble substrate becomes a solid biomass and enters into secondary clarifier thro effluent from aerators. These flocks of biomass will sediment in the Secondary Clarifier and the treated effluent will pass to chlorine contact tank.

The sewage from internal buildings of STP such as administrative office cum laboratory will be conveyed through pipes to last manhole of trunk sewer of zone VIII.

2.2.6.2 .Chlorination System

The Treated Sewage from the Secondary treatment units will be collected in a chlorination tank of 50 m x 1 x1.2 m depth where chlorine will be added for disinfection at suitable dosing rate with necessary mixing arrangements and sodium meta bi sulphate (SMBS –

Na2S2O5) will be added to chlorinated treated effluent in order to reduce the residual chlorine if exceeds 0.5 ppm, which is internationally the standard. SMBS is a white crystalline powder with sulfur dioxide odor, readily soluble in water in range from 470 to 540 g/lit . Storage of SMBS is not a problem since it is not covered under Hazardous as per the rules of Ministry of Environment and Forest , GOI, Newdelhi in notification dated 30 th march 2010. SMBS reacts with oxygen when exposed to air resulting changing into sulfate. It has no side effects so it is used as preservative in food and beverage industry.

In this treatment unit, the chlorine dosage will be kept at about 10 ppm and it will be regulated to ensure the residual is not exceeding 0.5 ppm by adding SMBS which reacts with chlorine as its oxidizing agent to convert the sulphite to sulphate instantaneously. This will be done in the final compartment of chlorine contact tank.

2.2.7 Sludge Handing System

The sludge handling system consists centrifuge house of 4mx4m x4.1m with 2 Nos of sludge drying bed of size 4m x 4m.

The excess sludge from secondary clarifier will be sent to centrifuge house for mechanical dewatering with required polymer dosing as catalyst for efficient de watering. As the proposed technology has been ASP- EA , the secondary sludge will be digested anaerobically after centrifugation in drying beds. The sludge cake produced after centrifugation shall be disposed as manure or for land filing by ULB.

The screenings / grit will be disposed to nearby Municipal compost yard is located nearby STP.

The centrate shall be re circulated into the Aeration tank to the waste water for continuous treatment.

2.2.8 Disposal of treated Effluent**:**

The treated effluent after chlorination will flow through 400 mm Φ RCC pipe to a length of 150 m under gravity will be let into the Vettaru river and partly will be re-utilized for gardening / green belt development around STP units.

It has been decided to deliver the treated effluent to M/s Nagai power private Ltd for industrial purpose. The proposal is in advanced stage of clearance by GOTN.

The STP is a manually operated one and does not require any sophisticated manual intervention as the entire biological treatment takes place by gravity. A programmed of induction training and visit to functioning STP has been provided for so that the O&M staff deployed on the project are conversant and are taken care of by SDCL for 5 years.

2.2.9 Safety measures

Hand rails made up of Stainless steel will be provided in the units for safety of operators. Ladders will be constructed for getting access into individual units.

Diesel Generator set of 200 KVA with proper acoustic system will be provided to ensure uninterrupted power supply.

The cost of the project is Rs 4.04 crores including the 5 years O&M.The relevant layout drawing of the STP in Fig 6 is presented herein. The site allotted for STP with the disposal point in Vettaru river are depicted in Fig.7 and Fig.8. The position of inlet and effluent main along with point of disposal to river is indicated in Fig 9.

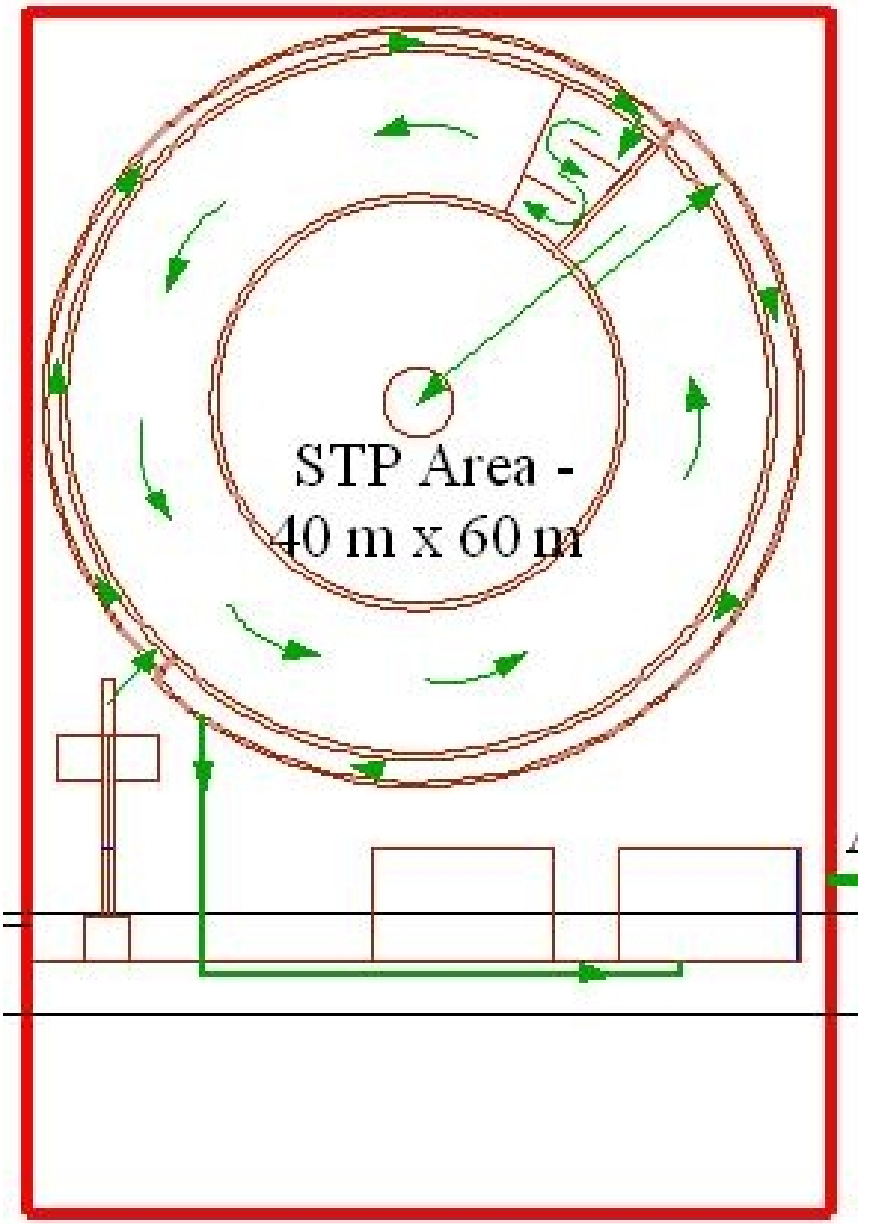
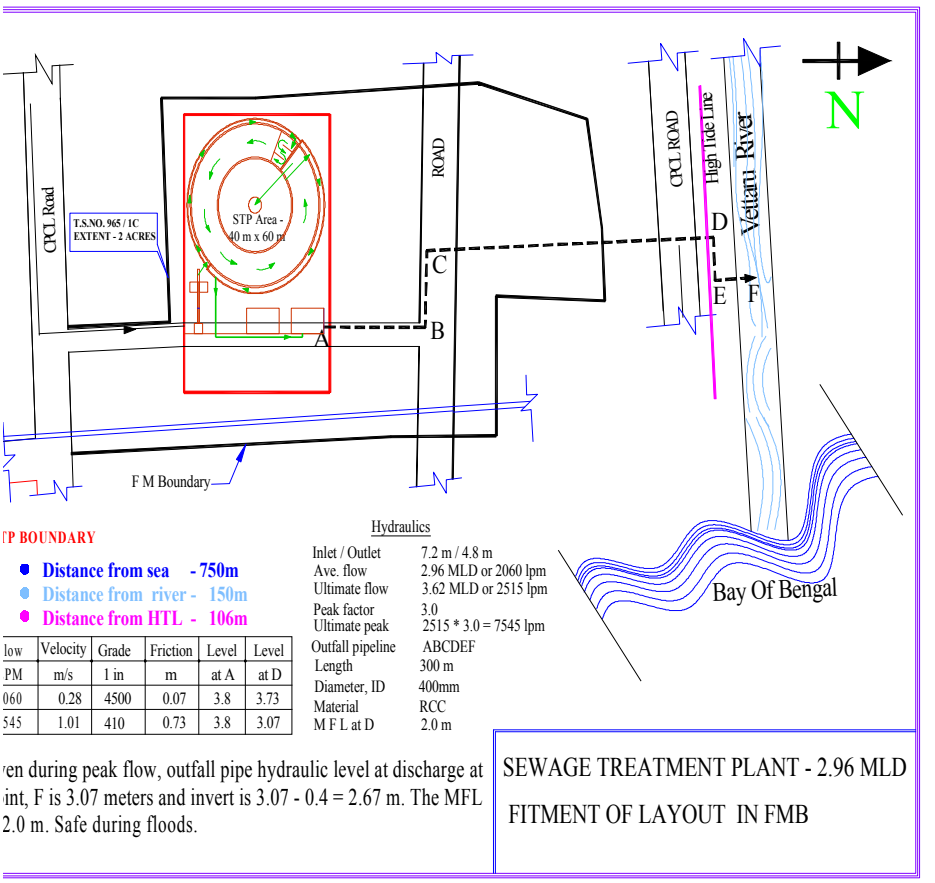


Fig.6. Layout of sewage treatment plant for Nagore

Fig.7 Site for Sewage Treatment Plant

Fig.8. Disposal Point – River Vettaru Near Railway Bridge



low	Velocity	Grade	Friction	Level	Level
PM	m/s	1 in	m	at A	at D
060	0.28	4500	0.07	3.8	3.73
545	1.01	410	0.73	3.8	3.07

en during peak flow, outfall pipe hydraulic level at discharge at int, F is 3.07 meters and invert is 3.07 - 0.4 = 2.67 m. The MFL 2.0 m. Safe during floods.

Fig.9 Position of inlet and Effluent outlet in STP

Purpose of the Report

a) Identification and assessment of all the likely environmental and social impacts of the project components

b) Development of an Environmental management plan for making the project environmentally sound and socially acceptable

c) Recommendation of an appropriate monitoring mechanism for environmental Management.

d) To maximize the benefits of the projects and minimize /mitigate environmental and social risks due to the project.

Legislative and Regulatory Considerations

The statutes broadly applicable to public infrastructure projects , STP are

(a) Water (Prevention and Control of Pollution) Act, 1974 and Tamil Nadu Water (Prevention And Control of Pollution) Rules, 1974 which seeks to control and enhance the quality of water. Under this law, it is mandatory to obtain consent for discharge of effluents and pay consent fees to Tamil Nadu Pollution Control Board (TNPCB) for any municipal projects causing water pollution.

(b) The Water (Prevention And Control of Pollution) Cess Act, 1977, which provides for levy and collection of a cess by local authorities on water consumed by persons or industries to augment resources for Pollution Control Boards.

(c) Air (Prevention and Control of Pollution) Act 1981 and Tamil Nadu Air (Prevention of Control of Pollution) Rules 1983 which address the prevention and control of air pollution. Accordingly the entire state of Tamilnadu has been declared as air pollution causing area and all the STP projects may cause odour nuisance if proper measures are not taken. Hence these laws would be applicable. If air pollution is caused, immediate remedial action will be taken.

(d) Environmental & Social Framework (ESF) & TNUDF which require EA and approval of World Bank prior to implementation. The projects comply with the environmental resettlement and social standards set forth in the TNUDF's Environmental and Social Framework.

(e) Environment (Protection) Act, 1986 which addresses pollution and natural resource issues. It seeks to supplement existing laws on pollution

control and also lays down standards for air quality and noise. The Central Government in pursuance of its rule-making powers under the Act, has passed notifications regulating location of industry and operations.

(f) Public Liability Insurance Act (PLIA) of 1991 mandates that business owners operating with hazardous substances take out insurance policies covering potential liability from an accident and establish Environmental Relief Funds to deal with accidents involving hazardous substances.

(g) Coastal Regulation Notification , 1991 – Notification under section 3(1) and 3 (2) (v) of the Environment Protection Act , 1986 and Rule 5(3)(d) of the Environment protection rules ,1986 Declaring coastal stretches as COASTAL REGULATION ZONE (CRZ) and Regulating activities in the CRZ.

(h) Operation Policy & Directorate of the World Bank-Environmental Assessment – OP/BP 4.01 Requirements which requires the borrower to screen projects upstream in the project cycle for potential impacts. Thereafter, an appropriate EA approach to assess, minimize / enhance and mitigate potentially adverse impacts is selected depending on nature and scale of project. The EA needs to be integrated in the project development process such that timely measures can be applied to address identified impacts. The policy requires consultation with affected groups and NGOs to recognize community concerns and the need to address the same as part of EA. TNUIFSL has adopted the principles of the above policy and has evolved a management framework to address the environmental issues in its lending operations.

(I)Cultural Property – OP 11.03 Requirements – World Bank's Operational Policy Note 11.03 which aims at preserving and avoiding the elimination of structures having archaeological (prehistoric), pale ontological, historical,

religious and unique natural values. Projects that could significantly damage non-replicable cultural properties are declined for funding and the Bank will in turn assist protection and enhancement of cultural properties encountered in the project rather than leaving that protection to chance.

(j) Natural Habitats – OP/BP 4.04-Operational Policy 4.04 which sets out the World Bank's policy on supporting and emphasizing the precautionary approach to natural resource management and ensuring opportunities for environmentally sustainable development. As per this policy, projects that involve significant conversion or degradation of critical natural habitats are not supported by the Bank.

(k) Forests – OP/BP 4.36 which sets out specific policy on protection of forests through consideration of forest related impacts of all investment operations, ensuring restrictions for operations affecting critical forest conservation areas, and improving commercial forest practice through use of modern certification systems. The policy requires consultation with local people, the private sector and other stakeholders in forest area. In the context of TNUP operations, these issues are relevant for the projects that pass through or require diversion of forestland.

Though there are elaborate provisions in these statutes for e specific provisions of the statutes in so far as the public infrastructure projects are concerned, the specific statutes in so far as the STP are as in Table-1

Table-1

Statutes Relating to STP

Project	Applicable Legislations	Obligations	Responsibility
Sewerage Network, Pumping station and Treatment plant	Water (P & CP) Act, 1974	Secure the following from TNPCB for sewage treatment plant: • Consent to Establish. • Consent to Operate • Ensure air and noise quality is within the stipulated limits of TNPCB	ULB / Project implementing Agency. ULB / operating Agency. Contractor during construction and ULB/ operating agency during operation
Sewage treatment plant	CRZ notification 1991	Secure clearance from NCZMA , MoE & F , New Delhi.	ULB / PIA
Effluent discharge to river	Public works department	Secure No objection to discharge effluent to river from PWD	ULB / PIA

INFLUENT AND EFFLUENT QUALITY OF SEWAGE

Sewage Treatment Plant (STP) would be provided for the ultimate population of 35100. At 100 lpcd sewage contribution, the quantity of sewage to be treated would be 2.96 Mld for intermediate population of 29600. The STP with Activated Sludge Treatment Process will be provided.

Influent Quality:

BOD (5 day at 20°C)	300 mg/l
COD	700 mg/l
TSS	450 mg/l

Effluent Quality:

BOD (5 day 20°C)	not more than	20 mg/1
COD	not more than	250 mg/1
TSS	not more than	30 mg/1

Chapter-3

Status of Permissions

The local body has applied for getting consent to establish from TNPCB in 2007. After examining the application, the TNPCB informed local body to get CRZ clearance since the required available site proposed for STP construction falls in CRZ under CRZ notification , 1991 issued by GOI

The local body submitted proposal for CRZ clearance to District Coastal Zone Management Authority and the proposal was forwarded to Director,Dept of Environment on 11.12.2007 with recommendations to issue CRZ clearance .

