ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT (REVISED)

FOR THE RESTORATION OF PALLAVARAM PERIYA ERI AND KEELKATTALAI ERI

UNDER TNSUDP

OCTOBER 2018

PREPARED BY PALLAVARAM MUNICIPALITY

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1 INTRODUCTION

PREAMBLE

Water bodies in urban / peri-urban areas take the toll of development and population increase. Generally, they get polluted due to disposal of Sewage and waste water, Solid Waste, industrial effluent, construction debris, etc. Uncontrolled activities such as vehicle washing and animal washing are other activities are responsible for further deterioration of the water quality. Washing of cloths using detergents and open defecation close to water bodies also increases the pollution and contamination. Eutrophication due to high nutrient content contributed by pollutants and siltation due to land use practices and activities also impact the water holding capacity of waterbodies.

NEED OF THE STUDY: Ecological and hydrological features of the water bodies are being affected due to inappropriate activities and use patterns. However, these have a very important role to play in maintaining the surrounding environmental conditions, water retention and recharge; which are essential for the communities. Hence it is important to protect and restore the available seasonal and perennial water bodies and water spread areas.

PROJECT BACKGROUND

In the present proposal, two water bodies falling within the Pallavaram Municipality have been proposed for restoration and protection. These 2 lakes are selected as they fall in same water shed area and both are along 200 feet radial road. These waterbodies are seasonal (rain fed) *'Eri's* or irrigation tanks. Both these waterbodies are non-system tanks and are under the ownership of the Public Work Department. The preparation of Detailed Project Report for the proposed restoration of Pallavaram Periya Eri and the Keelkattalai Eri was carried out during the period 2013-2014. Tamil Nadu Urban Infrastructure Financial Services Limited (TNUIFSL) appointed M/s Voyants Solutions Pvt. Ltd (VSPL) to prepare a Detailed Project Report (DPR) Restoration and Protection of three Water Bodies within Chennai Metropolitan Area (CMA) - Zamin Pallavaram Peri Eri, Keelkatalai Lake and Pallikaranai Narayanapuram Eri. Of the three Eris two fall under the administrative area of Pallavaram Municipality and Narayanapuram Eri falls under Greater Chennai Corporation Area. Of these, the two waterbodies under the administrative area of Pallavaram Municipality have been proposed to be restored under the Tamil Nadu Sustainable Urban Development Project (TNSUDP). The proposed activities

for restoration were subsequently finalised in consultation with the PWD and revised DPR was finalised by Pallavaram Municipality in 2017. While preparing the DPR in 2014, detailed Environmental and Social Impact Assessment (ESIA) was carried out and report was prepared. However, due to changes in the proposals in consultation with PWD, DPR has been revised and hence the ESIA is now revised by Pallavaram Municipality for the revised scope of work.

OBJECTIVES OF THE PROJECT

The proposed project would be a first input into a longer-term endeavour to restore, rehabilitate and develop the waterbodies / eri's lakes[1] and its surrounding area on a sustained basis.

The aim and objectives of the project are as follows:

- Ecological conservation and restoration of the water bodies.
- Protection of the water bodies from entry of domestic waste water and sewage from the catchment area and improving the water quality.
- Increasing the storage capacity of the water bodies by desilting.
- Improving the water availability through ground water recharge and
- Improving the overall environmental conditions and aesthetics of the area.

PROJECT AREA

Pallavaram Lake and Keelkattalai Lake are located within the Pallavaram Municipal Area limits on the 200 feet Radial Road connecting Pallavaram to Thoraipakkam. The details of Pallavaram Lake and Keelkattalai Lake are as follows:

1.1.1 Pallavaram Periya Lake

The Pallavaram Lake ('big lake'), once a sprawling water body covering about 124.90 Acres in the initial stage. The present stage of the lake is provided in the following table.

[1] In this report the words lake / waterbody / tank etc. are used interchangeably with the local Tamil name Eri which means a rain fed irrigation tank

Land under different uses	Extent (in acres)	Survey Number and Land use
Total Extent	124.90	R.S. No. 432, Water body
(1) Encroached	47.26	
(2) Radial Road	2.47	
(3) SWM dump	5.50	
Sub Total	54.23	
Sub-project Area /Available Area	**69.67**	

The dumping of garbage from Pallavaram Municipality for nearly a decade is the main reason for the shrinkage of the water body in the southern side. The construction of Pallavaram–Thuraipakkam radial Road, a project initiated to connect Chennai Airport and Rajiv Gandhi Salai, had split the lake into two portions and connected with vents. The inlets of the tanks carry sewage from residential area. The surrounding habitations located adjoining to the Lake cause pollution of the lake. The present of the scope of the project is 69.67 acres and it is free from encroachment.

OWNERSHIP OF THE LAKE:

This lake is owned by Public Works Department (PWD); Implementation of the restoration works is being carried out by Pallavaram Municipality after obtaining No objection certificate (NOC) from PWD. As per PWD classification this is a non-system irrigation tank with no ayacut.

CURRENT LAND USE

The current land use of the Pallavaram Lake is Waterbody as per the CMDA Master plan Map No MP-II/CMA (M) 13-C/2008.

SENSITIVE RECEPTORS

The surrounding land uses includes primary, residential and mixed residential adjacent to lake.

ARCHAEOLOGICAL IMPORTANCE

Pallavaram Periya Eri does not fall under protected/ prohibited/ regulated area as per AMSAR classification.

CURRENT USES OF PALLAVARAM LAKE

- The catchment of this Lake is predominantly residential area.
- The habitations are located adjoining to the Lake are responsible for polluting the lake through discharge of untreated sewage, solid waste, open defecation and other misuse such as vehicle and animal washing.

Issues related to the Pallavaram Lake:

The following issues were identified

- Reduction of Storage Capacity and Water spread Area due to siltation and Encroachment.
- Inflow of Sewage and waste water from the Catchment area.
- Excessive growth of weeds due to Eutrophication.
- Leach ate entry from the Solid waste dump in the southern side of the lake.
- Deterioration of ground water quality in the surrounding areas.

Catchment Area

This lake receives storm water from the surrounding catchment area. The approximate catchment area of the lake is around 2.67 Sq. km. The main source of water to the lake is the storm water and during dry weather condition, there will not be any flow in to the lake

As the lake receives storm water during rainy season and it is learnt that the lake may reach full level during September.

Pallavaram Lake has four inlets and one defunct outlet (Sluice)

Figure 1: Satellite Image of Pallavaram lake

1.1.2 Keelkattalai Lake

The Keelkattalai Lake a sprawling water body covering about 56.60 Acres in the initial as well as in the present stage. The area of Keelkattalai Lake as per Revenue records 56.60 acres and there are no encroachments in the lake. The land detail is provided in the following table.

Current Land use	Survey Number and Land Use	Extent (in acres)
Water Body	R.S. No. 307	56.60

OWNER SHIP OF THE LAKE: This lake is owned by Public Works Department (PWD). However, it is being maintained by Pallavaram Municipality. The implementation of the restoration works is being carried out by Pallavaram Municipality after obtaining No Objection Certificate (NOC) from PWD. As per PWD classification this is a non-system irrigation tank with no ayacut.

CURRENT LAND USE: The current land use classification of the Keelkattalai Lake is Waterbody as per the CMDA Master plan Map No MP-II/CMA (M) 13-B/2008.

SENSITIVE RECEPTORS

The surrounding land uses includes primary residential and industrial.

ARCHAEOLOGICAL IMPORTANCE

This does not fall under protected/ prohibited/ regulated area as per AMSAR classification.

CURRENT USES OF KEELKATTALAI LAKE

- In Keelkattalai as there is no encroachment, the total extent of lake area can be restored without any loss.
- Human activities like vehicle washing & bathing, fishing, etc., are noticed
- The lake is getting utilized for casual fishing during rains.

Keelkattalai Lake is surrounded by Ullagam, Alandur, Eswara Nagar, Thenmozhi Nagar, Swamimalai and Veeramani Nagar areas. The total area of the lake as per Revenue records 56.60 acres. The Radial Road from Pallavaram to Thuraipakkam bifurcates the lake into two halves which are hydraulically connected through vents.

Catchment Area: This Lake receives rain water from outlets of Pallavaram Lake and Nanmagalam Lake along with the contributory area in between. The approximate catchment area of the lake works out to 18.75 Sq. km. extending up to Tambaram in south west. The main source of water to the lake is rain water and during dry weather condition there will not be any flow in to the lake.

As the Lake is rain fed the lake reaches full level in September or October month. At present activities like bathing, vehicle washing, casual fishing, etc. are noticed in the lake. There is no indication of sewage or effluent present in the lake water and there is no drain carrying sewage/ waste water entering the lake.

Issues related to Keelkattalai Lake: Pollution from activities like vehicle washing & bathing, dumping of wastes/garbage are noticed

Figure 2: Satellite Image of Keelkattalai Lake

STRUCTURE OF ESIA

The ESIA has been divided into 12 chapters. First chapter is Introduction followed by EIA, Baseline Environment, Review of various options, Project Description, Statutory and Legal Framework, Environmental Impacts and Mitigation Measures, Environmental Management Program, Social Impact Assessment, Implementation Arrangement, Public Consultation, Project Benefits.

2 ENVIRONMENTAL IMPACT ASSESSMENT

OBJECTIVE

The purpose of this Environmental Impact Assessment (EIA) is to provide information on the nature and extent of environmental impacts arising from the proposed restoration activities including impacts on labourers and nearby communities, disposal of waste during construction phase and post construction phase. EIA has been performed for the water bodies to determine the baseline environmental quality data in the study area and to identify and predict possible environmental impacts.

This chapter addresses Identification of aspects and magnitude of impacts due to the disposal of pollutants, misuse of water bodies and other impacts while renovating the Water body and suggest mitigation measures. In order to monitor the water body after restoration suitable monitoring program is proposed.

SCOPE OF EIA

The scope of assessment is to envisage environmental changes anticipated due to the proposed project/ facilities. To assess the environmental attributes of study area around the proposed project site, the following tasks have been performed:

- Literature review and collation of secondary data relevant to the study area;
- Primary data collection and establish the baseline environmental status of the study area;
- Identify pollution levels due to industrial and domestic activities in the study area;
- Understand the impacts on various environmental attributes in the study area.
- Identification of mitigation measures and preparation of an Environmental Management Plan (EMP) outlining the measures for environment protection;
- Identify critical environmental attributes required to monitor regularly.
- Revision of the earlier EIA Report.

METHODOLOGY FOR EIA

Any developmental activity in general is expected to cause impacts on surrounding environment at the project site during its implementation and operation phases, which can be both positive and negative. The nature and intensity of impacts on different components of environment depend on the type of project activities and geographical conditions of the study area. The impacts of the project activities on environmental components can be quantified through EIA Studies within the impact zone of the project. The results of EIA studies form the basis for the preparation of a viable EMP for mitigation of the adverse impacts.

2.1.1 Study period

The baseline information on physical information of the lake, water and soil quality and visual inspection of the flora/ fauna in the project area was collected during May and June 2018 and included in this revised ESIA report.

2.1.2 Study Area

For the environmental impact studies, the lake area proposed for restoration was identified as study area (Impact Zone). The studies carried out on each individual component have been detailed in subsequent sections.

Consultation with Stakeholders: Consultation with the general public near the project area was conducted on 20.08.2018 with the aim of sharing the information about the ongoing project and receiving their feedback and suggestions. Details of the consultation is provided in the **Chapter 11**.

3 BASELINE ENVIRONMENT

EIA study for this Water body restoration involved assessment of water, soil, and the existing biological environment within the project area. The process has been extensively carried out in and around the entire project area. The project area has been monitored and necessary baseline survey samples collected and analysed. Results of the reference sample tests have been established as the baseline to study the adverse (potential) impacts due to the discharge of sewage directly / indirectly into the water body, predict the possible impacts due to proposed project activities and prepare suitable Environment Management Plan.

SOLID WASTE MANAGEMENT

Pallavaram Municipality is Selection Grade Municipality and approximate garbage generation per day is 104 M.T. (SBM survey)

The Public Health section is functioning under the Sanitary Officer. There are 1 Sanitary Officer, 7 Sanitary Inspectors, 14 Sanitary Supervisors, 282 Sanitary Workers, 10 Drivers under this section.

A Site to an extent of 50 acres was purchased jointly for Alandur, Pallavaram and Tambaram Municipalities for the Combined Compost Yard at Vengadamangalam in Chengalpattu Taluk. The plant has been constructed and is operational. Pallavaram Municipality transports all the solid waste generated within its administrative area to the new solid waste management site. Pallavaram Municipality has ensured that there will not be further dumping of solid waste into the Pallavaram lake area.

WATER QUALITY MONITORING AND ASSESSMENT

To assess the water quality, samples have been collected from each lake and analysed for various parameters. The details are provided as follows:

3.1.1 Water Quality – Pallavaram Periya Lake

Water Samples were collected on 04.06.2018 in the water spread area of Pallavaram Lake.

To ascertain the Water Quality of the Lake, Water Samples were collected from two locations inside the Lake and analysed for various Parameters.

The result shows BOD-47.2 mg/l – 57.1 mg/l as against < 3 mg/l. This is a clear indication of polluted water. This indicates the presence of sewage and microorganisms; indicating the need for sufficient heath care / PPEs for works while

working on the Lake. Total Coliform 1100/100 ml and 1600/100 ml against 500/100 ml. indicating the inflow of domestic waste water. Oil and grease- levels were observed as 17 mg/l and 52 mg/l in the samples. This also points out the need for waste water diversion from the inlets and improvements to lake water quality after diversion / proposed restoration.

3.1.2 Water Quality – Keelkattalai Lake

The Restoration work in Keelkattalai Lake commenced during 3/18. Water Samples were collected on 04.06.2018 from the water spread area of Keelkattalai Lake.

To ascertain the Water Quality of the Lake, Water Samples were collected from 2 locations inside the Lake and assessed for various parameters.

The result shows BOD-5.3 mg/l – 6.4 mg/l as against < 3 mg/l, oil and grease- 4 mg/l and 7 mg/l. Total Coliform 345/100 ml and 542/100 ml against 500/100 ml. The oil and grease level indicate the pollution from vehicle washing activity.

The higher concentration of Pollutants is due to the water samples being tested during low storage in Keelkattalai Lake.

SOIL QUALITY MONITORING

Assessment of soil quality was carried out during June 2018. The soil sample from Pallavaram Tank was collected at 100 m east of infall point of inlet drain D2 in the water spread area of the Tank and in Keelkattalai Tank it was collected 120 m south of Radial Road and 40 m west of Tank Bund. The Results of the soil quality assessment are provided in the below Table

Table 3-1: Summary of Silt Quality analysis

S.N.	Parameter	Results (mg/l)		Permissible concentration as per Hazardous Waste Rule** (mg/l)
		Pallavaram Periya Lake	**Keelkattalai Tank**	
1	Colour	Black Muddy	Grey	
2	Nitrate asN	122-284	55.0-62.0	1,000
5	Iron as Fe	369-117	157-186	-
6	Copper as Cu	1.87-4.13	0-0.12	25
7	Zinc as Zn	12.8-21.30	1.96-2.83	250
8	Nickel as Ni	0-0.15	BDL	20
9	Cobalt as Co	BDL	BDL	80
10	Manganese as Mn	BDL	0.11-0.14	10
11	Lead as Pb	O.68-1.16	BDL	5.0
12	Chromium as Cr	0.24-0.86	BDL	5.0

Source: ** Standards Laid down under Schedule- II of Hazardous Waste Rule 2016.

Review of Results for Silt

The result shows that the pollutants present in the samples are well within the concentration limits prescribed in Hazardous Wastes Rules, 2016. Hence, the silt after utilising within the site for strengthening of bund, the excess earth can be well disposed in the abandoned stone quarry in Tiruneermalai. Vegetative matter / weeds will be sent to the Pallavaram Municipality's solid waste composting yard at Venkadamangalam.

FLORAL AND FAUNAL ASSESSMENT

Chennai is a metropolitan city in India. The rapid growth of Chennai city has caused stress on the environment and infrastructure services in the surrounding areas. Fringe area of Chennai which once had flourishing agriculture are now being converted into urban areas. Farmers sell their land at high prices for urban uses and are migrating to the cities in search of better economic opportunities.

The urbanization resulted in many changes in the natural ecosystem including shrinking of natural forests and disappearing of natural water bodies mostly due to conversion for other urban uses including real estate development. Many of the water bodies in Chennai and surroundings could be seen dumped with garbage.

Zamin Pallavaram and Keelkattalai waterbodies also face similar issues like spill over of urban activities into the lakes, pollution due to sewage, waste water and solid waste from surrounding areas, eutrophication and siltation. This study attempts to assess the ecological significance of Zamin Pallavaram Lake and Keelkattalai Lake.

Currently visual observation of the flora and fauna was carried out in the project area as demarcated as follows:

1. Biodiversity within the lake
2. Biodiversity along the immediate periphery of the lake (Bund width)
3. Biodiversity beyond the Bund width.

3.1.3 PALLAVARAM PERIYA LAKE

Location: 12.95884 N, 80.15023 E., located in the Chrompet – Old Mahabalipuram 200ft road on the below map.

Figure 3 : Pallavaram Lake

3.1.3.1 Floral Diversity

Flora and fauna in and around the lake was observed. Southern side of the lake was invaded by *Akaya Thamarai,* an aquatic weed. Besides, *Prosopis juliflora* an exotic plant popularly known as poor man's fuel wood, is seen to the Northern boundary of the lake.

It is observed that most dominant family is Poaceae family, the grass varieties which easily grows around less disturbed areas, as these Lakes. These are mostly found beyond the northern boundary of the Pallavaram Lake. Palm trees are observed near around the Lake bund. It is important that the Lake is protected and retained as a source of water for such flora to flourish in the surrounding areas.

3.1.3.2 Fauna

Mammals

During the survey some species of mammals namely Indian Palm Squirrel and Grey Mongoose were encountered. These species are most commonly found in and around Chennai and in South of India.

Birds:

During the monsoons and times when water pondage is observable in lake, bird life in and around the lake is good. During the assessment species like Grey-Heron, Cattle-Egret, Common Mynaa, House Crow, Yellow Billed Babbler, Kingfisher, etc. were observed.

Amphibians and Reptiles

During the preliminary survey we have recorded few species herpto fauna in and around the lake, viz., amphibians namely Bronzed Frog, Indian Bull Frog and Common Indian Toad, and reptile Garden Lizard. These species are most commonly found in and around Chennai.

Fishes

While commencing the work on 18.05.2018 in Pallavaram Tank, a walk-through survey was conducted in the project area and interactions with local people residing in the peripheral area of Tank were carried out. According to local people fishing was done earlier in Pallavaram Tank and in the last 10 years, no one is fishing in the Tank due to the sewage mix in the Tank.

Conclusion:

The ecological survey shows that seasonal, local varieties of flora and fauna have been found in and around Pallavaram Periya lake. While the dominant species outside the lake boundary is mainly local grasses and Prosopis, aquatic weed infestation (Eichhornia Crassipes) is observable in the Lake. Lake bund area / boundary area has few palm trees. Due to sewage water flow into the lake, biodiversity in the lakes is restricted to weeds. The proliferation of weeds in the lake is mainly owing to the increased nutrient content (Eutrophication) due to sewage flow and leachate inflow from the garbage dump in the southern side of the Tank. As part of the desilting process, weeds have to be removed from the Lake. It is expected that diversion of sewage through diversion drain and removal of solid waste dumped in the south part of the Lake would reduce the proliferation of the weeds. Diversion channel is proposed as part of this project. Pallavaram Municipality has awarded a Bio mining Project to remove the solid waste dumped on the southern part of the lake through a separate tender costing Rs.700.00 lakhs. These would improve the overall environmental quality and biodiversity of the Lake and its surroundings.

Along the Tank Bund some seasonal shrubs and Palm trees are observed which will not be disturbed during bund strengthening. The Biodiversity beyond the bund will not be disturbed as the temporary access roads already exist and no proposed activity will spill beyond the bund.

No trees are proposed to be cut or removed from the project area.

3.1.4 KEELKATTALAI LAKE

Keelkattalai Lake is covering a peripheral area of 269441.85 Sq., located in 12. 95055 N, 80.17786 E (Map.1), the lake is bifurcated by the Medavakkam Radial Road. Other activities such as Washing of heavy vehicles, seasonal fishing and domestic usage (bathing and washing etc) were noticed. Dumping of plastic wastes and debris around the bund is causes for concern.

Figure 4 : Keelkattalai lake

3.1.4.1 Floral Diversity

Preliminary survey was carried out in the Keelkattali Lake to record the ecological significance of the lake. The presence of flora and fauna in and around the lake was recorded. Among these, the herbaceous species was more abundant followed by grasses, shrubs and woody plants. The most common plant, tree species observed in and around were Neem, Palm, Prosopis julifera, Ricinus comunis, Calotropis, Jatropha, etc., in addition to few grass species. These are most commonly observed species around water bodies.

3.1.4.2 Fauna

Mammals

During the survey we encountered some local species of mammals namely Indian Palm Squirrel, and Grey Mongoose.

Amphibians and Reptiles diversity

Species like Garden Lizard, Frogs, Common skink and Indian Fan-throated Lizard, etc., were observed in and around the lake.

Bird Diversity

During the survey species like pond heron, Little Grebe, Cattle Egret, Little Cormorant, Kingfisher, Common Myna and house crow were observed to be abundant in the lake area.

Fishes

Seasonal casual fishing is reported in this lake.

Conclusion:

The ecological survey in the Keelkattalai Lake shows poor diversity of plants and animals in and around Lake, due to disturbances from surrounding landuses and activities. Vehicle washing in the northern side of the lake was noticed, which will pollute the water. Currently the water quality in Keelkattalai is better than Pallavaram Lake.

Activities such as dumping of garbage, vehicle washing in the lake would create adverse impacts on the lake ecology. Hence, these activities have to be monitored and steps have to be taken to curtail these activities. By desilting and strengthening of bunds we can improve the water retention and thereby improve the ground water recharge.

As a part of the project vegetative turf will be provided above the stone pitching in the front slope of the Bunds. The vegetative patch for this is taken from the tank bed itself to ensure the local varieties. This would also encourage the growth of local flora and fauna. The biodiversity around the lake will be left undisturbed and the species around will thrive once the lake water quality improves.

