CHENNAI METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD
CHENNAI- 600 028

NATIONAL COMPETITIVE BIDDING

BID DOCUMENT
FOR

PROVIDING COMPREHENSIVE UNDER GROUND SEWERAGE SCHEME TO OKKIUM THORAIPAKKAM (DIVISION – 193, 194 & 195), AREA – XV (SHOLINGANALLUR) IN CHENNAI CITY

CONTRACT NO: CNT / SEW / NCB /AMRUT -2.0 & KfW/ 001A / 2022-23

BID DOCUMENT

VOLUME - V
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) REPORT

SUPERINTENDING ENGINEER (CONTRACTS & MONITORING)
CHENNAI METROPOLITAN WATER SUPPLY & SEWERAGE BOARD
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Note:	The ESIA report is a dynamic document which is subjected to change from time to time during the execution of the project. It is the responsibility of the Bidder to view/download the ESIA report from the official website of CMWSSB.

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LIST OF ACRONYMS

AP	Affected Person
CMD	Chairperson & Managing Director
CMWSSB	Chennai Metropolitan Water Supply and Sewerage Board
CRZ	Coastal Regulation Zone
DPR	Detailed Project Report
E&S	Environmental and Social
ECSMF	Environmental, Climate Change and Social Management Framework
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment Report
ESF	Environmental and Social Framework
ESMP	Environmental and Social Management Plan
FI	Financial Institution
GCC	Greater Chennai Corporation
GOI	Government Of India
GoTN	Government of Tamil Nadu
GRC	Grievance Redressal Committee
IT	Information Technology (Corridor)
KfW	Kreditanstalt fur Wiederaufbau (KFW Development Bank)
MA&WS	Municipal Administration and Water Supply
MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act 2005.
MoEF& CC	Ministry of Environment and Forests& Climate Change
OMR	Old Mahabalipuram Road
PIA	Project implementation Agency
PIU	Project Implementation Unit
PMC	Project Management Consultant
ROW	Right of Way
SEC	Sensitive Environmental Components
SG	Sustainability Guidelines-Assessment and management of Environmental, Social and Climate Aspects: Principles and Procedures
SMIF	Sustainable Municipal Infrastructure Financing
STP	Sewerage Treatment Plant
SWM	Solid Waste Management
TNUIFSL	Tamil Nadu Urban Infrastructure Financial Services Limited
ULB	Urban Local Body
WB	World Bank

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Executive Summary

1. Introduction and Background

CMWSSB is a statutory body which provides water supply and sewerage infrastructure facilities to the residents of Chennai City as well as Chennai Metropolitan Area in a phased manner. The Government of Tamil Nadu vide G.O (MS) No.256, MA &WS (Election) Dept. dt.26.12.2009 have issued orders for expanding Chennai city by annexing 42 Adjacent Urban local bodies which includes 9 Municipalities, 8 Town Panchayats and 25 Village Panchayats. The extent of the expanded Chennai City limit is extended to 426 sq.km from the original area of 174 Sq.km. As directed in the G.O. the administration of the expanded Chennai City came into effect from 20/10/2011. Therefore, it becomes the direct responsibility for the CMWSS Board to implement water Supply schemes and Underground Sewerage Schemes in the newly annexed, (erstwhile) 42 local bodies as well as to other areas within Chennai Metropolitan Area.

2. Description of the project

Objective

The main objective of this sub project is toprovide Underground Sewerage Scheme to OkkiumThoraipakkam area in Chennai City in line with the Master Plan prepared by CMWSSB.

Project Location

OkkiumThoraipakkam area is bounded by Injambakkam and Neelangarai on the east, Pallikaranai on the west, Perungudi on the north and Karapakkam on the south. It falls under the Sholinganallur Assembly Constituency and South Chennai Parliamentary Constituency. The total length of the road/streets is about 121.45 Km

Need for the Project

The Proposed Underground Sewerage Scheme in the Okkium Thoraipakkam area is very much needed for the following reasons;

- To achieve the goals set forth in the National Urban Sanitation Policy such as eradication of open defecation.
- Providing sanitation to all and to achieve the pre-set the service level benchmark of 100% on sewage management which includes sewage network for efficient collection of sewage, efficient treatment of the collected sewage and safe disposal of the treated effluent, reuse and recycling of treated sewage, efficient redressal of customer complaints, cost effective sewage management & efficient collection of sewage charges.
- To provide sewerage facilities on par with the erstwhile Chennai City.
- By executing the proposed underground sewerage scheme in OkkiumThoraipakkam area, the Govt. of Tamil Nadu & the CMWSSB achieves to provide better facilities within the OkkiumThoraipakkam area which will create a better platform for the improved quality of living, development and growth of the OkkiumThoraipakkam area and their surrounding areas as well.
- Providing efficient underground sewerage scheme to OkkiumThoraipakkam area will experience rapid commercial and Industrial growth and this will result in improved economy and social status of the people.

- In addition to this, every citizen of the nation will achieve fundamental right of access to the basic welfare facilities.

The OkkiumThoraipakkam lies along the IT Corridor of South Chennai. The Tamil Nadu Government had proposed to develop six lanes IT Express Road by providing the required infrastructure including water supply and sewerage facilities prior to formation of road. Accordingly, sewerage facilities were provided along the IT Corridor and a small portion of OkkiumThoraipakkam area comprising of TNUHDB tenements. The leftover area of OkkiumThoraipakkam is proposed to be included in this schemes for providing underground sewerage system in the other schemes.The sub-project components are,

(i) laying of collection system for a length of 69.63Km.
(ii) construction of 3 No of lift stations;construction of 6 No of sub pumping stations
(iii) laying of CI pumping mains for a length of 10495m.
(iv) providing house service connection for 14310 No

Table 1: Sub project components

Project area	Collection System (Km)	PS/SPS(No.)	LS (No.)	Pumping Main (Km)	HSC (No.)	MHs (No.)	Avg. Flow (MLD)
Okkiyum Thoraipakkam	69.63	6	3	10.495	14310	2819	35.18

The ultimate flow 3.01 MLD from Sri Sai Nagar, SPS-01 is disposed into existing STP at Perungudi and balance ultimate flow of 35.18 MLD is disposed into existing STP Sholinganallur.

3. Legal and regulatory framework

Environmental Climate Change and Social Management Framework (ECSMF) was developed for the project including all relevant environmental and social regulations and policies. The same adhered to National and State Environmental and Social Policies and regulatory frameworks as well as international ESHS requirements and standards as per KfW Sustainability Guideline. The prevailing key National, State level laws, rules, policies, notifications pertaining to environmental climate change and social aspects have been reviewed to the proposed UGSS. This sub project requires CRZ clearance for the section of network. ESF of World Bank and kfW SG Feb. 2022 have been applied and this ESIA have been prepared in line with the requirement.

4. Applicability of ECSMF

The Project proposed shall be implemented safeguarding the environmental and social concerns of the development activity. The requirements for ensuring environmental and social safeguards have been stipulated in the TNUIFSL's Environmental and Social Management Frame work exclusively for this project. And this document is prepared based on updated ECSMF.

5. Baseline Environment Climate and Social structure

The basic information about the project area is carried out through secondary environmental survey along with the data from the various information resources for the attributes of the

ambient environment. The social survey was carried out along the pumping main for social baseline data. The baseline data help to understand the existing environmental conditions and socio-economic characteristics of the study area. It is required to compare and assess the impacts on E&S aspects caused during the project life cycle. The project related baseline data on climate, meteorology, land usage, water, air, noise, soil, flora, fauna and social profile of local population among others were collected and the major findings of the key parameters are summarized hereunder:

Temperature

The meteorological data shows the average annual minimum temperature is 25° Celsius and the average annual maximum temperature is 33°

Humidity

The average annual percentage of humidity is 69%. Higher rates of relative humidity are observed between November with 76% and lower rates of relative humidity are observed between June with 63%

Air Quality

Tamil Nadu Pollution Control Board (TNPCB) regularly monitors the ambient air quality of Chennai through a network of eight ambient air quality monitoring stations established under the National Air Quality Monitoring Programme (NAMP). Samples are collected for 24 hours basis twice a week, and are for the Respirable Suspended Particulate Matter (RSPM). (RSPM is particulate matter less than 10 microns) and gaseous pollutants such as Sulphur dioxide (SO_2) and Nitrogen dioxide (NO_2). The average concentrations of PM10 are 46.0 µg/m3. The average SO_2 concentrations were recorded as 10µg/m3. The average NO_2 (oxides of Nitrogen) concentrations were recorded as 19.0µg/m3.The observed air pollutants were within the limits as per TNPCB standards.

Noise Environment

Sound level data of 10 stations of Chennai is analyzed on yearly basis by TNPCB. In which Pallikaranai and Velacherry are nearear to the project area. The Noise levels observed in Pallikaranai area during day time were found to be 78 dB (A) and in the night time the noise levels observed 77 dB (A).

Ground water

Ground water depth varies from depth of 2mts in the Okkium Thoraipakkam.Based on the assessment of Groundwater Quality Index in and around the projectarea, Tamil Nadu through secondary data available the status of ground water quality in OkkiumThoraipakkam is found to be critical. The presence of high TDS and hard water occurs in most of the locations. The water quality index shows the quality of the ground water is moderate to very poor and it is not suitable for drinking purposes. Further the study emphasis the continuous seasonal assessment of groundwater quality. Even though treatments like reverse osmosis, distillation, activated carbon etc. can eliminate the prevailing contamination, the present scenario needs consideration on rainwater harvesting, waste water reuse and water treatment techniques.