The proposal was placed in the State Coastal Zone Management Authority meeting through Dept of Environment held on 13.04.2010, the committee recommended the proposal to Government of Tamilnadu. Based on this recommendations , the Principal Secretary , Department of Environment & Forests , Government of Tamilnadu forwarded the proposal to Chairman , National Coastal Zone Management Authority (NCZMA) , Ministry of Environment & Forests , GOI , NewDelhi on 20.05.2010. The proposal was placed in 90th Expert Appraisal Committee meeting held on 20-08-2010 at Fazal hall, Scope complex, NewDelhi and the EAC of IA-III division, Ministry of Environment & Forests, GOI, NewDelhi formally accepted to issue CRZ clearance. After reviewing the proposal and EAC recommendations, the CRZ clearance was issued by the Director, IA-III Division, Ministry of Environment & Forests, Government of India , NewDelhi on 31-01-2011. The copy of clearance letters are available with state Pollution control Board and can be seen in the Ministry of Environment & Forests, GOI , website at http://www.envfor.nic.in.

Based on the clearance received from MoEF, GOI, New Delhi, the consent to establish Sewage Treatment Plant was granted by Tamilnadu Pollution Control Board vide Tamilnadu Pollution Control Board consent order No 79 and proceedings No DEE/TNPCB/NGT/F.MIS 0604/O/L/W/2011 Dated 17-03-2011. The same was issued with the conditions stipulated as following and the compliance status by the executing agency is also furnished along.

Table-2 Status of compliance to TNSCZMA/CRS/TNPCB for Nagore STP

	Specific conditions by TNSCZMA	**Compliance status**
1	The treated water shall be re-utilised for gardening , cultivation etc to the maximum extent and the surplus water may be discharged into the river after achieving the PCB standards	Reutilization of treated water for industrial purpose is finalised and remaining if any will be utilized for gardening.
2	The installation of STP with latest technology such as sequential batch reactor (SBR) may be explored instead of conventional system . Further the use of UV disinfection , instead of chlorine in the proposed STP shall also be explored	Agency has already been fixed to construct STP with ASP – Extended Aeration technology. Further the residual chlorine will be reduced to standard by adding SMBS.
3	Discharge of treated effluent from STP into river shall be designed for the least flow conditions	Discharge of treated water will be 0.03 Cu.m per sec only, this meager quantity can not affect the regular flow in the Vettaru river as the river width is 155 m
4	A continuous monitoring system shall be implemented in consultation with the TNPCB. Environmental Engineers shall be appointed to monitor the operation of the STP for implementing the project effectively .	Fully equipped laboratory with Chemist under Maintenance Engineer for monitoring the system will be placed in STP.
5	Well established Lab shall be provided to monitor the performance of STP	Lab will be installed within STP

	Conditions made by GOI under CRZ notification	Compliance status
i	Consent for Establishment shall be obtained from TNPCB under Air and water Act and a copy shall be submitted to the Ministry before start of any construction work at the site.	Done
ii	Possibilities shall be explored for reuse of the treated sewage water instead of disposed into river / sea.	Agreed. Reuse for industrial purpose is explored.
iii	There shall be no ground water drawal in CRZ area for the project	Agreed
iv	All the conditions stipulated by SCZMA , tamilnadu vide letter dated 20.05.2010 shall be strictly complied	Agreed
v	Construction shall be carried out strictly as per the provisions of CRZ notification , 1991 . No construction work other than those permitted in CRZ notification shall be carried out in CRZ area.	Agreed. Only construction of 2.96 MLD STP .
vi	There shall be no disposal of solid and liquid wastes in to the Coastal areas	Agreed.
vii	The solid waste shall be properly collected , segregated and disposed as per the provision of Solid waste (Management and Handling) rules , 2000.	Agreed. Screened SW will be disposed in to nearby yard and the digested sludge will be disposed for land fill.
viii	Installation and operation of DG set if any shall comply with the guidelines of CPCB	Agreed. DG set will be installed with sound proof.
ix	Under the provisions of Environment (Protection) Act 1986 , legal action shall be initiated against the project proponent if it was found that construction of the project has been started without obtaining environmental clearance	Agreed

Sl. No	Conditions in the NOC issued by the TNPCB	Compliance Status
1	The consent to establish is valid for establishing the facility of Treatment and disposal of Sewage generated in Nagoore area of Nagapattinam Municipality for 2.96 MLD	The STP is designed for 2.96 MLD for the inetrmediate flow
2	The consent is valid for establishing the facility with mentioned outlet in application for the discharge of sewage effluent with the point of disposal in Inland surface water	This is complied with and the treated effluent will be discharged into Vettaru river at a distance of 150 m from the STP through closed conduit of 400 mm RCC pipe.
3	The unit shall provide Sewage treatment plant as indicated in approved layout	The units for STP will be provided only as per approved drawing as shown in Fig 6
4	**ADDITIONAL CONDITIONS**	
1	No untreated sewage or solid waste generated in the treatment plant activity shall find access to nearby channel or water course other than Vettaru	This will be complied with
2	The components of STP shall be sufficiently above Ground level, so as to ensure that the storm water will not be mixed with sewage during monsoon or to avoid carry over the sediments from the site	This is complied with and the units have already been designed properly to avoid intrusion of storm water
3	The unit shall adhere to Ambient air quality/Ambient noise level standards prescribed by the Board	This is complied with and will be adhered properly
4	The unit shall develop thick and adequate green belt around the premises of unit to alleviate air and noise pollution	This is compiled with. Necessary green belt development has been proposed and the implementation plan is also included in the report, refer Table 21 and 22.
5	The unit shall provide compound wall of adequate height around STP	This is complied with and will be provided as substitute item instead of fencing which is in the contract.

6	The unit shall provide rain water harvesting facilities so as to increase the ground water level in the vicinity of the unit	This is complied with. Necessary rain water harvesting facilities will be provided from top of unit buildings to ground level receiving structures.
7	The unit shall install electronic magnetic flow meter at the final outlet of the STP before disposal into Vettaru	This is complied with and will be provided
8	The unit shall explore the possibility of using alternate disinfection method instead of chlorination	Chlorinated effluent will be made to have SMBS to nullify the residual chlorine if any.
5	**GENERAL CONDITIONS**	
1	The above consent to establish cannot be construed as consent to operate and the unit shall not commence the operation without getting consent to operate	This is complied with. Necessary consent to operate will be obtained before commissioning the trial run of the plant.
2	The applicant shall make a request for grant of consent to operate at least thirty days before commissioning trial production	This is complied with. The request will be properly applied by applicant before 30 days of trial run.
3	The unit shall construct compound wall around the boundary of the unit	Necessary compound wall will be provided instead of fencing which found place in contract.
4	Samples of water from the wells or any other nearby water sources have to be taken by the unit and get them analysed by the Board laboratory to develop base line data to assess the existing water quality	This has already been done and the results obtained from TWAD board water testing laboratory is enclosed and analysed in the base line data
5	The unit shall provide alternate power source along with separate energy meter for STP to ensure continuous operation of STP	Necessary noise free generator with required capacity as alternate power source to run STP will be provided
6	The consent does not authorize or approve the construction of any physical structures or facilities or the undertaking of any work in natural water course	This is complied with and no structure of present STP will be constructed on any natural water course
7	Any change in the details furnished in the conditions has to be brought to the notice of the Board and got approved by the Board, before obtaining Consent to Operate under the said act	This is complied with and taken care of.

8	The unit has to comply with the provisions of Public Liability Insurance Act.1991 to provide immediate relief in the event of any hazard to human beings, other living creatures /plants and properties while handling and storage of hazardous substances	This is complied with and necessary safety precautions will be taken care .Public Liability Insurance will also be implemented in the event of any hazardous happenings.
9	Consent to Operate will not be issued unless the unit complies with the conditions of consent to establish	This is complied with
10	In case there is any change in management, the unit shall inform the change with relevant documents immediately	Will be done if any changes in management arise

Further , as the effluent is to be disposed into Vettaru river at a distance of 150 m the permission and no objection for letting treated effluent into river was sought from Public Works Department and the same was granted by Executive Engineer, PWD, Thiruvarur on 17-03-2011 with following conditions.

1. The quantity as mentioned in the project report shall only be let out into river.
2. The treated effluent at let out point should not affect river bund and structures.
3. Protection measures on both sides of conveying pipe lines shall be done by user department.
4. The effluent pipe line shall be leak proof and kept under protection.
5. The laboratory records of treated effluent will be checked by PWD any time.
6. Certificate on quality of effluent has to be given to this office by first week of January of every year.
7. The permission will be revoked if quality standards are not maintained as per norms.

Chapter 4
PREPARATION OF ENVIRONMENTAL PROFILE

The location of the STP site is at the Northern side of the Nagapattinam town along Vettaru river as in Fig. 4

The STP site is nearly at the very extreme boundary of the town. The site is located at TS No 965/1C. The extent of site is 2 acres.The original classification of the site is Natham Promboke and it belongs to Nagapattinam Municipality. The site is located with town in western side , Nagoore – karaikal railway track on Eastern side and Bay of Bengal is back side of rail track and Vettaru river flows on Northern side and Nagai town in the southern side of STP site.

The project area of the STP does not encompass or border any environmentally sensitive area as seen from the fact finding survey carried out as in Table-2.

Table-3

No	Sensitive Environmental Component	Yes/No
1	Religious, heritage historic sites and cultural properties	No
2	Archaeological Monuments/Sites	No
3	Scenic areas	No
4	Hill resorts/mountains/ hills	No
5	Beach resorts	No
6	Health resorts	No
7	Coastal species, areas rich in corals, mangroves, breeding grounds of specific	No
8	Estuaries rich in mangroves, breeding ground of specific species	No

9	Gulf areas	No
10	Biosphere reserves	No
11	National park and wildlife sanctuaries and reserves	No
12	Natural lakes, swamps Seismic zones tribal Settlements	No
13	Areas of scientific and geological interests	No
14	Defense installations, especially those of security to pollution importance & sensitive	No
15	Border areas (international)	No
16	Airport (for solid waste management projects)	No
17	Tiger reserves/elephant reserve/turtle nestling grounds	No
18	Habitat for migratory birds	No
19	Lakes, reservoirs, dams	No
20	Streams/rivers/estuary/seas	yes

Chapter-5

PRECISE LOCALIZED BASELINE AROUND THE STP SITE

The setting of Nagapattinam-Nagoore town is shown in Fig. 2 and represents a reasonable degree of urbanization well connected by road and train services but with no specific industrial or higher academics.

5.1 Project Town Profile

Nagapattinam is one of the oldest Municipality in Tamilnadu and it was constituted in the year 1866 during British regime. It is a selection Grade municipality. The strength of the council is 36. The population of the Municipality as per 2001 census is 92525.

5.2 Transportation Linkages

a) By Road

The town lies on the Vilupuram – Nagapattinam National Highways – 45A. It is also connected with Nagapattinam – Thiruvarur- Mysore National Highways road of NH 67 Some major District roads are also connecting Nagapattinam to nearer places. Regular bus services are available to all important cities of Tamil Nadu and Karaikal of Puduchery union territory from this town.

Fig.10. Map showing the road connections of Nagapattinam

b) By Air & Train

The nearest airport is at Trichy about 140 km away from Nagoor/ Nagapattinam. Regular train services are available to Nagpattinam, Thiruvarur , Thanjavur, , Tiruchirappallai and Ernakulam of Kerala State from this town . At present 5 trains are regularly servicing from this town to the above places.

5.3 Important Landmarks

The well known famous worship place of nagoor darga is with in this area and is nearer to Velakanni, the famous pilgrimage centres of Tamilnadu and Karaikal of Puduchery state .A Large Number of pilgrims from all over the country pass this project town daily. The newly constructed collectorate complex lies along Nagapattinam – Nagore road .

Fig.11 New Collectrate Complex

Fig.12 Nagore boat yard at estuary

There are no reserve forests or national parks in the project limit of the Nagore STP scheme.

5.4 Environmental Resources

Rivers are considered the largest surface water potential resources for the project town of Nagore / Nagapattinam Municipality. Three rivers flow in the project town namely Devanathi, Kaduvaiyaru and Vettaru. The river Devanathi is confluencing with river Kaduvaiyaru before 850m from the sea and flows towards the Bay of Bengal. The river Vettaru also joins with Bay of Bengal at Nagore.

5.5 Project town Population

Population density of Nagapattinam has more than doubled in the six decades spread over an area 14.92 sq km with rapid growth as shown in Table 3.

Table 4

	Year	Population	Year	Population
Population Growth	1951	52936	2001	92525
	1961	57834	2009	102987
	1971	59063	2024 (Estimated)	125895
	1981	68026	2039 (Estimated)	153899
	1991	80262		

5.6 Industries & Agriculture

Industrial Activities in Nagore are very negligible compared to other similar towns. Only few rice and flourmill, Saw Mills and other service industries are running in this town.. Agriculture activity in the project town is more. Fishing based industries are running in the town and a harbor is available here to promote the fishing products.

5.7 Description of the Environment

Temperature

The town has an of average temperature of 32 C maximum and 24.75 C minimum.

Rainfall

The year average rainfall is 1300 mm as in Table-4.The rainfall in the year 2006 is 1450 mm, which is excess of the yearly average rainfall.

Table 5 Season wise Rainfall

Sl. No	Season	Month	Rainfall (mm)	in %
1	Spring	January-February	2	0.1
2	Summer	March-May	257	19.9
3	SW Monsoon	June-September	261	20.09
4	NE Monsoon	October-December	780	60.0
Total			1300	100%

Wind Speed and Direction

Dust Storms, whirl winds and dusty winds blow from various quarters towards the end of May. The Southwest winds sets in during April, it is the strongest in June and continues till September. Northeast monsoon starts during the month of October and blow till January. Cyclonic storm with varying wind velocity affects once in 3 or 4 years during the month of November – December. Both these storms affect the plantation crop. During Southwest monsoon the air is calm and undisturbed.

5.8 Rating of Environment

5.8.1 Air Environment

The prime idea of the baseline air monitoring is to weigh up the existing air quality of the project town. This will also be useful for assessing the conformity to standards of the ambient air quality during the Construction and Operation of the proposed STP project. This segment describes the selection of sampling locations, analytical techniques and frequency of sampling. The results of ambient air monitoring carried out during the study period September '2010 to November '2010 are discussed herein.

5.8.1.1 Ambient Air Quality Parameters

Ambient Air Quality Parameters

The air quality as per Central Pollution Control Board (CPCB) is in Table-5

Table-6 Ambient Air Quality for India as per CPCB Standards

Parameters	SPM	RPM	SO2	NO_x
Standards till Nov-2009				
Industrial Area	500	150	120	120
Residential Area	200	100	80	80
Standards after Nov-2009 (24 hour)				
Parameters		PM_{10}	SO2	NOx
Industrial, Residential, Rural & other		100	80	80

5.8.1.2 Selection of Sampling Locations

The baseline status of the air quality in the study area has been assessed through a scientifically designed ambient air quality-monitoring network. The design of monitoring network in the air quality surveillance has been based on the following considerations;

- Meteorological conditions
- Topography of the study area
- Locations of air quality likely to be impacted by local activities.
- Site Specific Conditions

5.8.1.3 Frequency and Parameters for Sampling

This was carried out simultaneously at five locations as in Table 6 and Fig 13 with a frequency of two consecutive days per month.

Fig. 13 Air and noise Quality Monitoring Locations

Table.7 Details of Monitoring locations for air and noise

S.No	Sampling Station Code	Sampling Station	Direction w.r.to site	Distance in meters	Parametes studied
1	STA-1	Top of the over head tank	E	200	Air, Noise,
2	STA -2	Top of Railway bridge	NE	150	Air, Noise
3	STA -3	Kalpandaga salai	SW	100	Air, Noise
4	STA -4	Myan street	S	50	Air ,Noise
5	STA -5	CPCL road	N	150	Air ,Noise

5.8.1.4 Instruments for Sampling

Respirable Dust Samplers were used for monitoring Total Suspended Particulate Matter (TSPM), HV Sampler, Respirable fraction (<10 microns) and gaseous pollutants like S02and NOx.