4 PROJECT PROPOSAL

The restoration the Pallavaram Periya Eri and Keelkattalai Eri has been finalised focussing on environmental improvement of the Lake with suitable remedial measures to restore the water quality, water retention and protecting existing area of the lake without rehabilitating the encroached families.

The major activities proposed are diversion of sewage, increasing the storage through desilting and protection of the lakes with fencing.

Table 4-1 : Impacts of project Proposal

Description	Pallavaram Lake	Keelkattalai Lake
Environment impact	• Prevention of Sewage entering the lake by providing adequate diversion channels connecting to the nearest sewerage scheme will improve the quality of lake water. • Ground water quality will be improved in the surrounding areas. • Desilting and weed removal would improve the storage / flood water holding capacity of the lake thus supporting in flood mitigation in critically affected areas. • Mosquito nuisance, odour and visual blight will drastically reduce. • Protecting lake from open defecation, washing and other misuses through chain link fencing. • Improved aesthetic appearance • Air & noise Pollution problems due to construction activity during construction phase • Community and work safety	• Protecting the lake from open defecation, washing through chain link fencing. • Restoration works improves the water quality in the lake and subsequently the quality of ground water. • Ground water quality will be improved in the surrounding areas. • Mitigation of flooding in critically affected areas. • Increased storage capacity. • Improved aesthetic appearance • Air & noise Pollution problems due to construction activity during construction phase • Community and work safety
Social impacts	• Adjoining areas will not be getting flooded even at the water level reaches proposed FTL. • Lake front development like walking strip will enhance the quality of life of the surrounding communities. • Improved Health conditions due to the prevention of pollution of the lake and ground water.	• Adjoining areas will not be getting flooded even at the water level reaches proposed FTL. • Lake front development like walking strip will enhance the quality of life of the surrounding communities. • Improved Health conditions due to the prevention of pollution of the lake and ground water.

5 PROJECT DESCRIPTION

The present scope of the project for both lakes are described below.

PALLAVARAM LAKE

5.1.1 Restoration Works Being Executed in Pallavaram Lake

The Total area of the project is restricted to 69.67 acres. The following components are included in the contractor scope for Pallavaram Lake.

- Bund strengthening work.
- Construction of Peripheral Drain for a length of 1813 m.
- Construction of Two regulators/ overflow weirs.
- Cleaning and Desilting the Tank.
- Chain link fencing with erection of Boundary Pillars.
- Construction of Walkway for 950 m on the Tank Bund for a width of 2.5 m.
- The duration of the project is 18 months in a single package.

5.1.2 Progress of Work

The following works are being executed currently.

5.1.3 Construction of Peripheral Drains

The peripheral drains will intercept and divert the sewage flow from the inlet drains to existing Trunk Sewer leading to STP at Perungudi. The Peripheral Drains under execution consists of four parts and they are as follows:

(1) **Peripheral Drain I** Inlet D_1 to well (4)- Completed - 303 m

(2) **Peripheral Drain II** Inlet D_2 to well (3)- Completed - 95 m

(3) **Peripheral Drain III** Inlet D_3 to D_2- Completed - 448 m

(4) **Peripheral Drain IV** Inlet D_4 to D_3 - Under Progress 177 m (Total length 335 m)

The construction of Peripheral Drains is in various stages of construction.

The Peripheral Drain will carry the sewage to the existing Trunk sewer and the sewage entry to the Tank will be completely intercepted after the completion of Peripheral drain.

5.1.4 Over Flow Weir/Regulator

The existing overflow weir is totally damaged. The surrounding areas have already been developed.

Two new Regulators/ Overflow weirs with controlling shutter arrangements are being taken up for execution. The construction of Regulator proposed on the Left side of Tank adjacent to 200 Feet Radial Road is in progress and will be completed before the onset of monsoon. The construction of Regulator for a width of 7.7 m is proposed.

A temporary overflow channel for a length of 650 m from the new Regulator up to the Bridge connecting the Radial Road will be taken up for execution.

The second regulator proposed on the right side of Tank adjacent to 200 feet Radial Road will be taken up for execution during January 2019 after reviewing the performance of the Left side Regulator under construction.

The construction of Regulator on left and right side of the radial road are constructed within the tank boundary.

Figure 5: Construction of Regulator in Pallavaram Lake

5.1.5 Cleaning & De-silting

The light Jungle and other vegetation in the left side of Tank bed is totally removed. This will facilitate to start the desilting of earth work in the Tank bed. The removal of floating materials, debris, water hyacinth, weeds etc from the tank bed before desilting is being done using a Float mounted Pocclain. The removed floating materials from the southern side of the tank is being sent after drying to the Venkatamangalam solid waste management facility maintained by the Municipality for segregation. The vegetative matters are sent to micro composting centre for

treatment and disposal. The remaining floating materials will be removed after the monsoon and after the commencing of Bio mining work in the southern part of Pallavaram Tank.

A quantity of 2,76,000 m^3 of earth is proposed to be desilted from the lake. For strengthening of the bund 32,000 m^3 of suitable earth will also be utilized from the lake.

i) Top slushy silt layer of 0.80m thickness in Pallavaram lake which is not suitable for construction activities are transported and disposed in the abandoned stone quarry at Tiruneermalai.

ii) After removing the Top slushy layer, the earth below for a depth of 1.20 m suitable for reuse like filling the low-lying area is divided into two parts of which part will be used for Bund strengthening work and the balance quantity will be sent to Tiruneermalai.

During desilting in Pallavaram lake, if any reuse of the desilted earth is identified by Pallavaram municipality, the same shall be implemented obtaining necessary approvals as applicable.

In Keelkattalai Lake desilting has been carried out for a depth of 1.2 m and the entire desilted earth (83,500 m^3) has been disposed of to Tiruneermalai abandoned stone quarry. The stone quarry is under the ownership of revenue department. There are no residential settlements around the quarry to a distance ranging from 100m to 500m. The quarry is encircled mostly by roads on all sides; Chennai bypass Road to the south and quarry roads on other sides.

Figure 6: Removal of Floating Materials in Pallavaram Tank

5.1.6 Protecting the Boundary of the Lake

To protect the tank from misuse, chain link fencing with erection of RCC Pillars is proposed. This would be constructed after the completion of Desilting work.

5.1.7 Solid Waste Dump Yard

At present the Leachate from the solid waste dumping yard is directly entering the Tank and polluting the water. No further dumping of solid waste is carried out in Pallavaram Lake.

The Municipality under its Solid Waste Management Project (as part of Swachh Bharat Mission) has taken up a work “Removal of the Legacy waste” in Pallavaram Lake (Ganapathipuram) through Bio-mining process at a cost of Rs. 700.00 lakhs through an independent agency and the work order is issued on 29-09-2018 with a project period of 12 months.

The desilting in the Right Portion of Pallavaram Lake will be taken up for execution after the commencement of the Bio mining work as both the works are to be done simultaneously. About 5.5 acres of the Solid waste dump will be reclaimed and added to the Tank. Hence, upon completion of this work no contamination of the lake due to leachate from the solid waste is anticipated.

5.1.8 Bund Strengthening

Bund strengthening work is in progress. The Bund is strengthened to a Top width of 4 m with side slopes of 2:1 and 1.5:1 in Rear and Front side of the Bund.

The side slopes are further strengthened with cement concrete block lining and the casting of CC Blocks of size 0.3x0.25x0.20 m is in progress.

Construction of above works in the tank doesn’t involve acquisition of private land and R&R.

Figure 7 : Bund improvement typical cross section

KEELKATTALAI LAKE

5.1.9 Restoration Works Being Executed in Keelkattalai Lake

The Total area of the project is restricted to 56.60 acres. The following components are included in the contractor scope for Keelkattalai Lake.

(1) De-silting of the lake to increase the storage capacity.

(2) Providing chain link fencing.

(3) Bund strengthening.

(4) Construction of Walkway for 750 m on the Tank Bund for a width of 2.5 m.

5.1.9.1 Cleaning & De- silting of lake

A quantity of 83,500 m^3 of earth is proposed to be desilted from this lake. For strengthening of the bund 21,000 m^3 of suitable earth will also be utilized from the lake. The remaining quantity of earth is now being conveyed to the abandoned stone quarry in Tiruneermalai.

The desilting in the Tanks are being executed only during day time upto 6 pm and conveying is being carried out following the city traffic norms in covered trucks. Desilting in both the lakes are proposed for a depth of 1.2 m below the average deep bed level. The slushy soil in Palllavaram Lake on both sides is dried in-situ before transportation and in Keelkattalai Lake the earth is directly conveyed since it is not slushy. During monsoon desilting work will be stopped.

Figure 8: Desilting Work

5.1.9.2 Boundary Protection-Chain Link Fencing

To protect the tank, chain link fencing with RCC pillars is proposed in the Fore shore boundary and at the rear side of the bund. Fencing work is proposed to be taken up for execution after the completion of Desilting work.

Figure 9 : Existing bund

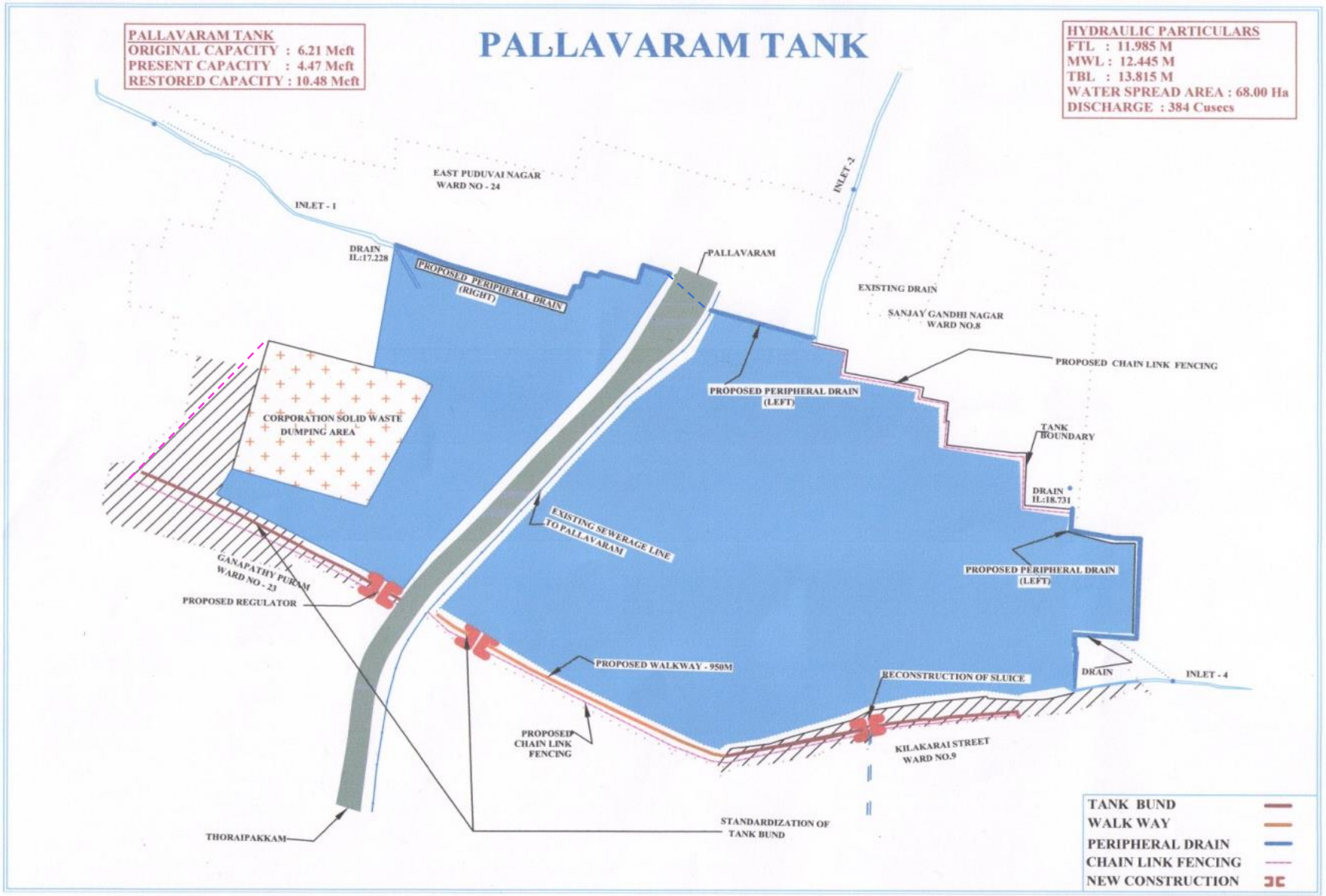
5.1.9.3 Bund strengthening

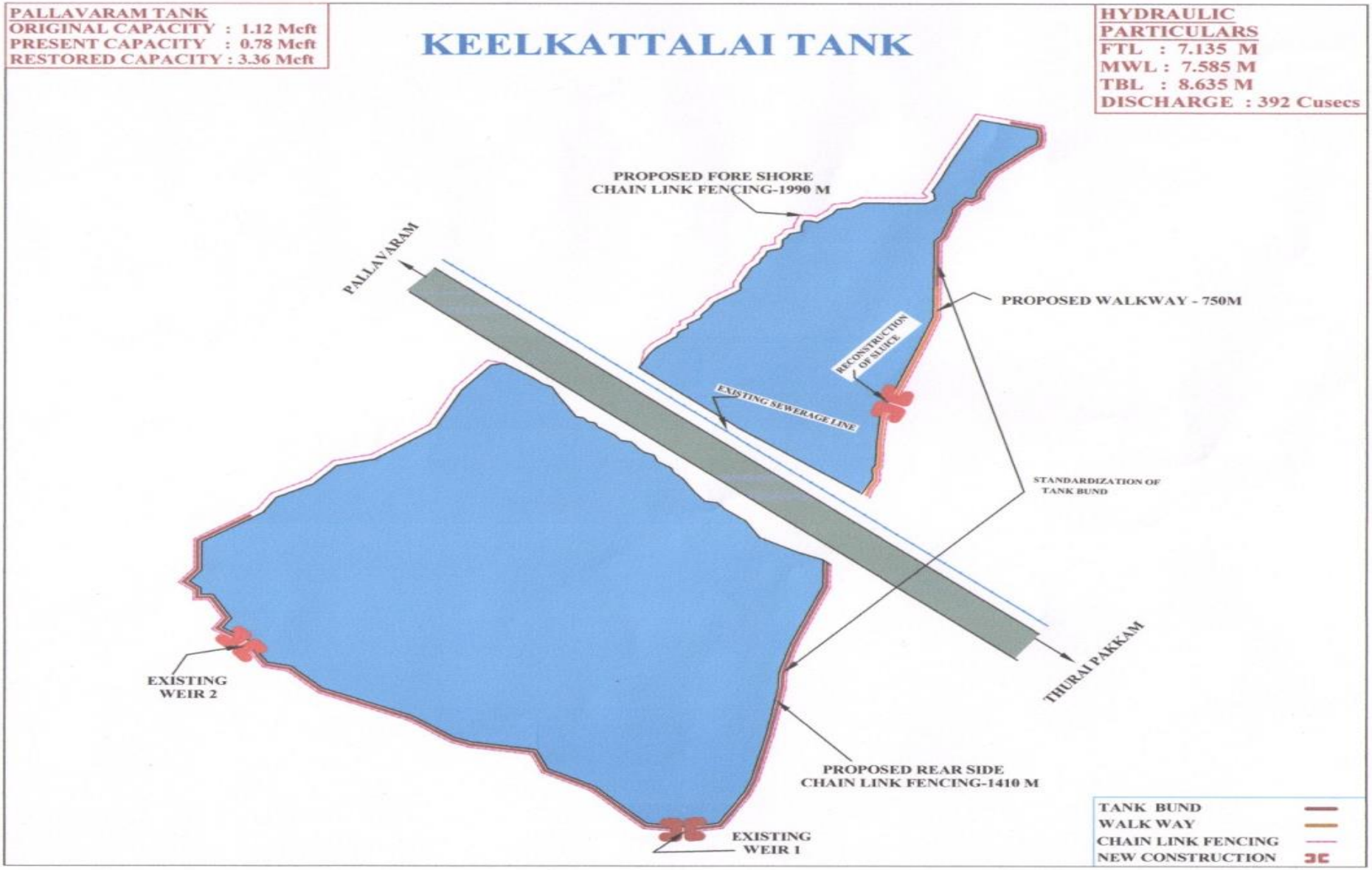
Bund strengthening work is in progress. The Bund is strengthened to a Top width of 4 m with side slopes of 2:1 and 1.5:1 in Rear and Front side of the Bund. The side slopes are further strengthened with cement concrete block lining and the casting of CC Blocks of size 0.3x0.25x0.20 m is in progress in the water spread area of the tank. The Retaining walls are being constructed at the breached and weaker section of the bund.

Construction of above works in the tank doesn't involve acquisition of private land and R&R.

Figure 10: Bund Strengthening

Figure 11: Casting and Fixing of CC Blocks


PALLAVARAM TANK
ORIGINAL CAPACITY : 6.21 Mcft
PRESENT CAPACITY : 4.47 Mcft
RESTORED CAPACITY : 10.48 Mcft
PALLAVARAM TANK
HYDRAULIC PARTICULARS
FTL : 11.985 M
MWL : 12.445 M
TBL : 13.815 M
WATER SPREAD AREA : 68.00 Ha
DISCHARGE : 384 Cusecs
EAST PUDUVAI NAGAR
WARD NO - 24
INLET - 1
INLET - 2
DRAIN
IL:17.228
PROPOSED PERIPHERAL DRAIN
(RIGHT)
PALLAVARAM
EXISTING DRAIN
SANJAY GANDHI NAGAR
WARD NO.8
PROPOSED CHAIN LINK FENCING
PROPOSED PERIPHERAL DRAIN
(LEFT)
CORPORATION SOLID WASTE
DUMPING AREA
TANK
BOUNDARY
DRAIN
IL:18.731
EXISTING SEWERAGE LINE
TO PALLAVARAM
GANAPATHY PURAM
WARD NO - 23
PROPOSED REGULATOR
PROPOSED PERIPHERAL DRAIN
(LEFT)
PROPOSED WALKWAY - 950M
RECONSTRUCTION OF SLUICE
DRAIN
INLET - 4
PROPOSED
CHAIN LINK
FENCING
KILAKARAI STREET
WARD NO.9
THORAIPAKKAM
STANDARDIZATION OF
TANK BUND
TANK BUND
WALK WAY
PERIPHERAL DRAIN
CHAIN LINK FENCING
NEW CONSTRUCTION


PALLAVARAM TANK
ORIGINAL CAPACITY : 1.12 Mcft
PRESENT CAPACITY : 0.78 Mcft
RESTORED CAPACITY : 3.36 Mcft
KEELKATTALAI TANK
HYDRAULIC PARTICULARS
FTL : 7.135 M
MWL : 7.585 M
TBL : 8.635 M
DISCHARGE : 392 Cusecs
PROPOSED FORE SHORE CHAIN LINK FENCING-1990 M
PALLAVARAM
PROPOSED WALKWAY - 750M
RECONSTRUCTION OF SLUICE
EXISTING SEWERAGE LINE
STANDARDIZATION OF TANK BUND
EXISTING WEIR 2
THURAI PAKKAM
PROPOSED REAR SIDE CHAIN LINK FENCING-1410 M
EXISTING WEIR 1
TANK BUND
WALK WAY
CHAIN LINK FENCING
NEW CONSTRUCTION

6 STATUTORY AND LEGAL FRAMEWORK

India has Policies, Acts, Rules and Laws in the Water Resources, Environment, Forest, agriculture, Fisheries and Social sectors, directly or indirectly related to lake management.

The Indian Constitution provides, in clear and unambiguous terms, for the State's commitment to protect the environment. Article 48-A of the Directive Principles States, "The State shall endeavour to protect and improve environment and to safeguard the forests and wild life of the country". Under Article 51-A (g),

The fundamental duty of every citizen of India to protect and improve the natural environment, including forests, lakes, rivers and wild life, and to have compassion for living creatures". The Constitution empowers Panchayats and Urban local bodies with functions and responsibilities, as relevant to Lakes Environment.

The Forest Conservation Act, 1980 and The Wildlife Act, 1972 relate to the biodiversity aspects and exploitation of resources whereas The Water (Prevention & Control of Pollution) Act, 1974, prohibits discharge of untreated wastewater effluents, as land and water are state subjects. The Supreme Court, in its many pronouncements, has given effect to the provisions of various Acts to direct the states to take preventive and mitigatory measures for protecting the water bodies from different anthropogenic pressures.

The Environment (Protection) Act, 1986 is an umbrella Act under which the central Government can notify steps to be taken by the states for ensuring protection and conservation of the environment, including water bodies. The National Environment Policy, 2006 seeks for setting up of a legally enforceable regulatory mechanism for Lakes & Wetlands to prevent their degradation and enhance their conservation. Accordingly, the Ministry has recently prepared a Draft Regulatory Framework for Wetlands (including all water bodies except main river channels) which is likely to be notified after receiving comments and suggestions from the public and concerned organizations.

The Ministry is also considering the suggestion that some lakes and wetlands are accorded a special status for their protection and conservation in view of their importance as entities of incomparable value.

INITIATIVES BY THE CENTRAL GOVERNMENT

Several acts and notifications issued by the Ministry of Environment and Forests (MOEF) provide the legal framework for protection of lakes and reservoirs (wetlands). These deal with environmental protection, pollution control, and specific natural resources protection acts, hazardous waste management, etc.

CONSTITUTIONAL PROVISION AND APPLICABLE LEGISLATIONS

Protection of environment and improvement were explicitly incorporated into the Constitution by the Constitution (Forty-Second Amendment) Act of 1976. Article 48A of the Directive Principles of State Policy declares: "the State shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country". 'Fundamental Duties' as envisaged in Article 51A (g), imposes a similar responsibility on every citizen 'to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures.

6.1.1 National Environment Policy, 2006

The National Environment Policy (NEP, 2006) is a response to the national commitment to a clean environment, mandated in the Constitution in Articles 48A and 51 A (g), strengthened by judicial interpretation of Article 21. The Objective of NEP 2006 is:

- Conservation of Critical Environmental Resources
- Intra-generational Equity: Livelihood Security for the Poor

The water (Prevention & Control of Pollution) Act, 1974 and amendments. It empowers the Government to maintain the wholesomeness of water bodies. The Act also provides for prohibition on use of streams (includes inland water whether natural & artificial) or wells for disposal of polluting matter, etc. It enables the Government through central & state pollution control Boards to prescribe standards and has provision for monitoring & compliance and penal provisions against the violators of the Act.