Soil Environment

The Geology of Chennai comprises mostly of Clay, Sediment rocks and Sand stone.Based on Geology, the city has been classified in to sandy area, clayey area and hard-rock

area.Sandy areas are found along the coastal area and river banks like Thiruvanmiyur, Adayar, Santhome, Kottivakkam, George Town, Kathivakkam, Thiruvottiyur and the rest of coastal regions. Most interior part of the city like T.Nagar, West Mambalam, Anna Nagar, Perambur and Virugambakkam are covered with clayey soil.Guindy, Velachery, Adambakkam and part of Saidapet are hard-rock areas.The subproject areas covering Okkium Thoraipakkam are mostly sandy areas.

Ecological Environment

Pallikaranai Marshland is an ecologically sensitive area found on Western Banks to the project area. It is a nesting ground for a large variety of migratory birds and rich with 61 species of flowering plants.This is one among the few remaining wetlands located inside Chennai City.The project area is out of the Pallikaranai marsh land boundary, hence there is no impact due to project. Within the project area there are no sensitive areas like forest or protected areas or nationally important / protected monuments. No eco sensitive areas are located in or close to the subproject area. The South Buckingham Canal stretch lies between Adyar Creek and Kovalam Creek and situated on the eastern part of the project area. The total length of the drain is 24.22 kms. The width of the canal is in the range of 10 to 100m. This stretch by itself experiences high flood levels during monsoon, due to rain from local precipitation. Providing sewerage scheme to OkkiumThoraipakkam area will prevent the discharge of untreated sewage from this area in to Buckingham Canal.

Site specific Environmental features

All the SPS/LS sites are free from encumbrances and owned by Government agencies/departments. The SPS site is located in habituated area, surrounded by residential buildings hence improvement to aesthetics of site, odour control mechanism, noise control are proposed along with planting trees, constructing raised compound wall, planting creepers.The pumping main will be laid within the right of way of the roads belongs to Greater Chennai Corporation / Tamilnadu Road Development Corporation.Collection gravity system is the pipeline network that receives the sewage from the house service connections and conveys to the pumping station. Machine holes will be constructed at the centre of the road and pipelines will be laid connecting the Machine Holes, for the roads wider than 60ft rider mains have been proposed to avoid frequent crossings.

Social Profile

The available data as per 2011 indicate total 1.08 lakh population which is almost equally divided into 54608 males (50.56%) and 53265 (49.43%) females. Within the total literacy rate of 90.34%, male literacy rate was higher (94.01%) compared to the females (86.61%). The social structure denotes that a maximum population belong to other backward castes (86%), followed by the scheduled castes (13.5 %) and scheduled tribe (0.5%). The average household size 3.86 persons was more compared to 3.5 persons at the state level. The main workers and marginal workers were 39.9% and 6.11% respectively and the non-workers constituted 53.9% of total population. The sub-project identified 12 potential temporary economic impacts to roadside vendors/hawkers during the construction phase (Refer Annexure 10 for details). This is due to non-availability of work front in those locations. The people affected by potential temporary economic impacts and other stakeholders from study area were receptive for the proposed project.

6. Potential Environmental and Social Impacts and Mitigation Measures

The project involves construction of collection system, lift station and pumping station and linking to existing STPs for treatment and disposal. Environmental impacts from this

proposed project are not adverse and mostly generic and temporary in nature. These impacts are identified mostly during construction phase only. These impacts will be mitigated through management measures identified in the Environmental and Social Management Plan. A section of the project attracts CRZ notification requiring CRZ clearance and works in these areas will be commenced upon obtaining CRZ clearance complying with the conditions laid therein. Further there are no sensitive environmental features within the project area. The implementation of underground sewerage scheme to OkkiumThoraipakkam is unlikely to cause any major environmental impacts.

There are no permanent/ temporary social impacts with respect to the sites for construction of pumping stations as all the sites are free from encumbrances and owned by Government agencies / departments. Further, the sewers and pumping mains will be laid within the right of way of the roads belongs to Greater Chennai Corporation / Tamilnadu Road Development Corporation. There are 12 potential temporary potential economic impacts during construction were identified. Further, any impacts identified during the implementation of the project will be mitigated as per the policy provisions of ECSMF / based on the requirement of the funding agency.

Mitigation measures have been developed to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result significant measures have already been included in the designs for the infrastructure. Various measures suggested for odour control including: appropriately locating sewage wells within site as far as away from the houses; developing tree cover; closed facilities; and design and operation measures to prevent odour build up; standard operating procedures for operation and maintenance; imparting necessary training; safety and personal protection equipment for workers, etc.

Potential impacts during construction are considered significant but temporary, and are common impacts of construction in urban areas, and there are well developed methods to mitigate the same. Except sewer works, all other construction activities (lifting and pumping stations) will be confined to the selected sites, and the interference with the general public and community around is minimal. In these works, the temporary negative impacts arise mainly from iv construction dust and noise, hauling of construction material, waste and equipment on local roads (traffic, dust, safety etc.,), mining of construction material from the existing government licensed mining areas, occupation health and safety aspects.

Sewer works will be conducted along public roads in an urban area congested with people, activities and traffic. Most of the Chennai city area has high density population, very narrow roads and congested with traffic, people and activities. Therefore sewer works will have significant impacts arising mainly: from the disturbance of residents, businesses and traffic due to construction work; safety risk to workers, public and nearby buildings due to deep trench excavations in the road; access impediment to houses and business, disposal of large quantities of construction waste, etc. These are all general impacts of construction in urban areas, and there are well developed methods of mitigation and management that are suggested in the ESMP.

7. Analysis of Alternatives

The alternative analysis is mainly aimed to mitigate the adverse social & environmental climate impacts in the project and make technically feasible and economic & financially viable alternative.
The expected positive and negative impacts to be relatively associated with the different factors and conditions were integrated and the overall impact for the project was calculated.

Based on which the infrastructure alternative is finalized is the best alternative considering all the factors including Social and Economic factors.

8. Environmental Climate and Social Standards risk classification

Risk classification

Environmental

The sub-project involves construction of collection system, lift station and pumping station and linking to existing STP for treatment and disposal. Environmental impacts from this proposed project during construction phase are not adverse and mostly generic & temporary in nature. These impacts will be mitigated through management measures identified in the Environmental and Social Management Plan. For operation phase, odour control measures have been identified and included in the project. The environmental risks associated with the project are **"moderate"** as per the updated ECSMF.

Social

All the project sites are free from encumbrances and owned by Government agencies/departments. The pumping main will be laid within the Right of Way of the roads belonging to Greater Chennai Corporation / Tamil Nadu Road Development Corporation. There are no major social impacts envisaged. There may be potential temporary economic impacts to hawkers, vendors, while laying of sewer lines. Based on this, the Social risk associated with this project is **"moderate"** as per updated ECSMF.

Risk Categorisation

In view of the above, the sub project of providing UGSS to Okkiyum Thoraipakkam is Categorised as **B** as per the updated ECSMF. However, if temporary or permanent resettlement impacts are identified during project implementation, the implementing agency will prepare a mitigation plan as per the updated ECSMF and compensate the affected based on the impact assessment. The Environmental Climate Change and Social Screening Form are attached in Annexure -1

9. Environmental & Social Management Plan (ESMP)

ESMP is prepared for this project to address the environmental, social and health &safety impacts caused by the project activities. The ESMP details out mitigation measures, responsibilities, monitoring methods, indicators and frequency during the project cycle. The implementation of ESMP will be closely monitored along the parameters like air, water, noise, soil, ecology, health, safety, etc. ensure compliance to all applicable Environmental, Social and Health & safety standards throughout the whole project cycle. Based on the findings of monitoring process, corrective measures will be taken during the project construction and operation as appropriate.

10. Stakeholder Consultation and Disclosure

The stakeholders meeting conducted on 17-06-2023 from 11 A.M to 1 P.M. where the stack holders expressed their opinions of the project. The Environmental and Social Impact Assessment Report (ESIA) made available at public locations and disclosed to a wider audience. The consultation process will be continued during project implementation. A Stakeholder Engagement Plan (SEP) is annexed at Annexure 7.

11. Grievance Redress Mechanism

A grievance redress mechanism (GRM) is described within the ESIA Report to ensure any public grievances are addressed and enclosed at Annexure 9.

12. Institutional Mechanism

CMWSSB

The Chief Engineer (CE) of CMWSSB and the Project Director supported by the concerned Superintending Engineer (SE) is overall responsible for the project management. The Executive Engineer (EE) will be designated as a Convenor who will be responsible for coordination, supervision and management of all the activities related to the project. The Executive Engineer (EE) will be assisted by the Assistant Executive Engineer (AEE) and Assistant Engineer (AE).

PMC

The Project Management Consultant (PMC) will have environmental and social experts to ensure adoptionand compliance of safeguards.

Contractor

The Project Manager and EHS Officer of the Contractor under the supervision of the Convenor will be mainly responsible for the E&S safeguards management and implementation of the plan and sub-plans under the project

13. Project Benefit

The most significant advantage of the system is maintaining sustainable development, the protection of the environment and improvement of the quality of life, with a further impact on the development of tourism and the economy in general.Considering all the above advantages, there is no doubt that if we all cooperate, ourselves and our children will enjoy a better quality of life in the years to come and that we will secure a better environment to the forthcoming generations.