5.8.1.5 Sampling and Analytical Techniques

Total Suspended Particulate Matter and Respirable Particulate Matter (RPM) present in ambient air is sucked through the cyclone of the respirable dust sampler. Coarse and non-respirable dust is separated from the air stream by centrifugal forces acting on the solid particles. These separated particulates fall through the cyclone's conical hopper and collect in the sampling cap placed at the bottom. The fine dust (<10 microns) forming the respirable fraction of the TSPM passes the cyclone and is retained by the Filter paper. A tapping is provided on the suction side of the blower to provide suction for sampling air through a set of impingers. Samples of gases are drawn at a flow rate of 0.2 liters per minute (LPM). TSPM and RPM have been estimated by gravimetric method. Modified West and Gaeke method (IS - 5182 part - II, 1969) has been adopted for estimation of SO2 and Arsenite Modified Jacob & Hochheiser has been adopted for estimation of NOx. These are listed in Table-7. Calibration charts have been prepared for all gaseous pollutants. The calibration is carried out whenever new absorbing solutions are prepared and used.

Table-8 Techniques adopted for Ambient Air Quality Monitoring

S No	Parameter	Technique	(*)
1	Sulfur dioxide (SO_2)	Colorimetric method (West and Gaeke)	6.0
4	Nitrogen Oxide (NOx)	Colorimetric method (Jacob & Hochheiser)	3.0
3	Particulate Matter (10 µg/m^3)	Gravimetric method (Respirable High volume sampler)	1.0
4	Carbon Monoxide(CO)	Non dispersive Infrared Spectometry	1.0 PPM
5	Hydrocarbon (HC)	Gas chromatography	0.05PPM

(*)Minimum Detectable Limit (micro.g / m^3)

5.8.1.6 Results and Discussion

The results of the sampling and analysis are compared with the standards for ambient air quality in Table-8 in respect of the stated parameters. It is seen that the maximum and minimum PM (10 μg/m^3) is 45 to 75 as compared to 100 for residential area. The values for SO_2 are 12.6 and 22.2 as compared to 120 and 80. The values for NOx are 7.4 and 16.5 as compared to 120 and 80. Thus, the base line values are well within the limits and do not call for any remedial intervention.

Table. 9 Summary of Ambient Air Quality Results

Sl.No	Sampling station	Concentration in μg/m^3		
		PM	SO_2	NOx
1	STA 1	75	22.2	16.5
2	STA 2	68	18.3	13.2
3	STA 3	74	20.5	12.8
4	STA 4	45	14.3	7.4
5	STA 5	54	12.6	9.8

The standard limit for PM_{10} is 100 μg/$m^{3,}$ SO_2 & NOx is 80μg/m^3

It is seen from the above table that the ambient air quality is within the permissible limits around STP site.

5.9 Noise Environment

The baseline noise levels in the project town of the proposed STP were established based on monitoring in six locations. Noise in general is sound, which is composed of many frequency components of various types of loudness distributed over the audible frequency range. Various noise scales have been introduced to describe, in a single number, the response of an average human to a complex sound made up of various frequencies at different loudness levels. The universally accepted is the 'A' weighted scale which is measured as dB (A).

This is more suitable for audible range of 20 to 20,000 Hz and has been designed to weigh various components of noise according to the response of a human ear. The environmental impact assessment of noise from the proposed activity and vehicular traffic has a bearing on various factors like potential damage to hearing, physiological responses, annoyance and general community responses. The environmental impact of noise can have several effects varying from Noise induced Hearing Loss (NIHL) to annoyance depending on loudness and duration of noise.

The impact of noise sources on surrounding community depends on;

- Characteristics of noise producing sources (instantaneous, intermittent or continuous). It can be observed that steady noise is not as annoying as one which is continuously varying in loudness;
- The time of day at which noise occurs, for example high noise levels at nights in residential areas disturbs sleep patterns.

- The location of the noise source, with respect to noise sensitive land use, which determines the loudness and period of exposure.

The noise survey has been conducted in the study area to assess the background noise levels in different zones viz., Residential, Industrial, Commercial and Silence zones. The main objective of noise monitoring in the study area is to establish the baseline noise levels and assess the impact of the total noise expected to be generated in the surrounding areas by implementing the proposed plant.

5.9.1 Instrument used for Monitoring

Noise levels were measured using a sound level meter. The sound level meter measures the Sound Pressure Level (SPL), the Maximum Sound Pressure Level (max) and the equivalent continuous noise level (Leq) by switching on the corresponding functional modes.

5.9.2 Method of Monitoring

Sound Pressure Level (SPL) measurements were taken at the specified locations, with an interval of 1 minute over a period of one hour for 24 hours. The noise levels during day lime have been monitored between 6 am to 10 pm and night noise levels during 10 pm to 6 am at all the locations covered in the project town. Noise levels were recorded every one minute in the following manner. To obtain noise levels at 8 AM, noise readings, with setting at 'A' response -slow mode, were recorded continuously for 60

minutes. All the readings were obtained for 24 hours. These readings were later tabulated and the frequency distribution table was prepared. Finally, hourly and 24 hourly values for various noise parameters viz., L_{10}, L_{50}, L_{90}, L_{eq} , L_{day}, L_{night} and L_{dn} were calculated.

5.9.3 Parameters measured during Monitoring

For noise levels measured over a given period of time interval, it is possible to derive important features of noise using statistical methods. This is calculated using the percent of the time certain noise levels are exceeded during the given time interval. The notation for the statistical quantities of noise levels is described below;

- L10 is the noise level exceeding 10 percent of the time.
- L50 is the noise level exceeding 50 percent of the time and
- L90 is the noise level exceeding 90 percent of the time.

- Hourly values were computed by noise integrating sound level meter.

- L_{day}: Average noise levels between 6.00 hours to 22.00 hours.
- L_{night} Average noise levels between 22.00 hours to 6.00 hours.

A rating has been developed by Environmental Protection Agency, (US-EPA) for specification of community noise from ail the sources is the Day-Night Sound Level, (L_{dn}).L_{dn} -It is similar to a 24 hr equivalent sound level except that during night time period (10pm to 6 am) a 10 dB (A) weighting penalty is added to the instantaneous sound level before computing the 24 hr average. This night time penalty is added to account for the fact that noise during night when people usually sleep is judged as more annoying than the same noise during the daytime.

The L_{dn} for a given location in a community may be calculated from the hourly $L_{eq's}$, by the following equation where, Ld_{3y} is the equivalent sound level during the daytime (6 am to 10 pm) and L_{night} is the equivalent sound level between 10 pm and 6 am.

$$L_{dn} = 10\log\frac{1}{24}\left\{\sum_{1+1}^{16}10(L_d eq\ /10) + \sum_{1+1}^{8}10[(L_n eq\ +10)/10]\right\}$$

Ambient noise monitoring was carried out at the following locations as in Fig 11 and Table-9.

Noise levels were monitored using a calibrated portable noise level recorder on an hourly basis for 24 hours, once at each location.

Levels of noise monitored during 6 AM to 9 PM were considered for the day noise levels and those monitored during 9 PM to 6 AM were considered for night noise levels. Day and night L_{eq} values were computed based on the monitored noise levels and are presented in Table 10.

The noise levels were found to be within the prescribed limits for all the locations other than at State high way, which exceeded the standards as in Table-12. This is attributed due to the continuous traffic flow on the road throughout the day.

Table 10 Ambient Noise Monitoring Results

Stn Code	L_{day}, dB (A)		L_{night} dB (A)	
	Noise level	Standard	Noise level	Standard
STA-1	36.2	55	28.1	45
STA -2	43.1	55	31.2	45
STA -3	36.8	55	26.7	45
STA -4	27.2	55	21.2	45
STA -5	31.2	55	22.4	45

Table -11 Ambient Noise Standards

Ambient Noise Standards	L_{day}	L_{night}
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

5.9.4 Observations

A. Day time Noise Levels

Noise levels during day time were found to be in the range 27.2 – 43.1 dB (A). The maximum was 43.2 dB (A) at the northeast side where the railway road and boat yard exist and minimum was 27.2dB (A) at the south side of project site.

B. Night time Noise Levels

Noise levels observed to fall in the range 21.2 – 31.2 dB (A) during the night time. A maximum of 31.2 dB (A) was observed at the northeastern side and a minimum-of 21.2dB (A) in the back side of the project site. The results of the survey carried during the study period indicate an average noise level. However, due care must be exercised in locating equipments and machinery along with proper sound proofing equipments to ensure that the noise level doesn't exceed the normal permissible limit of 55 dB (A) in residential area.

5.10 Water Environment

A set of select water quality parameters of surface and ground water resources, within the study area, have been analyzed for assessing the water environment. To assess the water quality in the study area two ground water and one surface water-sampling locations were selected.

5.10.1 Surface Water

Nagapattinam *town* has been provided with protected water supply system. A water Supply Scheme was executed for this Municipality in 1914 with Vettar at Odacheri village as the source. How ever, the supply from this source is only about 20 lakh litres and hence it is inadequate to meet the water requirements of the town.

In 1997 a new augmentation scheme was executed by TWAD Board at an estimated cost of Rs. 1140 lakhs. 11 bore wells were drilled to a depth of about 300m at various locations near Kilvelur village. How ever, three bore wells have subsequently turned saline due to steady increase in the TDS content and pumping was restricted. At present about 7.40 mld is being extracted. During summer months, this quantity gets reduced to 6.4 mld.

There are 11 reservoirs of various capacities and the length of Distribution system is about 85km. Water Supply is effected through 8900 House Service connections and 990 Public fountains.

Further, In 2004 an additional CWSS implemented to Nagapattinam Municipal area for additional 50 lpcd . At present the per capita Water Supply is about 90 1pcd.

5.10.2 Water Quality

The water sample tested for the town indicates that the pH value (7.78) is within the permissible limits of 6.5 to 8.5 for the drinking purpose and the turbidity level of 1 NTU against the norms of 10 NTU and meeting the drinking purpose. The water has a TDS content of only about 780 mg/l and is within the permissible limit of 2000 mg/l.

5.10.3 Storage and Distribution System

The current practice of water transmission and distribution reflects efficient monitoring. The water drawn from head works are transmitted to the over Head tanks located at the various zones. Then the water distributed to the individual service connection of the public and also to the commercial connections.

5.10.4 Distribution Network

The existing distribution system comprises of distribution network from the service reservoirs to individual house service connections and public fountains/stand posts, which covers 90% of total municipal road and Highways road in the town. Existing network system is laid out to cover dense population located in different parts of the town.

5.10.5 Strom water drains

The existing drainage of Nagapattinam is open drainage system. The total length of existing storm water drains is 16 km. The present condition of storm water drains also carries the sullage and sewage water.

5.10.6 Water Sampling Locations of water

The sampling stations were located in the following places and the relevance to the selection is explained aside.

Table.12 Water sampling points

Sl No	Location of sampling station	Distance	Relevance to STP
1	Pond	500	Western side
2	Borewell	250	Eastern side
3	Borewell	200	Northern side
4	Borewell	300	Southern side

The samples from the above sources around and nearer to STP site were collected as grab samples and sent for analyzing for various parameters. The results are tabulated below.

Table 13 - Results of examination of water quality

Sl NO	Parameters	Location1	Location2	Location3	Location 4
1	Appearance	Slight yellow	Clear	Colourless	Colourless
2	Odour	None	None	None	None
3	Turbidity NT units	15	40	39	42
4	TDS mg/l	780	5900	5630	5780
5	EC	1180	8520	8420	8610
6	PH	7.78	7.29	7.46	7.52
7	Alkanity,Total	140	740	738	755
8	Total Hardness	176	1440	1410	1530
9	Calcium	32	224	216	226
10	Magnesium	23	211	206	212
11	Sodium				
12	Potassium				
13	Iron as Fe				
14	Free Ammonia	0.4	3.3	3.1	3.2
15	Nitrite		1.9	1.95	2.01
16	Nitrate	5	8	8.5	8.9
17	Chloride	220	2420	2460	2510
18	Floride	0.4	0.1	0.18	0.21
19	Sulphate	87	92	98	96
20	Phosphate	0.2	0	0	0
21	Tidy test	0.8	2.4	2.45	2.43
22	BOD @20 Deg c	120	0	0	0
23	COD	210	0	0	0
24	Fecal coliform	Not found	Not found	Not found	Not found

The biological parameters like BOD and COD are available in the pond with some lower values due to man made activities and the bore wells are clear away from BOD and COD. The TDS value of Pond is within permissible where as the bore wells show higher values due to adjacent to sea.

Since the treated effluent has to be let into Vettaru river through closed conduit the quality of river Vettaru has been specially taken for the water sampling and samples were collected at the various points from let out point as tabulated in Table.

The treated effluent will be let into the tail end of the Vettaru river at a distance of 150 m from the last outlet of STP. The treated effluent will be

conveyed through 400 mm RCC pipe and will be let over into river well above the MFL of river.

River Vettaru from the discharge point to travel 750 m to join with the sea. So the quality of water is poor due to backwater intrusion. So the water is not used for any other purpose other than some fishing activities after the discharge point.

Table- 14 - Details of Water Sampling Locations

S.No	Location	Nature of Source
1	Vettaru – Let out Point	Surface water
2	Vettaru – 200m from let out point	Surface water
3	Vettaru -400m from let out point	Surface water
4	Vettaru – 600m from letout point	Surface water
5	Vettaru – near Sea	Surface water

The results obtained are tabulated below in Table.

Parameters	Vettaru Let out Point	Vettaru 200m from let out point	Vettaru - 400m from let out point	Vettaru 600m from let out point	Vettaru – near Sea
BOD_5 mg/lt	217.5	202.5	195	240	225
COD mg/lt	3978	4126	4689	4320	3251
DO mg/lt	0.82	1.02	0.89	1.2	1.94
pH	7.02	7.31	7.46	6.22	6.58

The Physical and chemical quality parameters of river Vettaru are also as follows

i)	Turbidity NTU		-	30
ii)	Total Dissolved solids	mg/l	-	26650
iii)	Electrical Conductivity	mho/cm	-	38000
iv)	pH		-	8.05
v)	Total Hardness	mg/l	-	4820
vi)	Chloride as Cl	mg/l	-	13000
vii)	Total suspended solids	mg/l	-	50

The biological parameters like BOD and COD clearly indicate the quality of waste water flowing in the river at present and the high value of TDS also indicates the back water intrusion. So the treated effluent after completion of STP will replace the existing quality parameters with desirable parameters of BOD,COD etc., and also the outfalls of sewage from the dwellings will be curtailed.

5.11 Land Environment

5.11.1 Physiography

Physiographically , the project town can be classified into plain land. The River Vettaru is flowing adjacent to the project town and confluences with Bay of Bengal at a distance of 0.75 Km.

5.11.2 Topography

The topography of the project area has contour ranging from 0m to 4 m . The general topography of the Municipality indicates a gentle fall towards East and West side. The climate is generally moderate hot and moderate chill. The average annual rainfall is 1300 mm . The North East monsoon contributes much for the rainfall.

5.11.3 Geology

The project town is principally assorted into the main types viz., clay, coastal alluvium, sandy loam and black cotton soil. River alluvium includes alternate layers of sand and clay for a huge thickness. River alluvium occurs in areas bordering the River.

5.11.4 Soil Environment

It is essential to determine the type & quality of soil in the project town and identify the current impacts of urbanization on soil quality and also predict probable impacts due to the proposed STP. Accordingly, a study of assessment of the baseline soil quality was carried out.