The Environment ({protection} Act, 1986 empowers the Central Government to take measures to protect and improve environment which includes water, air and land and the inter relationship which exists among and between water, air and land and human beings, other living creatures, plants, microorganisms and property.

The National Environment Policy (NEP), 2006, recognizes the ecological services rendered by the water bodies like lakes & wetlands.

6.1.2 The Environment (Protection) Act, 1986 (EPA)

According to EPA, "Environment" includes water, air and land and the interrelationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property; Section 3 of the EPA states, that Central Government shall have the power to take all such measures as it deems necessary or expedient for the purpose of protecting and improving the quality of the environment and preventing controlling and abating environmental pollution.

6.1.3 The Water (Prevention and Control of Pollution) Act, 1974

The above Act, 1974 suggest that only State Governments can enact water pollution Legislation. Article 252 empowers Parliament to enact laws on state subjects for two or more states, where the State Legislatures have consented to such legislation. Under this Act, the State Boards were vested with the regulatory authority and were empowered to establish and enforce effluent standards for factories discharging pollutants into bodies of water. A Central Board performs the same functions for union territories and coordinates activities among the states. The PCBs established under the Water Act, control sewage and industrial effluent discharges in the water bodies by approving, rejecting or conditioning applications for consent to discharge.

The proposed Restoration of Two Lakes does not attract the provisions of this act.

6.1.4 The Water (Prevention and Control of Pollution) Cess Act of 1977

The main object of this Act is to meet the expenses of the Central and State water Boards. Economic incentives are provided for control of pollution by differential levy of tax structure. The local authorities and certain designated industries are required to pay a cess for water consumption. The revenues accruing thus are in turn used for Implementation of the Water (Prevention and Control of Pollution) Act, 1977.

The Central Government, after making deductions for collection expenses, pays the Central board and the States such sums as it deems necessary to enforce the provisions of the Water (Prevention and Control of Pollution) Act, 1974. On the installation of effluent treatment equipment and meeting the applicable norms the polluter is entitled to get a rebate of 25% on applicable cess.

6.1.5 The Solid Waste Management Rules (2016)

The Union Ministry of Environment & Climate Change, Government of India has notified the new Solid Waste Management Rules, 2016 on April 8, 2016. The salient features of the SWM Rules, 2016 are as under These rules are applicable to (i)Every urban local body (Mega city to Panchayat level), (ii) outgrowths in urban agglomerations, (iii) census towns (iv) notified areas, (v) notified industrial townships, (vi) areas under the control of Indian Railways, (vii) airports/ airbases, (viii) Ports and harbours, (ix) defense establishments, (x) special economic zones, (xi) State and Central government organisations, (xii) places of pilgrims, (xiii) religious and historical importance as may be notified by respective State government from time to time and (xiv) every domestic, institutional, commercial and any other non-residential solid waste generator situated in the areas. The duties and responsibilities of various stake holder including ULB are specified.

6.1.6 The Indian Forest Act of 1927

This Act is a consolidation of Indian Forest Act of 1878 and its amendments, with minor changes it has been enacted in pre-independent India. This Act mainly deals with four categories of forests, viz., reserved forests, village forests, protected forests and nongovernment (private) forests. The said Act applies to the lakes which come under any of the above mentioned four categories of forest.

6.1.7 The Forest (Conservation) Act Of 1980

The Central Government has enacted the Forest (Conservation) Act, 1980 to prevent rapid deforestation and environmental degradation. According to this Act, before a State Government “de-reserves” a reserved forest, uses forest land for non-forest purposes, assigns forest land to a private person or corporation, or clears forest land for the purpose of reforestation, it has to take the approval of the Central Government. The Central Government is assisted by an advisory committee constituted under this Act.

6.1.8 National Lake Conservation Plan

Ministry of Environment and Forests has been implementing the National Lake Conservation Plan (NLCP) since 2001 for conservation and management of polluted and degraded lakes in urban and semi urban areas. The major objectives of NLCP Include encouraging and assisting State Governments for sustainable management and Conservation of lakes. Lakes being major sources of accessible fresh water require well planned, sustainable and scientific efforts to

prevent their degradation and ultimate death. The main objectives of the National Lake Conservation Plan are:

- Prevention of pollution from point and non-point sources.
- Environmental Assessment Report
- Eco - Restoration
- Desilting and weed control.
- Research & Development studies on floral and faunal activities and related ecological aspects.
- Other activities depending on the lake specific conditions such as integrated development approach, including interface with human populations.

6.1.9 Air (Prevention and Control of Pollution) Act 1981 and Tamil Nadu Air (Prevention of Control of Pollution) Rules 1983

These laws address the prevention and control of air pollution. Under section 21 of this Act, it is mandatory to obtain consent from Pollution Control Board to establish or operate any industrial operation. Activities involving emission of pollutants like establishing batch mixing plants require consent from TNPCB.

6.1.10 EIA Notification, dt. 2006 (S.O.1533(E), dt.14/09/2006)

The notification specifies that prior environmental clearance is required for the projects listed in the schedule of the notification before any construction work, or preparation of land by the project management except for securing the land, is started on the project or activity. The Schedule of the notification lists the broad categories of projects that require prior environmental clearance. The restoration of Lakes does not fall under any of the category listed in the EIA notification and does not require prior environmental clearance.

6.1.11 Labour Laws

Review of various labour laws is provided in Annexure- 14 for guidance. Provisions applicable for implementation are to be adhered by the contractor.

WORLD BANK POLICIES

Environmental Assessment - OP/BP 4.01 Requirements Operational Policy 4.01 (OP 4.01) is one of the ten safeguard policies of the World Bank, which provides the Environmental Assessment (EA) guidance for the lending operations. The OP 4.01 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.

In addition, the directions in the following policies of the World Bank may be considered.

Physical Cultural Resources OP/BP 4.11 Requirements The World Bank's Operational Policy aims at preserving and avoiding the elimination of structures having archaeological (prehistoric), paleontological, 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. It is also essential to incorporate chance find procedures in case of chance encounter with such properties during the project works.

Natural Habitats – OP/BP 4.04 Operational Policy 4.04 sets out the World Bank's policy on supporting and emphasising 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. Projects involving noncritical habitats are supported if no alternatives are available and if acceptable mitigation measures are in place.

Forests – OP/BP 4.36 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.

Involuntary Resettlement-OP 4.12 This policy describes Bank policy and procedures on involuntary resettlement as well as the conditions the borrowers are expected to meet in operations involving resettlement. The objective of the Bank's policy is to ensure that populations displaced by a project also benefit from the project and that livelihood and standards of living are improved, or at, least restored to earlier levels.

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK

The Environmental and Social Management Framework of the TNUIFSL (ESMF) has been prepared for Tamil Nadu Sustainable Urban Development Project (TNSUDP) reflecting the environmental and social policy of TNUDF and the operational policies of the World Bank. ESMF outlines the policies, assessments and procedures that will enable TNUDF to ensure that the sub projects that it funds under TNSUDP are developed in line with the ESMF and

are adequately protected from associated environmental and social risks. The ESMF has an Entitlement Matrix for Compensation and R&R.

To facilitate effective screening, projects are categorized into different environmental categories – E1, E2 and E3 linked to severity of impacts and regulatory requirements.

The E1, E2 and E3 categories are defined as follows.

E-1 projects are those wherein major environmental impacts are foreseen thus necessitating Environmental Assessment Reports (EAR). Project is classified as E1 if it is likely to affect sensitive environmental components (SEC) such as those mentioned below.

Sensitive Environmental Components.

- Religious, heritage historic sites and cultural properties
- Archaeological monuments/sites
- Scenic areas
- Hill resorts/mountains/ hills
- Beach resorts
- Health resorts
- Coastal areas rich in corals, mangroves, breeding grounds of specific species
- Estuaries rich in mangroves, breeding ground of specific species
- Gulf areas
- Biosphere reserves
- National park and wildlife sanctuaries and reserves
- Natural lakes, swamps Seismic zones tribal Settlements
- Areas of scientific and geological interests
- Defence installations, especially those of security importance and sensitive to pollution
- Border areas (international)
- Airport (for solid waste management projects)
- Tiger reserves/elephant reserve/turtle nestling grounds
- Habitat for migratory birds
- Lakes, reservoirs, dams
- Streams/rivers/estuary/seas

Those projects/activities, which require environmental clearance as per the EIA notification published by Ministry of Environmental and Forest will also be categorized as E1.

E-2 projects are expected to have only moderate environmental issues. A project is categorized as E2 if its potential adverse environmental impacts are less adverse than those of E1 projects. These impacts are mostly generic impacts in nature and in most cases, mitigation can be designed more readily than for E1 projects. Although the scope of assessment for an E2 project is project specific and examines the project's potential negative and positive environmental impacts, it recommends measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance.

No environmental issues are expected in E-3 projects and can be termed 'environmentally benign'. Hence no environmental assessment is required for an E3 project beyond screening.

Environmental Categorisation as per ESMF

The project for restoration of Pallavaram and Keelkattalai Lakes involves removal of weeds and floating matter, desilting, bund strengthening, diversion drains to prevent sewage entry, chain link fencing, etc.

The activities proposed for restoration of lakes are very limited aimed at diverting the pollutants, protecting the available water spread area, increasing the storage capacity and support water retention during floods. The negative impacts anticipated from implementation of this project are minimal whereas the benefits are envisaged to be considerable. These water bodies are essentially irrigation tanks owned by the PWD, but not being used for agriculture today due to urbanisation. These lakes hence are essentially expected to mitigate floods and act as holding tanks enhancing ground water recharge. These seasonal water bodies or their surroundings have no sensitive flora/ fauna or features. This project does not affect the Sensitive Environmental Components listed in ESMF and does not fall under the list of projects requiring prior Environmental Clearance from MOEF&CC. Not withstanding this, site specific ESIA is carried out with specific mitigation measures. Hence this project providing environmental enhancement opportunity, with minimal restoration activities (with no sensitive environmental features mostly due to its present silted/waste filled/eutrophic condition), is categorised as **E2**.

As per ESMF, the project requires environmental impact assessment to be carried out and preparation of management plan for implementation during different stages of the project and also carryout consultation with relevant stakeholders. In line with this, ESIA prepared during the initial DPR preparation has now been revised

considering the current activities for restoration of the two lakes and corresponding mitigation/ management measures. This project is under implementation and a broad management plan is included in the contract document with the contractor. The management measures as applicable for the current stage of the project are provided in this revised ESIA report. Details of the stakeholder consultation carried out during revision of ESIA has also been included in the report.

CONCLUSION

Considering the Statutory / Legal framework applicable for this project;

i Suitable EIA / EMP is essential to take care of impacts expected during the construction and post construction stages and is prepared.

ii With respect to the solid and wastes, Pallavaram Municipality is responsible for collection, transport and disposal of solid wastes as per the provisions of SWM rules and it will take care of the procedures upon completion of the project. Site will be cleared upon completion and all the construction waste will be cleared by the contractor.

iii Permission from Revenue Department for disposal of excavated silt from the lake into the abandoned quarry in Tiruneermalai is to be obtained and Pallavaram Municipality has applied for the same.

iv All regulatory permits are required with respect to applicable labour laws and facilities shall be provided. As the contractor has his own batching plant there is no need to get separate permission for this project.

7 ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

INTRODUCTION

This Chapter identifies the positive and negative impacts of the proposed work, before, during and post construction. The analyses of the impacts caused because of proposed improvement would help in identifying the array of mitigation measures for each identified impact.

OBJECTIVES

The objectives of this study are stated below:

- To present a clear assessment of potential impact associated with the proposed project intervention,
- To apply a methodology which assesses and predict potential impacts and provides a) the means for impact prevention and mitigation, b) the enhancement of project benefits, and c) the minimization of long-term impacts;
- To provide a specific forum in which consultation is systematically undertaken in a manner that allows stakeholders to have direct input to the environmental management process.
- To recommend the environmental management measures to reduce adverse impacts.

IMPACT ANALYSIS

7.1.1 Positive Impacts of the Project / Project Benefits

- This project after restoration will improve the water quality and improve the flora and fauna and at large; improve the environmental status of the areas around the lakes.
- Restoration of Water body would improve the water quality of the Tank which again improve the Ground water quality in the surrounding areas, which will be beneficial for the local community.
- Providing walk way etc. would benefit the local people and thereby misuse of water body will considerably reduce.
- Increase in storage of water, improvement in ground water recharge, and reduction in flooding of nearby areas are the major impacts envisaged.
- Land value improves near the project area.

- Preventing discharge of untreated Sewage / Industrial effluent in to water body will reduce the adverse impacts to the community living around the water body.

- Preventing disposal of garbage into water body would have indirect Health benefit to the community living around the water body.

- Protects the lake from further encroachments.

- The project would improve awareness of the people around the waterbodies and develop positive attitude towards the environment.

7.1.2 Impacts on Air Environment

Construction Phase

During construction phase activities such as de-silting, and reconstruction/repairing of Bund or Inlet/Outlet structure, other activities including casting of CC Blocks and its transportation will generate dust. Unless adequate care is taken through mitigation measures it may have adverse impacts on the workers and the nearby habitations. However, this is only temporary and can be abated by implementing adequate Environmental Management Program. Access to the work site for materials is through temporary roads plying from 200 Ft. radial road near to which there are no sensitive receptors. Construction materials are also stacked in areas away from habitations. The project is being implemented without any rehabilitation and no person will be redeployed to other placed as the structures like huts and buildings constructed in the Tank bund or water spread area will not be demolished and hence, air pollution due to demolition does not arise. Personal Protection Equipment (PPEs) shall be provided to the workers to prevent inhaling of dust/cement/other particles.

Mitigation measures to be adopted shall also include control measures for the handling of building materials such as cement, sand etc., during construction phase, Management of vehicular movement during construction phase and Traffic Management measures.

Post Construction Phase

During the post construction phase, minimal Air Pollution is anticipated since the principal activity is maintaining the water body free of wastes, annual desilting and / or de-weeding if required and monitoring the Water quality.

Noise Emission Sources

Noise will be generated during construction phase due to the operation of heavy equipment and transportation vehicles. However, this is temporary can be addressed by staggering the Operation and engaging the services of good managed vehicles and equipment. During the construction period the noise level will be maintained within limits and the workers will be provided with ear plugs or ear guards where vehicular noise occurs and where necessary.

7.1.3 Impact on Water Environment

This section describes the potential impacts on the water resource due to the pollutants disposed in to water body from the surrounding areas and during construction phase.

Water level in Pallavaram Lake

This water body has a catchment area of 2.67 Sq. Km and present capacity due to siltation is only 247 ML. It is proposed to increase the capacity to 375 ML after de-silting and constructing new weir. Lake receives considerable inflows from catchment area during July to November ranging from 121 cumecs to 512 cumecs.

In general, the water level in the lake will reach full tank level during the month of September and maintains full level till December end. From January as there is no sufficient inflow expected, the water level drops in tank and reaches the lowest in April & May months.

To prevent entry of floating materials during rainy season provision of grating/ shutter arrangement is being proposed.

Keelkattalai Lake

This waterbody is having a catchment area of 18.8 Sq. Km and water holding capacity of 405 ML currently. Lake receives considerable inflows from catchment area during September to November ranging from 187 to 738 cumecs. There is no visible entry of Sewage into this Lake.

Construction Phase

Construction works in the lake mainly involve bund strengthening in both lakes and weir construction in Pallavaram lake. Mainly, the silt from the tanks will be used for bund strengthening, in addition to turfing and concrete blocks. Concrete blocks are being casted in a private land, near an industry near Keelkattalai Tank. So, no spillage of any construction or

demolition materials is expected into the lake. The vehicles and equipment are parked / stored is done in the contractor's facility where the vehicles are maintained and fueled. Minimal amount of diesel would be brought to the site to meet emergency fuel requirement for vehicles. In case of any storage of fuel at the site, safe storage and fire management facilities shall be provided. Construction materials shall be stacked in covered sheds, with fire management facilities and suitable watch and ward would be necessary.

A major cause of concern regarding the water quality during construction works is the possibility of increased solid waste dumping in the lake from the road and from habitations nearby; mainly in case of Pallavaram Lake. Suitable waste management mechanism would be carried out for the nearby habitations by Pallavaram Municipality on regular basis to prevent garbage dumping. Biomining Project has been tendered out already to take care of the legacy waste accumulated on the southern side of the Lake. In addition, IEC, awareness / signboards would be displayed along the flyover / road crossing the lakes and nearby land uses would be directed to strictly manage their wastes without allowing it to be dumped into the Lakes.

Another impact expected is the sewage arising from the workers temporary shed at the site. To mitigate this temporary toilet with proper septic tanks would be provided by the contractor.

Post Construction Phase

No adverse impact is anticipated during the post construction phase when activities would be minimal and include monitoring of water quality, occasional / annual desilting and deweeding if required (mainly during the initial years)

Solid wastes from the nearby residences shall be managed by Pallavaram Municipality by providing adequate Dust Bins in the user area and collecting the garbage from the Bins on daily basis to the nearby Waste processing facility. Display of awareness Boards will also put in no of locations to encourage the users to dispose the garbage in to Dust bin and not to throw into the Lake. Inlets would be provided with gratings to prevent the entry of wastes into the Lake. Such material collected shall be disposed on a day to day bass at the SWM / plastic waste facility of Pallavaram Municipality.

7.1.4 Impacts on the Land Environment

a) Construction Phase

The dumping of construction debris and other solid waste into the water body will be prevented by erecting concrete pillars with chain link fencing.

As an alternative to sand which is a minor mineral M-sand has been used for the construction activities.

Desilted earth from water spread area of lakes will be conveyed to the abandoned stone quarry in Tiruneermalai.

This project would not involve any major construction activity except de-silting and Bund strengthening, the project activity would not result to any adverse impact to Soil. So, the desilted material will be treated at the solid waste management facility and /or deposited at the abandoned quarry which is impervious (granite) and hence no impacts are expected.

Desilted earth from water spread area of lakes will be conveyed to the abandoned stone quarry in Tiruneermalai. The abandoned stone quarry situated west of Tambaram-Maduravoyal Byepass Road in Tiruneermalai is being used as a dumping site for dumping the earth excavated for tunneling by Metro Rail Project and by PWD for depositing the excess desilted earth.

This stone quarry having a depth of more than 40 m was used to mine Granite stones for crusher units. This solid rock Quarry below ground level does not have any rock fractures and fissures and hence seepage of water from this quarry is almost nil. The slush soil and unusable earth excavated from these tanks which is dumped into this stone quarry will have no impacts on the Ground water. Disposal of excavated silt is proposed in an area around 5 acres of this quarry and no spillage of water is envisaged from the quarry due to the dumping.

7.1.5 Impacts on Topography & Geology

No soil is brought from outside to the project site and some quantity of the desilted earth from the lake will be used for bund strengthening while the remaining will be disposed in abandoned quarry. Hence, the proposed renovation activity will not result to any adverse impact to Topography and Geology. No major land modification/ construction is envisaged under this project.

a) Post Construction Phase

No significant impact is expected on the soils on and around the site during post construction phase.

7.1.6 Impacts Due to Waste Disposal

a) Construction Phase

During the construction phase, the solid waste getting into the Lake through the existing inlets will be prevented by placing Grill gratings at in fall points and other locations and sanitary helpers of Pallavaram Municipality will be arranged to remove this waste on day to day basis. The garbage generated in the temporary labour shed in project area will also be disposed carefully in coordination with the Local body.

b) Post construction Phase

During the post construction phase monitoring of the water quality will be carried out. To prevent the solid waste entering the lakes post construction signages, IEC, daily waste collection from the gratings, waste collection from nearby habitation and routine maintenance planning are proposed.

7.1.7 Flora and Fauna

a) Construction stage

Scrub on the lake boundary, mainly consisting of local/seasonal plant varieties and Prosopis near / on the bunds were removed prior to bund strengthening. However, these would quickly grow back after construction. During construction it is being ensured that the existing trees near the bund are not disturbed. Weeds in the lake will be removed.

As evident, it would be difficult to work on the lake desilting works during the rains, with high water level in the tanks. Care would be taken to stage the construction during non-monsoon days. This would prevent disturbance to visiting water birds which are more during this time. In addition, work are would be cordoned off while working in portions of the lake with higher numbers of visiting avifauna. (It is observed that during the desilting activities carried out till now; the birds naturally shift to areas of less disturbance. In Keelkattalai Lake, lake bed levelling is proposed post monsoons.

b) Post construction stage

The turfing proposed on the front slope of the bund will have aesthetic appearance.

7.1.8 Impacts on Workers and the Host Communities

Labour Facilities

For the labourers in the project site involved in the construction, temporary rest area is provided in the foreshore area of Keelkattalai Tank in private lands (with owner's consent). In Pallavaram resting sheds will be provided by the contractor. Mobile toilets with septic tank will be provided by the contractor and the sewage from the septic tank will be disposed in the sewerage facility of the municipality. Necessary labour rest shed with water, sanitation facilities during work hours is to be provided by the contractor near the work site. Number of workers who would be employed during construction will be around 30. The contractor has provided rented accommodation for labourers with basic amenities close to the work site and provides transportation facility to and fro to the site. The labourers working in the project are staying in rented houses and the generation of waste water due to labourers does not arise. Labourers shall be provided with personal protective equipment during work.

Host communities

Considering excavation for deep trenches along the roads to settlements or near to houses, it is proposed to provide adequate hard barricading to prevent the events of fall into the trenches. Barricading and necessary shoring provisions are essential during the construction of peripheral drains to ensure safety. Access roads for materials to the site shall be away from habitations. This would prevent dust / air / nose related disturbances. Muck and silt shall be disposed in areas away from habitations.

About 6 dumpers will be used daily for desilting the lakes. Silt will be transported during non-peak hours in covered trucks. These will be stored in designated area within the project area and allowed to drain off, prior to transport. Traffic management will be in place by the contractor with adequate placement of traffic signals and traffic control personnel, when the vehicles are passing through the local roads.