14. Implementation Monitoring

Implementation of ESMP is to be supervised by CMWSSB/PMC and be periodically reported to TNUIFSL. During implementation, ESIA is to be updated to incorporate consultation details and to reflect any changes in the project scope, sites etc. and it be submitted to TNUIFSL.

1.INTRODUCTION AND BACKGROUND

Chennai, the capital City of Tamil Nadu is the fourth largest Metropolitan City in India. Chennai with its excellent linkages to major international and domestic destinations, is the most preferred destination for manufacturing and new economy industries. The development of transport corridors, rail connectivity and port facility had attracted Industrial developments in and around Chennai resulting in increased growth in Chennai City population.

The water supply and sewerage facilities are existing in Chennai City for more than a century and the entire erstwhile Chennai City had been provided with water supply and sewerage facilities. In order to have a comprehensive planning and development in and around Chennai City, the Government of Tamilnadu vide G.O (MS) No.256, MA&WS (Election) Dept. Dt 26.12.2009 had issued orders on expanding Chennai City by annexing 42 adjacent local bodies which included 9 Municipalities, 8 Town Panchayats and 25 Village Panchayats contiguous to Chennai City. The extent of the expanded Chennai City limit has been extended to 426 Sq km from the original area of 174 Sq km having a population of 67.27 Lakhs (as per 2011 Census). As directed in the Government order, the administration of the expanded Chennai City came into effect from October 2011.

Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB) is the statutory body constituted exclusively to attend to the growing needs of and for planned development and appropriate regulation of water supply and sewerage services in the Chennai Metropolitan Area with particular reference to the protection of public health and for all matters connected therewith or incidental thereto.

Accordingly, consequent to the expansion of Chennai City limit, Government of Tamilnadu has directed the CMWSS Board to provide comprehensive water supply and sewerage scheme in all the newly added areas of Chennai City on par with Chennai City on priority basis. Accordingly, CMWSS Board has initiated action to provide water supply and sewerage facilities in all the areas of expanded Chennai City limit and they are in various stages of Implementation.

1.1. Status of Water Supply Scheme in 42 Added Areas

CMWSSB has commissioned comprehensive Water Supply Schemes to 31 areas namely viz. Thiruvottriyur, Kathivakkam, Ambattur, Valasaravakkam, Nolambur, Maduravoyal, Karambakkam, Porur, Meenambakkam, Nandambakkam, Alandur, UllagaramPuzthivakkam, Injambakkam, Karapakkam, Sholinganallur, Kottivakkam, Palavakkam, Perungudi, Mugalivakkam, Pallikaranai, Mathur, Vadaperumbakkam, Thiyambakkam, Surapet, Puzhal, Puthagaram, Kathirvedu, Jalladampettai, Edayanchavadi, Sadayankuppam and Kadapakkam.

Presently Water Supply Scheme work on 9areas are under progress; viz. Manali, Chinnasekkadu, Madhavaram, Nerkundram, Ramapuram, Manapakkam, Okkium-Thoraipakkam, Madipakkam and Uthandi.

Announcement was made by the Hon'ble Minister (Municipal Administration) on floor of Legislative Assembly on 24.08.2021 while moving the demand of Municipal Administration and Water Supply Department, that water supply schemes will be taken up in the remaining 2 newly added areas (Neelankarai and Semmenchery) of Chennai City at a cost of Rs. 89.00 Cr.
Accordingly, work order has been issued to Semmenchery water supply scheme and tender has been invited for Neelankarai WSS.

1.2. Status of Underground Sewerage Scheme in 42 Added Areas:

CMWSSB has commissioned comprehensive Underground Sewerage Scheme to 17 areas viz. Thiruvottiyur, Kathivakkam, Valasarawakkam, Madhavaram, Kathirvedu, Surapattu, Puthagaram, Nolambur, Madhuravoyal, Porur, Meenambakkam, Alandur, Ullagaram-Puzthuthivakkam, Karapakkam, Sholinganallur, Perungudi and Ambattur.

Presently Underground Sewerage Scheme works are under progress in 8 areas viz, Ramapuram, Mugalivakkam, Pallikaranai, Nerkundram, Manali, Chinnasekkadu, Karambakkam and Manapakkam,

Announcement was made by the Hon'ble Minister (Municipal Administration) on floor of Legislative Assembly on 24.08.2021 while moving the demand of Municipal Administration and Water Supply Department that Underground Sewerage Scheme to 17 areas ULBs viz. Mathur, Vadaperumbakkam, Theeyambakkam, Puzhal, Edayanchavadi,Sadayankuppam, Kadapakkam, Nandambakkam, Kottivakkam, Palavakkam, Madipakkam, Jalladampettai, Neelankarai, OkkiyamThoraipakkam, Injambakkam, Uthandi and Semmencheri including Left out streets of Madhavaram will be taken up for the 17 newly added areas.

Accordingly, the Detailed Project Reports for the above works were prepared and posed for availing funds from the funding agencies namely TUFIDCO & TNUIFSL. After appraisal, the Government accorded administrative approval for implementation of Underground Sewerage Scheme to Madipakkam at a cost of Rs. 249.47 Cr under AMRUT 2.0 and MIDF (Metropolitan Infrastructure Development Fund)and the work has been taken up for implementation. Further, the Government accorded administrative approval for the implementation of Underground Sewerage Scheme to OkkiumThoraipakkam at a cost of Rs. 256.91 Cr with part funding under AMRUT 2.0. However, the Detailed Project Report for the above work is under appraisal for availing the balance funds from the external funding agencies (Kfw) for implementation of the above scheme for which this Environmental andSocial Impact Assessment Report (ESIA) has been prepared. Hence, the work will be taken up for implementation after sanction of funds.

Also, for the balance 15 newly added areas, the Detailed Project Reports for providing Underground Sewerage Scheme in 5 added areas of Chennai City, namely Kottivakkam, Palavakkam, Neelankarai, Injambakkam, Uthandi, Vadaperumbakkam, Theeyambakkam, Puzhal, Mathur, Edayanchavadi, Sadayankuppam, Kadapakkam, Semmencheryand for the left out areas of Madhavaram has been appraised for availing part funds under AMRUT 2.0 and administrative Sanction from the Government of Tamil Nadu obtained. Hence, the work will be taken up for implementation after obtaining funds from AMRUT 2.0 and from any of the external funding agencies.

For Kottivakkam, Palavakkam, Neelankarai, Uthandi, Semmenchery, Injambakkam & Jalladampettai, the Detailed Project Report has been appraised for availing funds under AMRUT 2.0 &Singara Chennai 2.0. For Left out areas of Madhavaram .Edayanchavadi, Sadayankuppam, Kadapakkam, the Detailed Project Report has been appraised for availing funds under AMRUT 2.0 & KfW. Accordingly, tender has been invited for Kottivakkam, Palavakkam, Neelankarai, Uthandi, Semmenchery, Jalladampettai, Injambakkam, Left out areas of Madhavaram .Edayanchavadi, Sadayankuppam, Kadapakkam, UGSS. Now, this Detailed Project Report comprising of providing collection system, pumping main, construction of pumping stations with allied works has been prepared for providing comprehensive Underground Sewerage scheme to OkkiumThoraipakkam area which falls in Divisions 193, 194 & 195 under Zone XV (Sholinganallur) of Expanded Chennai City.

1.3. UGSS to Okkium Thoraipakkam

1.3.1. Objective

The main objective of this project is to provide Underground Sewerage Scheme to Okkium Thoraipakkam area in Chennai Cityin line with the Master Plan prepared for CMWSSB.

The Detailed Project Report comprises of Preparation of detailed designs, drawings & cost estimates for providing Underground Sewerage Scheme to Okkium Thoraipakkam area. On obtaining funds for implementation of the above scheme, the detailed bid documents for implementation of Underground Sewerage Scheme in the project area shall be prepared.

The Detailed Project Report also includes preparation of both Environmental and Social Impact Assessments Reports (ESIA). Accordingly, this report has been prepared to narrate the Environmental and social issues emerging during the implementation of the above scheme and also the management and mitigation plans for sorting the same.

1.3.2. Brief description of study area and existing infrastructure

Okkium Thoraipakkam is one of the erstwhile Town Panchayats in St. Thomas Mount Panchayat union of Kancheepuram District merged with Chennai City. Okkium Thoraipakkam now falls in Divisions 193, 194 & 195 under Zone XV (Sholinganallur) of Expanded Chennai City. Okkium Thoraipakkam lies along the Old Mahabalipuram Road (OMR) at a distance of about 7kms from Thiruvanmiyur. This area is bounded by Injambakkam and Neelangarai on the east, Pallikaranai on the west, Perungudi on the north and Karapakkam on the south. It falls under the Sholinganallur Assembly Constituency and South Chennai Parliamentary Constituency. The total length of the road/streets is about 121.45 Km.