Table-15 Soil Classification

Sl.No	Soil Classification	Percentage
1	Clay	31
2	Sandy Loam	28
3	Coastal Alluvial	41

Fig17. Soil Nature of Nagore

5.12 Biological Environment

There are no wild life sanctuaries/parks with in 10 km radius of the project town. The area did not record the presence of any critically threatened species. The records of Botanical Survey of India and Forest Department also did not indicate presence of any high endemic or vulnerable

species in this area. Site clearance will be done only in the area required for the project. A minimum level of tree plantation will be ensured. No important species are present in the area. None of the flora and fauna recorded belongs to endangered category. Some flora observed in different soil types are (a) Bambusa aryndinacea, (b) Prosopis juliflora, (c) Azadirachta indica, (d) Nepuntia oleracea Lam and (e) Tamarindus indica . Field studies conducted to assess fauna in study area. On the basis of field studies and secondary sources, there are no endangered animal species present-in the study area.
But some varieties of Fish fauna are found in the rivers like Murrels, Mytes bleekeri (Keluthi), Puntius Suphore (Kendai) and Madavai. Since the treated effluent will be discharged into river with required Dissolved Oxygen there will not be any threat to the fish fauna culture.

5.13 Precise Localized Baseline around the STP site

The present STP site is away from the town and the nearest domestic activity is at least about 60 m away. The nearby slum dwellings lie within 60m from western side of STP . No educational institution is located around or nearer to STP. A Railway station is located adjacent to STP. The site allotted for STP has already been left unused which was leveled and made barren. Besides, there are no trees to be cut up in the STP site.
The sea Bay of Bengal is away at a distance of 750 m. Vettaru river is flowing at a distance of 150 m in the Northern side of STP.
No sensitive environmental components are found around or nearer to STP other than rivers and sea. So necessary permissions and approval sought for establishing the STP nearer to the water bodies have been properly obtained from the concerned departments. Moreover, there are lands available continuous to the STP site which are belonging to the municipality. There is no fishing activity in this area apart from boat yard.
The issue of the STP impacting the environment especially the localized baseline around the STP site becomes non-existent based on the above study. Similarly, the environment impacting the STP is also non-existent because, since the STP is not drawing upon the resources of the environment

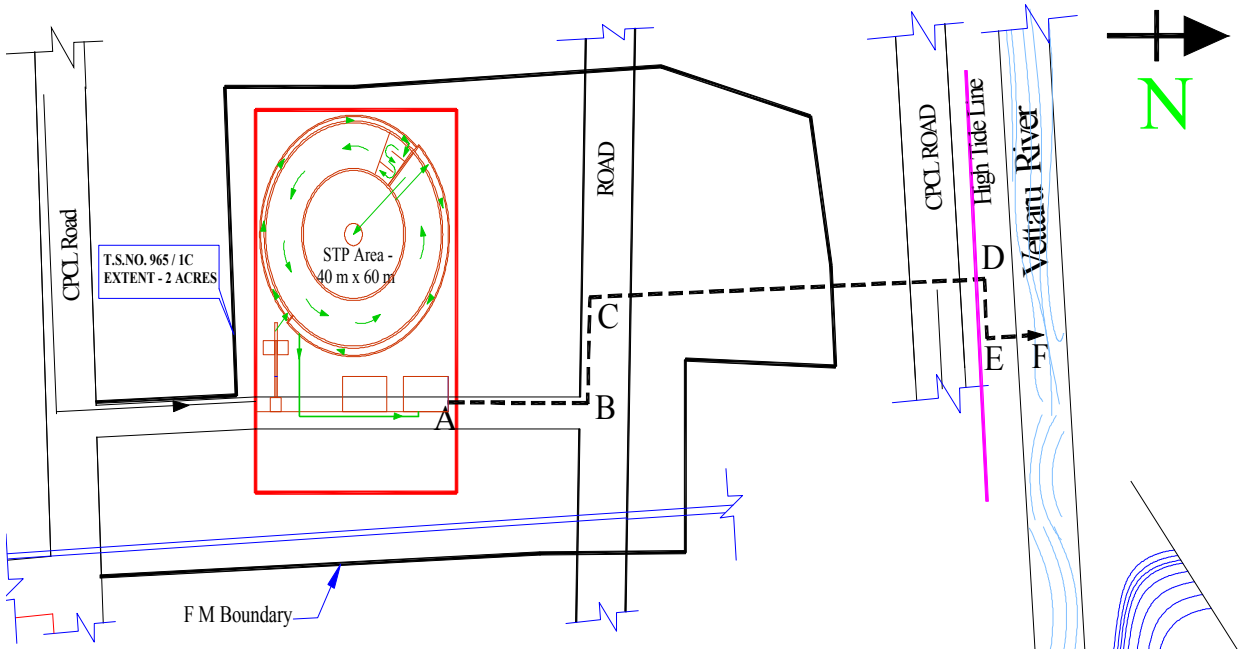
5.14 Inferences from the Baseline Study

The study clearly establishes that the present baseline data is well within the parameters of human tolerance limits of Air, Water, Noise, Land, Soil, Biological and Socio-economics. There are no endangered species of flora and fauna within the native species.

But some varieties of Fish fauna are found in the estuary of rivers due to back water intrusion of the sea like Murrels, Mytes bleekeri (Keluthi), Puntius Suphore (Kendai) and Madavai. Since the treated effluent will be

discharged into river with required Dissolved Oxygen of more than 4 mg/lit after treatment of sewage, there will not be any threat to the fish fauna culture.

However, considering that the local unsanitary conditions of sewage stagnations create the artificial negative impact on the environment by way of breeding of insect vectors, there is enough justification for launching the STP project as a measure which will have a positive impact on the environment in the Nagapattinam town for which this project is being considered and is resolved to be taken up.



TP BOUNDARY

- **Distance from sea - 750m**
- **Distance from river - 150m**
- **Distance from HTL - 106m**

low	Velocity	Grade	Friction	Level	Level
PM	m/s	1 in	m	at A	at D
060	0.28	4500	0.07	3.8	3.73
545	1.01	410	0.73	3.8	3.07

Hydraulics

Inlet / Outlet	7.2 m / 4.8 m
Ave. flow	2.96 MLD or 2060 lpm
Ultimate flow	3.62 MLD or 2515 lpm
Peak factor	3.0
Ultimate peak	2515 * 3.0 = 7545 lpm
Outfall pipeline	ABCDEF
Length	300 m
Diameter, ID	400mm
Material	RCC
M F L at D	2.0 m

ven during peak flow, outfall pipe hydraulic level at discharge at int, F is 3.07 meters and invert is 3.07 - 0.4 = 2.67 m. The MFL 2.0 m. Safe during floods.

SEWAGE TREATMENT PLANT - 2.96 MLD

FITMENT OF LAYOUT IN FMB

Chapter 6

Determination of Potential Impacts

The screening as also the EA aspects are presented in Table 14 herein in so far as the proposed activity at the project site of STP.

Table-16

Screening	Yes	No	Remarks
A	**Project Siting**		
Is the project area densely populated?		✓	A slum dwellings are nearby wihin 60 m and densely populated Nambiyar nagar hamlet is at 0.7km with population of 2000 .
Adjacent to or within any environmentally sensitive areas?	✓		River vettaru flows
Cultural heritage site		✓	
Protected area		✓	
Wet land		✓	
Mangrove		✓	
Estuarine	✓		About 0.75 Km away from site
Buffer zone of protected area		✓	
Special area for protecting biodiversity		✓	
Bay	✓		About 0.75 Km away from site

B Environment Assessment & Review			
Screening	Yes	No	Remarks
Potential env. Impacts the project may cause:			
Impairment of historical / cultural monuments / areas and loss / damage to these sites?		✓	
Interference with other utilities and blocking of access to buildings; nuisance to neighbouring areas due to noise, smell, and influx of insects, rodents, etc?		✓	
Dislocation or involuntary resettlement of people		✓	
Impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?		✓	
Environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?		✓	
Noise and vibration due to blasting and other civil works?		✓	
Discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		✓	
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		✓	Adequate buffer zone is available.
Social conflicts between construction workers from other areas and community workers?		✓	No litigations

Road blocking and temporary flooding due to land excavation during the rainy season?		✓	
Noise and dust from construction activities?		✓	
Traffic disturbances due to construction material transport and wastes?		✓	
Temporary silt runoff due to construction?		✓	
Hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		✓	
Deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		✓	
Contamination of surface and ground waters due to sludge disposal on land?		✓	
Health and safety hazards to workers from toxic gases and hazardous materials, which may be contained in sewage flow and exposure to pathogens in sewage and sludge?		✓	

Chapter 7
Social Assessment

To assess the socio-economic environment in the study area, secondary data was collected on demographic features, amenities and occupation pattern in the area. Detailed socio-economic survey was carried out within limit of the project town and with reference to the proposed STP project to assess the socio economic status of the population. The Socio-Economic status of the population is an indicator for the development of the region. Any developmental project of any magnitude will have a bearing on the living conditions and on the economic base of population in particular and the region as a whole. Similarly, the proposed activities will have its share of socio-economic influence in the project town. Information on socio-economic profile has been already dealt in detail in Environmental Profile. However the following are stated relevant to the terms of reference and specific to the proposed STP project. The data collection for evaluation of impact of proposed project on socioeconomic aspects in the study area has been done through primary household survey method and through the analysis of secondary data collected for the given study area. As per the scope of this study, the information on socio –economic aspects has been collected and complied from several secondary sources. These include Taluk Office, Collectorate, Agriculture Department, Irrigation Department etc. The socio-economic details are that the working population of the project town constitutes 25% of the total population and majority of them are engaged in tertiary activities like tourism and Trade related activities. Secondary Sector is the second important activity and nearly 25% of total workers are engaged in business and related allied activities. Only 36% of total workers are engaged in Primary Sector especially in Fishing and agriculture activities. Basically, there is no negative attitude towards the proposed STP and though economically, the population are not affluent, still, they are aware that the stagnating sewage will soon vanish and are willing to pay tax for STP.

Chapter 8
Public Notice

Public information board mentioning Town Survey number and location was placed at Jaffar park site for 2.96 MLD STP in May 2009 by ULB and implementing agency . No adverse comments received by ULB / Implementing body till date.

Chapter-9

Possible Impacts and mitigation Measures

Impact of Project on Environment, Enhancements and Monitoring

These are presented in Tables 16 to 21

Environmental Management Plan

Table 17 Project EMP and Mitigation in Pre construction, Construction and O&M Stages

No	Potential Negative Impacts	Mitigation Measures	Status in respect of Project at the STP site	Time frame	Responsible agencies
1.		**PRE-CONSTRUCTION STAGE**			
1	Clearances	All clearance required for Environmental aspects during construction shall be ensured and made available before start of work.	i. Since the STP construction falls under Coastal Restriction Zone, clearance from MoEF/GOI for CRZ is obtained ii. Subsequently, Consent to establish STP has also been obtained from TNPCB. iii. For disposing the effluent in the nearby river course, necessary NOC has been obtained from Public Works Department on 17-03-2011.	Before construction	ULB / TWAD

2	Tree Cutting	i) Try to save the trees by adjusting the plant layout or the alignment of sewage intake structures, sewer mains, pumping stations, etc ii) Provide adequate protection to the trees to be retained with tree guards (e.g. Masonry tree guards, Low-level RCC tree guards, Circular Iron Tree Guard with Bars) as required.	The site has already been left unused by local body. Hence there are no trees to be cut up in the STP site, which is barren.	Pre-construction & construction phase	Contractor
		iii) Identify the number of trees that will be affected with girth size & species type along the sewer mains, pumping / lifting station sites and sewerage treatment plant site. The details to be indicated on map to scale and/or a strip map as may be appropriate. Prepare tree cutting schedule to facilitate clearance requirements iv) Trees identified for cutting shall be removed from the construction sites before commencement of construction with prior permission from the concerned department. v) Undertake tree plantation (not less than three rows inside and along the boundary of STP, and compensatory plantation as per the tree cutting clearances). vi) Compensatory plantation by way of Re-plantation of at least twice the number of trees cut should be carried out in the project area.			

3	Utility Relocation	i) Identify the common utilities to be affected such as: telephone cables, electric cables, electric poles, water pipelines, public water taps, etc ii) Affected utilities shall be relocated with prior approval of the concerned agencies before construction starts. iii) Provide advance notice (not less than 10 working days) to affected parties. The advance notice shall be in the form of written notice and a grievance redressal cell shall be established for timely addressing of grievances	There are no such utilities in the project site of the STP.	Pre-construction & construction phase	TWAD/ Concerned departments
4	Baseline parameters	Adequate measures shall be taken and checked to control the Baseline parameters of Air, Water and Noise pollution. Base line parameters shall be recorded and ensured conformance till the completion of the project. The monitoring requirements, at minimum shall comply with consent conditions by the pollution control board	Checked up and are within limits at STP site and monitoring will be followed accordingly	Pre-construction, construction and post-construction phase	contractor

5	Planning of temporary Traffic arrangement	i) Temporary diversion will be provided with the approval of the engineer. Detailed traffic control plans will be prepared and submitted to the engineers for approval, at least two weeks prior to commencement of works. ii) The traffic control plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of wok each day, SIGNAGES, safety measures for transport of hazardous materials and arrangement of flagmen. iii) Any accidents and/or risk of inconveniences caused to the community shall be borne by the contractor	There are no thoroughfares crossing the project site of the STP since the STP is located in Municipal site at the side of the road	Pre-construction & construction phase	contractor / TWAD
6	Disposal of treated wastewater.	i) The construction activities at STP shall be initiated only after consent to establish certificate is secured from the TNPCB. ii) STP operations shall take place only after Consent to Operate certificate is accorded by the TNPCB and the treated water quality shall comply with the consent conditions stipulated by TNPCB or at minimum shall meet the discharge standards depending on the type of receiving water body (stream / nullah /open land /irrigation purposes, etc.) iii) Performance standards shall always be maintained, Ensuring efficient working condition of treatment plant.	The consent to establish STP has been obtained from TNPCB. Agreed to Agreed to	Pre-construction, construction phase& operation phase	ULB/TWAD
7	Storage of materials	The contractor shall identify the site for temporary use of land for construction sites /storage of construction materials, etc. These sites shall be operated only after prior approval of the engineer.	All storages are within the STP site & temporary land not needed	Pre-construction & construction phase	Contractor / TWAD

8	Construction of labour camps	Contractor shall follow all relevant provisions of the Factories Act, 1948 and the Building and the other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 for construction and maintenance of labour camp. The location, layout and basic facility provision of each labour camp will be submitted to Engineer prior to their construction. The construction will commence only upon the written approval of the Engineer. The contractor shall maintain necessary living accommodation and ancillary facilities in functional and hygienic manner and as approved by the Engineer. All temporary accommodation must be constructed and maintained in such a fashion that uncontaminated water is available for drinking, cooking and washing. The sewage system for the camp must be planned. Adequate health care is to be provided for the work force. The layout of the construction camp and details of the facilities provided should be prepared and shall be approved by the engineer.	No labour camp is required nor provided at site as the labour are all native force & transit from their homes elsewhere. They bring their lunches with them. A vehicle equipped with first-aid is always stationed for rushing needy labour to nearest medical center. Any how, temporary accommodation will be provided for and necessary temporary sanitation arrangements will be provided for the labourers use in the worksite.	During the construction	Contractor
		The construction camp shall not be located within 1000m from the nearest water stream, residential areas and/or any sensitive land uses like schools, hospitals, etc.			