Table 7-1 : EIA of water bodies and its remedial measures		
Current Issues	**Impact anticipated**	**Project Consideration**
i)Domestic Sewage from surrounding areas	1. Decrease of DO, Increase of BOD, Nitrate, TSS, pH, TSS, H2S, Odour ETC, 2. Threat to water quality in the lake, odour/ visual blight, fish life and growth of unwanted weeding	Intersecting the sewage at the inlet of the tank and diverting in to the nearest underground sewerage manhole.
ii)Municipal Garbage / Construction Debris	1. Organic Pollutants, Heavy Metals, Floating substances such as Plastics, Inerts, Odour 2. Reduction of capacity of water body, threat to fish life	Prevention and diversion of garbage to ULBs dump yard Providing Bins at strategic locations to collect the municipal garbage is being considered. IEC activities, signages and gratings in the inlet drains.
iii) Community based activities- as open defecation	Contamination with human excreta - increase in Coli form counts, Nitrate, TSS etc	Fencing the waterbody will protect the lake.
iv)Washing of clothes	Oil &Grease, increase in Chemical pollutants such as sulphate, sulphide etc	Fencing the waterbody will protect the lake.
v)Bathing	Contamination of water- increase in Oil &Grease, Sulphate, Sulphide, colour and Odour	Fencing the water body will protect the lake.
vi)Washing of Animals	Contamination of water- BOD and increase in Coli form counts	Fencing the water body and prevention of such activity

vii)Disposal of Commercial waste /Bio medical waste	Reduction of capacity of water body, contamination of water body with BOD, Coliform Counts, Oil &Greases & threat to fish life	Fencing the water body, signages, awareness and prevention of such activity to access
viii)Growth of Unwanted Weeds	Increase of pollutants such as BOD	Regular maintenance and periodical removal of weeds

8 ENVIRONMENTAL MANAGEMENT PROGRAM

ENVIRONMENTAL MANAGEMENT PROGRAM

The Environment Management Plan would consist of all mitigation measures for each item wise activity to be undertaken during the Planning, construction and operation Stage and the entire life cycle to minimize the impacts as a result of the activities of the project and to prevent misuse of water body. It would also delineate the environmental monitoring plan for compliance of various environmental regulations. The following section has been revised to reflect the current status of the project and status of compliance to measures identified in the management plan.

8.1.1 Land Environment

The dumping of construction debris and other solid waste into the water body will be prevented by erecting concrete pillars with chain link fencing.

As an alternative to sand which is a minor mineral M-sand has been used for the construction activities.

Desilted earth from water spread area of lakes will be conveyed to the abandoned stone quarry in Tiruneermalai.

DUMPING SITE - TIRUNEERMALAI

The abandoned stone quarry situated west of Tambaram- Maduraavoyal Byepass Road in Tiruneermalai is being used as a dumping site for dumping the earth excavated for tunneling by Metro Rail Project and depositing the excess desilted earth by PWD from the Tanks.

The earth desilted from Pallavaram and Keelkattalai Tanks are being conveyed to this abandoned stone quarry in Tiruneermalai.

This stone quarry having an area of around 5 acres and having a depth of more than 40 m was used to mine Granite stones for crusher units. This solid rock Quarry below ground level does not have any rock fractures and fissures and hence seepage of water from this quarry is almost nil. The slush soil and unusable earth excavated from these tanks which is dumped into this stone quarry will have no impacts on the Ground water.

8.1.2 Water Environment

The entry of sewage and other waste water into the water body is diverted by constructing the peripheral drain. By desilting and deepening water spread area of lakes the capacity of the lakes is increased, thereby flood mitigation and ground water recharge are addressed. A Regulator is being constructed in Pallavaram Lake to regulate the water flow from the lake. Provision of gratings in the inlet to prevent the entry of unwanted plastics into the lake. Chain link fencing will safeguard the water spread portion of the lake.

Upon completion of construction the solid waste management around the lakes will be done by the Pallavaram municipality. Through Chain link fencing along the boundaries dumping of wastes into the lakes will be prevented. In addition, it is being proposed to erect Signages at suitable location to create awareness and to prevent deposition of solid waste on sides of Tank Bunds, especially near the radial road. Provision of dustbins is being proposed by the municipality and will be provided at strategic locations upon the completion of the project. IEC activities are also proposed by the municipality to prevent dumping of solid wastes into the lake.

8.1.3 Air Environment

Control measures for the handling of building materials such as cement, sand etc., during construction phase.

Management of vehicular movement during construction phase.

Traffic Management measures.

8.1.4 Socio-Economic Aspects

Providing rented accommodation for the labour workforce with basic amenities close to the existing site.

Necessary labour rest shed with water, sanitation facilities during work hours is provided by the contractor near the project area.

8.1.4.1 Safety/ Barricading

Barricading and necessary shoring provisions are made during the construction of peripheral drains to ensure safety. Labourers are provided with personal protective equipment during work.

ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan for the project has been revised based on the current scope of activities & status of work and is provided below.

Table 8-1 : Environmental Management Plan

Activities	Environmental Management Measures	Responsibility
PRE-CONSTRUCTION		
Assessment of Environmental Parameters	Baseline parameters for Water and Soil have been assessed prior to commencement of work.	PMC/ Pallavaram Municipality / Contractor
CONSTRUCTION		
Permissions from various departments	For disposal of the excavated silt in the abandoned stone quarry in Tiruneermalai, permission from the Revenue Department shall be obtained. During construction, the permits obtained by the contractor shall be periodically examined and validity be ensured. This includes the Consent for the Batching plants from where the contractor sources the concrete, Labour License, insurances etc. (Guidance List of applicable permits for contractor is provided in Annexure 12.	PMC/ Pallavaram Municipality Contractor/ PMC/ Pallavaram Municipality
De-silting of the Lake	The desilted earth will be disposed of to the abandoned stone quarry in Tiruneermalai	Contractor/ PMC/ Pallavaram

Construction of diversion drains Strengthening of Bunds.	identified as dumping area of Municipality. No appreciable change to the drainage course shall occur due to the construction of diversion channel. Wetting of soil before trench excavation, wetting of brick, metal and sand before handling. Sprinkling of water on metal and sand should be carried out before handling. Construction residues such as metal cuttings/ shavings, wood, packing materials and containers shall be disposed following the applicable legal requirements.	Municipality
Transportation of building materials	Now the trucks are being taken to site after forming temporary approach road parallel to the bund and on the peripheral boundary of the water spread area for conveying silt and other construction materials and the temporary approach road shall be removed upon completion of construction activities. Vehicles transporting construction materials prone to fugitive dust emissions is covered. Trucks carrying sand are provided with tarpaulin sheets to cover the bed and sides of the trucks. Idling of delivery trucks or other equipment is avoided during loading and unloading. Sprinkling of water (for materials such as blue metal, sand and brick) before unloading to suppress dust generation. Adequate care taken to prevent spillage of earth or construction materials offsite and in haul routes. Any such spillage shall be removed immediately, and the area cleaned.	Contractor
Management of Excavated silt Disposal of	The waste is temporarily retained within the lake in areas have been earmarked and dry waste is transported in covered trucks and register will be maintained at the site.	Contractor/ PMC/ Pallavaram Municipality

construction debris and excavated materials.	Excavated silt is removed from the site every day preventing storage. Location for disposal of excavated waste is identified in an abandoned stone quarry at Tiruneermalai where the silt is being transported daily. Floating materials like plastics, weeds will be sent to the already established SWM (composting and plastic segregation) facility of the municipality. Transportation of the materials is being carried out without in trucks covered by tarpaulin sheets. Ensure that silt is dry during transportation to the disposal site and dripping shall not be permitted. Wastes arising from the construction of regulators shall be safely stored and disposed.	
Traffic Management	Traffic management will be in place by the contractor with adequate placement of traffic signals and traffic control personnel, when the vehicles are passing through the local roads and near the project site. Transportation of the construction materials to project site and excavated silt/ wastes for disposal covered trucks shall be in in non-peak hours.	Contractor / PMC/ Pallavaram Municipality
Nuisance to neighbourhood community	Materials are transported through the temporary approach road formed without disturbing the neighbourhood community. Supervisors at the site will guide the heavy vehicles carrying materials and machinery to the temporary access road and signages if required may be provided. Safety barricading is provided while construction of drains near the structures restricting entry to work place and signages will be placed. Work site lighting during night where ever required will be provided during implementation.Adequate slope gradient is maintained while strengthening the bund in working in the boundary of the site. Storage of materials is done only within the project area in earmarked areas, without disturbing the nearby community. GRC has been formed to address any grievance of the community due to construction	Contractor/ PMC/ Pallavaram Municipality

	activities. Boards with details of the committee members and contact details have been provided near the project area.	
Operation of construction machinery	All construction vehicles should comply with emission standards and be maintained properly Wind shields should be installed all along the site boundary to abate the dust carry-over to the neighbouring areas. Use of Ready-mix Concrete wherever possible shall be explored. In the case of use of Concrete Mixer, Concrete Mixer should be mounted on shelter with top and sides closed. Sprinkling of water on metal & sand should be carried out before handling.	Contractor
Chance finds	Construction contractors to follow these measures in conducting any excavation work 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 instructions for dealing with the same. Stop work immediately to allow further investigation if any finds are suspected; Create awareness among the workers, supervisors and engineers about the chance finds during excavation work The Engineer will inform State Archaeological Department if a find is suspected, and seek direction from ASI prior to recommencing the work.	Contractor, PMC, Pallavaram Municipality
Pollution from Fuel and Lubricants	The contractor shall ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites is	Contractor

	located at 500 m from the project area. All location and lay-out plans of such sites are submitted by the Contractor which is approved by the Engineer. Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Contractor will arrange for 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. Engineer will certify that all arrangements comply with the guidelines of PCB/ MoEF or any other relevant laws.	
Site clearance/ levelling	Sprinkling of water to reduce dust generation. All vehicles, equipment and machinery to be procured for construction shall confirm to the relevant Bureau of Indian Standards (BIS) Norms and relevant emission/safety norms and/or standards. Use of less noise generating equipment for all activities; and provision for personal protective equipment, ear muffs, etc. Temporary Approach road has been formed for accessing the project area from the radial road and it will be removed upon completion of construction.	Contractor
Unforeseen Impacts	Unforeseen impacts encountered during implementation will be addressed in accordance with the principles of ESMF.	Contractor & PMC to report to ULB. ULB to report to TNUIFSL
Identification and selection of Quarries	The contractor will identify materials from existing licensed quarries with the suitable materials for construction. Apart from approval of the quality of the quarry materials, the legal status of the quarry	Contractor/Municipality/ PMC

	operation, as to whether approval necessary approvals are obtained is being verified by the engineer's representative regularly.	
Water	The quality of the water used for construction is being tested regularly to meet the requirements.	Contractor
Sand	M-sand is only used for construction purposes in the project.	Contractor
Labour Requirements and facilities	The contractor is engaging un-skilled labour. There is no child labour in the construction site. There is no separate labour camp in the project site. However, Labourers are provided with rented accommodation which has water and sanitation facilities and also, they are provided with transportation vehicles to the project area. In the project area temporary resting shed has been provided with drinking water and toilet facility in Keelkattalai Lake. The temporary toilets would be provided with septic tanks and be periodically disposed in the sewerage network of Municipality. For Pallavaram Lake there is a public toilet near, which may be used by the workers. Primary health centres of Pallavaram municipality is within 2 km from the accommodation.	Contractor
Occupational Safety & Health of workers Emergency Measures	Workers are provided with necessary occupational health and safety equipment such as protective face mask, head gear, eye shields protective goggles and safety gloves etc. Emergency contact numbers including Ambulance will be displayed at the project site and labour accommodation. First aid will be made available at site. Onsite Emergency plan will be finalized and implemented for community and work men to act when in emergency. Emergency procedures will be displayed in the site.	Contractor

	Health check-up for the contract labourers shall be carried out periodically due to exposure to slushy soil. Workers exposed to dust, chemicals or pathogens and working in high humidity areas shall be allowed to take breaks away from these areas and be encouraged to wash frequently. Sanitary facilities should be well equipped with supplies (eg. Protective creams) Supervisors will be deployed at the site for work implementation with heavy vehicles. Elevated platforms as in should be equipped with handrails, toe boards and non-slip surfaces. Personal Floatation devices (life vests), First Aid Kits, Fire Extinguisher, Tow rope, etc. shall be provided on vehicles / floats which work near water filled portions of the Lake. Maintain records on accidents, near misses.	
Safety Aspects	Adequate precautions like hard barricading shall be prevent accidents and from the machineries. All machines used shall conform to the relevant Indian standards Code and shall be regularly inspected by the PMC. Adequate strutting is provided to avoid collapse of soil. Protective footwear and protective goggles to all workers employed on mixing of materials like cement, concrete etc. Earplugs are being provided to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation. The contractor is supplying all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc to workers and staffs. Construction materials and tools shall be stored in an organised manner within the	Contractor

	identified area in project site. Educate the workers on safe storage, handling, removing used materials/ wastes/ broken pieces, etc. Reinforcement rods shall not be left exposed. During construction necessary barricading shall be provided to prevent injury to the workers and the nearby community. Protection with sand bag barrier is provided and red taping is also done. The used construction materials including nails, wooden pieces and other waste generated will be immediately removed from the work site after completing the construction work. Signages, reflectors and work site lighting during night where ever required will be provided during implementation. The contractor is complying with all the precautions as required for ensuring the safety of the workmen as per the International Labour 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. There is no child labour in the site.	
Barricading site	The construction site is being barricaded at all time in a day with adequate marking, flags, reflectors etc. for safety of general traffic movement and pedestrians	contractor
First Aid	First aid box is available in the project site. Emergency numbers will be displayed. Contractor's Vehicle is always available near the project site to take injured or sick	Contractor

	person(s) to the nearest hospital	
Water Pollution from Construction Wastes	All waste arising from the project is to be disposed of in the manner that is acceptable by the Engineer.	Contractor
Dust Pollution near settlements	All earth work will be protected in manner acceptable to the engineer to minimize generation of dust. Area under construction shall be covered & equipped will dust collector. Construction material will be covered or stored in such a manner so as to avoid being affected by wind direction. Unpaved haul roads near / passing through residential and commercial areas to be watered thrice a day. Trucks carrying construction material to be adequately covered to avoid the dust pollution and to avoid the material spillage.	Contractor
Vehicular noise pollution at residential / sensitive receptors.	Idling of temporary trucks or other equipment is not permitted during periods of loading / unloading or when they are not in active use. The practice must be ensured especially near residential / commercial / sensitive areas. Stationary construction equipment will be kept at least 500m away from sensitive receptors. All possible and practical measures to control noise emissions during drilling shall be employed. The Pallavaram municipality/ PMC is ensuring adequate controls measures depending on site conditions.	Contractor
Noise from vehicles, plants and equipment	Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if	Contractor

	found defective will be replaced. Maintenance of vehicles, equipment and machinery will be regularly monitored in order to keep the noise levels at the minimum.	
Storage of construction materials	Construction materials are being stored within the project area, without affecting the traffic and other common utilities.	Contractor
Waste Disposal	Desilted earth is disposed in the abandoned stone quarry in Tiruneermalai. Other Waste generated in the site including that from the labour shed are regularly emptied and disposed of in consultation with the ULB.	Contractor/Pallavaram Municipality
Clearing of site and restoration	On completion of the works, the left-over construction materials will be removed stored and removed by the contractor from project site for reuse/ proper disposal. 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.	Contractor
Monitoring of environmental parameters	The contractor shall undertake seasonal monitoring of air, water, noise and soil quality through an approved monitoring agency. Monitoring plan is provided in section 9.3 of this ESIA report.	Contractor
Associated activity	Work order has been issued to an independent agency for bio mining of the existing solid waste in the southern part of Pallavaram Lake. As desilting is yet to commence in this portion of the lake a separate work schedule will be prepared in consultation with another agency implementing the Bio mining project and a separate EMP will be prepared if required and implemented.	Contractor/PMC / Pallavaram Municipality
CONSTRUCTION		

AND O&M STAGE		
Solid waste Management	Prevention of dumping of wastes inside the waterbody through continuous monitoring. Provide required number of bins at strategic locations around the lakes and the solid wastes generated shall be regularly collected through existing arrangement & manpower available with the municipality. Entry of floating materials in to the lake will be controlled by providing bar screens in the inlets and which will be removed daily by municipal sanitary workers (with adequate PPEs/gears). Provide Signages to create awareness and conduct IEC activities. Display boards carrying the messages of DO's and Dont's	Pallavaram Municipality

MONITORING PLAN

ENVIRONMENTAL MONITORING PLAN

The environmental monitoring plan for the project is presented in following Table. For each of the environmental components, the monitoring plan specifies the technical aspects of monitoring like locations of monitoring; frequency of monitoring and duration, sampling method, parameters to be monitored and standards to be compared. The monitoring plan also specifies the applicable standards, and implementation and supervising responsibilities.

Environmental Monitoring Plan

Technical Aspect of Monitoring	Details of each Technical Aspect
Air Quality Monitoring	
Project stage	Construction stage (period of 18 months)
Parameter	PM10, PM 2.5, SO_2, NO_x, and CO
Sampling Method	High volume air sampler to be located 50 m from the source of pollution in the downwind direction. Method specified by CPCB for analysis shall be followed.
Standards	Revised National Ambient Air Quality (NAAQ) Standards set by CPCB
Frequency	Once in every season (except monsoon)
Duration	Continuous 24 hours / or for 1 full working day
Locations	Two locations near sensitive receptors at construction site of each lake, one near the concrete mix plant
Measures	Wherever air pollution parameters increase above specified standards, additional measures as decided by the engineer shall be adopted.
Implementation	Contractor through NABL/MoEF & CC approved monitoring agencies
Supervision	Environmental officer appointed by PMC
Water quality Monitoring	
Project stage	Construction stage (period of 18 months)

Technical Aspect of Monitoring	Details of each Technical Aspect
Parameter	pH, BOD, COD, TDS, Pb, Oil & Grease, Detergents and Faecal Coliforms for Surface water. pH, TDS, Total hardness, Sulphate, Chloride, Fe, and 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, 2012)
Frequency	Pre-monsoon and post monsoon seasons during the entire construction period
Duration	One-time grab sampling
Locations	Surface water – Two locations i.e., nearby water bodies or confluence point of project drain Ground water – Two locations for each lake.
Measures	At locations of increased water pollution towards downstream, all inflow channels shall be checked for pollution loads and channel delivering higher pollution loads shall be terminated from disposal into the water source.
Implementation	Contractor through NABL/MoEF & CC approved monitoring agencies
Supervision	Environmental officer appointed by Pallavaram Municipality
Noise Level Monitoring	
Project stage	Construction stage (period of 18 months)
Parameter	Noise level on dB (A) scale
Sampling Method	Measure equivalent noise levels using an integrated noise level meter kept at a distance of 15 m from edge of the pavement
Standards	Noise Pollution (Regulation and Control) Rules, 2000
Frequency	Once in every season (except monsoon).
Duration	Reading to be taken at 15 seconds interval for 15 minutes every hour for 24 hours and then average will be taken.

Technical Aspect of Monitoring	Details of each Technical Aspect
Locations	Two locations near sensitive receptors at construction site on each lake & one near concrete mix plant.
Measures	In case of noise levels causing disturbance to the sensitive receptors, management measures as suggested in the EMP shall be carried out.
Implementation	Contractor through NABL / MoEF &CC approved monitoring agencies
Supervision	Environmental officer appointed by PMC

ENVIRONMENTAL COMPLIANCE REPORTING

The contractor shall report on the status of the implementation of the EMP as per the reporting format approved by the engineer, and get it duly approved by the PMC who in turn will submit it to Pallavaram Municipality. The Pallavaram Municipality shall submit the compliance report to TNUIFSL along with the periodical progress report.

Provision for implementation of EMP:

The management measures for construction phase have been included as part of the contract documents through EMP and hence will be met by the contractor during implementation. The construction stage Management Plan provided above has been prepared based on the EMP given in the contract documents and shall be complied by the Contractor/ PMC/ ULB as applicable.

During the O&M stage, activities relating to Solid Waste will be carried out by the Pallavaram Municipality and rest of maintenance activities including flood management will be the responsibility of the PWD.

Collection and transportation of wastes would be handled by the existing arrangement & manpower available with the municipality. Provision Dust Bins at strategic locations, placing Sign Boards, Printing Pamphlets and other IEC activities are proposed for effective solid waste management and bar screen/gratings would be provided in the inlets to prevent entry of wastes into the lakes. The cost for these activities are estimated to be Rs.5 Lakhs. Break-up of the cost of EMP is is provided in the table below and will be met by Pallavaram Municipality.

Cost Estimate for EMP by Pallavaram Municipality

Sl. No.	Description	Quantity	Rate	Amount
1	Provision for Dust Bins Non-metallic Metallic	 5 5	 6,000 16,000	 30,000 80,000
2.	Provision for Sign Boards	10	18,000	1,80,000
3	Provision for Bar Screen and gratings	8	20,000	1,60,000
4.	Provision for Printing Pamphlets	L.S.	L.S.	10,000
5.	Provision for IEC activities	L.S.	L.S.	40,000
			Total	**5,00,000**

9 SOCIAL IMPACT ASSESSMENT

Two lakes are taken up under this sub-project and they are Pallavaram Lake and Keelkattalai Lake. The details of the two lakes are as follows.

Pallavaram Lake

Pallavaram Lake is having a total area of 124.90 in the initial stage. And in the present stage the lake area free from encroachments, other land uses such as Solid Waste Dump Site (about 5.5 acres), Radial Road (about 2.47acres) and encroached (about 47.26 acres). Hence this sub-project scope is restricted to 69.67 acres without affecting the encumbrances.

As per the revenue records the survey no is 432 and the land use is water body. The lake is owned by Public Works Department. A diagram capturing these details is provided in Annexure- 5

Land Statement:

Land under different uses	Extent (in acres)	Survey Number and Land use
Total Extent	124.90	R.S. No. 432, Water body
(4) Encroached	47.26	
(5) Radial Road	2.47	
(6) SWM dump	5.50	
Sub Total	54.23	
Available Area	69.67	
Sub-project Area	**69.67**	

Keelkattalai Lake

Keelkattalai lake is having a total area of 56.60 which is free from encroachment. As per the revenue records the survey no is 307 and the land use is water body. The lake is owned by Public Works Department. The pictorial presentation of the tank features, surrounding habitations etc is provided in the Annexure-6

Current Land use	Survey Number and Land Use	Extent (in acres)
Water Body	R.S. No. 307	56.60

Present stage:

The works are taken up in both the lakes and the components of the sub project are as follows.