Figure 1: Location of the Project area

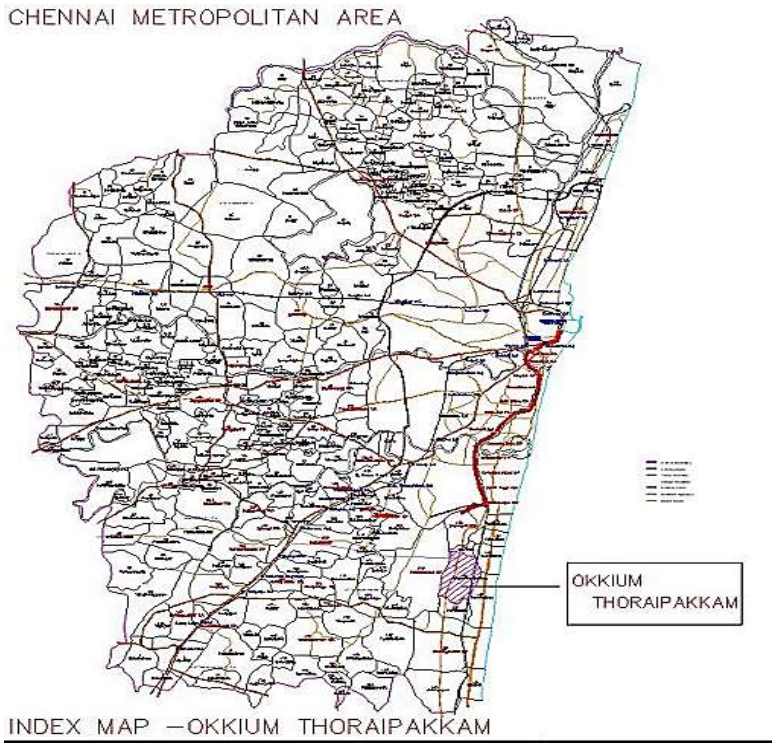
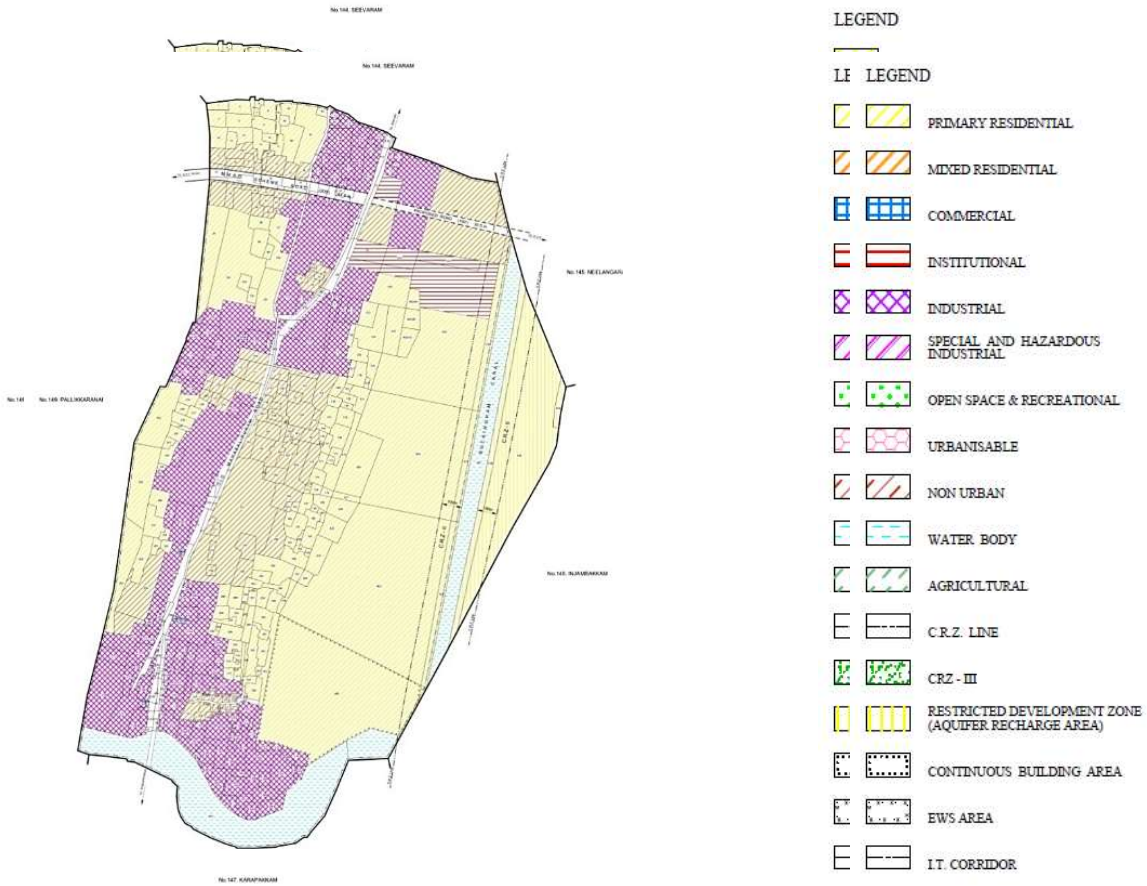


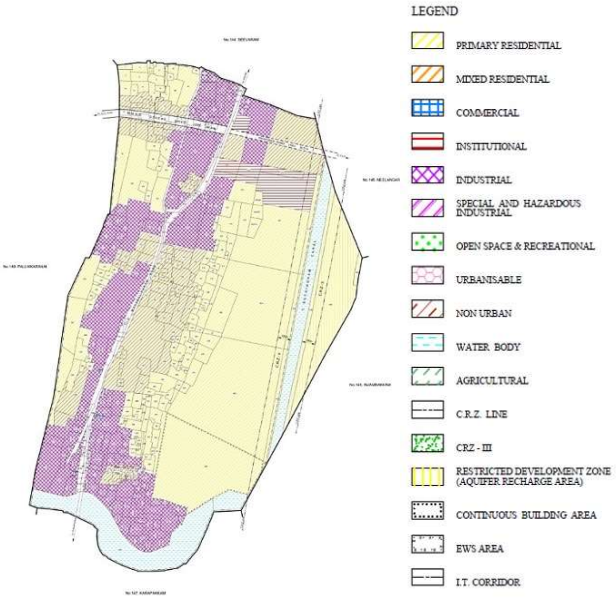
Figure 2: Streets view of Okkium Thoraipakkam

1.3.3. Land use

In the proposed land use map prepared by CMDA for Okkium Thoraipakkam for the year 2026, 373.46 Ha (61.9%) has been earmarked for residential, and the rest is distributed among Institutional, Industry and Water body.

Figure 3: Land-use Map of Okkium Thoraipakkam





1.3.4. Solid waste management and Storm Water Drains in Study area

Domestic Solid waste collected from door to door is emptied into bins placed at the road junctions. Waste collected in the bins are further emptied by mechanized carrier vehicles provided with lifting, unloading and compressing arrangement which arrives at regular intervals.

Most of the streets are provided with storm water drains. Drains are covered with RCC slabs provided with Machinehole covers at regular intervals. Due to milder slopes, the solid wastes / thrashes thrown into drains frequently clog the drains and overflows during the rainy season.

1.3.5. Existing Water Supply

At present, ground water is extracted from the tube wells and open wells and is pumped to the existing overhead tanks and then distributed to the consumers through House Service Connections and through stand posts. For the slum areas, where piped system is not available water is supplied through hand pumps. The implementation of the work of providing Comprehensive Water Supply Scheme to Okkium Thoraipakkam with supply rate of 150 lpcd with distribution system in all the streets is under progress.

1.3.6. Existing Sewerage facilities

At present, there is no organized system of sewage collection and disposal existing in Okkium Thoraipakkam area except a small area. Most of the households have their own septic tanks & soak pits and these septic tanks are being cleaned periodically through sucking machines either of CMWSSB or of private agencies. However, some of the households directly discharge their waste water in storm water drains. Since Okkium Thoraipakkam is fast developing with domestic buildings (individual houses / Apartment) and commercial buildings, it is necessary to provide Underground Sewerage Scheme to Okkium Thoraipakkam area.As stated earlier, based on the immediate need, the following area has already been provided with the sewerage facilities.

Table 2: Existing sewerage facilities in Okkium Thoraipakkam area

S.No	Area Name	Length (m)	Status of UGSS
1.	TNUHDB Tenements	26611	Existing Sewer system - Functioning

1.3.7. Proposed Sewerage facilities:

The Proposed project involves providing Underground Sewerage Scheme to OkkiumThoraipakkam area comprising of laying of Collection System including House Service Connections, construction of Pumping Stations / Lift Stations to collect and pump the sewage via pumping main to a downstream pumping station and for onward disposal into the Sewage Treatment Plant for treatment.

Though the length of streets available in OkkiumThoraipakkam is 121.45km., a portion of area has been provided with sewerage facilities as stated in the Table 2. Further, certain portion of the OkkiumThoraipakkam area has already been considered under the Underground Sewerage Schemes for the surrounding areas of OkkiumThoraipakkam, as all the schemes have been prepared comprehensively. The following is the details of proposals considered already.

Table 3: Details of areas already considered/provided with sewerage facilities in other schemes

S. No	Area Name	Length (m)	Status of UGSS
1.	IT Corridor scheme in OMR	3280	Already laid under IT corridor scheme – To be commissioned
2.	Balavinayaganagar	7184	Already laid under Infrastructure &Amenities funds – To be commissioned
3.	Neelankarai part	4635	Considered under the DPR prepared for Neelankarai&Injambakkam UGSS – DPR posed for availing funds
4.	KarpagaVinayagar Nagar	11745	
5.	Part of Sri Sai Nagar	645	Covered under Perungudi UGSS for which the work is under implementation.
	Total	**27489**	
6.	TNUHDB Tenements	26611	Existing Sewer system - Functioning
	Overall length	**54100**	

Hence, out of the Overall length of 121.45 Km for OkkiumThoraipakkamarea,UGSS for 54.1Km has been laid/ is to be laid in other schemes. Therefore, the balance length of streets of 67.35 Km is now considered for providing Underground Scheme for OkkiumThoraipakkam.