2		**CONSTRUCTION STAGE**			
1	Compensatory plantation of trees	Compensatory plantation of atleast twice the number of trees felled should be done in line with competent authority guidelines.	Since the site is barren, no compensatory trees required except green belt	Pre-construction and Construction	contractor
2	Protection of top soil & Environmental enhancing	The topsoil to be protected and compacted after completion of work. Topsoil from the STP area should be stored in stockpiles and that can be used for gardening purposes at WTP site, which will be an environmental enhancing measure.	Agreed to	During construction	contractor
3	Disposal of construction debris and excavated materials.	A suitable site should be identified for safe disposal, in relatively low lying areas, away from the water bodies, residential and agricultural fields etc., and got approved by the Engineer. Care should be taken that dumped material does not affect natural drainage system.	Construction debris is minimal & used for filling in basements and their dumping is not required.	During construction	contractor / TWAD
4	Pollution from Fuel and Lubricants	i) The contractor shall ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refueling sites will be located at least 500 m from rivers and irrigation canal/ponds. ii) All location and layout plans of such sites shall be submitted by the Contractor prior to their establishment and will be approved by the Engineer. iii) Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. iv) Contractor will arrange for	Vehicles come from the town and go back daily This will be complied with This will be complied with This will be complied with	Construction and operation.	contractor

		collection, storing and disposal of oily wastes to the pre-identified disposal sites (list to be submitted to Engineer) and approved by the Engineer. All spills and collected petroleum products will be disposed off in accordance with MoEF and state PCB guidelines. v) Engineer will certify that all arrangements comply with the guidelines of PCB/ MoEF or any other relevant laws.	This will be complied with		
5	Contamination of ground water quality	i) Groundwater quality may get contaminated due to leaching of wastewater. So, the treated water quality shall comply with the standards laid down by the PCB for disposal onto land, water body or for irrigation use. ii) Regular monitoring is required for the treated sewage quality and also the ground water quality in the near by areas and ensures compliance with PCB standards.	This will be complied with This will be complied with	During construction and operation	contractor
6	Water Pollution from Construction Wastes	The Contractor shall take all precautionary measures to prevent the wastewater generated during construction from entering into streams, water bodies or the irrigation system. All waste arising from the project is to be disposed off in the manner that is acceptable by the Engineer.	Water is used only for curing of concrete which is consumptive and no run off This will be complied with	During Construction	contractor
7	Impact of surrounding areas	To avoid the problems of foul smell polluted air, insects, noise pollution and other problems buffer zones to be provided in the form of green belt around the STP site, this has to be strictly ensured.	This will be complied with	During Construction	contractor
8	Informatory Signs and Hoardings	The contractor shall provide, erect and maintain informatory/safety signs, hoardings written in English and local language, wherever required or as suggested by the Engineer.	This will be complied with	During construction	contractor

9	Risk from Electrical Equipment(s)	The Contractor shall take all required precautions to prevent danger from electrical equipment and ensure that – i) No material shall be stacked or placed as to cause danger or inconvenience to any person or the public. ii) All necessary fencing and lights will be provided to protect the public in construction zones. All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Engineer.	This will be complied with	During construction	contractor
10	Disposal of treated wastewater.	i) The treated water quality shall comply with the standards of TNPCB before let out into the stream / nullah /open land /irrigation purposes, and necessary permission to be obtained from the concerned department. ii) Ensure efficient working condition of treatment plant. iii) Prevent the pollution of stream water and other water bodies receiving STP discharge.	This will be complied with This will be complied with This will be complied with	Pre-construction / construction and operation stage.	TWAD / ULB contractor
11	Disposal of sludge	A suitable site should be identified for the safe disposal of sludge generated at the STP site and got approved by the Engineer. Prepare a sludge disposal plan and adheres to the same.	As per the tender document, it is the site of MSW	Pre-construction, construction and operation.	contractor/ ULB/TWAD
12	Labour camp & facilities	Setting up of labour camps needs to be done as per the procedures. Adequate potable water facilities, sanitation and drainage etc., in conformity with the Indian labour laws shall be ensured. The contractor shall also guarantee the following:	No labour camp is required nor provided at site as the labour are all native force & transit from their homes elsewhere. They	During Pre-construction and construction	contractor

		i) The location, layout and basic facility provision of each labour camp will be submitted to Engineer prior to their construction. ii) The construction will commence only upon the written approval of the Engineer. iii) The Contractor shall construct and maintain all labour accommodation in such a fashion that uncontaminated water is available for drinking, cooking and washing. iv) Supply of sufficient quantity of potable water (as per IS) in every workplace/labor campsite at suitable and easily accessible places and regular maintenance of such facilities. v) The sewage system for the camp are designed, built and operated in such a fashion that no health hazards occurs and no pollution to the air, ground water or adjacent water courses take place. Ensure adequate water supply is to be provided in all toilets and urinals.	bring their lunches with them. A vehicle equipped with first-aid is always stationed for rushing needy labour to nearest medical center. Protected water is tankered and stored at site.		
13	Safety Aspects	i) Adequate precautions shall be taken to prevent the accidents and from the machineries. All machines used shall confirm to the relevant Indian standards Code and shall be regularly inspected by the PIA. ii) Where loose soil is met with, shoring and strutting shall be provided to avoid collapse of soil. iii) Protective footwear and protective goggles to all workers employed on mixing of materials like cement, concrete etc. iii) Welder's protective eye-shields shall be provided to workers who are engaged in	This will be complied with	During construction	contractor

		welding works. iv) Earplugs shall be provided to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation. v) The contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, earplugs, mask etc to workers and staffs. The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labor Organization (ILO) Convention No. 62 as far as those are applicable to this contract. The contractor will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and the Building and other Construction Workers (regulation of Employment and Conditions of Services) Act, 1996 are adhered to. The contractor will not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with products containing lead in any form.			
.14	First Aid	The contractor shall arrange for: i) A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone ii) Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital	Fully complied with Fully complied with	During construction	contractor

No.	EA & Issues in various stages of the project	EMP and Mitigation	Responsible agencies
	Construction Stage		
1.	Site clearance and flora & fauna	The entire site is barren and virgin land devoid of any fauna or flora and only sparse dry grass. Hence, no EMP is necessitated in this aspect.	Contractor
2.	Storage of materials	The materials used in civil construction are brought to site only to the extent of transit storage and used up in the works as and when arrived. Mass storage Doesn't arise, as the stockyards of material vendors are easily available in the city. The mechanical and electrical equipments are kept in safe custody in a regular storeroom.	Contractor
3.	Noise & Dust		
3a	Ear plugs to operators of heavy machinery and workers in near vicinity	Heavy machinery is not used except for JCB, which is manufactured to comply with noise emission standards. However necessary ear plugs will be provided to the operators and workers if any heavy machinery will be deployed for any work.	Contractor
3b	Preventive Maintenance of construction equipment and vehicles to meet emission standards and to keep them with low noise.	The only equipment used at site is the JCB in civil works and EOT during equipment erection and these are branded, licensed manufactured items with already compliance in manufacturing process to standards of emission and noise before marketing them.	Contractor
3c	Provision for fixing of generators and concrete mixers at site. Where residences are located within 200m from construction sites and insensitive areas like hospitals, schools and zoological parks, etc, noisy construction work shall be undertaken during day time only (7.30 hrs to 18.00 hrs)	Generators are not used at site. If electrical supply is tripped in the grid, the work is suspended during the outage times. concrete is procured as ready-mix and use of on-site concrete mixers will be only as fillers for small patch works and the timings will be only in broad daylight. Moreover, these mixers used are branded, licensed manufactured items with already compliance in manufacturing process to standards of emission and noise before marketing them.	Contractor

3d	Sound barriers in inhabited areas shall be installed during the construction phase.	This will be provided on the one side where the inhabited area though sporadic is present. These barriers will be of non-corrodible temporary nature till compound wall is completed.	Contractor
3e	During night, material, transport should be uniformly distributed to minimize noise	Night work is not contemplated	Contractor
3f	Prior information to be provided in blasting if significant	Blasting is neither needed nor envisioned	Contractor
3g	Blasting in accordance with the Explosives Act 1984 and Explosive Rules 1983	Blasting is neither needed nor envisioned	Contractor
3h	Dust contamination at construction sites	Dust arises only if stone is crushed at site for concrete. It is directly procured from authorized quarry. Unloading of sand is by automatic tippers. If shoveled in extraneous circumstances. This will be controlled to a drop of about a meter at best.	Contractor
3i	Dust contamination along haul roads.	Trucks are covered by solid tarpaulins in transit	Contractor
4	Earth work- Noise, Land, Social		
4a	Ensure unobstructed natural drainage through proper drainage channels/ structures	Earthwork is practiced only in dry summer times to avoid economic losses to the contractor if done in monsoon	Contractor
4b	Dispose surplus excavated earth at identified sites.	Surplus earth is stored at site and reused for making the base for roadways	Contractor
4c	Ensure minimum hindrance to normal local activities and business	No such local activities and / or business is in place in the project area of the STP	Contractor
4d	Avoid damage to permanent structures	There are no such structures in the project area of the STP	Contractor

5.	Disposal of construction debris-Land		
5a	Daily inspection at haul roads and sites for construction debris for safe collection and disposal to land fill sites	The haul is by trucks equipped with tight top wrap tarpaulins and no such losses are envisioned. If at all, it happens, the same is retrieved to site for consumption.	Contractor
5b	Collection and disposal of refuse	There is no refuse in civil construction. The only refuse is the formwork and shuttering materials which are taken back	Contractor
5c	Minimize construction refuse by balancing cut and fill requirement	This has already been accounted for in design engineering	Contractor
6	Social disruptions-		
6a	Minimize interruptions to utility services though proper planning and scheduling of activities & interdepartmental co-ordination.	There are no utilities in the project site of the STP	Contractor
6b	Construction of temporary road/ access & diversion of traffic.	There is a regular public road and there is no need for temporary roads in public domain and hence not needed	Contractor
6c	Preference to local labour skilled persons during construction and O&M	This is precisely what is practiced to keep a harmony in the social setting	Contractor
7.	Aesthetics		
7a	Aesthetic enhancement through proper house keeping of construction sites.	This is complied with as a standard practice by the contractor in all his works	Contractor
7b	Immediate trench closure after pipe laying/ completion of work	Will be followed	Contractor
7c	Repair pavements immediately following construction of pipe & appurtenant structure	Pavements will come up only after civil works are completed & as such repairs to pavements does not arise	Contractor
7d	Complete construction activity by removing all temporary structures restoring the project and surrounding area as near as possible to the preconstruction.	The whole site is a barren virgin land and restoration does not arise. In fact, the site gets occupied and beautified by the STP activities	Contractor

8.	Conservation-Land-Soil		
8a	Farmland and forest belts shall not be used for materials borrow sites.	Sand, quarry dust &gravel are procured from authorized outlets. No import of earth. No borrow pits.	Contractor
8b	Arable land shall not be selected a borrow sites as must as possible. If excavation has to be done in arable land, top soil layer (30 CM) shall be saved and returned after construction work is completed, so as to minimize impacts on eco system, agriculture and animal husbandry	Borrow sites are not contemplated. Sand and quarry dust and gravel are procured from authorized outlets. Import of earth in not practiced. Topsoil will be redeployed at site	Contractor
8c	Education of construction workers shall be strengthened to protect national resources, wild plants and animals.	There are no such national resources or wild plants or wild animals at the project site of STP	Contractor
9	Construction labour-Social		
9.	Planning of labour camps needs to be done to ensure adequate water supply, sanitation and drainages etc., in conformity with laws.	No labour camp is required nor provided at site as the labour are all native force & transit from their homes elsewhere and bring their lunches. A vehicle equipped with first-aid is always stationed for rushing needy labour to medical center. Protected water is tankered and stored at site. Toilets are with septic tank & leach trench and will be for use even after STP is over.	Contractor
10	Water & Sewer Lines-Water, Land		
10a	Laying of sewer lines should be realigned wherever possible to minimize tree feeling	Sewer lines are not part of the STP and hence need not be done by contractor. Even otherwise, there are no trees in the project site of the STP.	Doesn't arise
10b	Laying Sewerage system-Adequate precautions should be taken while laying the sewer lines to avoid possibility of cross connection with the water supply lines.	Sewer lines and water supply lines are not part of the STP and hence need not be done by contractor.	Doesn't arise

10c	Locating of vents of sewer system, Low cost Sanitation and Sewage Pumping stations- While placing the vent shafts, precautions to minimize odor nuisance to residents be taken	Sewer lines are not part of the STP and hence need not be done by contractor	Doesn't arise
11.	Accidents and Safety-Social		
11a	In order to guarantee construction safety, efficient lighting & safety signs shall be installed on temporary roads with adequate traffic regulations for temporary roads.	Agreed to	Contractor
11b	In construction, effective safety and warning measures be adopted to reduce accidents.	Agreed to	Contractor
11c	Provide temporary crossing / bridges to facilitate normal life and business	The site is exclusive for STP and hence temporary crossings and bridges need not be built by the contractor.	Doesn't arise
12.	Traffic and Transportation-Social		
12a	Use major roads to avoid traffic congestion and insist compliance by the Contractor	Agreed to	Contractor
12b	Local construction materials, especially earth and stones be used as much as possible to avoid long distance transportation	Will be taken care of	Contractor
12c	Adequate actions to direct and regulate traffic be taken in consultation with municipality to prevent jamming of roads during construction. While planning alternative routes, care to be taken to minimize congestion and negative impacts at sensitive receptors as schools and hospitals	Such dense transportations do not at all arise in a work of this nature and a maximum of some four truckloads alone will be in plying over a day. However, this will be sorted out.	Traffic Police/ contractor

12d	Traffic control diversions marked with signs, lights & other measures (flags) be provided	Same as 16c	Traffic Police/ contractor
12e	Prior to creating diversions and detours the citizens be consulted in advance through citizen's meetings. It should be an informed decision taken through public participation.	No such detouring is ever foreseen	Doesn't arise
12f	Diversion works be dismantled to restore area to original condition after construction.	No such diversions are warranted, as a maximum of some four truckloads alone will be in plying over a day.	Doesn't arise
13	Cultural relics- Social		
13.	If fossils, coins, articles of value/antiquity, structures & other remains of geologic or archeological interest are found, the local Govt be immediately informed of such discovery & excavation be stopped until identification of cultural relics by authorized institution and clearance is given.	Agreed to	Contractor
14.	Environmental Pollution		
14a	Prevent loss of chlorine and other chemicals and ensure prescribed safety measures for their storage, handling and application.	Will be properly ensured and more care will be taken in handling	Contractor
14b	The treated water quality shall comply with the standards of TNPCB before let out into the river	Will be complied and regularly monitored	Contractor

15	HRD-Social		
15.	Implementations of a well-planned programme of human resource development aimed at increasing competence and capabilities of technical & administrative personnel at all level	Training of ULB/TWAD staff during the commissioning period of the STP	Contractor
16	Air Quality Sampling		
16	Sampling Once before start of work & once every season of the year during construction period & upto 18 months (operation Period)	Though the tender document specifies sampling for SPM, RPM, SO_2, NO_x, CO & Pb, in actual fact, only the PM - 10 and PM -2.5 can be associated with this construction activity and SO_2, NO_x, CO & Pb are not even remotely linked to it. In the O&M stage, even these two do not arise given the nature of the biological STP. But the Air quality will be monitored in the construction stage and operation stage also for monitoring the odour level of the units .	Contractor
17	Water Quality Sampling.		
17	Sampling Twice a year (pre monsoon and post monsoon seasons) during the construction period and seasonal monitoring for O&M period	Though the tender document specifies for pH, BOD, COD, DO, TDS, Pb, Oil & Grease and Detergents for Surface water and pH, TDS, Total hardness, Sulphate, Fluorides, Chloride, Fe, Pb for groundwater. Proper monitoring will be done for the parameters mentioned in all seasons and necessary water quality monitoring will be as per the consent granted by TNPCB	Contractor
18	Noise Level Monitoring		
18	Sampling once every seasons for each year of construction	The tender document and consent received from TNPCB specify the Noise level on dB (A) scale and this will be monitored at the periphery of the STP	Contractor
19	Soil Quality Monitoring		
19	Sampling in pre and post monsoon seasons each year for the entire construction period	The tender document specifies the Pb, SAR and Oil & Grease which will be monitored at the STP	Contractor

	Laying Of Effluent Pipe		
20	To include measures for the pipeline in the narrow road to the point of disposal.	The effluent main will be laid with proper bottom bedding with encasing concrete on top from STP site to effluent outfall.	Contractor