Table 9-1 : Sub-project components

Pallavaram lake	Keekattalai lake
Bund strengthening work. Construction of Peripheral Drain for a length of 1813 m. Construction of Two regulators/ overflow weirs. Cleaning and Desilting the Tank. Chain link fencing with erection of Boundary Pillars. Construction of Walkway for 950 m on the Tank Bund for a width of 2.5 m.	De-silting of the lake to clear the debris and increase the storage capacity. Chain Link Fencing. Bund strengthening. Construction of Walkway for 750 m on the Tank Bund for a width of 2.5 m

SOCIAL IMPACTS OF THE PROJECT

Identification of Impacts:

- Prediction of Impacts based on the data collected from the primary sources and taking into consideration.

Field Survey

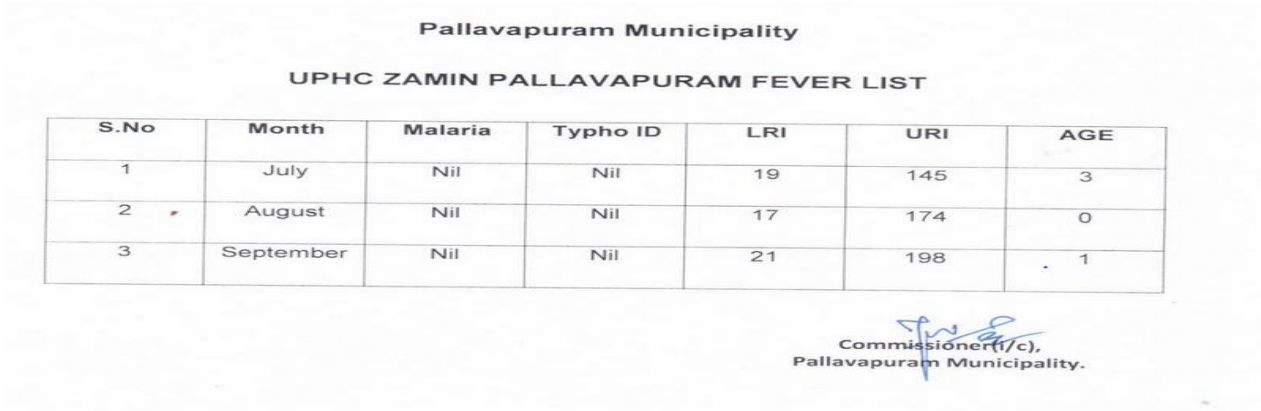
- The Consultant has carried out extensive field investigations and several meetings with the people at the project affected area. The impacts are as follows:

- No loss of properties and no loss of livelihood.
- Improve in water quality of Lake would direct positive impact on the Ground Water quality
- Public spending for fresh water from other sources in absence of adequate water supply from ULB will be considerably reduced as they can get quality ground water.
- Improved Health conditions due to the prevention of pollution of the lake
- Increase in rental value of the properties
- Increase in Property and Land values
- Lake front development like fencing and walking strip will enhance the environmental & health status of the surrounding communities.

- The full tank level will not have any impacts on the structure of the habitations adjoining the lake.

Baseline health situation around the lake area:

The Pallavaram Municipality has an UPHC located in Zamin Pallavaram Eri. The out patients got treated for the past three months data has been obtained from the UPHC for fever list. The report shows that no malaria and typhoid is reported in the past three months (July-September, 2018). In the previous month about 21 case were diagnosed with Lower Respiratory Infection, about 198 persons diagnosed with Upper Respiratory Infection and 1 person reported for Acute Gastroenteritis (Diarrhoea).



Pallavapuram Municipality

UPHC ZAMIN PALLAVAPURAM FEVER LIST

S.No	Month	Malaria	Typho ID	LRI	URI	AGE
1	July	Nil	Nil	19	145	3
2	August	Nil	Nil	17	174	0
3	September	Nil	Nil	21	198	1

Commissioner(i/c),
Pallavapuram Municipality.

Primary Baseline Health Survey

A baseline health survey has been carried out on 22.10.2018 in the surrounding areas of the lakes. The survey was carried out using structured questionnaire (Annexure-7), 50 respondents are selected using simple random sampling method. The samples are drawn from slum as well as non-slum areas located adjacent to both the lake area. The outcome of the survey is summarised below.

- None of the respondents report disease like Jaundice, Diarrhoea, Gastro, Polio and Worms in both slum and non-slum areas.
- 7 respondents reported fever in non-slum area and 2 in the slum area.
- Typhoid is reported by one responded residing in the non-slum area.
- A majority of the respondents, irrespective of slum-non-slum areas stated that they will prefer Municipal Primary Health Centre, then GH and private.

Death occurred due to illness in the last one year is none.

- Only 2 respondents from the slum areas are using public toilets.
- 48 respondents were reported that they have toilets at their home.
- None of the respondents reported open defecation

Gender Impact

This sub-project will mitigate any negative gender impact such as risk of gender based violence (GBC), if any and will promote equal employment opportunity during construction and maintenance wherever possible according to the skill requirements.

STAKE HOLDERS CONSULTATION

The Public consultation session was conducted on 20th August 2018 for the general public and stake holders. Door to Door intimation was given to the public and stakeholders regarding the consultation venue and time. The consultation was held at Surabhi Kalyana Mandapam, Radial Road, Pallavaram at 10 AM. The proceedings of the public consultation have been video recorded. The points raised during the meeting are recorded in the form of minutes. Consultation meetings were held for all the lakes. Points related to the projects were discussed elaborately with the people and received the feedback

Figure 12:Discussion with the encroachers of Pallavaram Lake

Entry of sewage and dumping of solid waste posing health issues for the surrounding resident and required immediate remedial measures to stop polluting the Lakes.

The participants suggested that the lake has to be restored without affecting the people living in the lake surroundings.

Baseline Details as Per DPR

As per the DPR and earlier version of ESIA, the tank area in total is 124.90 acres and there are about 1155 encroachments.

Present Status

The present scope of the project area is restricted to 69.67 acres doing away with the encroached portions of the lake. And this project doesn't involve eviction / resettlement of the 1155 encroachments identified by the earlier ESIA.

SOCIAL CATEGORISATION

Pallavaram Lake:

The sub-project which is under implementation has been restricted to 69.67 acres of area is free from encroachments, and doesn't involve acquisition of private lands, no displacements, hence categorised as S3 as per ESMF.

Keelkattalai Lake: The present scope of the project doesn't involve acquisition of private land, displacement and R&R, hence categorised as S3 as per ESMF.

Based on the above and considering the present scope of the works in both the lakes, this sub-project is classified as S3 as per ESMF.

IMPACTS DURING IMPLEMENTATION

At present the scope of the project is restoration of lakes in encumbrance free area thereby not having any impacts. However, any Impacts arises during implementation of the project will be compensated as per ESMF Entitlement Matrix. During the works taken up so far no social impacts is encountered.

GRIEVANCE REDRESSAL MECHANISM

In order to redress the grievance raised by any affected person from project implementation, project level Grievance Redressal Committee (GRC) shall be established as a grievance redressal mechanism.

9.1.1 GRIEVANCE REDRESSAL COMMITTEE (GRC)

The Project level GRC constituted and the details are as follows:

Table 9-2: GRC

NAME	ADDRESS	GRC	CONTACT DETAILS
	The Commissioner, Pallavaram Municipality	Chairperson	Pallavaram Municipality, 3rd Street, New colony, Chrompet, Chennai- 44 commr.Pallavaram@tn.gov.in 044-22418459
D. Jayaprakash	Ex. Vice Chairman Pallavaram	Member	9444250438
P.S. Vanathammal	Community Organiser	Member	9884727245
M. Egavalli	Community Organiser	Member	9855276027
M. Karuppaih Raja	Municipal Engineer	Convenor	044-22418459

The GRC shall convene meetings of the committee as necessary at such place or places in the PIA as he considers appropriate; and Conduct the proceedings in an informal manner as he considers appropriate with the object to bring an amicable settlement between the parties.

Step by step approach will be followed for redressing grievances. First, the aggrieved PAP to approach the GRC in the first stage and the grievance committee will look into the grievances and resolve the issues. The proceedings of GRC will be documented.

If not satisfied with the resolution provided by GRC, then the complainants can appeal to the grievance redressal mechanisms available at the office of CMA at Chennai.

9.1.2 GRIEVANCE REDRESSAL:

Initially any aggrieved PAP, if any, will be directed to approach GRC, controlled by the **appropriate Commissioner of ULB** / or the authorized signatory which is constituted by the PIA. It will consist of a panel of three Members, one of whom shall be the PIA representative from the sub-project. The others will include representative of the residents of the area / local body who are publicly known to be persons of integrity, good judgment and command respect; and a representative of local NGO/CBO. If the grievance of the PAP is not addressed by PIA, subsequently it will refer to District Collector, during the Collectors weekly grievance redress day. If the PAP is still unsatisfied with the decisions taken by the project and the Collector, he would as a last recourse can appeal in the court of law.

The PIA representative of the GRC shall convene meetings of the committee as necessary at such place or places in the PIA as he considers appropriate; and Conduct the proceedings in an informal manner as he considers appropriate with the object to bring an amicable settlement between the parties; The report of the members shall be recorded in writing and attested copies thereof shall be provided to the parties. All expenses incurred in arranging grievance negotiations and meetings of GRC as well as logistics required, shall be arranged by the borrower.

CURRENT STATUS OF THE PROJECT AND CERTIFICATION

Pallavaram Lake

The civil works are in progress

- The interception drain work is in progress in both sides of the lakes and on both the sides of the 200 ft road.
- **Peripheral Drain I** Inlet D_1 to well (4)- completed - 303 m
- **Peripheral Drain II** Inlet D_2 to well (3)- completed -95 m
- **Peripheral Drain III** Inlet D_3 to D_2-completed-448 m
- **Peripheral Drain IV** Inlet D_4 to D_3 - Under Progress -177 m (Total 335 m)
- Desilting in water spread area in Left side of Lake.
- Bund strengthening
- Construction of Regulator on the left side of Radial Road across the Tank Bund

Keelkattalai Lake

- The Bund Strengthening work is completed for this Tank for 1300 m out of the bund length 1440 m.
- The Bund side slope in the Front side (Water side) is being protected for a slope length of 3.60 m with CC Blocks of size 0.30 x 0.25 x 0.20 m and this Lining work is completed for 120 m and the work is in progress.
- A Retaining wall construction is in progress for a length of 77.70 m at the breached weaker portion of the bund.
- Desilting in the water spread area on the Right side of lake is in progress.
- Cement Concrete Blocks (CC Blocks) are being casted at Keelkattalai Tank Water spread area for both the tanks.
- Demarcation of boundary for this Lake is completed.

STATUS OF SOCIAL IMPACTS

The implementation of present work has been restricted to 69.67 acres in Pallavaram Lake and 56.60 acres in Keelkattalai Lake. During the implementation of this sub-project there will be no removal of 1155 informal settlements residing around the lake by the Pallavaram Municipality as well as by the land-owning agency i.e. PWD during the construction period. In the construction work carried out so far, no encroachments are evicted, a certification in this regard by the ULB is enclosed in annexure-13.

A baseline videography has been taken to serve as baseline as of September 2018, even if any impacts are triggered to the houses close to the lake restoration area.

The NoC from the PWD was obtained on 06-09-2017 for permitting the ULB to take up the restoration works. A gist of the NoC conditions is as follows:

- Zamin Pallavaram Lake and Keelkattalai Lakes to be desilted and the Bunds strengthened without changing the hydrology of these lakes.
- The boundaries of the water spread area of these two lakes have to be demarcated by the Surveyor, Revenue Department and the peripheral compound wall / Chainlink Fencing should be erected after the removal of encroachments in the foreshore area.
- Inlet Regulators should be provided to receive the rain water into these lakes from the catchment area.
- No treatment plant should be provided in the water spread area.
- No construction is entertained in the Zamin Pallavaram Periya Eri – S. No: 432, Area 80.54.5 Hectares and in Keelkattalai Eri S. No: 307, Area 24.25.0 Hectares except constructions related to Hydrology structures.
- Fully treated water only should be allowed into the lake and no sewage water should be let into the lake.
- Prior intimation should be given to the officials of Public Works Department before commencing the work.
- The Zamin Pallavaram Lake and Keelkattalai Lakes are being used in flood water management, Ground water recharge and Environmental protection, and there is no Irrigation contribution from these two Lakes.
- During the monsoon seasons, the water courses and other surplus courses of these Lakes are to be repaired only by PWD for flood mitigation and management.

- Pallavaram Municipality should co-operate in removing the encroachments in both the Lakes and to ensure the removal of encroachments completely while executing the other works.

APPLICABLE FOR THIS PROJECT

All the above NoC conditions of the PWD is complied. The foreshore area is the presently available water spread area of the lake, which is free from encroachments and no encroachments were removed prior to start of works /during the progress of works.

RELIGIOUS AND COMMUNITY FACILITIES

Site Observations:

The community assets in the encroached area of the lake are kept intact in the Pallavaram Lake. Similarly, no disturbance to the temple due to this project. (see Table 9-2)

Table 9-3: Community Assets in encroached area of the lake

S.No	Name of the places	Pallavaram Lake	Remarks
1	Public Taps	24	No impacts
2	Street lamp poles	85	No impacts
3	Public Toilets	3	No impacts
4	Hand Pumps	131	No impacts
5	Public wells	----	

Table 9-4: Religious & Community structures in the lake area

Name of the Lake	No of Temples	Location	Present condition	Remarks
Pallavaram lake	1	South east Bund	Pucca structure and under the worship of the people on Daily basis.	No disturbance to the temple due to restoration works proposed
Keelkattalai Lake	No temples	------	------	------

As per the ESIA the tank is used for bathing, washing and open defecation. While revising the DPR, PWD objected for construction of bathing Ghats. Hence as per the present scope of the project no such facilities are proposed. However, there is one public toilet available in about 200 m being maintained by the municipality. The Pallavaram Municipality has provided Individual Household Latrines (IHHL) under SBM to all the habitations surrounding Pallavaram as well as Keelkattalai Lakes.

Employment opportunities

This project during the construction period on an average will generate employment opportunities for 25 - 30 people including skilled /semi-skilled/ un-skilled.

During the O&M stage, activities relating to Solid Waste will be maintained by the Pallavaram Municipality and rest of maintenance activities including flood management will be the responsibility of the PWD.

10 IMPLEMENTATION ARRANGEMENTS

The Pallavaram Periya Eri and Keelkattalai Eri are at present in the administrative jurisdiction of Public Works Department of Govt. of Tamil Nadu. Restoration of these lakes is being implemented by Pallavaram Municipality.

The Environmental Management Measures for the construction phase have been included in the agreement with the contractor and implementation of the measures for compliance to environmental safeguards is to be ensured by the contractor. The measures identified for the operation phase will be taken up by Pallavaram Municipality upon completion of construction activities.

Pallavaram Municipality/ Project Management Consultant (PMC): Pallavaram Municipality has appointed Tamil Nadu Water Investment Company Ltd., as Project Management Consultants (PMC) for managing implementation of restoration project. PMC shall ensure adoption and compliance of ESMF. PMC shall submit monthly ESMF compliance report to Pallavaram Municipality who in turn shall submit compliance report to TNUIFSL along with the progress report.

Contractor: The Contractor shall ensure safeguards compliance throughout the project. Contractor will have also have mechanism for handling grievances related to construction works. The Contractor to sensitize the labours on Code of Conduct, awareness raising among labourers etc.

Grievance Redressal Mechanism: A project level grievance redressal committee has set up by the Pallavaram Municipality.

NAME	ADDRESS	GRC	CONTACT DETAILS
	The Commissioner, Pallavaram Municipality	Chairperson	Pallavaram Municipality, 3rd Street, New colony, Chrompet, Chennai- 44 commr.Pallavaram@tn.gov.in 044-22418459
D. Jayaprakash	Ex. Vice Chairman Pallavaram	Member	9444250438
P.S. Vanathammal	Community Organiser	Member	9884727245
M. Egavalli	Community Organiser	Member	9855276027
M. Karuppaih Raja	Municipal Engineer	Convenor	044-22418459

PLAN OF IEC ACTIITIES

Information, Education and Communication plays a pivotal role in creating awareness, mobilizing people and ensuring infrastructure development in a participatory and in an accountable manner through requisite advocacy and by transferring knowledge, skills and techniques to the system beneficiaries.

The proposed action plan for implementation of IEC activities is furnished in Table below.

Table 10-1 : Action Plan

Target & Scope	Strategy & Tasks	Target Group
Ensure compliance of applicable Rules and to create awareness among stakeholders	Distribution of campaign materials like flip chart brochures, posters, stickers etc. to target group. Audio-visual medium, CDs, short tele-films, street corner plays Pursue with various media including cinema halls in public interest to create awareness through interspersed documentary strips Identifying resource persons from target group (preferably institutions and media) and train them to propagate awareness to citizens and institutional members	General public Educational institutions Media & Youth Clubs Social clubs like Rotary Club, Lions Club Environmental Clubs

11 PUBLIC CONSULTATION

STAKE HOLDER'S MEETING

During the updation of ESIA the Stakeholders meeting was conducted on 20th August 2018 for the general public. Door to Door intimation was given to the public and stakeholders regarding the consultation venue and time. The consultation was held at Surabhi Palace Thirumana Mandapam, 200 feet Radial Road, Chrompet, Chennai -600044 at 10.00 A.M. The proceedings of the public consultation have been video recorded. The points raised during the meeting are recorded in the form of minutes.

KEY POINTS OF THE STAKEHOLDER MEETING DURING RESTORATION

The meeting was held with the public was aimed at receiving maximum feedback in order to improve the proposed solutions. The presentation was given in Tamil by Mr. Siva Kumar, Commissioner, Pallavaram Municipality, Er. Karuppaiah Raja, Municipal Engineer, Pallavaram Municipality, Er. Anbu Ilango, Consultant, TWIC. The presentation covered the current status of the lakes and the restoration work being carried out. The presentation of the report was followed by suggestions and queries from the public:

- Public thanked the Govt. for taking up the project on priority.
- Preventing measures for stopping disposal of solid waste and vehicle washing must be ensured.
- Water body boundary has to be protected by providing fencing.
- The participants suggested that the lake has to be restored without affecting the people living surrounding areas of the lake.
- Entry of sewage and dumping of solid waste posing health issues for the surrounding residents and required immediate remedial measures to stop polluting the Lakes.
- The participants expressed that they have been living in this area for the past 25 years and are happy for rejuvenate lakes by which environment will be improved.
- Underground sewage scheme and storm water drains shall be provided around the lakes on priority.
- Non-Government Organisations (NGOs)/Community Based Organisations (CBOs)/Resident Welfare associations (RWAs)/Students shall be involved in awareness activities in protecting the Water bodies.

11.1.1.1 QUERIES AND SUGGESTIONS

After the meeting, the attendees were requested to fill in the feedback forms delivered in the stakeholders meeting.

11.1.1.2 ACTION PLAN

The summary of suggestions extracted from the meeting and feedback forms filled by the stakeholders at meeting held on August 20th 2018 is as follows:

Table 11-1 : Suggestions and action plans of stakeholder meeting

No	Suggestions & Questions	Action Proposed
1	No property or people shall be evicted as we are living in this area for the past 35 years	It is proposed to go for restoration of the lake with the available land
2	Discharge of Sewage in to the Lake from surrounding areas which is the main cause for Water Pollution, needs to be arrested.	Peripheral Drain is proposed to divert the sewage flow to the sewerage scheme.
3	Disposal of Garbage in to Lake by Municipality and Public directly shall be controlled.	Chain Link Fencing is proposed to prevent solid waste dumping. IEC, signages will be provided – SWM will be arranged by Pallavaram Municiapality for this area immediately.
4	Storage Capacity of the lakes shall be improved by deepening the Lake.	Lake will be de-silted to restore to its original depth.
5	Vehicle washing shall be stopped in the lake	All-round Chain-Link Fencing is proposed
6	Walking Track shall be developed for the benefit of local community.	Lake front development like walking Track is proposed.
7	Trees shall be planted along the Boundary of the Lake.	Planting trees of local species will be examined.
8	Encroachment in lake area and drainage channels shall be removed.	Restoration of existing lake area is considered.
9	Existing Garbage dump in Pallavaram Lake shall be removed	The Pallavaram has proposed scientific closure to the existing dump at a cost of Rs. 700 lakhs.
10	Water body shall be provided with necessary Bund covering the entire periphery.	Necessary walkway all along the periphery is proposed. Existing bund is being strengthened. Necessary pitching with CC Blocks inside slope of the Bund and Green cover over the outside slope to prevent erosion and as well to give better appearance. Turfing with soil/vegetative sods from the lake bed is provided.
11	Entry of Stray Animals and Animal Washings shall be prevented.	The lake is proposed with Chain link fencing. Signages/warning boards.
12	Development of aquaculture in the Lake shall be proposed.	Development of aquaculture in the Lake will be examined.
13	Awareness Campaign shall be encouraged involving NGOs.	Necessary Guidelines will be evolved.

Details of consultation conducted during the DPR preparation is provided in Annexure -3

ANNEXURES

ANNEXURE 1: ENVIRONMENTAL SCREENING FORM

Name of the Borrower: Government of Tamil Nadu

Project location : Pallavaram Municipality

Project : Restoration of Zamin Pallavaram Eri and Keelkattalai Eri in Pallavaram Municipality of Kancheepuram District.