1.4. Need of the Project

The Proposed Underground Sewerage Scheme in the OkkiumThoraipakkam area is very much needed for the following reasons:

- To achieve the goals set forth in the national Urban sanitation policy such as eradication of open defecation.
- Providing sanitation to all and to achieve the pre-set the service level benchmark of 100% on sewage management which includes sewage network for efficient collection of sewage, efficient treatment of the collected sewage and safe disposal of the treated effluent, reuse and recycling of treated sewage, efficient redressal of customer complaints, cost effective sewage management & efficient collection of sewage charges.
- To provide Sewerage facilities on par withthe erstwhile Chennai City.
- By executing the proposed underground sewerage scheme in OkkiumThoraipakkam area, the Govt. of Tamil Nadu & the CMWSSB achieve to provide better facilities within the OkkiumThoraipakkam area which will create a better platform for the improved quality of living, development and growth of the OkkiumThoraipakkam area and their surrounding areas as well.

- Providing efficient Underground Sewerage Scheme to OkkiumThoraipakkam area will experience rapid commercial and Industrial growth and this will result in improved economy and social status of the people.
- In addition to this, every citizen of the nation will achieve fundamental right of access to the basic welfare facilities.

2. DESCRIPTION OF THE PROJECT

2.1. Details of the Sub - Project (Project Area)

Providing Collection System including House Service Connections, construction of Pumping Stations / Lift Stations to collect and pump the sewage to a downstream pumping station and further onward disposal into STP for treatment.

Table 4: Sub-project Components of OkkiumThoraipakkam (Project area)

Sl. No	Component	Description
1	Proposed Sewer Length Material Sewer diameter (mm)	69.63 km DWC and CI 250 to 700 mm
2	No. of Machine holes	2819
3	Pumping main length (proposed in Km) / Material / Size	10.49 km / CI / 200 to 750mm dia
4	Number of Pumping stations	1. Sri Sai Nagar 2. Chandrasekaran avenue 3. Aaligandeswarar Nagar 4. Solaiamma Nagar 5. Sakthi Nagar 6. Mettukuppam Foundry Salai
5	Number of Lifting stations	1. CTS road 2. Pandian Salai 3. VPG Avenue
6	Sewage Treatment Plant (Existing)	1. Shollinganallur 2. Perungudi
7	No.of House Service Connections	14310 nos
8	Quantity to be treated (mld)	Intermediate Flow 2.25 MLD@ Perungudi STP 26.39 MLD@ Sholinganallur STP Ultimate Flow 3.311 MLD @ Perungudi STP 31.395 MLD @ Sholinganallur STP

Figure 4: Collection System with Zone Boundary of Okkium Thoraipakkam Area

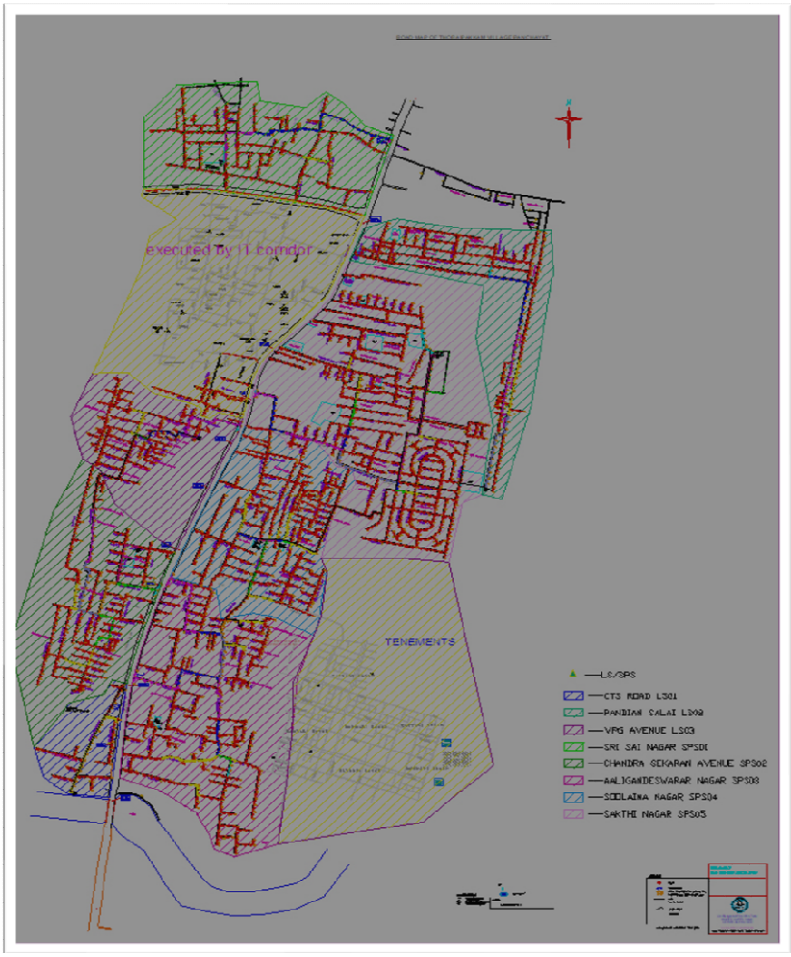


Table 5: Population Projection (Overall for Okkium Thoraipakkam Area)

S. No	Name of the ULB	Design year		
		2025	2040	2055
1	Okkium Thoraipakkam	141851	238732	318272

While estimating the flow in sewers 80% of 150LPCD of water supplied and infiltration at the rate of 500L/D/MH for coastal area (OkkiumThoraipakkam) has been adopted.

2.2. Collection System of OkkiumThoraipakkam (Project Area):

OkkiumThoraipakkam is located in between Pallikaranai & ECR. With the intention of minimising the crossing of OMR and Buckingham canal and the collection system has been divided and designed as two areas. First one is the area between OMR and Buckingam canal and second one is between OMR and Pallikaranai Marsh Land.

Proposed UGSS project involves laying of sewerage collection system planned mostly at mid of the roadway, construction of Machine holes at every 30mts interval. Machine holes are of three types, RCC precast Machine holes from 1.0m to 2.5m and RCC cast in situ Machine holes for the depth beyond 3m.

Table 6: Details of Collection System

Pipe Size (Dia. In mm)	Length of pipe (m)	%
200	240	0.3
250	60022	86.2
300	2766	4.00
400	478	0.71
500	308	0.69
600	787	1.1
Total, DWC pipeline	64601	92.78
250	244	0.35
300	670	0.96
350	1506	2.16
400	104	0.15
450	1628	2.33
500	104	0.15
600	752	1.08
700	22	0.03
Total, CI pipeline	5030	7.22
Total network length	**69631**	100.00

Table 7: Details of Machine holes (Depth wise)

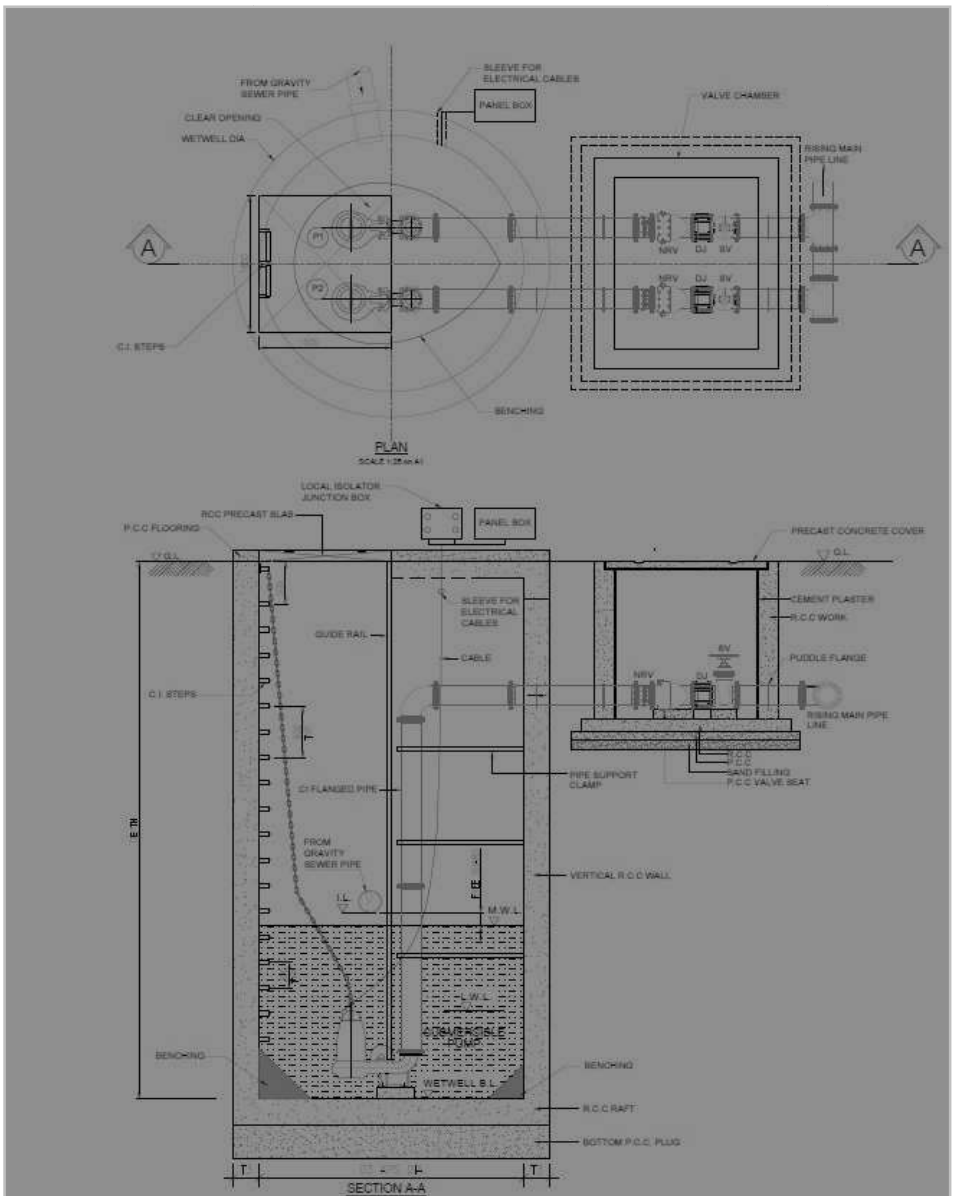
MH Type	Total No	%
Brick Manholes		
at 1.0 m	690	24.5
at 1.5 m	1040	36.9
Precast RCC manhole		
at 1.0m	13	0.5
at 1.5m	28	1.0
at 2.0m	389	13.8
at 2.5m	205	7.3
Cast in -situ RCC MH 1.2m		
at 3.0m	158	5.6
at 3.5m	101	3.6
at 4.0m	51	1.8
at 4.5m	29	1.0
at 5.0m	12	0.4
at 5.5m	9	0.3
at 6.0m	8	0.3
Cast in -situ RCC MH 1.5m		
at 3.0m	2	0.1
at 3.5m	2	0.1
at 4.0m	31	1.1
at 4.5m	21	0.7
at 5.0m	13	0.5
at 5.5m	8	0.3
at 6.0m	5	0.2
at 6.5m	4	0.1
Total no of manholes	**2819**	**100**