No	EA & Issues in various stages of the project	EMP and Mitigation	Responsible agencies	Stages
	Operation& Maintenance phase			
	Public and Worker Health and Safety			
1	The potential impacts on public health arise largely from: I)discharge of effluent close to public use areas like resident blocks, agricultural land etc., II) handling and disposal of sludge; and III) accidents and spills	1) The treatment plant will only be allowed for Department staff and authorized personnel; 2) The proposed treatment plant site will be provided with compound wall for security 3) Staff will be inoculated against diseases; 4) All personnel on site will wearing appropriate clothing 5) Adequate ablutions and change facilities to promote appropriate occupational health and safety (OHS) 6) Proper facilities will be incorporated to remove sludge from the sludge drying beds 7) Fresh water will be supplied for wash down	Contractor/ TWAD during five years from commissioning and ULB afterwards	During Operation and maintenance phase
	Plant Operations and Maintenance			
2	The wastewater treatment plant will be designed to allow plant maintenance during ongoing plant operations and minimise down time for routine maintenance activities	Prior to commissioning of the STP an Operations Manual that sets out essential operating and maintenance procedures to ensure optimum environmental management of the activity will be produced. Operators will be adequately trained so that they are competent to operate the plant and are aware of the environmental management requirements of the activity. A copy of the operations/maintenance manual will be kept readily available on the site.	Contractor/ TWAD during five years from commissioning and ULB afterwards	During commissioning and Operation and maintenance phase

	Storage and Use of Hazardous Materials like chlorine etc			
3	It should be ensured that chemicals and fuel storage is safe and that any materials that leak or spill do not cause environmental damage	1) Any dangerous goods or hazardous substances will be stored in accordance with safety standards and regulations in force 2)Regarding disinfection, The consent by TNPCB insisted to explore the possibility of alternative arrangements instead of chlorination , which has to be explored by PIA/ULB and to be decided 3)The quantity of material stored on-site will be kept to a minimum and chemicals will be preferentially ordered on a needs basis 4) An easily accessible spill kit/s will be kept on site 5) An inventory will be kept of all hazardous materials stored on the site. 5) Operators will be trained in the safe handling and storage of hazardous goods	Contractor/ TWAD during five years from commissioning and ULB afterwards.	During Operation and maintenance phase
	Sludge Management			
4	Sludge handling will be one of the issues to be taken care of. Ongoing sludge management during O&M phase has to be developed	1)A sludge management plan will be developed with the guidance of ULB prior to the commissioning of the STP plant to detail the removal of sludge, screenings and grit particles to regularize the provided storage capacity. 2) Identify odour mitigation measures of the sludge removed 3) determine levels for future desludging 4) general consideration will be undertaken when determining the end-of-use options	Contractor/ TWAD during five years from commissioning and ULB afterwards	During Operation and maintenance phase
	Site Access			
5	Site Access to be available to the plant and the inside units for easy movement of vehicles and maintenance personnel	Road access to the STP site is already available. Improved road access to the treatment plant and units will be constructed as part of the works.	Contractor/ TWAD	During construction and Operation and maintenance phase

	Odour Control			
6	The opportunity for the development of nuisance odour is assessed to be limited. Residences are located nearer to STP, and the sources of odour should be restricted at inlet, screens, grit chamber, sumps, clarifiers and the sludge dewatering area.	1)The opportunity for the development of nuisance odour is assessed to be limited 2) Necessary green belt will be developed around STP to control odour and it is included in cost of EMP 3) Necessary spraying of water will be done on the odour creating units 4) Necessary monitoring will be done on ambient air quality around STP as per Use method specified by CPCB for analysis and upto 5 Years (operation Period) by the approved monitoring agencies.	Contractor/ TWAD during five years from commissioning and ULB afterwards	During Operation and maintenance phase
	Noise Control			
7	The anticipated noise levels at the nearest hamlet will comply with CPCB noise level standards. Supply and install equipment and design and construct buildings such that noise levels comply with the regulatory requirements.	The results of the survey carried during the study period indicate an average noise level around STP site. However, due care will be exercised in locating equipments and machinery along with proper sound proofing equipments to ensure that the noise level doesn't exceed the normal permissible limit of 55 dB (A) The noise generating machineries like generator ,re circulating pumps, blowers (if bearings worn out) are placed well away from the nearby premises as per the layout. More over generator is equipped with acoustics for sound proof. So generating noise during operation period will be minimum and will be well within the permissible limits. But if it happens to be increased due to sudden worn outs the operators will be provided with ear plugs before attending the break downs	Contractor/ TWAD during five years from commissioning and ULB afterwards	During Operation and maintenance phase

	Public Access and Security			
8	Secured fencing should be provided. Necessary security personnels to be employed	1)Compound wall will be provided around the wastewater treatment plant site to exclude unauthorised personnel. 2) All infrastructures required for this scheme will have the appropriate security measures in place to prevent sabotage, misuse or theft and will assist in reducing public safety risks.	Contractor/ TWAD during five years from commissioning and ULB afterwards	During Operation and maintenance phase
	Disposal of treated wastewater.			
9	i) The treated water quality shall comply with the standards of TNPCB before let out into the stream / nullah /open land /irrigation purposes, and necessary permission to be obtained from the concerned department. ii) Ensure efficient working condition of treatment plant. iii) Prevent the pollution of stream water and other water bodies receiving STP discharge.	This will be complied with. Necessary care and attention will be taken to comply the standards of treated effluent and the efficiency of STP will be maintained by proper preventive maintenance.	Contractor/ TWAD during five years from commissioning and ULB afterwards	During Operation and maintenance phase
	Water Quality			
10	Samples already taken for base line study should be collected from source and analysis should be done periodically as per Standard Methods for Examination of water and Waste water	Water Quality monitoring will be done in the sampling points for twice a year (pre monsoon and post monsoon seasons) during construction and O & M phase for assessing the quality of ground water around STP and the influent quality will be properly monitored as per the Environment monitoring plan provided in Table-18	Contractor/ TWAD during five years from commissioning and ULB afterwards	During Operation and maintenance phase
	Soil Quality monitoring			
11	The soil inside the STP area and the sludge disposal area are to be tested periodically. If any increase in pollution levels, source shall be identified and shall be diverted from future disposal	Soil Quality monitoring will be done during the pre monsoon post monsoon seasons each year for the entire construction period	Contractor/ TWAD during five years from commissioning and ULB afterwards	During Operation and maintenance phase

	Contingency and Emergency Situations			
12	The contingency and emergency plans will be prepared prior to operation. The plan will address, but not be limited to the following potential events: 1. Treatment plant failures; 2. Disinfection system failures; 3. Treated effluent quality non-compliance; 4. Personnel strikes; 5. Operator errors; 6. Incidents reporting; 7. Natural event emergencies; and 8. Spills or overflows.	Agreed to and will be prepared for before operation.	Contractor/ TWAD	During commissioning
	Monitoring			
13	Monitoring of the discharge is required to: 1.Optimise plant performance; 2. Assess compliance with permitted emission limits; and 3.Assess impacts on the receiving environment Intensive monitoring of the discharge will be undertaken during and after commissioning until plant performance has been evaluated over a range of operating conditions. Plant design capacity should be met No changes in flow characteristics or water quality of receiving waters Plant performance meeting design expectations	Agreed to and will be compiled with	Contractor/ TWAD during five years from commissioning and ULB afterwards	During Operation and maintenance phase
	Complaints Register and Incident Report			
14	A complaints register will be maintained by Contractor to record any incoming complaints and the remedial actions taken to assess and rectify the complaints as appropriate	Agreed to and will be compiled with	Contractor/ TWAD during five years from commissioning and ULB afterwards	During Operation and maintenance phase

4		**Environmental enhancement and special issues**		**Implementing Agency**	**Location**
4.1	Flora and Chance found Fauna	The contractor will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal. If any wild animal is found near the construction site at any point of time, the contractor will immediately upon discovery thereof acquaint the Engineer and carry out the Engineer's instructions for dealing with the same. The Engineer will report to the near by forest office (range office or divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials.	These will be ensured.	Project area	contractor

4.2	Chance Found Archae-ological Property	All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation. The contractor will take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal acquaint the Engineer of such discovery and carry out the SC's instructions for dealing with the same, waiting which all work shall be stopped. The Engineer will seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work in the site.	These will be ensured.	Project area	contractor
4.3	Monitorin g of environ-ment parameters	The contractor shall undertake seasonal monitoring of air, water, noise and soil quality through an approved monitoring agency. The parameter to be monitored, frequency and duration of monitoring plan shall be prepared	This will be complied with	Project area	contractor

4.4	Sensitive Areas	The sensitive areas like Schools, hospitals to be provided with suitable noise barriers and safety measures, prior to the start of work in order to minimize the dust and noise impacts due to vehicle movement during construction and their effectiveness to be checked during operation phase.	Sound proof DG sets , green belt around STP for odor control etc	Project area	contractor
4.5	Clearing of construction of camps and restoration	Contractor to prepare site restoration plans for approval by the engineer. The plan is to be implemented by the contractor prior to demobilization. On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expenses, to the entire satisfaction of the engineer.	Labour come and go daily and there are no camps	Corridor of Impact	contractor

4.6	Tree Protection & Tree Planting	• Giving due protection to the trees that fall in the shoulders /corridor of impact shall be the prime focus during Construction/post construction • Masonry tree guards, Low level RCC tree guards, Circular Iron Tree Guard with Bars, use of plate compactors near trees may also be considered where necessary • Re-plantation of at least twice the number of trees cut should be carried out along the project road. Since the major portion of the project road may pass through open lands, planting of trees along the entire stretch of the road is recommended as an enhancement measure. • Growth and survival of trees planted shall be ensured and monitoring done at least for a period of 3 years. Survival status shall be reported on monthly basis to Engineer incharge.	The land is barren and no trees are available	Corridor of Impact	contractor

Table-18

Environmental Enhancement Plan

No	Enhancement Issues	Details of enhancement	Location	Agency
1	Flora, fauna, trees	Green belt development	In and around STP site	SDCL
2	Water quality	Treated sewage complying to PCB	STP downstream	SDCL
3	Development of fallow barren land	Treated effluent may be utilized for arboriculture	Downstream of STP	Local Body

Table-19

Environmental Monitoring Plan

Air Quality Monitoring	
Project stage	Pre Construction , Construction & operation period (as agreed)
Parameter	SPM, RPM, SO_2, NO_x, CO and Pb
Sampling Method	Use method specified by CPCB for analysis
Standards	Air (Prevention and Control of Pollution) Rules, CPCB, 1994
Frequency	Once before start of work & once every season of the year during construction period & upto 5 years (operation Period)
Duration	Continuous 24 hours / or for 1 full working day
Location	Three Air quality monitoring locations around STP identified for baseline studies.
Measures	Wherever air pollution parameters increase above specified standards, additional measures as decided by the engineer shall be adopted
Implementation	Contractor through approved monitoring agencies
Supervision	Implementing agency
Water quality Monitoring	
Project stage	Pre Construction & Construction
Parameter	• pH, BOD, COD, DO, TDS, Pb, Oil & Grease and Detergents for Surface water. • Water pH, TDS, Total hardness, Sulphate, Fluorides,Chloride, Fe, Pb for groundwater.
Sampling Method	Grab sample collected from source and analysis as per Standard Methods for Examination of water and Waste water
Standards	Indian standards for Inland Surface Water (IS; 2296, 1982) and for Drinking water (IS; 10500,1991)

Frequency	Four times per year in all seasons for eight stations (4 water quality monitoring stations around STP and 4 water quality monitoring stations for surface water in the rivers) and will be monthly for the water in the discharge channel near outlet of effluent into the channel during the construction period& operation period (as agreed) and the regular monitoring of effluent will be done in the laboratory to be formed inside STP
Duration	Grab sampling
Location	Four Water quality monitoring stations identified around STP for baseline studies, and the water quality monitoring in the surface water identified in base line studies in the rivers and the effluent discharge point near river.
Measures	If the desired quality parameters of effluent increase, the function of STP to be monitored and corrected. If any changes in water quality monitoring stations observed, the STP site has to be checked for any leaks or spillages and to be rectified
Implementation	Contractor through approved monitoring agencies
Supervision	Implementing agency
Noise Level Monitoring	
Project stage	Pre Construction , Construction & operation period (as agreed)
Parameter	Noise level on dB (A) scale noise levels on dB (A) scale
Special guidance	• Free field at 1 m from the equipments whose noise level are being determined. • Equivalent noise levels using an integrated noise level meter kept at a distance of 15m from edge of pavement
Standards	MoEF Noise Rulers, 2000
Frequency	Once every seasons (except monsoon) for each year of construction

Duration	Reading to be taken at 15 seconds interval for 15 minutes every hour and then averaged
Location	At the sampling locations as per the base line study for construction and operation period and one location nearer to the placement of pumpsets and generator for operation period of 5 years
Measures	Incase of noise levels causing disturbance to the sensitive receptors, management measures as suggested in the EMP shall be carried out.
Implementation	Contractor through approved monitoring agencies
Supervision	Implementing agency
Soil Quality Monitoring	
Project stage	Pre Construction & Construction
Parameter	Monitoring of Pb, SAR and Oil & Grease
Sampling Method	• Sample of soil collected to be acidified and analysed using absorption spectrophotometer
Standards	Threshold for each contaminated set by IRIS database of USEPA until national standards are promulgated
Frequency	• During the pre monsoon post monsoon seasons each year for the entire construction period
Duration	Grab sampling
Location	Four Soil quality monitoring locations around STP identified for baseline studies.
Measures	At location of increased in pollution levels, source shall be identified and shall be diverted from future disposal
Implementation	Contractor through approved monitoring agencies
Supervision	Implementing agency

8.1 Green Belt Implementation Plan

The tree planting drive as specified in the tender document will be addressed by way of planting trees inside the STP boundary in the freehold area as shown in Fig.11.

The total area of extent allotted for the sewage treatment plant is 2 acres . The area proposed for construction STP , Pumping station and other allied works is 3900 m^2. So the balance area available of 4193 m^2 will be developed with green belt.

The green belt to a width of 6m will be developed on all the four sides of the STP .

The trees having higher rate in converting CO2 to O2will be planted around periphery of STP. The green belt will be extended to all other available area and the buffer zones available around STP .One row of Eucalyptus, one row of Asoka and one row of Neem tree are proposed now for plantation. Provisions for plantation and maintenance of Green belt have been included in the cost of monitoring plan in this report.