Project Components		
Sl. no	**Components**	**Details**
1	Brief description of the project proposal	The Project involves restoring the two rainfed irrigation tanks / Eri's namely; Pallavaram Periya Eri and Keelkattalai Eri. The main objective is to improve the water quality of these tanks by diverting the sewage / wastewater entry into the lakes, desilting and removing the debris and weeds, bund strengthening, chain link fencing and walkway development. These activities would result in overall environmental improvement, improvement of water quality and water storage capacity during floods.
2	Number of project sites and Project components	Projects components are 1. Bund Strengthening work 2. Desilting Work 3. Peripheral Drain Work 4. Construction of Regulators 5. Reconstruction of Sluice 6. Chain Link Fencing, Kerb wall and laying Pavement blocks for walkway. Other support activities include casting of concrete blocks and turfing.
3	Details of Alignment and Component	The tanks are rain fed and mainly collect storm water runoff from their respective catchment areas
4	Location of the Project Sites & Current Use (Provide information for all sites	Pallavaram lake situated in Pallavaram village;

	involved in the project)	and Keelkattalai lake is situated in Keelkattalai village under Pallavaram Municipality. The present use of the lake is to store the rain water (earlier used for agriculture; currently to support water storage during floods).		
	Biological Environment			
Sl. no	**Components**	**Yes**	**No**	**Details**
5	Is the project adjacent to any of the following (Provide information for all sites and alignment of the project)			
(i).	Cultural Heritage site		✓	Beyond 300m
(ii).	Protected Area		✓	Beyond 5 Km
(iii).	Wetland/ Mangrove/ Estuarine Region		✓	Beyond 5 Km
(iv).	Natural Forests		✓	
(v).	Other Sensitive Environmental Components as listed in ESMF		✓	
(vi).	Residences, schools, hospitals etc	✓		
(vii).	Drinking water source, upstream and downstream uses of rivers etc		✓	
(viii)	Lowlying areas prone to flooding / areas of Tidal Influence (CRZ)		✓	
6.	Does the proposed project could cause the following			
(i).	Impact on Surrounding Environmental Conditions	✓		Positively in the long run but temporarily minor reversible impacts during construction
(ii).	Degradation of land / eco-systems		✓	
(iii).	Loss or impacts on Cultural / heritage properties		✓	

(iv).	Water Resource Problems		✓	
(v).	Pollution of Water bodies / ground water		✓	
(vi).	Cutting of Trees / Loss of Vegetation		✓	Clearing of weeds, scrub
(vii).	✓ Health & Safety Risks in the neighbourhood	✓		During construction
(viii)	Potential risk of habitat fragmentation due to the clearing activities? (eg. Hindrance to the local bio diversity like disturbing the migratory path of animals/ birds etc.)		✓	
	Physical Environment			
	Components	**Yes**	**No**	**Details**
7	Will the project affect the River flow pattern, stream pattern or any other irrigation canal?		✓	
8	Water quantity? Estimated usage of water quantity for the project	✓		12,000 litres per day which will be brought from outside the lake area.
9	Estimated energy consumption for the project activities		✓	
10	Any other resources proposed to be utilized for project activity? (eg., ground water)	✓		Sand, Mineral sand, Stone jelly, for construction purposes.
	Geology / Soils			
	Components	**Yes**	**No**	**Details**
11	Does the project activity involve cutting and filling/ blasting etc…?		✓	
12	Will the project cause physical changes in the project area (e.g., changes to the topography) due to excavation, earthwork etc…?		✓	
13	Will the project involve any quarrying/		✓	Only Desilting

	mining etc?			
	Pollution			
	Components	**Yes**	**No**	**Details**
14	Will the project use or store dangerous substances (e.g., large quantities of hazardous chemicals/ materials like Chlorine, Diesel, Petroleum products etc…)?		✓	Diesel for emergency usage in Heavy Earth Machinery on a day to day basis. Mostly, the machines will be stored and fuelled at contractor's facility away from the sites
15	Will the project produce solid or liquid wastes?	✓		Desilted slushy earth contains plastic wastes and floating plant matter.
16	Will the project cause air pollution or increase in emission of pollutants?	✓		Temporary due to movement of vehicles / machinery
17	Will the project generate or increase noise?	✓		Temporarily during operation of heavy equipment
18	Will the project generate water pollution (water bodies/ groundwater)?		✓	
19	Will the project cause construction Hazard to workers/ residents	✓		During construction
20	Is there a potential for release of toxic gases or accident risks	✓		Temporary
	Environmental Enhancement Measures			
	Components	**Yes**	**No**	**Details**
21	Has the Project design considered the following?			
22	Is the project design considering energy conservation measures/ energy recovery options?		✓	
23	Is the project considering waste minimisation or waste reuse/recycle options?	✓		Waste / weeds are proposed to be used for composting.

24	Has the project design considered RWH or any other environmental enhancement measure?	✓		Natural recharge is envisaged as water retention will be enhanced by the proposed improvements.

				lake
	General			
22	Please indicate whether any other features of the project that could influence ambient environment	✓		The Sewage entry in to the lake is being diverted to UGSS and flood water only is proposed to be stored in the lake and Due to desilting, the capacity of lakes gets increased and Ground water availability in the nearby area will increase.
23	Has any consultation with the public or stakeholders been conducted?	✓		Stack holder meeting conducted on 20-08-2018 with public participation.

Date: 21-08-2018

Signature and name of the Borrower

COMMISSIONER
CHROMEPET, CHENNAI-44

Enclosures: (Provide maps with the geographical location of the project; and an appropriately-scaled map clearly showing the project area and project sites with land use, existing buildings, infrastructure, vegetation, adjacent land use, utility lines, access roads and any planned construction, as required).

ANNEXURE 2: SOCIAL SCREENING FORM

SOCIAL SCREENING FORM

Name of the Borrower: Government of Tamil Nadu

Project location : Pallavaram Municipality

Project : Restoration of Zamin Pallavaram Eri and Keelkattalai Eri in Pallavaram Municipality of Kancheepuram District.

Land Use, Resettlement, and/or Land Acquisition				
Sl.no	**Components**	**Yes**	**No**	**Details**
1	Does the project involve acquisition of private land?		✓	
2	Alienation of any type of Government land including that owned by Urban Local Body?		✓	
3	Clearance of encroachment from Government/ Urban Local body Land?		✓	
4	Clearance of squatters/hawkers from Government/ Urban Local Body Land?		✓	
5	Number of structures, both authorized and/or unauthorized to be acquired/ cleared/		✓	
6	Number of households to be displaced?		✓	
7	Details of village common properties to be alienated Pasture Land (acres) Cremation/ burial ground and others specify?		✓	
8	Describe existing land uses on and around the project area (e.g., community facilities, agriculture, tourism, private property)?		✓	Residential.
9	Will the project result in construction		✓	No

	workers or other people moving into or having access to the area (for a long time period and in large numbers compared to permanent residents)?			
10	Are financial compensation measures expected to be needed?		✓	No
Loss of Crops, Fruit Trees, Household Infrastructure and livelihood				
Sl.no	**Components**	**Yes**	**No**	**Details**
11	Will the project result in the permanent or temporary loss of the following?			
11.1	Crops?		✓	
11.2	Fruit trees / coconut palms? Specify with numbers		✓	
11.3	Petty Shops/ Kiosks		✓	
11.4	Vegetable/Fish/Meat vending		✓	
11.5	Cycle repair shop		✓	
11.6	Garage		✓	
11.7	Tea stalls		✓	
11.8	Grazing		✓	
11.9	Loss of access to forest produce (NTFP)		✓	
11.10	Any others – specify		✓	
Welfare, Employment, and Gender				
Sl.no	**Components**	**Yes**	**No**	**Details**
12	Is the project likely to provide local employment opportunities, including employment opportunities for women?	✓		

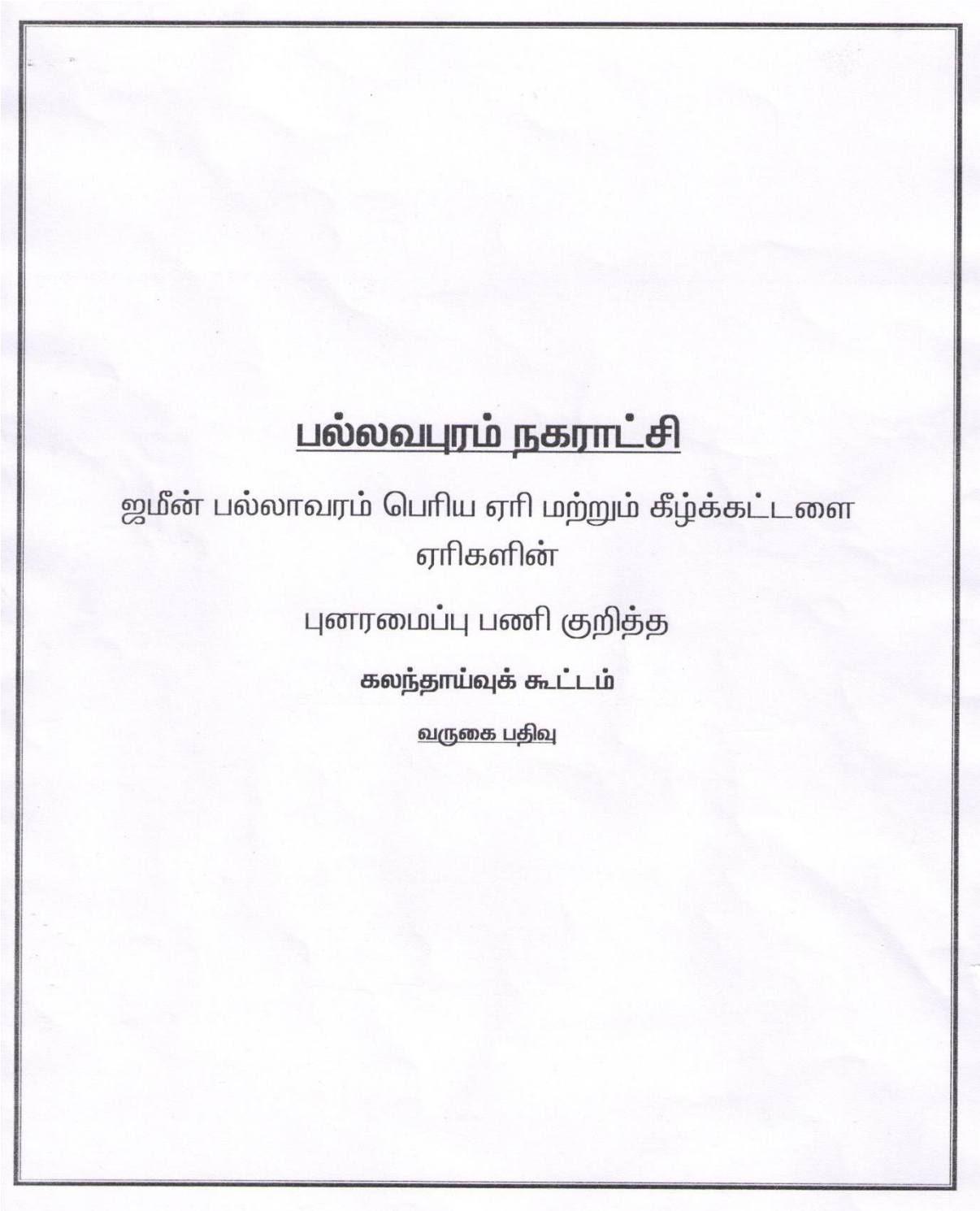
	employment opportunities for women?			
13	Is the project being planned with sufficient attention to local poverty alleviation objectives?		✓	
14	Is the project being designed with sufficient local participation (including the participation of women) in the planning, design, and implementation process?	✓		During the Planning Process
Historical, Archaeological, or Cultural Heritage Sites				
Sl.no	**Components**	**Yes**	**No**	**Details**
Based on available sources, consultation with local authorities, local knowledge and/or observations, could the project alter:				
15	Historical heritage site(s) or require excavation near the same?		✓	
16	Archaeological heritage site(s) or require excavation near the same?		✓	
17	Cultural heritage site(s) or require excavation near the same?		✓	
18	Graves, or sacred locations or require excavations near the same?		✓	
	Tribal Population/Indigenous People			
19	Does this project involves acquisition of any land belonging to Scheduled Tribes?		✓	
	Beneficiaries			
20	Population proposed to be benefitted by the proposed project			Ward No: 8, 9, 24 & 25 of Pallavapuram Muniipality
21	No. of Females proposed to be benefitted by the proposed project			10358
22	Vulnerable households /population to be benefitted			5511
23	No. of BPL Families to be benefitted			5828

COMMISSIONER
PALLAVAPURAM MUNICIPALITY
CHROMEPET, CHENNAI-44

Date: 21-08-2018

Signature and name of the Borrower

ANNEXURE 3: Stakeholder meeting during restoration – Feedback



பல்லவபுரம் நகராட்சி

ஜமீன் பல்லாவரம் பெரிய ஏரி மற்றும் கீழ்க்கட்டளை ஏரிகளின்

புனரமைப்பு பணி குறித்த

கலந்தாய்வுக் கூட்டம்

வருகை பதிவு

வரிசை எண்.	பெயர் (ம) பதவி	தொலைபேசி எண்	கையொப்பம்
107	இ.கீதா, Data Entry Operator	9840720091.	[signature]
108	மு. பானி "	9840752836	[signature]
109	S. ஜூலி "	8608789314	[signature]
110	R. சிந்துஜா "	9600136508	[signature]
111	S. Gayathri Grace	9841708538	[signature]
112	S. GOMATHY	9094159127	[signature]
113	K. வசந்தா	—	K. வசந்தா
114	C. சித்ரா	—	C. சித்ரா
115	அனிதம்	—	அனிதம்
116	[illegible]	9884187292	[signature]
	P. சின்னராஜ்	9840743679	P. சின்னராஜ்
117	V. அமுதா	8778040250	V. அமுதா

வரிசை எண்.	பெயர் (ம) பதவி	தொலைபேசி எண்	கையொப்பம்
1	கோ. சிவகுமார், நகரமைப்பு அலுவலர் பல்லாவரம் நகராட்சி.	9444030586	20/8/18
2	K. RAMESH INSPECTOR OF POLICE, S.12. chitlapakkam PS	9443007015	
3.	K. சிவகுமார் நகராட்சி ஆணையர் பல்லாவரம்	8754446151	20/8/18
4.	M KARUPPIAH RAJA Municipal Engineer / pallavaram	9003003606	
5.	P. செல்வராஜ் சுகாதார அலுவலர் பல்லாவரம் நகராட்சி	7708064661	20/8/18
6	தி. அன்புச்செல்வன் Team twic leader	9486869818	
7.	ஆ. [illegible] DM/ESSM/TNUIFSL, Chennai-28	9444533296	
8.	CHITRA RAJESH. ESSM/TNUIFSL, Ch-28	9444748398.	
9.	V. Amalarasi, Junior Assistant Pallavapuram Municipality	9865460283	
10.	N. Marimuthu Sanitary Inspector, PMC	8754023760	
11	K. Chandra. Asst. Pallavapuram Municipality	9002136605	
12	C. VENKATESAN ASSISTANT ENGINEER, PALLAVARAM MUNICIPALITY	8754446118	20/8/18

பல்லவபுரம் நகராட்சி

ஜமீன் பல்லாவரம் பெரிய ஏரி மற்றும் கீழ்க்கட்டளை ஏரிகளின் புனரமைப்பு பணி/Restoration of Zamin Pallavaram Periya Eri & Keelkattalai Eri

இடம்: சுரபி பேலஸ் திருமண மண்டபம் தேதி.20.08.2018

கலந்தாய்வு கூட்ட கருத்துப்படிவம்/**Feedback Form**

பெயர் (Name)	SRINIVASAN K.R
பதவி (Designation)	Business
முகவரி (Address)	59, ERIKarai St, Chromepet,
மொபைல் எண் (Mobile No)	9841350503
மின்னஞ்சல் (Email.ID)	manamadai@yahoo.com

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்
Please record your opinion and suggestions

Thank you everybody for giving a Brief about yielding water facility by clearing our lake nearby.
also Thanks for the assurance you gave to not moving any body outside. Residing there.
Finally In many streets we could see the water which were blocked you should check out this
Thank you Very Much

K.R. SRINIVASAN

ஜமீன் பல்லாவரம் பெரிய ஏரி மற்றும் கீழ்க்கட்டளை ஏரிகளின் புனரமைப்பு பணி/Restoration of Zamin Pallavaram Periya Eri & Keelkattalai Eri

இடம்: சுரபி பேலஸ் திருமண மண்டபம் தேதி.20.08.2018

கலந்தாய்வு கூட்ட கருத்துப்படிவம்/Feedback Form

பெயர் (Name)	A. ஜூலியா
பதவி (Designation)	
முகவரி (Address)	கலைஞர் நகர் மெயின் 101 வடக்கு தெரு கார்த்தி நகர் பல்லாவரம் சென்னை - 43
மொபைல் எண் (Mobile No)	9094197884
மின்னஞ்சல் (Email.ID)	

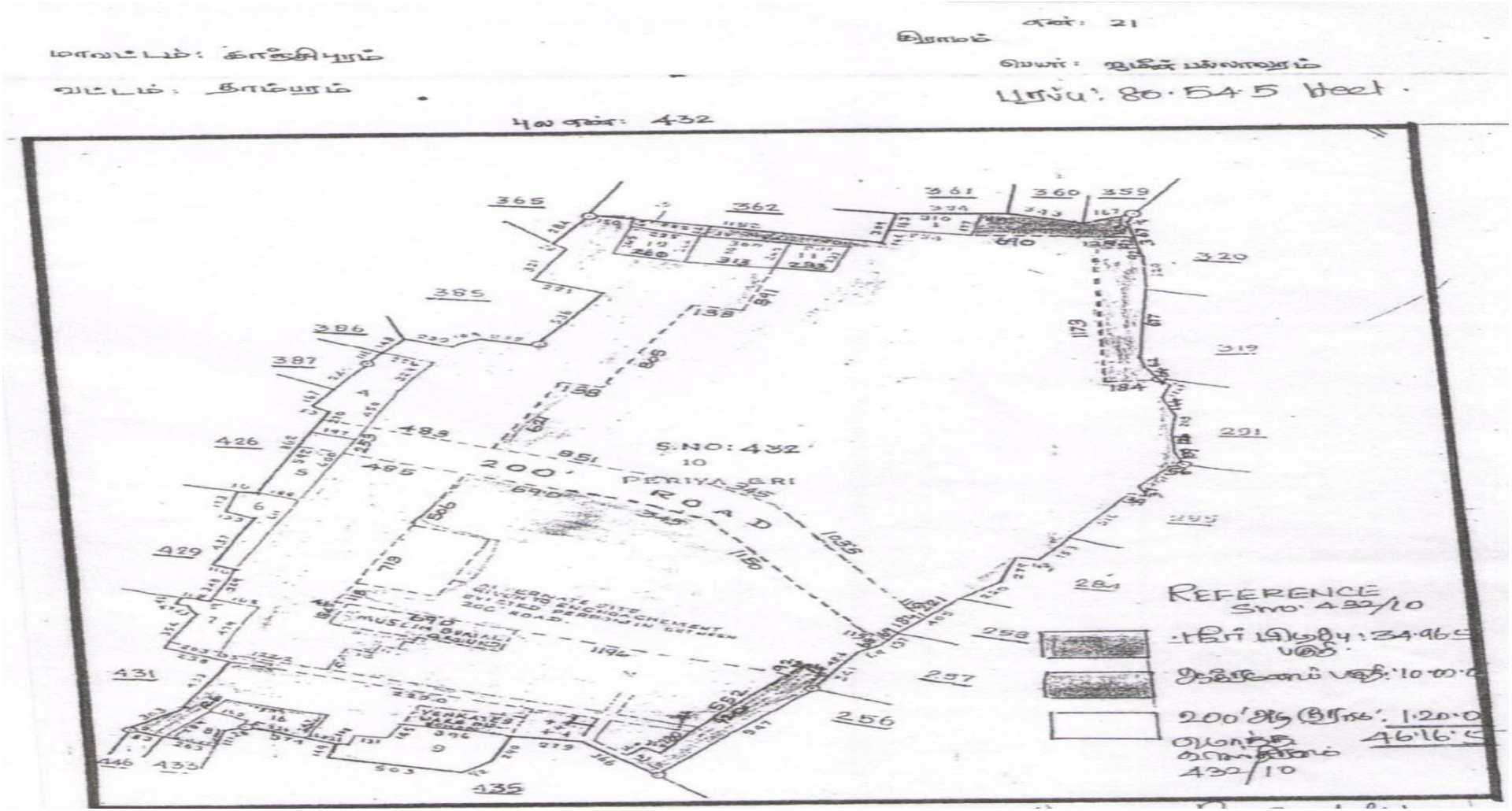
உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்
Please record your opinion and suggestions