2.2.1. Pumping station and Pumping Mains

Lift Station:

Basically, Lift Station are the bigger sized RCC well fitted with two no. of Submersible pumps, which will pump the sewage received here through CI Pumping mains either to elevated Machine holes in other zone or to the pumping stations. Lift Station (Suction well) are totally buried within the ground, covered with RCC cover slab with openings for operation and maintenance, cover slabs are designed for maximum wheel loads expected in those roads. Hence, vehicles are allowed freely to run over these LS and will not be a hurdle for traffic. To control pump operations, a kiosk would be erected on side of footpaths, hence there will not be any superstructure in lift Stations.

Figure 5: General layout of lift station



Sewage Pumping Station:

Pre identified government sites, which would not require land acquisition are preferred for locating pumping stations. Full-fledged sewage pumping station includes, Screen cum grit well, fitted with manually operated screen with provision for grit collection and grit pumps. Suction well would be the next component which will receive sewage from screen cum grit well, 3 non clog submersible sewage pumps would be functioning in and convey sewage to collection system of next zone or if it is a terminal station, pumping to annexed STP.
Figure 6 General Layout of Pumping station & other components

Pumping main:

Cast iron Pumping mains are the carriers of sewage to final destiny. Roads having right of way not less than 12mts are chosen for laying of pumping mains and the lines will be laid on shoulders at a depth of 1.2mts to 2.0m.

Table 8: Details of Pump Stations & Pumping Mains

Sr. No	LS/SPS	Village / Location	Peak Flow 2055 (MLD)	Diameter/ Depth of Suction Well (m)	Dia / Length of PM (mm/m)	PM Passing Through Streets
1	SPS 01	Sri Sai Nagar	8.034	4.0 / 6.61	350 / 750	To Inlet Chamber of Perungudi STP
2	SPS 02	Chandra Sekaran Avenue	28.898	7.0 / 8.67	600 / 600 (4500 laid)	To Sholinganallur STP dia DI PM along OMR / GCC
3	SPS 03	Aaligandeswarar Nagar	45.884	8.0 / 8.93	750 / 2750	To Suction Well in Injambakkam/ SPS01
4	SPS 04	Soolaiama Nagar	5.570	4.0 / 7.48	300 / 900	To SPS03
5	SPS 05	Sakthi Nagar	25.099	7.0 / 7.85	600 / 2500	To SPS03
6*	SPS 06*	Mettukuppam Foundry Salai*	18.382*	6.5 / 9.11	400 / 430* (1300 laid)	To SPS02
7	LS 01	CTS Road	1.928	2.5 / 4.93	200 / 560	Existing IT corridor MH in OMR road
8	LS 02	Pandian Salai	6.996	2.5 / 7.55	350 / 985	To SPS05
9	LS 03	VGP Avenue	6.869	3.5 / 7.30	300 / 1020	To SPS06

*****The ultimate year (2055) peak flow expected at this pumping station is **18.382 MLD**, for which the 400 mm dia pumping main already laid in IT corridor scheme is inadequate. In this

case, in order to utilize the laid 400 mm dia pumping main ,the proposed pumping main of 400mm diameter 'B' class CI pipe holds adequate till the year **2047** corresponding to a peak flow of **14.098 MLD** flow and velocity of 1.3m/s, which is within the limit as per CPHEEO norms.

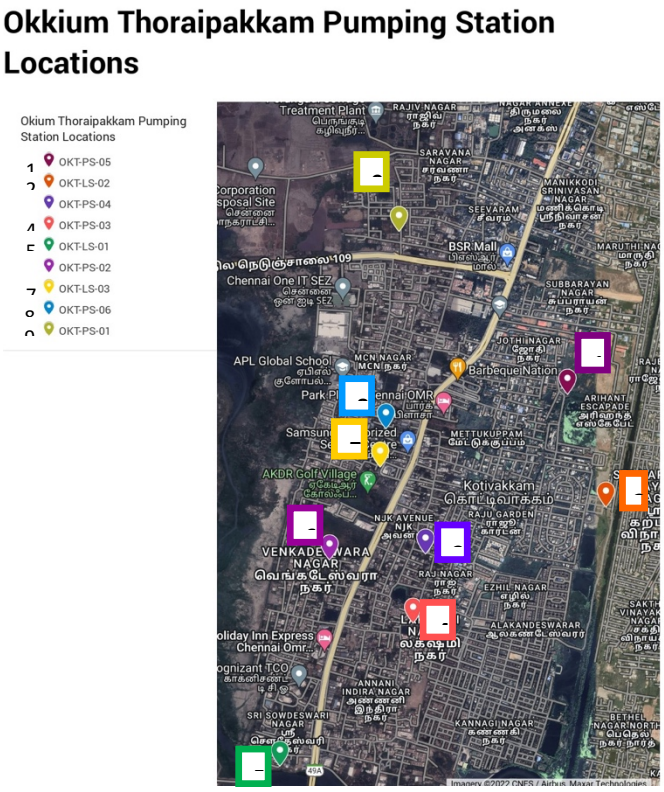


Figure 6: Location of Pump Stations

2.2.2. Infrastructure (PS/LS) Sites:

Based on the sites allotted by the erstwhile local body and presently owned by Corporation of Chennai, zoning of sewerage system has been formulated by CMWSSB covering the project area as given below in Table 9.

Table 9: Location & Size of land required for Construction of Pumping Station

S. No	LS / SPS	Location	Extent of land (Sq. m)	Survey No.	Classification	Ownership of land	Remarks
1.	SPS01	Sri Sai Nagar	300	18 & 19	OSR	Greater Chennai Corporation	NOC obtained
2.	SPS02	Chandra Sekaran	300	253	OSR	Greater Chennai	NOC obtained

		Avenue				Corporation	
3.	SPS03	Aaligand-eswarar Nagar	900	205/2B	ULC	Revenue Department	Already OHT is available in site. Joint inspection made on 04.03.2022 Enter upon permission awaited
4.	SPS04	Soolaima Nagar	450	184/1	Meikal	Revenue Department	Already OHT is available in site. Part of land used as burial ground by GCC. Enter upon permission awaited
5.	SPS05	Sakthi Nagar	14000	402/1B, 405 / 8A3	Punjai Tharisu	CMWSSB	NOC obtained
6.	SPS06	Mettu kuppam foundry Salai	540	106/2	Panchayat Land	CMWSSB	NOC obtained
7.	LS01	Near CTS Road	Road Side	-	-	Greater Chennai Corporation	-
8.	LS02	Pandian Salai	Road Side	-	-	Greater Chennai Corporation	-
9.	LS03	VGP Nagar (OHT site)	50	113	GCC land	CMWSSB	Existing OHT

Note: CMWSSB- Chennai Metropolitan Water Supply and Sewerage Board, GCC- Greater Chennai Corporation, OHT=Over Head Tank, ULC= Urban Land Ceiling , OSR=Open Space Reservation (Land)

2.2.3. Sholinganallur STP

An 18MLD capacity Sewage Treatment Plant at Sholinganallur is under Operation and Maintenance and two more plants of 18MLD & 36MLD capacity are under construction and has been proposed to be completed by December 2023. Thus, after completion, the total

Capacity of STP available would be 72 MLD (18+18+36).Currently, the STP is treating about 10MLD of sewage received from Sholinganallur, Karapakkam and Perumbakkam TNUHDB (Tamil Nadu Urban Habitat Development Board) areas.