Table.20
Species proposed to plant

Sl No	Plant proposed		No of rows proposed	Approximate number of trees
	Local Name	Botanical Name		
1	Neem tree	Azadirachta indica	3	75
2	Eucalyptus	Eucalyptus	3	75
3	Ashok	Sarasca indica	3	75
		Total		225

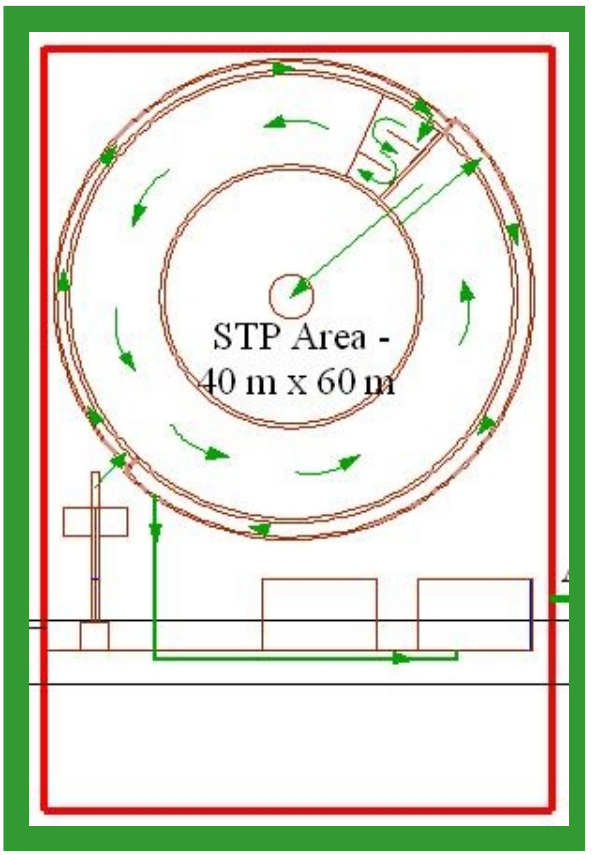


Fig. Proposed green belt development around STP area

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Table -21 Cost of Environment Monitoring plan

Period of Monitoring: 7 Years (2 year for construction phase and 5 years for operation phase)

No	Monitoring of	Frequency	Parameters	location	Period	Frequency	Cost in Rs	Amount
1	Air	Once before start of work & once every season of the year during construction period & during operation period	PM (10 & 2.5) and odour emissions from STP like H2S	STP boundary	7 Years	4 times per annum @ 3 sampling locations	7500/ sampling	630000
2	Water	Twice a year (pre monsoon and post monsoon seasons) during the construction period & monthly during operation period	pH, BOD, COD, SS and TDS	Sampling points around STP	7 Years	4 times per annum@ 8 sampling locations& 12 times per annum @ the effluent disposal point and downstream	1500/sampling	336000 90000

3	Noise	Once every seasons (except monsoon) for each year of construction& operation period	Noise level on dB (A) scale	STP boundary	7 Years	4 times per annum @ 4 sampling locations	1000/sampling	112000
					5 years	1 Sampling location inside STP Near railway track	1000/sampling	5000
4	Soil	During the pre monsoon post monsoon seasons each year for the entire construction & operation period	Pb, SAR and Oil & Grease	STP boundary	7 Years	2 times per annum @ 2 sampling locations	3000/sampling	84000
							TOTAL	1257000
	GREEN BELT DEVELOPMENT							
5	Cost for developing Green Belt including cost of nursery, plantation, providing protection arrangement including fertilizing, watering etc complete. For plantation inside STP and on peripheral including plantation of compensatory plants (For about 300 plantations)						225x200	45000
6	Maintenance and survival monitoring for 5 Years including watering, fertilizing and protecting etc., complete						5x225 X150	168750
7	Safety kit and protective equipments for the staff deployed in maintenance including training and health checkups.						5x 25000	125000

Table 22. Cost of Environmental Protection Measures

No	Particulars	Amount
ONE TIME INSTALLATION COST		
1	Green Belt Development	45000
2	Protective equipments & safety training programmes	125000
RECURRING COST		
3	Environmental monitoring	1257000
4	Green Belt Maintenance	168750
	TOTAL COST	**1595750**

Note: - One time installation cost:-

1) Green belt development:- The installation cost will be met out from the cost bided for site clearance, disposal and landscaping development.

2) Protective equipments: - The cost will be met out from the cost bided for electrical works including safety equipments.

Recurring cost: - The recurring cost will be met out from the cost bidded for O &M period of five years

Environmental Compliance Report

The contractor will submit a monthly progress report as per the reporting format approved by the engineer, on the status of the implementation of the EMP, and get it duly approved by the engineer for its compliance and for proceeding with the work. The Engineer and the Environmental and Social Safeguard (ESS) Manager, who will have access and authority to monitor the status based on the same and for which necessary facilities will be made by the contractor**.**

This will be complied with and necessary facilities will be made for monitoring and monthly progress report will be submitted in the format approved by TNUIFSL.

Operation of Sewage Treatment Plant

Component based measures - Process & Mechanical

Sl No	Unit	Personnel Protective Equipments	Process		Mechanical	
			Issues	Remedial action	Issues	Remedial action
1	Inlet chamber	Hand Gloves Jacket or apron With shoes	Foaming may arise during inflow	Sprinkling of water will be done through hose	Leakages may come in bottom of sluice gates	Periodical greasing and proper lubrication for proper functioning
2	Manual screens	Hand Gloves Jacket or apron With shoes	Due to low flow velocity in the screening channel, too much grit in the bar screen chamber, with water surging	Cleaning frequency will be increased and the chamber will be flushed with a hose	Nothing is expected	Normally the manual screens will be operated during break down of mechanical screens
3	Mechanical screens	Hand Gloves Jacket or apron With shoes	Normally nothing will take place		The rake teeth on mechanical cleaning screens will be susceptible to breakage and bending	The screen, catch tray and screen handling arrangement will be thoroughly inspected once in six months and any item broken, eroded, corroded will be rectified.
4	Grit separator	Hand Gloves Jacket or apron With shoes	If the velocity increases the grit particles will be washed away with sewage to next process	The incoming velocity will be controlled properly by adjusting deflectors monitoring the depth of flow	Mechanical malfunctions and rotten egg odor in the grit chamber (hydrogen sulfide formation), which can lead to metal and concrete corrosion problems	i) he mechanical equipments will be periodically serviced and lubricated to avoid sudden break downs. Chain alignment will be checked properly.
6	Aeration tank	Hand Gloves Jacket With shoes Safety harness with life jacket	a. Excessive , Deficient , or non-uniform mixing occurs. b. Thick greasy dark tan or	a. Air flow will be adjusted or the diffusers will be cleaned. b. High mixed	a. Choking of diffusers. b. Blower breakdown c. Breakdown in diffuser	a. Diffusers will be properly cleaned by removing them from the basin on (ex-situ)

			brown foam or scum c. Large amounts of a white, soap suds-like foam	liquor concentration; waste rate too high. More wasting of sludge is required c. young, under-oxidized sludge. Less wasting of sludge required .	pipes	onsite or inside the basin (in-situ). Proper cleaning techniques will be used for diffuser cleaning. b. The blowers will be properly serviced and lubricated and will be checked for any defects for proper maintenance c. The connected pipes will be properly checked for corrosion or any blockages.
7	Secondary clarifier	Hand Gloves Jacket With shoes Safety harness with life jacket	a. Sludge Floating to Surface b. Overflow weir	a. The return sludge to be regulated or DO in aeration tank to be corrected. b. The overflow weir will be properly monitored and any clumps found will be properly scraped off during shut down maintenance.	Possible wear and tear of mechanical driven assembly	The central driven mechanism will be properly lubricated and serviced at regular intervals to avoid any sudden break down as per the manufacturers guidelines
8	Sludge thickener	Hand Gloves Jacket With shoes Safety harness with life jacket	a) Odors and Rising Sludge b)Thickened Sludge Below c)Desired Solids Concentration	a) Sludge withdrawal rate will be increased. b) Pump rate for sludge withdrawal will be decreased.	Wear & tear of internal components of drive can occur	Proper Preventive maintenance will be adhered. Proper lubrication and greasing will be carried out.

						If one thickener is taken into service, the sludge will be bypassed to another thickener by pumping out. .
9	Centrifuge	Hand Gloves Jacket With shoes	Poor Centrate Clarity Solids Cake Not Dry Enough	Sludge feed rate and chemical dosage will be adjusted. Sludge feed rate will be reduced as well chemical dosage will be adjusted.	Excess Vibration Centrifuge Shuts Down or Will Not Start	Parts will be checked and tightened and will ensure proper lubrication. Centrifuge will be flushed out and the relay will be resetted.
10	Sludge handling pump sets and blower system		No process based issues will araise.	No action will be taken.	Pump choking, impeller & vanes of blower wear & tear.	The stand by pump & blower will operated one day every week to keep the pump & blower in working condition. Necessary preventive measures will be taken for smoother operation.
11	Power failure		No process based issues will arise.	No action will be taken.	Mechanical drives will not function.	Standby captive power will put into operation

Issue Based Measures

Sl no	Operational problem	Factor	Remedial measures
1	Excess flow than the designed quantity	Storm or rain water fed into manholes	The flow will be bypassed after primary clarifier
2	Sludge Floating to surface in Secondary Clarifiers	Bulking of sludge	Aeration tank Dissolved Oxygen level to be increased
3	Improper Effluent Distribution: Fouled Weirs	Accumulated solids and biological growth	Frequent and thorough cleaning of weirs will be done
4	Aeration Tank Content Turns Black;	Inadequate aeration	Aeration piping system will be checked for leaks and plugged air diffusers will be cleaned
5	In Diffused Aeration Systems, Air Is Rising in very large bubbles or clumps in some areas	Diffusers are plugged	Diffusers will be cleaned. Air cleaners ahead of blowers will be checked to reduce plugging from dirty air.
6	Sludge withdrawal ports plugged	Low velocity in sludge withdrawal lines	The clogged lines will be back flushed and the sludge will be pumped more frequently
7	Higher suspended solids concentration in the raw sewage	Due to flow into manholes or due to more domestic activities	Primary clarifier sludge pumps will be operated more
8	Higher sludge flow to sludge thickener	Sludge withdrawal rate is low or more suspended solids in the raw sewage	The underflow pump will be operated for more duration
9	Pin floc in Secondary Clarifier Overflow (very fine solids particles suspended throughout lightly turbid liquid)	Excessive turbulence in aeration tanks or Over oxidized sludge	Aeration agitation will be reduced or Sludge wasting will be increased.

Safety Work Practices for Sewage Treatment Plant (Dos and Don'ts)

Sl No	DOs	DON'Ts
1	Post "NO SMOKING" signs at all entrances to digester facilities and at other conspicuous places.	Do not smoke, light open flames, or produce sparks in the immediate vicinity of digester tanks, digester control buildings, or other conspicuous areas
2	Practice good personal hygiene and safety to guard against occupationally related diseases.	Do not eat, drink, or smoke while handling grit, screenings or sludge
3	Wear clothing that protects the arms and legs. Keep shirts tucked into pants	Avoid loose-fitting clothing that could get caught in moving equipment
4	Wear the appropriate protective gloves whenever working in contact with wastewater, biosolids, Wash hands with a disinfectant soap after handling wastewater, biosolids, or chemicals.	Never allow wastewater, biosolids, or chemicals to come into contact with cuts or broken skin. Do not place fingers into mouth, nose, ears, or eyes while handling wastewater, biosolids, or chemicals.
5	When working with classifiers or grit equipment, beware of rotating equipment.	Do not sacrifice safety for speed
6	Wear safety harness or life jacket when leaning on or hanging over aeration tank guard rails or safety chains.	Do not sit on aeration tank guard rails or safety chains
7	Use care and caution when using hand tools, power tools, and portable power equipment.	Do not use tools and equipment unless trained and experienced in the proper use and operation.
8	Use care and caution when lifting heavy tools and equipment.	Do not use defective tools or equipments for handling tough jobs
9	Use care and caution when working in the laboratory. Store chemicals in a safe place where they are not hazardous to personnel or property. Wash hands with a disinfectant soap after handling chemicals. Wash off chemical spills on skin immediately with running water.	Do not place fingers into mouth, nose, ears, or eyes while handling chemicals. Do not have personal contact with chemicals
10	Keep all work places including service rooms, storage rooms, passageways and exits clean and orderly. Keep all walk areas free of sludge, slime, caustic, polymer, rags, grit, grease, oil, or other materials that could cause slipping.	Do not walk on sludge. Do not walk on bare foot or in slippery footwear.

11	Have at least two persons present before entering a launder or weir trough: one person to enter the sedimentation effluent troughs or weir trough, the other in the clear to observe in the event of an emergency	Never enter a sedimentation tank effluent trough or weir through alone and unattended
12	Plant personnel must be trained and instructed on the use and handling of chlorine, chlorine equipment, chlorine emergency repair kits, and other chlorine emergency procedures. Use extreme care and caution when handling chlorine. Lift chlorine cylinders only with an approved and load-tested device. Secure chlorine cylinders into position immediately Store chlorine l-ton cylinders on their sides only (horizontally) Always keep valve protection hoods in place until the chlorine cylinders are ready for connection Use only the specified wrench to operate chlorine cylinder valves. Open chlorine cylinder valves slowly; no more than one full turn Have at least two personnel present before entering a chlorine atmosphere: One person to enter the chlorine atmosphere, the other to observe in the event of an emergency	Never leave a cylinder suspended. Avoid dropping chlorine cylinders. Avoid banging chlorine cylinders into other objects. Never apply direct flame to a chlorine cylinder. Except to repair a leak, do not tamper with the fusible plugs on chlorine cylinders. Do not hammer, bang, or force chlorine cylinder valves under any circumstances Never enter a chlorine atmosphere unattended Never store other materials in chlorine cylinder storage areas; substances like acetylene and propane are not compatible with chlorine.
13	Use care and caution when working around all electrical equipment Observe "DANGER" and "HIGH VOLTAGE" signs. Consider all electrical conductors and equipment to be "live" until positively proven to be de-energized. Use only wooden or fiberglass ladders when working around electrical lines and equipment. Have frayed or broken electrical cords repaired immediately	Do not bypass electrical safety devices. Do not use open-face drop lights. Never tape frayed or damaged electrical cords. Never use an empty electrical control panel as a storage locker Never use electrical tools in or near water without ground fault interrupter circuit. Never stand in water when using an electrical tool or equipment

CONCLUSION

It may be seen that there are no major concerns of any adverse impacts on the environment by the STP.
The treated effluent from the STP after proper primary, secondary and tertiary treatment will meet the proposed, more stringent emission limit Guidelines

The treatment plant will:

1. Have proper sound management practices, particularly during construction.
2. Not have an impact on cultural heritage material as none was identified during the survey of the site.
3. Control odour emissions.
4. Control the storage of chemicals on the site in accordance with specific Standards.
5. Have no impact on the existing groundwater regime.
6. Produce an effluent which has a high potential for re-use.

These positive outcomes show that the construction of the treatment plant for Nagore of Nagapattinam Municipality will improve the current situation for the environment. Considering that the local unsanitary conditions of sewage stagnations create the artificial negative impact on the environment by way of breeding of insect vectors, there is enough justification for launching the STP project as a measure which will have a positive impact on the environment in the Nagore of Nagapattinam town for which this project is being considered and is resolved to be taken up.

F. No. 11-49/2010-IA.III
Government of India
Ministry of Environment & Forests
(IA-III Division)

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi - 110 003,

Dated: 31st January, 2011

To
The Municipal Commissioner,
M/s Nagapattinam Municipality,
Nagapattinam, Tamil Nadu.

Subject: CRZ clearance for the constructions of Sewage Treatment Plant (STP) and out fall pipeline in Nagore, Tamil Nadu by M/s Nagapattinam Municipality - Reg.

***

This has reference to letter No. 8210/EC-3/2010-1 dated 20.05.2010 of the Principal Secretary, Tamil Nadu Costal Zone Management Authority seeking prior CRZ Clearance under the Coastal Regulation Zone (CRZ) Notification, 1991 for the above proposal. The proposal has been appraised as per prescribed procedure in the light of provisions under the Coastal Regulation Zone Notification, 1991 on the basis of the mandatory documents enclosed with the application viz., the Questionnaire, recommendation of Coastal Zone Management Authority, the additional clarifications furnished in response to the observations of the Expert Appraisal Committee constituted by the competent authority in its meetings held on 18th -20th August, 2010.

2. It is interalia noted that the proposal involves providing underground Sewerage Scheme to the Nagapattinam Town. The Nagapattinam town is divided into 2 areas namely Nagapattinam & Nagoore and 8 Zones. Zone 1 to 6 belongs to Nagapattinam Area and remaining 7&8 belongs to Nagoore area. The Sewage from Zone 1 to 6 will be collected in MPS II at Kottaivasal and will be pumped to 9.63 MLD capacity STP proposed to be installed at TS No 1560/1A which is part of Compost yard of Nagapattinam Town. The Sewage from Zone 7 & 8 will be collected in PS 8 and there by pumped to 2.96 MLD Capacity STP proposed to be constructed at TS No 965/1 C, Jaffar Park, Nagore. The treatment technology adopted for both the STP's is Activated Sludge Process with Sludge handling units.