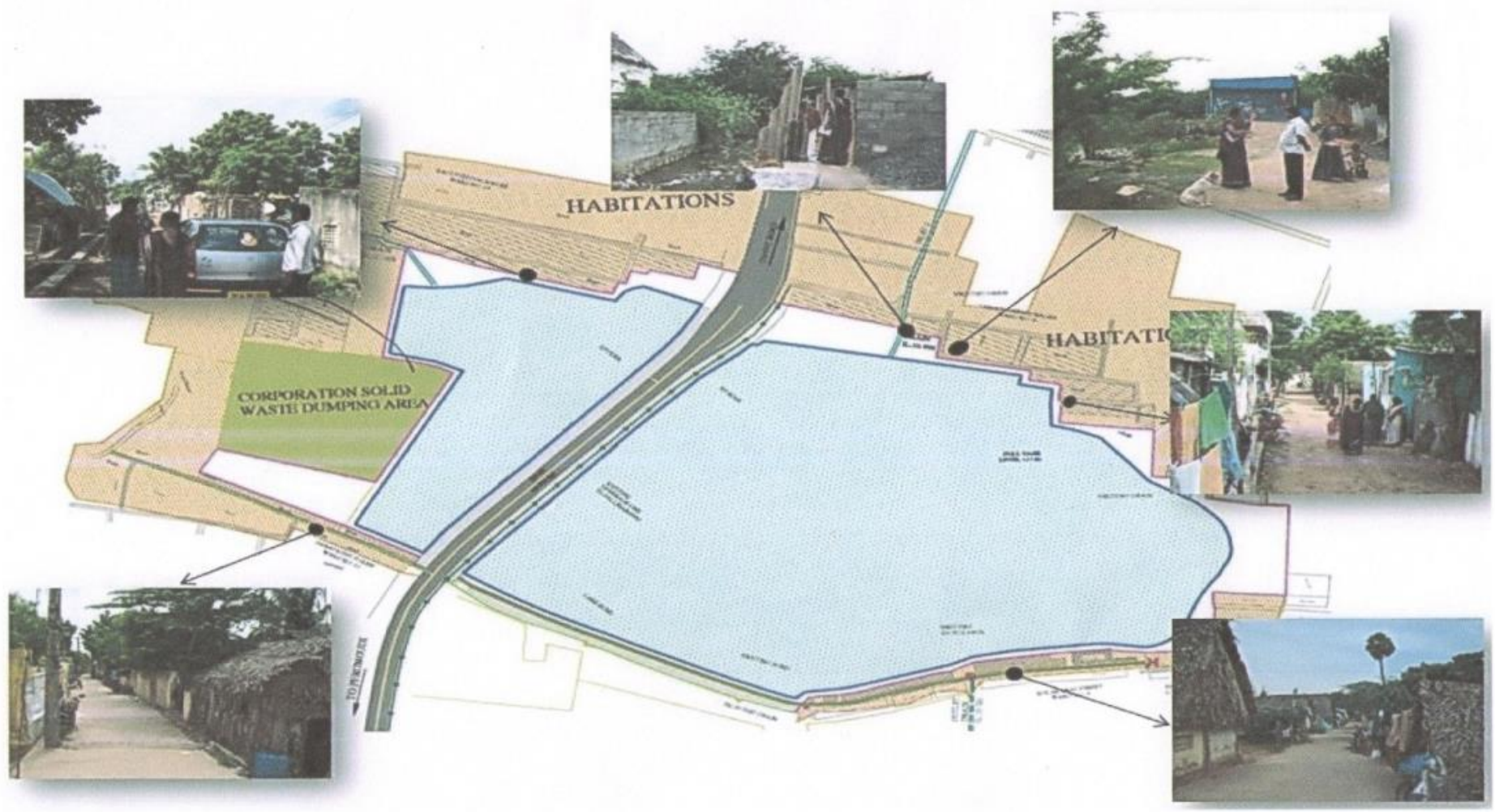
ஐயா அவர்கள்

மிக்க நன்றி எங்களுக்கு எந்த வாதிப்பு இல்லாமல் நீங்கள் கால்வாய் அமைப்பு ஏரி சுத்தம் செய்வதற்கு மிக்க நன்றி

இப்படிக்கு
A ஜூலியா

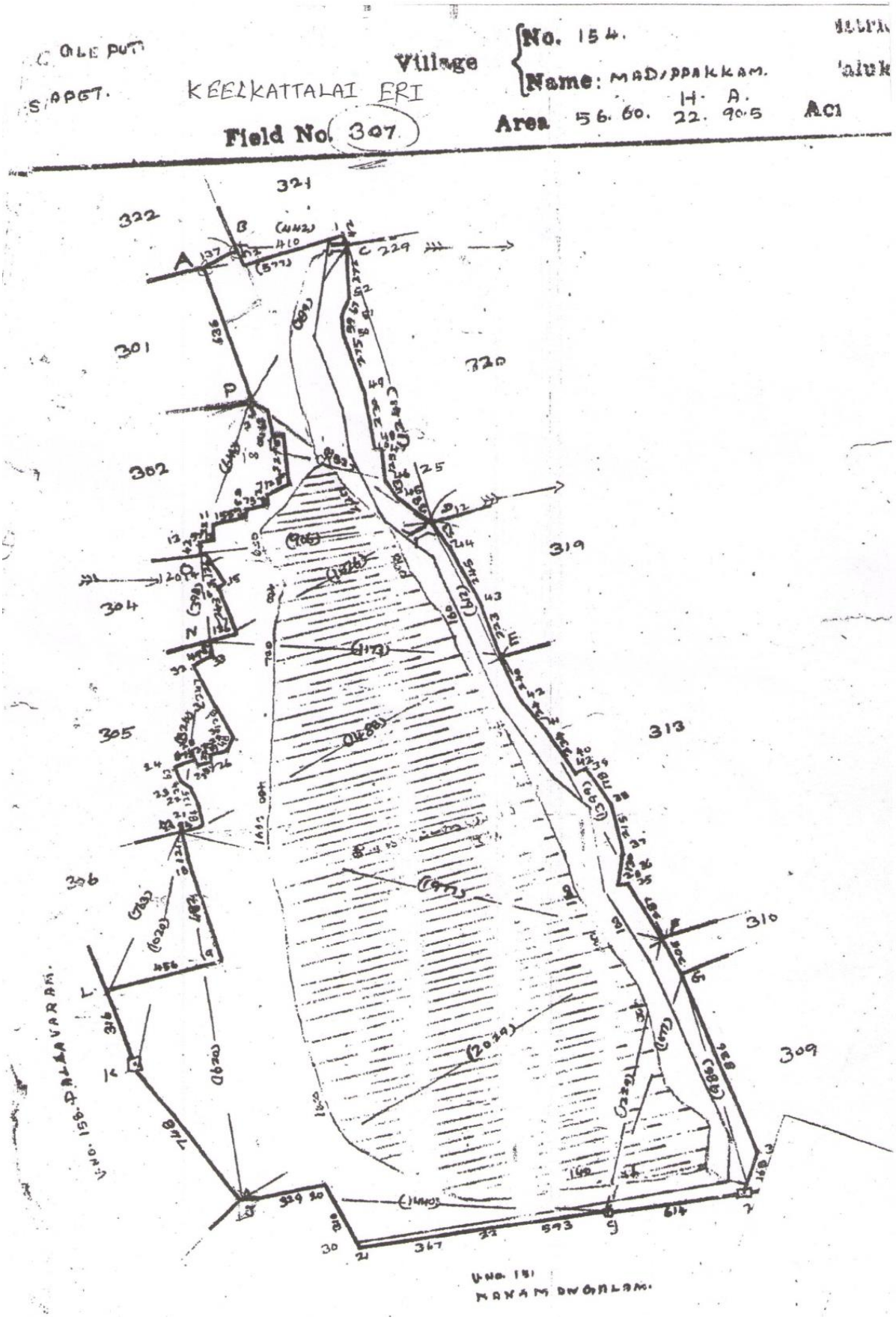
ANNEXURE 4: FMB – Extract of Pallavaram Periya Eri

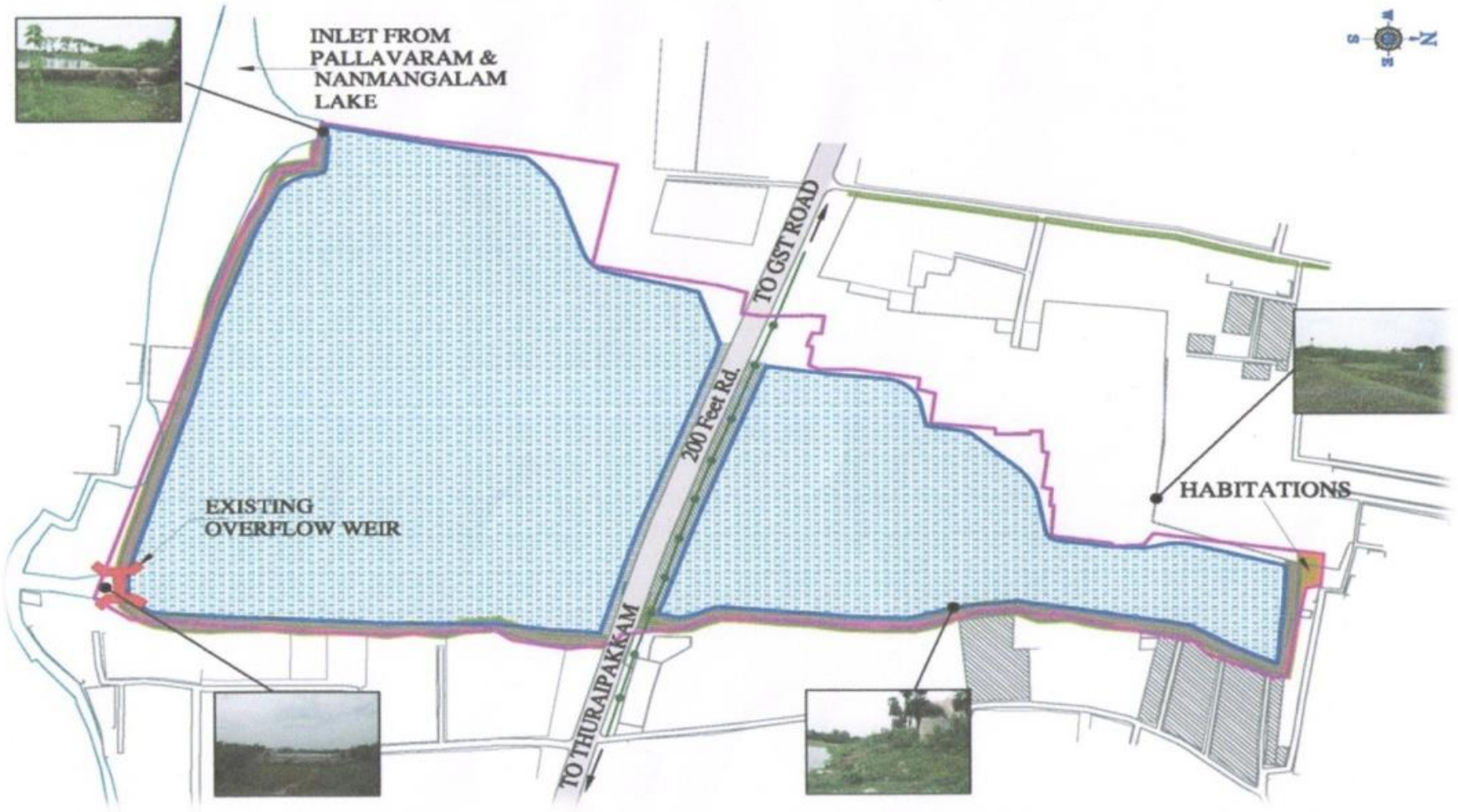




Lake Boundary with Habitations area for Pallavaram Lake

ANNEXURE 5: FMB – Extract of Keelkattalai Eri





Lake Boundary with Habitations area for keelkattalai Lake

ANNEXURE 6: Health Baseline Survey Format

Health Baseline Survey

Pallavapuram Municipality

I – Identification:

1. Area :
2. Street Name/ Ward / Door No.
3. Slum/ Non Slum
4. Name of the Head of the Household 5. Gender (Female/Male)

5- Whether you and/or your family member have suffered with any of the following diseases in the last one year.

Type of Disease	Yes/No	No of family members reporting
1. Jaundice		
2. Typhoid		
3. Diarrhea		
4. Gastro		
5. Polio		
6. Worms		
7. Any other ( )		

6. If anyone hospitalised in the family in the last one year. (Yes/No)_____

6a. If yes provide details of hospitalisation(Nos): Male_____Female_____Children_____

6b. Reasons for hospitalisation_____

6c.Loss of days of employment_____Schooling_____

7. What is the approximate average monthly expenditure in the last one year?_____

8. What is the mode of treatment _____
[1. Government Hospital; 2. Municipal Health Centre; 3.Private; 4. Over the counter medicines; 5. Other (Specify)]

9.Is any death occurred in your family due to illness in the last one year?_____

Basic Amenities

10. What is the source of Drinking Water [Tap water/Packaged water/ Public Tap/Lorry]
11. Do you have Toilet at home (Yes/No)
12. Do you use Public Toilet (Yes/No)
13. Open Defecation (Yes/No)

Name of the Investigator: Signature : Date of Survey :

ANNEXURE 7: Analysis of Water Test Reports (Samples Tested During Restoration Period)

QUALI - CARE CIVIL RESEARCH CENTER
Testing Laboratory for Building Material
1A, Thiruneermalai Main Road, Chrompet, Chennai 600 044
044 49577001 / 81243 52223 / 81243 62223
An ISO / IEC 17025 CERTIFIED LABORATORY
email.: qualicarecivil@gmail.com www. qcrctesting.com
ISO/IEC 17025
SSI : TN08D0004814

TEST REPORT ON ANALYSIS OF WATER SAMPLE

The Commissioner, Pallavapuram Municipality Office, Chrompet, Chennai – 600 044	Job order No/ Date	509_1 / 04.06.2018
	Customer Ref	Letter, Dt : 04.06.18
	Period of Test	04/06/18 to 10/06/18
Name of the Works : Restoration of Pallavaram and Keelkattalai Tanks	Identification / Location	**Pallavaram Tank / S - 1** Left Side of Radial Road – 100 m U/S of Bund
	Technical Reference	IS : 10500:2012

Chemical Analysis (Wet) :

Sl. No	Test Parameter	Unit	Results	As per IS – 10500:2012 Limits
1	pH Value at 25°C	Number	7.34	6.5 – 8.5
2	Total Dissolved Solids	mg/l	1052	500 max
3	Total Suspended Solids	mg/l	65	< 20
4	Chloride as Cl	mg/l	275	250 max
5	Sulphate as SO_4	mg/l	117	200 max
6	Biochemical Oxygen Demand at 27°C for 3 days	mg/l	46.5	< 3
7	Chemical Oxygen Demand	mg/l	137	< 3
8	Oil & Grease	mg/l	52	0.5 max
9	Dissolved Phosphate as P	mg/l	3.1	-
10	Fluoride as F	mg/l	1.2	1 max
11	Nitrate as NO_3	mg/l	2	45 max
12	Pesticides	-	Absent	-
13	Dissolved Oxygen	mg/l	2.6	-
14	Total Coliform	MPN / 100 ml	> 1600 / 100 ml	-

End of the test report

For QUALI-CARE CIVIL RESEARCH CENTRE

T.Thangakumar
Technical Incharge

Page – 1/1

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2. * Details as furnished by the client & Samples as supplied by the client
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email.: qualicarecivil@gmail.com www. qcrctesting.com
ISO/IEC 17025
SSI : TN08D0004814

TEST REPORT ON ANALYSIS OF WATER SAMPLE

The Commissioner, Pallavapuram Municipality Office, Chrompet, Chennai – 600 044	Job order No/ Date	509_2 / 04.06.2018
	Customer Ref	Letter, Dt : 04.06.18
	Period of Test	04/06/18 to 10/06/18
Name of the Works : Restoration of Pallavaram and Keelkattalai Tanks	Identification / Location	**Pallavaram Tank / S - 2** Right Side of Radial Road – 50 m U/S of Bund
	Technical Reference	IS : 10500:2012

Chemical Analysis (Wet) :

Sl. No	Test Parameter	Unit	Results	As per IS – 10500:2012 Limits
1	pH Value at 25°C	Number	7.72	6.5 – 8.5
2	Total Dissolved Solids	mg/l	1025	500 max
3	Total Suspended Solids	mg/l	49	< 20
4	Chloride as Cl	mg/l	245	250 max
5	Sulphate as SO_4	mg/l	83	200 max
6	Biochemical Oxygen Demand at 27°C for 3 days	mg/l	57.1	< 3
7	Chemical Oxygen Demand	mg/l	208	< 3
8	Oil & Grease	mg/l	17	0.5 max
9	Dissolved Phosphate as P	mg/l	2.58	-
10	Fluoride as F	mg/l	1.1	1 max
11	Nitrate as NO_3	mg/l	5.6	45 max
12	Pesticides	-	Absent	-
13	Dissolved Oxygen	mg/l	3.2	-
14	Total Coliform	MPN / 100 ml	> 1100 / 100 ml	-

End of the test report

For QUALI-CARE CIVIL RESEARCH CENTRE

T.Thangakumar
Technical Incharge

Page – 1/1

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email.: qualicarecivil@gmail.com www. qcrctesting.com SSI : TN08D0004814
QCRC
ISO/IEC 17025

TEST REPORT ON ANALYSIS OF WATER SAMPLE

The Commissioner, Pallavapuram Municipality Office, Chrompet, Chennai – 600 044	Job order No/ Date	509_3 / 04.06.2018
	Customer Ref	Letter, Dt : 04.06.18
	Period of Test	04/06/18 to 10/06/18
Name of the Works : Restoration of Pallavaram and Keelkattalai Tanks	Identification / Location	**Keelkattalai Tank / S - 1** 50 m U/S of Sluice
	Technical Reference	IS : 10500:2012

Chemical Analysis (Wet) :

Sl. No	Test Parameter	Unit	Results	As per IS – 10500:2012 Limits
1	pH Value at 25°C	Number	7.05	6.5 – 8.5
2	Total Dissolved Solids	mg/l	568	500 max
3	Total Suspended Solids	mg/l	5	< 20
4	Chloride as Cl	mg/l	227	250 max
5	Sulphate as SO_4	mg/l	18	200 max
6	Biochemical Oxygen Demand at 27°C for 3 days	mg/l	6.4	< 3
7	Chemical Oxygen Demand	mg/l	42	< 3
8	Oil & Grease	mg/l	BDL (< 4)	0.5 max
9	Dissolved Phosphate as P	mg/l	1.02	-
10	Fluoride as F	mg/l	0.52	1 max
11	Nitrate as NO_3	mg/l	BDL (< 1)	45 max
12	Pesticides	-	Absent	-
13	Dissolved Oxygen	mg/l	6.3	-
14	Total Coliform	MPN / 100 ml	345 / 100 ml	-

----------End of the test report----------

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Technical Incharge

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QCRC
ISO/IEC 17025
SSI : TN08D0004814

TEST REPORT ON ANALYSIS OF WATER SAMPLE

The Commissioner, Pallavapuram Municipality Office, Chrompet, Chennai – 600 044	Job order No/ Date	509_4 / 04.06.2018
	Customer Ref	Letter, Dt : 04.06.18
	Period of Test	04/06/18 to 10/06/18
Name of the Works : Restoration of Pallavaram and Keelkattalai Tanks	Identification / Location	**Keelkattalai Tank / S - 2** 120 m U/S of Weir II
	Technical Reference	IS : 10500:2012

Chemical Analysis (Wet) :

Sl. No	Test Parameter	Unit	Results	As per IS – 10500:2012 Limits
1	pH Value at 25°C	Number	7.89	6.5 – 8.5
2	Total Dissolved Solids	mg/l	778	500 max
3	Total Suspended Solids	mg/l	17	< 20
4	Chloride as Cl	mg/l	201	250 max
5	Sulphate as SO_4	mg/l	63	200 max
6	Biochemical Oxygen Demand at 27°C for 3 days	mg/l	5.3	< 3
7	Chemical Oxygen Demand	mg/l	46	< 3
8	Oil & Grease	mg/l	7	0.5 max
9	Dissolved Phosphate as P	mg/l	0.63	-
10	Fluoride as F	mg/l	0.78	1 max
11	Nitrate as NO_3	mg/l	1.3	45 max
12	Pesticides	-	Absent	-
13	Dissolved Oxygen	mg/l	6.35.7	-
14	Total Coliform	MPN / 100 ml	542 / 100 ml	-

----------End of the test report----------

For QUALI-CARE CIVIL RESEARCH CENTRE

T.Thangakumar
Technical Incharge

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ANNEXURE 8: Minutes of Meeting

MUNICIPAL ADMINISTRATION AND WATER SUPPLY DEPARTMENT

From

Thiru.K.Sivakumar.M.A
Commissioner,
Pallavapuram Municipality,
Chromepet,
Chennai – 600 044

To

1. The Commissioner of Municipal Administration,
   Commissionerate of Municipal Administration,
   Chepauk, Chennai-600 005.
2. The Managing Director,
   Tamilnadu Urban Infrastructure Financial Services Limited,
   #19, T.P Scheme Road, Raja Street Extension,
   Raja Annamalaipuram,
   Chennai-600 028.

Letter No. Roc.3461/2015/E1, Dated: 10.08.2018

Sir/Madam,

Sub: Pallavapuram Municipality – Field visit by World Bank - Restoration of Pallavaram Periya Eri – Report submitted - Reg.

Ref : 1. G.O.No.(MS) 01 MA&WS (MA2) dated 02.01.2015.
2. PWD (D2) Dept. G.O No.64 dated 06.09.2017.
3. Minutes of Meeting conducted by Principal Secretary to Government on 03.08.2015.

It is inform that as discussed with World Bank Review Mission during the field visit on 10.08.2018 at Pallavaram Periya Eri & Keelkattalai Eri Water Body Improvement Projects, it is here to inform that no encroachers has been evicted as a part of the project, as per the direction given by the meeting conducted by the Principal Secretary, Government, during the meeting 03.08.2015 on Restoration of Pallavaram Periya Eri & Keelkattalai Eri. Copy of the meeting of minutes enclosed for your kind information please.

10/8/18

Commissioner
Pallavapuram Municipality

Encl:

Minutes of the Meeting.

Minutes of the **Meeting held an 3.8.2015 regarding the Restoration Works to be done in Pallavaram, Keelkatalai and Narayanapuram Tanks.**

The Principal Secretary, Public Works Department held a meeting an 3.8.2015 regarding the Restoration Works in Pallavaram, Keelkattalai and Narayanapuram Tanks proposed to be taken up by the MA&WS Department. The Principal Secretary, MA&WS, Chief Engineer, Water Resources Department, Chennai Region, and officials of Water Resources Department, MA&WS and Chennai Corporation attended the meeting.

MA&WS Department has sought for NOC from the Water Resources Department to undertake restoration of Narayanapuram Lake at a cost of Rs.15.67 crore and Pallavaram Periya Eri and Keelkattalai Eri at a cost of Rs.22.02 crore. But Water Resources Department is insisting on executing the above works by that Department.

It was informed that there are no encroachments in Keelkattalai Eri and more than 120 huts in Narayanapuram Lake were removed by the Chennai Corporation and maintained as encroachment free. But the Pallavaram Periya Eri, there are nearly 1200 encroachments for which Forms I, II & III have been issued. MA&WS Department proposes to do the restoration work in the Pallavaram Periya Eri without removing the encroachments.

The following decisions were taken during the meeting:

i. The Restoration works in the Narayanapuram Lake, Pallavaram Periya Eri and Keelkattalai Eri may be taken up by the Local Bodies under MA&WS Department, with the technical support of Water Resources Department. Regarding Pallavaram Periya Eri in the boundary of the Tank has to be demarked with demarcation stones, eventhough they restrict these development activities in the area free from encroachments.

ii. After Restoration works are completed, the Local Bodies shall maintain the 3 Tanks. The Local Bodies shall given a commitment for to this effect.