The sewage generated from Okkium Thoraipakkam (Project area) for the Intermediate year 2040 and ultimate year 2055 is 28.64 MLD and 38.19 MLD respectively and is proposed to be discharged into both the existing STPs namely Sholinganallur STP and Perungudi STP. Accordingly, the sewage generated from the Project area proposed to be treated in Sholinganallur STP is about 35.18 MLD for the Ultimate year 2055.

Further, as per the Master Plan, the designed flows from Pallikaranai, Uthandi, Kottivakkam, Palavakkam, Neelankarai, Injambakkam, Semmancheri, Jaladampettai including OkkiumThoraipakkam amounting to 56 MLD, 99 MLD and 149 MLD for the base year (2025), intermediate year (2040) and ultimate year (2055) respectively are also proposed to be treated in the Sholinganallur STP. However, only the work of providing UGSS to Pallikaranai is under implementation now. The Detailed Project Reports (DPR) for Providing UGSS to the above areas except Pallikaranai has been completed and has been posed for availing funds from the funding agencies and will be taken up for implementation gradually.

Figure 7: Location of existing Sewage Treatment Plant at Sholinganallur

The capacity of Sholinganallur STP including present and under construction capacities will handle the designed flow from the above mentioned areas upto around the year 2030. The necessary arrangements for further capacity addition will be adopted as per the recommendations given in the Master Plan.

2.2.4. Perungudi STP

Three nos. of Sewage Treatment Plants of capacities 54MLD, 60MLD& 12MLD respectively are under Operation & Maintenance in Perungudi and one no. of 60MLD plant is under construction and has been proposed to be completed by Dec'2023. Thus, after completion, the total Capacity available would be 186 MLD (54+60+12+60).Currently, the STP is treating about 112MLD of sewage received from Core city and added areas namely Alandur, Meenambakkam, Perungudi and Ullagaram Puzhuthivakkam.

The sewage generated from OkkiumThoraipakkam (Project area) for the Intermediate year 2040and ultimate year 2055 is 28.64 MLD and 38.19 MLD respectively is to be discharged into both the existing STPs namely Sholinganallur STP and Perungudi STP. Accordingly, the sewage generated from the Project area proposed to be treated in Perungudi STP is about 3.01 MLD for the Ultimate year 2055.

Further, as per the Master Plan, the designed flows from Core city and added areas including OkkiumThoraipakkam amounting to 119 MLD, 145 MLD and 174 MLD for the base year (2025), intermediate year (2040) and ultimate year (2055) respectively are also proposed to be treated in the Perungudi STP.

It can be seen from the above that the Perungudi STP is having adequate capacity to treat the designed sewage flows generated from the Core city and added areas. Hence, no additional STP is required till the Ultimate year (2055).

Figure 8: Location of existing Sewage Treatment Plant at Perungudi

2.2.5. Associated Facilities

Adequacy

The Sholinganallur STP campus has one STP with 18 MLD capacity. The construction of three new STPs with the capacity of two numbers of 18 MLD each and one 36 MLD capacity shall be commissioned in Dec. 2023. The total capacity of all the STPs is 90 MLD which is adequate to take the capacity of 35.18 MLD sewage generated from the proposed project area.

The Perungudi STP campus has three STPs with 54 MLD, 60 MLD and 12 MLD capacity. The construction of one new STPs with the capacity of 60 MLD capacity shall be commissioned in Dec. 2023. The total capacity of all the STPs is 186 MLD which is adequate to take the capacity of 3.01 MLD sewage generated from the proposed project area.

Performance

The existing STPs with the technology of Activated Sludge Processing at Perungudi has the total capacity of 186 MLD (1 number of 54 MLD, one 60 MLD and 12 MLD). The ongoing construction of new STP with SBR technology of 60 MLD STP to meet the latest discharge norms of TNPCB.

The existing STPs with the technology of SBR at Sholinganallur has thel capacity of 18 MLD. The ongoing construction of news STP with SBR technology of 72 MLD STP to meet the latest discharge norms of TNPCB.

Regulatory compliance

Sholinganallur and Perungudi STPs: TNPCB is checking the discharged treated water periodically. As per TNPCB observations the threshold limits of discharge norms as required by TNPCB/Central Pollution Control Board (CPCB) within the prescribed limits. The STP are functioning properly and the treated effluent is discharged as per TNPCB norms.

Currently, the digested sludge is then fed into mechanical centrifuge. The dewatered sludge cakes is then collected and disposed inside the STP premises for land filling.

2.2.6. Recycle and Reuse of Waste Water

- Water reuse accomplishes three fundamental functions:
  Treated wastewater is used as a water resource for beneficial purposes,
  Treated effluent is kept out of streams, lakes, etc, reducing the pollution of surface and ground water
  Protects public health.

- Water recycling and reusing treated wastewater for beneficial purposes such as agricultural and landscape irrigation, industrial processes, toilet flushing, and replenishing water reservoirs (ground water recharge) offers resource and financial savings. Wastewater treatment can be tailored to meet the water quality requirements of a planned reuse. The use of waste water at decentralized sites reduces the amount of potable water required for other uses and applications.

- The present inflow of sewage received, treated and discharged from Chennai City is 600 MLD (average), out of which 23 MLD of secondary treated water is supplied for Industrial purposes commencing from the year 1993 and 0.23 MLD is supplied to GCC & TNRDC for landscaping and gardening purposes.

Further, 2 Nos of Tertiary Treatment And Reverse Osmosis Plant (TTRO plants) each of 45 MLD capacity at Koyambedu and Kodungaiyur are commissioned. Currently avg of 41 MLD are supplied to the Industries.

CMWSSB is continuing its efforts to augment supply of water through sustainable sources based on the detailed study made by IIT Chennai. In this regard, the IIT Chennai had developed a model and presented it for consideration to the special water group constituted by GoTN.

After careful consideration, the GoTN issued in principle approval vide G.O No 131 (MS) MAWS Dt.10.12.2018 for two proposals of each 10 MLD capacity for recycle and recharge of tertiary treated water TTUF from Nesapakkam STP and Perungudi STP to Porur and Perungudi lakes.

The Tertiary Treated Ultra Filtration (TTUF) in Nesapakkam has been completed and the trial operations have begun.

2.2.7. Climate Resilience

Energy Efficiency:

- To optimize the power consumption, the Variable Frequency Drive (VFD) for pumps would be proposed in all SPS.
- Around 40-50% of energy consumption can be reduced by adopting VFD starter instead of conventional starter. Comparison of conventional starters vs VFD starter and energy saving calculation is attached in Annexure 6.
- LED lamp are proposed to be used in all SPS.

Emission Reduction:

- DG sets provided in the project are as per standards for emission as prescribed by pollution control board
- To reduce noise pollution DG sets are provided with acoustic enclosure.

Flood

- The city has been highly vulnerable to extreme weather and erratic rainfall, including periodic droughts and floods.
- Finished Floor Level (FFL) in all SPS has been fixed above the Maximum Flood Level (MFL) occurred during 2015 and marked visibly in wall.
- One dewatering pumping would be kept on a platform above the MFL for pumping water from the pump pit.
- This project envisages the construction of Pipe carrying bridge across Okkiyum Maduvu. NOC will be obtained from the concerned department and terms & conditions stipulated by the department will be complied with conditions given by the Public Works Department without hindrance to the flow obstruction during flood and cleaning of waterways.

3. LEGAL AND REGULATORY FRAMEWORK

In this section, the prevailing key National, State level laws, rules, policies, Acts, notifications pertaining to environmental, climate change and social aspects have been reviewed for their applicability to the proposed UGSS to Okkium Thoraipakkam and provided in the following table.

Table 10: National and State Regulations on Environmental Climate change and Social

Sl. No.	Acts/ Rules/ Regulations	Description	Relevance to sub-project
1	Wildlife Protection Act, 1972	This Act seeks to protect wildlife, by creating protected areas and controlling trade in wildlife products. Project activities that cross over into protected area regimes then requisite permission must be obtained.	Not Applicable.
2	Water (Prevention And Control of Pollution) Act, 1974 and Tamil Nadu Water (Prevention And Control of Pollution) Rules, 1974	These laws seek to control pollution of water and enhance the quality of water. Under this law, it is mandatory to obtain consent for discharge of effluents and pay consent fees to Tamil Nadu State Pollution Control Board (TNPCB) for any municipal projects causing water pollution.	Applicable. Activities involving emission of pollutants like establishing batch mixing plants require consent from TNPCB.
3	The Water (Prevention And Control of Pollution) Cess Act, 1977	This Act provides for levy and collection of a cess by local authorities on water consumed by persons or industries to augment resources for Pollution Control Boards.	Provisions are applicable.
4	Forest (Conservation) Act, 1980	Forest (Conservation) Act, 1980 was enacted to halt rapid deforestation and governments cannot de-reserve forest land or direct that it be used for non-forest purposes.	Not Applicable. None of the project attracts the provisions.
5	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.	Applicable. Activities involving emission of pollutants like establishing batch mixing plants require consent from TNPCB.
6	Environment (Protection) Act, 1986	Popularly known as EP Act, it is an umbrella legislation that supplements existing environmental regulations. This law essentially links pollution and natural resource issues.	Applicable.