3. The Tamil Nadu Costal Zone Management Authority has recommended the project vide Lr. No. 8210/EC-3/2010-1 dated 20.05.2010. Both the STPs are located in non-CRZ area. The Nagapattinam STP site (TS 1560/1A) is located at 1050 m from Sea, 300 m from river Devanathi & Kaduvaiyaru and 116 m from HTL of River Kaduvaiyaru. The Nagoore STP site (TS 960/1C) is situated about 750 from Bay of Bengal, 150 m from River Vettaru and 106 m from HTL (river). Only the Sewerage and outfall pipeline falls within CRZ

areas. CRZ-I(ii), CRZ-II and CRZ-III areas. The total extent of the project site is 7.0 crees and out of which 5.0 acres of the areas is falling in Nagapattinam and balance area in Nagore. The project cost in CRZ area is Rs. 48.95 crores.

4. The Expert Appraisal Committee, after due consideration of the relevant documents submitted by the project proponent and additional clarifications furnished in response to its observations, have recommended for the grant of CRZ Clearance for the project. Accordingly, the Ministry hereby accords necessary CRZ Clearance for the above project as per the provisions of CRZ Notification, 1991 and its subsequent amendments, subject to strict compliance of the terms and conditions as follows:

5. **SPECIFIC CONDITIONS:**

(i) "Consent for Establishment" shall be obtained from Tamil Nadu Pollution Control Board under Air and Water Act and a copy shall be submitted to the Ministry before start of any construction work at the site.

(ii) Possibilities shall be explored for reuse of the treated sewage water instead of disposal into river/Sea.

(iii) There shall be no ground water drawal in CRZ area for the project.

(iv) All the conditions stipulated by SCZMA, Tamil Nadu vide letter dated 20.05.2010 shall be strictly complied.

(v) Construction shall be carried out strictly as per the provisions of CRZ Notification, 1991. No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area

(vi) There shall be no disposal of solid and liquid wastes in to the Coastal areas.

(vii) The solid waste shall be properly collected, segregated and disposed as per the provision of Solid Waste (Management and Handling) Rules, 2000.

(viii) Installation and operation of DG set if any shall comply with the guidelines of CPCB.

(ix) Under the provisions of Environment (Protection) Act, 1986, legal action shall be initiated against the project proponent if it was found that construction of the project has been started without obtaining environmental clearance.

6. **General Conditions:**

(i) In the event of any change in the project profile a fresh reference shall be made to the Ministry of Environment and Forests.

(ii) This Ministry reserves the right to revoke this clearance, if any, of the conditions stipulated are not complied with to the satisfaction of this Ministry.

(iii) This Ministry or any other competent authority may stipulate any additional conditions subsequently, if deemed necessary, for environmental protection, which shall be complied with.

(iv) Full support should be extended to the officers of this Ministry's Regional Office at Bangalore and the offices of the Central and State Pollution Control Board by the project proponents during their inspection for monitoring purposes.

7. These stipulations would be enforced among others under the provisions of water (Prevention and Control of Pollution) Act, 1974 the Air (Prevention and Control of Pollution) Act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and Municipal Solid Wastes (Management and Handling) Rules, 2000 including the amendments and rules made thereafter.

8. All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.

9 The project proponent should advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen on the website of the Ministry of Environment and Forests at http://www.envfor.nic.in The advertisement should be made within 10 days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the Regional office of this Ministry at Bangalore.

10. Environmental Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.

11 Any appeal against this Environmental Clearance shall lie with the National Environment Appellate Authority, if preferred, within a period of 30 days as prescribed under Section 11 of the National Environment Appellate Act, 1997.

12. A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parisad/Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.

13. Status of compliance to the various stipulated environmental conditi and environmental safeguards will be uploaded by the project proponent in website,

14. The project proponent shall also submit six monthly reports on status of compliance of the stipulated EC conditions including results monitored data (both in hard copies as well as by e-mail) to the respec Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.

15. The environmental statement for each financial year ending 31st Ma in Form-V as is mandated to be submitted by the project proponent o concerned State Pollution Control Board as prescribed under the Enviro m (Protection) Rules, 1986, as amended subsequently, shall also be put n website of the company along with the status of compliance of EC conditi and shall also be sent to the respective Regional Offices of MoEF by e-mail.

(Bharat Bhu h
Director (IA-
31.07.2011

Copy to:

1 The Principal Secretary, Department of Environment and Forests, Fi Floor, Panagal Building, Saidapet, Chennai – 600 015, Tamil Nadu
2 The Chairman, CPCB, Parivesh Bhawan, CBD-cum-Office Con pl East Arjun Nagar, Delhi – 32.
3 The Director, Department of Environment, Government of Tamil ac Panagal Building, Ground Floor, Saidapet, Chennai-15.
4 The Chairman, Tamil Nadu Pollution Control Board, No. 76, Mou Salai, Gundy, Chennai.
5 The Chief Conservator of Forests, Ministry of Environment and Fo es Regional Office, Western Region, Kendriya Paryavaran Bhavan, Li Road No. 3, Ravishankar Nagar, Bangalore – 462016.
6 Guard File.
7 Monitoring Cell.

Fax:

To

The EE/ sew. on/ chiruvanur.

(Bharat Bhu h
Director (IA-

copy of FAX message is communicated. The EE is requested to apply for consent to establish STP to TNPCB immediately and to get the permission early so as to start the work without further delay. The action in this regard should be submitted to this office by return FAX.

copy to SE/ sewerage circle/ Chennai for necessary follow up action.

For Chief
1/2/11

TAMILNADU POLLUTION CONTROL BOARD

By Register Post with Acknowledgement due
(This document contains 5 pages)

CONSENT ORDER No.79

Proceedings No.DEE/TNPCB/NGT/F.MIS-0604/O/L/W/2011 dt.17.03.2011

Sub: TNPC Board-Consent to Establishment – **M/s.Nagapattinam Municipality (Sewage Treatment plant,) T.S.No.965/1C, Ward no.5, Block No10, Nagore Village, Nagapattinam Taluk, Nagapattinam District.** –for the establishment or take steps to establish the industry under Section 25 of the Water (Prevention and Control of Pollution) Act, 1974, as amended in 1988 (Central Act 53 of 1988).

Ref: 01. Your Application No. Nil dated 11.02.2011
02. IR No.DEE/TNPCB/NGT/F.MIS.0604/2011 dt.15.02.2011
03. 11th Zonal Consent Clearance Committee Meeting held on 22.02.2011

Consent to establish or take steps to establish is hereby granted under Section 25 of the Water (prevention and Control of Pollution) Act, 1974, as amended in 1988 (Central Act 53 of 1988) (hereinafter referred to as 'The Act') and the Rules and Orders made there under to

TheCommissioner,
M/s. Nagapattinam Municipality (Sewage Treatment plant),

(hereinafter referred to as 'The Applicant') authorizing him to establish or take steps to establish the industry in the site mentioned bellow:

T.S.No.965/1C, Ward no.5,
Nagore Village ,
Nagapattinam Taluk.
Nagapattinam District.

This Consent to establish is valid for **two years**, or till the industry obtains consent to operate under Section 25 of the Water (Prevention and Control of Pollution) Act, 1974, as amended in 1988 whichever is earlier subject to special and general conditions enclosed.

17/3/2011

DISTRICT ENVIRONMENTAL ENGINEER,
TAMIL NADU POLLUTION CONTROL BOARD,
NAGAPATTINAM.

To

The Commissioner,
M/s. Nagapattinam Municipality (Sewage Treatment Plant),
Nagapattinam.
Nagapattinam District.

Copy to

The Commissioner,
Nagapattinam Municipality,
Nagapattinam.

Copy Submitted to:

The Member Secretary,
TamilNadu Pollution Control Board,
Chennai-32.

Spare

SPECIAL CONDITIONS

1. This consent to establish is valid for establishing the facility for the manufacture of products/by products (Col.2) at the rate (Col.3) mentioned below. Any change in the product/by product and its quantity has to be brought to the notice of the Board and fresh consent has to be obtained.

Sl.No.	Description	Quantity/Month
1.	Treatment of sewage through sewage treatment plant	2.96 MLD

2. This consent to establish is valid for establishing the facility with the below mentioned outlets for the discharge of sewage/trade effluent. Any change in the outlets has to be brought to the notice of the Board and fresh consent has to be obtained if necessary.

3. The unit shall provide Sewage Treatment Plant as indicated below:

Sl.No	Description of Units	Nos	Size in m
01	Inlet Chamber	1	2.0 x 2.0
02	Screen Chamber	2	0.5 x 0.6 x 6 LD
03	Grit Chamber	2	2x2x0.8 LD
04	Contact Stabilization	1	6.4x2.3x5 LD
05	Aeration tank	1	32.6x18.6x5 LD
06	Secondary clarifier	1	18.6x2 SWD
07	Centrifuge Room	1	4.0 x 4.0

1.Additional conditions

01. No untreated sewage or any solid waste generated in the treatment plant activity shall find access to near by channel/water course other than Vettar river
02. The components of STP shall be sufficiently above ground level, so as to ensure that the storm water shall not be mixed with sewage during monsoon or to avoid carry over of sediments from the site.
03. The unit shall adhere to the Ambient Air Quality / Ambient Noise Level standards prescribed by the Board.

04. The unit shall develop thick and adequate green belt all around the premises of the unit to alleviate Air and noise pollution.
05. The unit shall provide compound wall of adequate height around the sewage treatment plant.
06. The unit shall provide rainwater harvesting facilities so as to increase the ground water level in the vicinity of the unit.
07. The unit shall install Electronic Magnetic Flow Meter (EMFM) at the final outlet of the STP before disposal into the Vettar river.
08. The unit shall explore the possibility of using alternate disinfection method instead of chlorination.

17/3/2011

DISTRICT ENVIRONMENTAL ENGINEER,
TAMIL NADU POLLUTION CONTROL BOARD,
NAGAPATTINAM.

GENERAL CONDITIONS

01. The above consent to establish cannot be construed as consent to operate and the unit shall not commence the operation without obtaining the Consent to operate.
02. The industry shall make a request for grant of consent to operate at least thirty days before the commissioning of trial production.
03. The unit shall construct compound wall around the boundary of the unit.
04. Samples of water from the wells or any other nearby water sources have to be taken by the unit and get them analyzed by the Board Laboratory to develop has line date to assess the existing water quality.
05. The unit shall provide an alternate power source along with separate energy meter for the Effluent Treatment Plant to ensure continuous operation of the Effluent Treatment Plant.
06. The consent does not authorize or approve the construction of any physical structures of facilities, or the undertaking of any work in any natural watercourse.
07. Any change in the details furnished in the conditions have to be brought to the notice of the Board and got approved by the Board, before obtaining consent to operate under the said Act.
08. The unit has to comply with the provisions of Public Liability Act, 1991 to provide immediate relief in the event of any hazard to human beings, other living creatures/plants and properties while handling and storage of hazardous substances (if applicable).
09. Consent to operate will not be issued unless the unit complies with all the conditions of consent to establish.
10. In case there is any change in the management, the unit shall inform the change with relevant documents immediately.

17/3/2011

DISTRICT ENVIRONMENTAL ENGINEER,
TAMIL NADU POLLUTION CONTROL BOARD,
NAGAPATTINAM.

-21-

பொ.ப.து / நீ.ஆ.அ

அனுப்புதல்
பொறி. மு.ரங்கநாதன் பி.இ.,
செயற்பொறியாளர், பொ.ப.து.,
வெண்ணாறு வடிநில கோட்டம்,
திருவாரூர்.

பெறுதல்
நிர்வாகப் பொறியாளர்,
தமிழ்நாடு குடிநீர் வடிகால் வாரியம்,
கழிவுநீர் கோட்டம்,
திருவாரூர்.

எண். 8676 / கோ 100 (பாதாள சாக்கடை) / 2011 / வ2 / நாள் 17.03.2011.

அய்யா,

பொருள் : தமிழ்நாடு குடிநீர் வடிகால் வாரியம் - நாகப்பட்டினம் நகராட்சி பாதாள சாக்கடை திட்டம் - சுத்திகரிக்கப்பட்ட கழிவுநீரை தேவநதி மற்றும் வெட்டாற்றில் விடுவதற்கு அனுமதி கோருதல் - குறித்து.

பார்வை :
1. நிர்வாகப் பொறியாளர், தமிழ்நாடு குடிநீர் வடிகால் வாரியம் / கழிவுநீர் கோட்டம், திருவாரூர் எண் 126 / இவஅ / 2011 / நாள் 23.02.2011.
2. உதவிசெயற்பொறியாளர், பொ.ப.து., வெண்ணாறு வடிநில உபகோட்டம், நாகப்பட்டினம் எண். 168 / 2011 / நாள் 15.03.2011.

****

பார்வையில் காணும் தங்களது கடிதத்தில் நாகப்பட்டினம் பாதாள சாக்கடைத் திட்டம் - சுத்திகரிக்கப்பட்ட கழிவுநீரை தேவநதி மற்றும் வெட்டாற்றில் விடுவதற்கு இத்துறையில் அனுமதி கோரப்பட்டுள்ளது.

எனவே, உரிய தலஆய்வு மேற்கொண்டு அதன் அடிப்படையில் கீழ்க்காணும் இத்துறையின் நிபந்தனைகளுடன் உரிய அனுமதி வழங்கப்படுகிறது.

நிபந்தனைகள்

1. திட்ட அறிக்கையில் குறிப்பிட்டுள்ள பாதாள சாக்கடை சுத்திகரிப்பு நிலையத்திலிருந்து சுத்திகரிப்பு செய்த கழிவுநீரை மட்டுமே வெட்டாறு மற்றும் தேவநதியில் ஆற்றில் வடிய விட வேண்டும். தெரிவிக்கப்பட்ட அளவு அதிகரிக்கப்படும் போது இத்துறையின் முன் அனுமதி பெற்ற பின்னரே செயல்படுத்திட வேண்டும்.

2. சுத்திகரிக்கப்பட்ட கழிவுநீர் இத்துறையின் பாசன ஆதாரங்களில் கலக்கும் இடத்தில் ஆற்றின் கரைகளுக்கும் மற்றும் கட்டுமானங்களுக்கும் எவ்வித சேதமும் ஏற்படுத்தக்கூடாது. அவ்வாறு ஏற்படும் பட்சத்தில் அதனை தமிழ்நாடு குடிநீர் வடிகால் வாரியம், கழிவுநீர் கோட்டம் மூலமாகவே சரி செய்து தரப்பட வேண்டும்.

3. கழிவுநீர் எடுத்துச்செல்லும் கழிவுநீர் குழாய்களின் இரு பக்கங்களிலும் பாது வசதி செய்துக் கொள்ளப்பட வேண்டும். அதுவும் தங்கள் துை மூலமாகவே செய்து கொள்ளப்பட வேண்டும்.

4. கழிவுநீர் எடுத்துச்செல்லும் குழாய்கள் மிகவும் பாதுகாப்புடன் இருப்பது கசிவுகள் ஏதும் ஏற்படாமல் மிகுந்த பாதுகாப்புடன் எடுத்துச் செல்ல வேண்டும்.

5. கழிவுநீர் சுத்திகரிப்பட்ட பின் அதனுடைய தரம் மற்றும் தன்மை ஆய்வுக்குறிப்புகள் பொதுப்பணித்துறையினரால் எந்த நேரமும் பார்வையிடப்

6. ஒவ்வொரு ஆண்டு ஜனவரி முதல் வாரத்தில் கழிவுநீரின் தரத்தன்மைச் சான்று பெற்று இவ்வலுவலகத்திற்கு வழங்கப்பட வேண்டும்.

7. வெட்டாறு மற்றும் தேவநதியில் கலக்கவிடப்படும் கழிவுநீர், நிர்ணயத்தரத் தன்மை குறைந்து, சுற்றுப்புற சூழல் பாதிக்கபடுமானால் இந்த அனுமதி இரத்து செய்ய உரிய நடவடிக்கை மேற்கொள்ளப்படும்.

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செயற்பொறியாளர், பொது,
வெண்ணாறு வடிநில கோட்ட
திருவாரூர்.