N.S. Palaniappan,
Principal Secretary to Government

//True Copy//

Section Officer

18.9.2015

ANNEXURE 9: NOC of PWD

சுருக்கம்

காஞ்சிபுரம் மாவட்டம், பல்லவபுரம் வட்டம், பல்லவபுரம் பெருநகராட்சி எல்லைக்குட்பட்ட ஜமீன் பல்லவபுரம் பெரிய ஏரி மற்றும் கீழ்க்கட்டளை ஏரிகளை புனரமைத்தல் மற்றும் பராமரித்தல் பணிகளை பல்லவபுரம் பெருநகராட்சி மூலம் மேற்கொள்ள பொதுப்பணித்துறையின் தடையின்மை சான்று வழங்குதல் – ஆணை வெளியிடப்படுகிறது.

பொதுப்பணி (ட்டி.2) துறை

அரசாணை (2டி) எண். 64

நாள் : 06.09.2017.
ஹேவிளம்பி, ஆவணி 21
திருவள்ளுவர் ஆண்டு 2048

மீண்டும் படிக்கப்பட்டது :

1. அரசாணை (நிலை) எண். 1, நகராட்சி நிர்வாகம் மற்றும் குடிநீர் வழங்கல் (எம்.ஏ2) துறை, நாள். 02.01.2015

மேலும் படிக்கப்பட்டவை :

2. சென்னை, நகராட்சி நிர்வாக ஆணையர், கடித எண். 14554/ 2016/குவ3, நாள். 16.06.2017.
3. சென்னை, நீர்வள ஆதாரத்துறை, சென்னை மண்டலத் தலைமைப் பொறியாளர், கடித எண். தொ1/உ.பொ1/ கோ.ஜமீன் பல்லாவரம்/ 2017, நாள். 28.07.2017.
4. சென்னை, நீர்வள ஆதாரத்துறை, முதன்மைத் தலைமைப் பொறியாளர், கடித எண். எஸ்7(1)/68809/உ.செ.பொ–5/2003, நாள். 17.08.2017.

- - - - -

ஆணை:

மேலே முதலாவதாக படிக்கப்பட்ட அரசாணையில், பல்லவபுரம் நகராட்சிப் பகுதியில் உள்ள ஜமீன் பல்லவபுரம் பெரிய ஏரி மற்றும் கீழ்க்கட்டளை ஏரி ஆகிய இரண்டு பெரிய ஏரிகளை ரூ. 22.02 கோடியில் புனரமைக்கும் பணிகளை நகராட்சி மூலம், தமிழ்நாடு நகர்ப்புற வளர்ச்சித் திட்ட நிதியின் கீழ், மேற்கொள்ள நிர்வாக அனுமதி வழங்கப்பட்டது.

2. மேலே இரண்டாவதாக படிக்கப்பட்ட கடிதத்தில், சென்னையும் 2 ஏரிகளை புனரமைப்பது மற்றும் மழைநீரை சேமிக்கும் திட்டத்தின் கீழ் நடந்து வரும் வழக்கில், விதிகளில் பணிகளை ஆரம்பிக்குமாறு தெரிவிக்கப்பட்டுள்ள நிலையில், 21.11.2016-அன்று தலைமை செயலகத்தில், முதன்மை செயலர், பொதுப்பணித்துறை, முதன்மை செயலர், நகராட்சி நிர்வாகம் மற்றும் குடிநீர் வழங்கல் துறை, மேலாண்மை இயக்குநர், TNUIFSL, நகராட்சி நிர்வாக ஆணையர், பொதுப்பணித்துறை, தலைமைப் பொறியாளர் ஆகிய உயர்மட்ட அதிகாரிகளால் நடத்தப்பட்ட கூட்டத்தில், துறைவாரியாக பணிகளை மேற்கொள்ளுமாறு அறிவுரைகள் வழங்கப்பட்டதை தொடர்ந்து, பல்லாவரம் பெரிய ஏரியில் கழிவு நீர் கலப்பதை தடுப்பதற்கு ரூ. 2.80 கோடிக்கு நகராட்சி மூலம் மதிப்பீடு தயார் செய்யப்பட்டுள்ளது என்றும், பொதுப்பணித்துறை மூலம் பெரிய ஏரி மற்றும் கீழ்க்கட்டளை ஏரிகளை தூர் வாருதல், கரைகளை வலுப்படுத்துதல் மற்றும் மதகு அமைத்தல் ஆகிய பணிகளை மேற்கொள்ள முறையே ரூ. 8.05 கோடி மற்றும் ரூ. 3.80 கோடிக்கு மதிப்பீடுகள் தயார் செய்யப்பட்டுள்ளது என்றும், இரண்டு ஏரிகளில் அபிவிருத்திப் பணிகளை மேற்கொள்ள ரூ. 14.65 கோடிக்கு மொத்த மதிப்பீடு தயார் செய்யப்பட்டுள்ளது என்றும் செங்கற்பட்டு, நகராட்சி நிர்வாக மண்டல இயக்குநர் தெரிவித்துள்ளதாக நகராட்சி நிர்வாக ஆணையர் தெரிவித்துள்ளார்.

3. மேலும், மேற்படி ஏரிகள் நீர் பாசனத்திற்கு பயன்படுத்தப்படவில்லை என்பதாலும், ஆயக்கட்டும் ஏதும் இல்லை என்பதாலும், ஏரிகளில் புனரமைப்பு பணிகள் மேற்கொள்ளும் பட்சத்தில், எதிர்வரும் மழைக் காலங்களில் அதிக அளவில் மழைநீரை தேக்கி வைக்க இயலும் என்பதாலும், இதனால் இப்பகுதிகளில் உள்ள குடியிருப்புப் பகுதிகளில் நீர் ஆதாரம் உயர்ந்து குடிநீர் பற்றாக்குறை இல்லாத நிலை ஏற்படும் என்பதாலும், மேலும் இத்திட்டச் செயல்பாட்டிற்கான முழுத்தொகையும் நகராட்சி நிர்வாகத் துறையின் (கடன் 60%, மான்யம் 30%, நகராட்சி பங்களிப்பு தொகை 10% ஆகும்) மூலம் மேற்கொள்ளப்படுவதால் இத்திட்டப்பணிகளை பல்லாவரம் நகராட்சி மூலமாக செயல்படுத்திட பொதுப்பணித்துறையின் தடையின்மை சான்று பெறும் பொருட்டும், நீர்வள ஆதாரங்களை பாதுகாக்கும் விதமாகவும், பணிகளை விரைந்து செயல்படுத்தக் கோரும் பல்லாவரம் நகராட்சி ஆணையரின் பிரேரணையை அரசின் ஆணை வேண்டி நகராட்சி நிர்வாக ஆணையர் பரிந்துரை செய்துள்ளார்.

4. மேலே மூன்றாவதாக மற்றும் நான்காவதாக படிக்கப்பட்ட கடிதங்களில், காஞ்சிபுரம் மாவட்டம், பல்லாவரம் வட்டம், பல்லாவரம் பெருநகராட்சி எல்லைக்குட்பட்ட பகுதியில் அமைந்துள்ள ஜமீன் பல்லாவரம் பெரிய ஏரி மற்றும் கீழ்கட்டளை ஏரி ஆகியவை பொதுப்பணித்துறையின் கட்டுப்பாட்டிலுள்ள ஏரிகள் எனத் தெரிவித்துள்ளதோடு, இவ்வேரிகளில் சில நிபந்தனைகளின் அடிப்படையில் பணிகளை மேற்கொள்ள பல்லாவரம் பெருநகராட்சிக்கு தடையின்மை சான்று வழங்க நீர்வள ஆதாரத்துறை, சென்னை மண்டலத் தலைமைப் பொறியாளர் மற்றும் நீர்வள ஆதாரத்துறை, முதன்மைத் தலைமைப் பொறியாளர், ஆகியோர் பரிந்துரை செய்துள்ளனர்.

5. நீர்வள ஆதாரத்துறை, சென்னை பண்டலத் தலைமைப் பொறியாளர் மற்றும் நீர்வள ஆதாரத்துறை, முதன்மைத் தலைமைப் பொறியாளர் ஆகியோர்களின் பரிந்துரையை ஆவனமுடன் பரிசீலித்த பின்னர் அதனை ஏற்க அரசு முடிவு செய்துள்ளது. அதன்படி, காஞ்சிபுரம் மாவட்டம், பல்லவபுரம் வட்டம், பல்லவபுரம் பெருநகராட்சி எல்லைக்குட்பட்ட பகுதியில் அமைந்துள்ள ஜமீன் பல்லவபுரம் பெரிய ஏரி மற்றும் கீழ்கட்டளை ஏரிகளை புனரமைக்கும் பணிகளை பல்லவபுரம் பெருநகராட்சி மூலமாக செயல்படுத்திட, கீழ்க்கண்ட நிபந்தனைகளுக்குட்பட்டு, தடையின்மை சான்று வழங்கி அரசு ஆணையிடுகிறது.

நிபந்தனைகள்

அ) ஜமீன் பல்லவபுரம் பெரிய ஏரி மற்றும் கீழ்கட்டளை ஆகிய ஏரிகளை தூர்வாரி கரைகளை நீரியல் தன்மை மாறாமல் பலப்படுத்த வேண்டும்.

ஆ) மேற்படி இரு ஏரிகளின் நீர்பரப்புப் பகுதிகளை (Water Spread Area) வருவாய் துறையின் நில அளவையரைக் கொண்டு நில அளவை வரைபடத்தில் (FMB) உள்ளவாறு எல்லை நிர்ணயம் செய்து, ஆக்கிரமிப்புகளை முழுமையாக அகற்றிய பிறகு, எல்லை நிர்ணயம் செய்த பகுதியில் ஏரிகளின் எதிர்வாயில் (Foreshore) பகுதியில் சுற்றுச் சுவர் / சுற்று வேலி அமைக்கப்பட வேண்டும்.

இ) நீர் பிடிப்பு (Catchment) பகுதியில் இருந்து வரும் மழை நீரை ஏரிகளுக்குள் வருவதற்கு ஏதுவாக திருகுமறை கதவுகளுடன் கூடிய உள்வாங்கிகள் (Inlet Regulators) அமைக்கப்பட வேண்டும்.

ஈ) ஏரிகளின் நீர்பரப்புப் பகுதியில் (Water Spread area) சுத்திகரிப்பு நிலையம் அமைக்கக் கூடாது.

உ) ஜமீன் பல்லவபுரம் பெரிய ஏரியின் புல எண்.432 பரப்பளவு 80.54.5 ஹெக்டர் பகுதியில் ஏரியின் நீரியல் தொடர்புடைய கட்டுமானங்களை தவிர, பிற கட்டுமானப் பணிகள் ஏதும் கட்டப்படக் கூடாது மற்றும் கீழ்கட்டளை பெரிய ஏரியின் புல எண். 307 பரப்பளவு 24.25.0 ஹெக்டர் பகுதியினை ஏரியின் நீரியல் தொடர்புடைய கட்டுமானங்களை தவிர, பிற கட்டுமானப் பணிகள் ஏதும் கட்டப்படக்கூடாது.

ஊ) முழுமையாக சுத்திகரிக்கப்பட்ட நீரினை மட்டுமே ஏரிகளினுள் செல்ல அனுமதிக்க வேண்டும். சாக்கடை கழிவு நீரை எக்காரணம் கொண்டும் ஏரிகளில் விடக்கூடாது.

எ) பணிகள் துவங்கப்படும் முன் நீர்வள ஆதாரத்துறை அலுவலர்களுக்கு தகவல் தெரிவித்த பின் பணிகள் மேற்கொள்ளப்பட வேண்டும். மேலும் ஏரிக்கரைக்கோ, கலுங்குகளுக்கோ (weir) எந்தவிதமான பாதிப்புகளும் ஏற்படுத்தக்கூடாது.

ஏ) ஜமீன் பல்லாவரம் பெரிய ஏரி மற்றும் கீழ்க்கட்டளை ஏரிகளின் பாசன பகுதிகளில் ஏதுமில்லை எனினும், இவ்வேரிகள் வெள்ளநீர் மேலாண்மை மற்றும் நிலத்தடி நீர் செறிவூட்டலுக்கும், சுற்றுச்சூழல் பாதுகாப்பு மற்றும் மேம்பாட்டிற்கும் பயன்பட்டு வருகின்றன. எனவே, இவ்வேரிகளில் தொடர்ந்து பராமரிப்பு மற்றும் எதிர்காலத்தில் தேவையான இதர புனரமைப்பு பணிகள் பொதுப்பணித்துறையால் மட்டுமே மேற்கொள்ளப்பட வேண்டும்.

ஐ) பருவமழைக் காலங்களில் இவ்வேரிகளின் நீர்வழித்தடங்களை சீரமைத்தல் மற்றும் உபரி நீர் வழிப் பாதைகளில் வெள்ள நீர் கடந்து செல்ல வழிவகை செய்தல் போன்ற வெள்ள மேலாண்மைப் பணிகள் பொதுப்பணித்துறையால் மட்டுமே மேற்கொள்ளப்பட வேண்டும்.

ஒ) மேலும், இவ்விரு ஏரிகளில் உள்ள ஆக்கிரமிப்புகளை முழுமையாக அகற்ற பல்லவபுரம் பெருநகராட்சி ஒத்துழைப்பு நல்குவதுடன், இதரப் பணிகள் மேற்கொள்ளப்படுகையில் ஆக்கிரமிப்புகள் முழுமையாக அகற்றப்படுவதை உறுதி செய்து கொள்ள வேண்டும்.

(ஆளுநரின் ஆணைப்படி)

எஸ்.கே. பிரபாகர்
அரசு முதன்மைச் செயலாளர்

பெறுநர்

முதன்மைத் தலைமைப் பொறியாளர்,நீர்வள ஆதாரத்துறை, சென்னை–5
தலைமைப் பொறியாளர், நீர்வள ஆதாரத்துறை, சென்னை மண்டலம், சென்னை–5
நகராட்சி நிர்வாக ஆணையர்,சேப்பாக்கம், சென்னை–5
முதன்மை கணக்காய்வுத் தலைவர் (A&E/Audit-I/E & RSA) சென்னை–18.

நகல்

மாண்புமிகு முதலமைச்சர் அலுவலகம், சென்னை–9
அமைச்சர் (நகராட்சி நிர்வாகம் மற்றும் ஊரக வளர்ச்சி,
சிறப்புத் திட்ட செயலாக்கம்) அவர்களின் நேர்முக உதவியாளர், சென்னை–9
நகராட்சி நிர்வாகம் மற்றும் குடிநீர் வழங்கல் துறை, சென்னை–9
இருப்பிடத் தணிக்கை அலுவலகம், சென்னை–9
இ.கோ/உதிரி நகல்

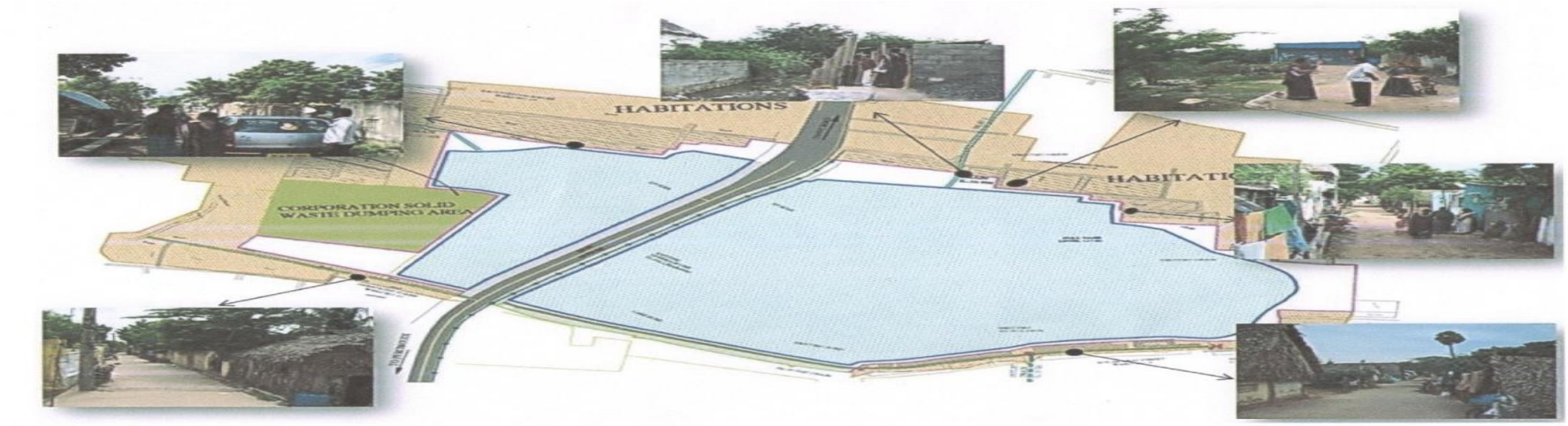
//ஆணைப்படி அனுப்பப்படுகிறது//

பிரிவு அலுவலர்

ANNEXURE 10: Habitations in Pallavaram and Keelkattalai Lake

As per the details collected, the present status of Habitations is given in the table below

S No	Name of Tank	Extent Water spread in Acres	Encroachment Area in Acres	Number of Encroachments
1.	Pallavaram Tank	124.90	46.26	1155[2]



Lake Boundary with Habitations area for Pallavaram Lake

Details of Habitations around the Pallavaram Lake

Habitations details	No of Houses	Population	Ward No
East Puduvai Nagar	180	747	24
Sanjay Gandhi nagar	578	2357	24
Kulakarai street	173	680	8 to 9
Ganapathypuram	224	849	23
Total	**1155**	**4633**	**---**

[2] The scope of this project is limited to Restoration of Lakes alone and no R&R is envisaged.

Lake Boundary with Habitations area for Keelkattalai

List of habitations around Keelkattalai Lake

S.no	Name of Tank	Extent Water spread in Acres	Encroachment Area in Acres	Number of Encroachments
1.	Keelkattalai Tank	56.60	Nil	Nil

ANNEXURE 11: Certification

Certification

Pallavaram Peria Eri

In any of the works mentioned above, there is no displacement, there are no partially affected structures. Further works also doesn't affect any structures or involves displacement.

Keelkattalai Lake

In any of the works mentioned above, there is no displacement, there are no partially affected structures. Further works also doesn't affect any structures or involves displacement.

Project Engineer (Contractor) | Team Leader (PMC) | Municipal Engineer | Commissioner

COMMISSIONER
PALLAVAPURAM MUNICIPALITY
CHROMEPET, CHENNAI-44

ANNEXURE 12: Salient Features of Labour & Environment Protection Laws

SALIENT FEATURES OF SOME MAJOR LABOUR LAWS

APPLICABLE TO ESTABLISHMENTS ENGAGED IN CIVIL CONSTRUCTION WORK

(a) Employees Compensation Act 1923: The Act provides for compensation in case of injury, disease or death arising out of and during the course of employment.

(b) Payment of Gratuity Act 1972: gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

(c) Employees P.F. and Miscellaneous Provision Act 1952 (*since amended*): The Act provides for monthly contribution by the employer plus workers @ 10% or 8.33%. The benefits payable under the Act are:

(i) Pension or family pension on retirement or death, as the case may be.

(ii) Deposit linked insurance on the death in harness of the worker.

(iii) Payment of P.F. accumulation on retirement/death etc.

(d) Maternity Benefit Act 1961: The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

(e) Sexual Harassment of Women at the Workplace (Prevention, Prohibition and Redressal) Act, 2013: This Act defines sexual harassment in the workplace, provides for an enquiry procedure in case of complaints and mandates the setting up of an Internal Complaints Committee or a Local Complaints Committee

(f) Contract Labour (Regulation & Abolition) Act 1970: The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by law. The Principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labour.

(g) Minimum Wages Act 1948: The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employments.

(h) Payment of Wages Act 1936: It lays down the mode, manner and by what date the wages are to be paid, what deductions can be made from the wages of the

workers.

(i) Equal Remuneration Act 1976: The Act provides for payment of equal wages for work of equal nature to male and female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.

(j) Payment of Bonus Act 1965: The Act is applicable to all establishments employing 20 or more employees. Some of the State Governments have reduced this requirement from 20 to 10. The Act provides for payments of annual bonus subject to a minimum of 8.33% of the wages drawn in the relevant year. It applies to skilled or unskilled manual, supervisory, managerial, administrative, technical or clerical work for hire or reward to employees who draw a salary of Rs. 10,000/- per month or less. To be eligible for bonus, the employee should have worked in the establishment for not less than 30 working days in the relevant year. The Act does not apply to certain establishments.

(k) Industrial Disputes Act 1947: The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations, a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

(l) Trade Unions Act 1926: The Act lays down the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.

(m) Child Labour (Prohibition & Regulation) Act 1986: The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in the Building and Construction Industry.

(n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service) Act 1979: The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.

(o) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996 and the Building and Other Construction Workers Welfare Cess Act, 1996 (BOCWW Cess Act): All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under these Acts. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be notified by the Government. The Employer of the establishment is required to

provide safety measures at the building or construction work and other welfare measures, such as Canteens, First – Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

(p) Factories Act 1948: the Act lays down the procedure for approval of plans before setting up a factory engaged in manufacturing processes, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power.

(q) Weekly Holidays Act -1942

(r) Bonded Labour System (Abolition) Act, 1976: The Act provides for the abolition of bonded labour system with a view to preventing the economic and physical exploitation of weaker sections of society. Bonded labour covers all forms of forced labour, including that arising out of a loan, debt or advance.

(s) Employer's Liability Act, 1938: This Act protects workmen who bring suits for damages against employers in case of injuries endured in the course of employment. Such injuries could be on account of negligence on the part of the employer or persons employed by them in maintenance of all machinery, equipment etc. in healthy and sound condition.

(t) Employees State Insurance Act 1948: The Act provides for certain benefits to insured employees and their families in case of sickness, maternity and disablement arising out of an employment injury. The Act applies to all employees in factories (as defined) or establishments which may be so notified by the appropriate Government. The Act provides for the setting up of an Employees' State Insurance Fund, which is to be administered by the Employees State Insurance Corporation. Contributions to the Fund are paid by the employer and the employee at rates as prescribed by the Central Government. The Act also provides for benefits to dependents of insured persons in case of death as a result of an employment injury.

(u) The Personal Injuries (Compensation Insurance) Act, 1963: This Act provides for the employer's liability and responsibility to pay compensation to employees where workmen sustain personal injuries in the course of employment.

(v) Industrial Employment (Standing Order) Act 1946: It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.