7	Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (MSIHC Rules, 1989)	These rules aim at providing control for the generation, storage and Import of hazardous chemicals. According to these rules, the user of hazardous chemicals has to follow procedures as stipulated in the rules to prevent and control hazards from such chemicals and to ensure safety and permission has to be obtained from the authority concerned for such activity. The list of chemicals and threshold limits of handling falling under the purview of these rules is provided in the schedule to the rules.	Applicable. Hazardous chemicals if any stored/used for the project attracts the provisions.
8	Hazardous and Other Wastes Management Rules, 2016	This law addresses handling of hazardous and other wastes that fall under specified schedules and necessitates authorisation for such facilities from State Pollution Control Board. Projects attracting these rules will have to follow the guidelines for handling and disposal of hazardous wastes. Measures include storage on a paved surface in a designated area with adequate secondary containment, with adequate labelling and before it is disposed to TNPCB approved vendor.	Applicable. During the construction and during operation, wastes and used oils will be generated which shall be stored and disposed as per the requirements of the rules.
9	Public Liability Insurance Act, 1991	This act provides for providing immediate relief to the persons affected by accident occurring while handling any hazardous substance and for matters connected therewith.	Applicable.
10	Bio Medical Waste Management Rules, 2016	This notification by MoEF&CC lays down the method of collection of hospital waste, its transportation and disposal based on scientific methods.	Not applicable.
11	Fly Ash Notification, 2021	This notification necessitates use of fly ash for various construction activities like road laying, road and flyover embankments, shoreline protection structures in coastal districts, building construction projects etc within 300 kms from the lignite or coal based thermal power plants.	Not Applicable.
12	Solid waste Management Rules	This notification by Ministry of Environment and Forest lays	Applicable. Solid wastes from the

	2016	down the methods of handling Municipal Solid Waste and its scientific disposal. Establishing a facility for disposal requires authorisation from State Pollution Control Board.	construction/ labour camps are to be handled in compliance with the provisions of the rules.
13	The Noise Pollution (Regulation and Control) Rules, 2000	The ambient air quality standards in respect of noise for different areas/zones namely industrial, commercial, residential or silence areas/zones are specified in the Schedule of these rules. An area comprising not less than 100 metres around hospitals, educational institutions and courts may be declared as silence area/zone as per these rules.	Provisions are applicable. The noise levels (during construction and during operation of pumping stations) shall not exceed the ambient air quality standards in respect of noise as specified in the Schedule.
14	EIA Notification, dt 2006 (S.O.1533(E), dt.14/09/2006) and subsequent amendments	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 eight broad categories of projects that require prior environmental clearance.	Not Applicable.
15	Wetlands (Conservation and Management) Rules, 2017	The rules list the wetlands that needs to be protected like those covered under Ramsar Convention, those in UNESCO heritage site, those which are ecologically sensitive etc.	Not Applicable. There are no such wetlands within the project area.
16	The National Green Tribunal Act, 2010	This act provides for establishment of National Green Tribunal for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental. The National Green Tribunal established under this act is a specialized body equipped with the necessary expertise to handle environmental disputes involving multi-disciplinary issues.	Provisions are applicable.

		The Tribunal shall not be bound by the procedure laid down under the Code of Civil Procedure, 1908, but shall be guided by principles of natural justice.	
17	E-Waste (Management and Handling) Rules, 2016	The rules prescribe procedures for manufacture, collection, dismantling, recycling, and disposal of electronic wastes and requires authorisation of the State Pollution Control Board for the same.	Not applicable.
18	Coastal Regulation Zone (CRZ) Notification, 2019	This notification under Environment (Protection) Act, 1986 supplements the law on site clearance by declaring certain zones as CRZ and regulates activities in these zones. Projects attracting this notification shall obtain CRZ clearance for implementation from the authority as required.	Applicable. A section of the project alignment falls under the CRZ purview. Hence CRZ clearance is to be obtained prior to start of work in the area.
19	Plastic waste (Management & handling) Rules 2016	This rules provides for collection, segregation, processing, treatment and disposal of the plastic waste in an environmentally sound manner, restriction on thickness of plastic sheet or like, prohibition on identified use, extended producer responsibility, marking and labelling requirement, registration of manufacturer, producer, importer, brand owner and plastic waste processor, reducing the plastic waste generation.	Not applicable.
20	Prohibition of Employment as Manual Scavengers ‘and their Rehabilitation Act 2013	This act prohibits construction of insanitary latrines and employment or engaging of manual scavenger for the purpose of manual scavenging. No person, local authority or any agency shall, from such date as notified by the State Government (which shall not be later than one year from the date of commencement of this Act), engage or employ, either directly or indirectly, any person for hazardous cleaning of a sewer or a septic tank.	Provisions are applicable.
21	National Action Plan on Climate Change	India is faced with the challenge of sustaining its rapid economic growth while dealing with the global threat of climate change.	Provisions are applicable for relevant projects.

22	Energy Conservation Act, 2001	Aims to reduce specific energy consumption in different sectors and sets up a specialized Bureau of Energy Efficiency to institutionalize energy efficiency measures, monitoring, and measurement at plant and macro-levels.	Provisions are applicable for relevant projects.
23	Energy Conservation Building Code (ECBC)	The Energy Conservation Act 2001 that was passed by the Indian Parliament empowered the Central Government to prescribe an Energy Conservation Building Code (ECBC). This code applies to new commercial buildings with a connected load of 100 kW & more or contract demand of 120 kVA or more; Introduces passive design features such as daylight requirements and shading provisions; Introduces provisions of installing Renewable Energy Systems; Sets minimum energy efficiency standards for design and construction; Encourages energy efficient design or retrofit of buildings .	Not Applicable.
24	The Ancient Monument and Archaeological Sites and Remains (Amendment and Validation) Act 2010	The Rules designate areas within a radius of 100 m and 200 m from the “protected property/ monument/ area” as “prohibited area” and “regulated area” respectively. Hence, no permission for construction of any public projects or any other nature shall be granted in the prohibited areas of the protected monument and protected area In respect of regulated area, the competent authority may grant permission for construction, reconstruction, repair and renovation based on recommendation of the National Monument Authority duly taking note of heritage bye-laws, which shall be prepared in respect of each protected monument and protected areas.	Not relevant. However, in case of chance finds, provisions are applicable.
25	The Right to Fair Compensation and transparency in Land Acquisition,	The Act provides for enhanced compensation and assistances measures and adopts a more consultative and participatory	Provisions of this Act is relevant to this project.

	Rehabilitation and Resettlement Act, 2013 (LARR)	approach in dealing with the Project Affected Persons. This act came into effect on 1 January 2014 and the Land Acquisition Act, 1894 stands repealed. The Act lays down procedures for estimating fair compensation of the affected families (and not just the titleholders) due to land acquisition, rehabilitation and resettlement. The Act is notified by the GoTN on 21 September 2017 (G.O. Ms. No. 298, Revenue & Disaster Management (LA-I(1), 20th September 2017).	
26	The Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006	It grants legal recognition to the rights of traditional forest dwelling communities.	Not applicable
27	The Child Labour (Prohibition and Regulation) Amendment Act, 2016. The Child Labour (Prohibition and Regulation) Act,1986	No child below 14 years of age will be employed or permitted to work in any of the occupations set forth in the Act's Part A of the Schedule or in any workshop wherein any of the processes set forth in Part B of the Schedule. Child can help his family or family enterprise, which is other than any hazardous occupations or processes set forth in the Schedule, after his school hours or during vacations.	Applicable.
28	The Occupational Safety, Health and Working Conditions Code, 2020	This code consolidates and amends the laws regulating the Occupational safety and health and working conditions of the persons employed in an establishment. The Act replaces 13 old central labour laws like The Factories Act, 1948, The Building and other Construction Workers Act, 1996, The Mines Act, 1952, The Inter-State Migrant Workmen Act, 1979, etc	Applicable. Stipulations of the code are to be complied with during construction.
29	Code on Wages, 2019	The Code on Wages seeks to regulate wages & bonus payments in all employments. The code subsumes four existing acts namely, The Equal Remuneration Act, 1976, The	Applicable. Stipulations of the code are to be complied with during construction.

		Minimum Wages Act, 1948, The Payment of Bonus Act, 1965, The Payment of Wages Act, 1936.	
30	Workmen Compensation Act, 1923.	The Act provides for compensation by the employer to their workmen in case of injury by accident arising out of and during employment.	Applicable.
31	Chennai Metropolitan Area Ground water (Regulation) Amendment Act, 2002	This amendment to the original act was made to impose provision of rainwater harvesting in every building either private or government to augment ground water storage in such manner as may be prescribed. The act also mentions that water bodies, including ponds, lakes, tanks and the like, whether public or private should be used only for the purpose of storage of water and not for any other purposes. These provisions are also included in the Panchayats Act and the Municipal Act.	Provisions are applicable
32	The Tamil Nadu Preservation of Private Forest Act, 1949	Guidelines for extraction of trees from non-forest area stipulates that permission for tree cutting shall be taken from State Forest department	Applicable.
33	The Tamil Nadu Hill Areas (Preservation of Trees) Act, 1955	This Act regulates the cutting of trees and cultivation of land in hill areas of Tamil Nadu, (Coonoor, Kodaikanal, Kotagiri, Ootacamund, Yercaud). Any tree cutting in these areas requires permission from the Committee under this Act.	Not Applicable.
34	The Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014 and Rules[c] 2015 notified by GOTN.	The Street Vendors Act came into force on March 5, 2014, and seeks to protect the livelihoods of street vendors while regulating street vending. The Act recognizes street vendors of different types including mobile (moving) vendors, stationary (vending from a particular place), natural markets (spaces where buyers and sellers traditionally congregate), vendors with temporary built-up structures, hawkers, peddlers and squatters. It provides for regulation of street vendors, defines the rights and duties of street vendors and	Applicable if the project components are involved in the designated vending zones.

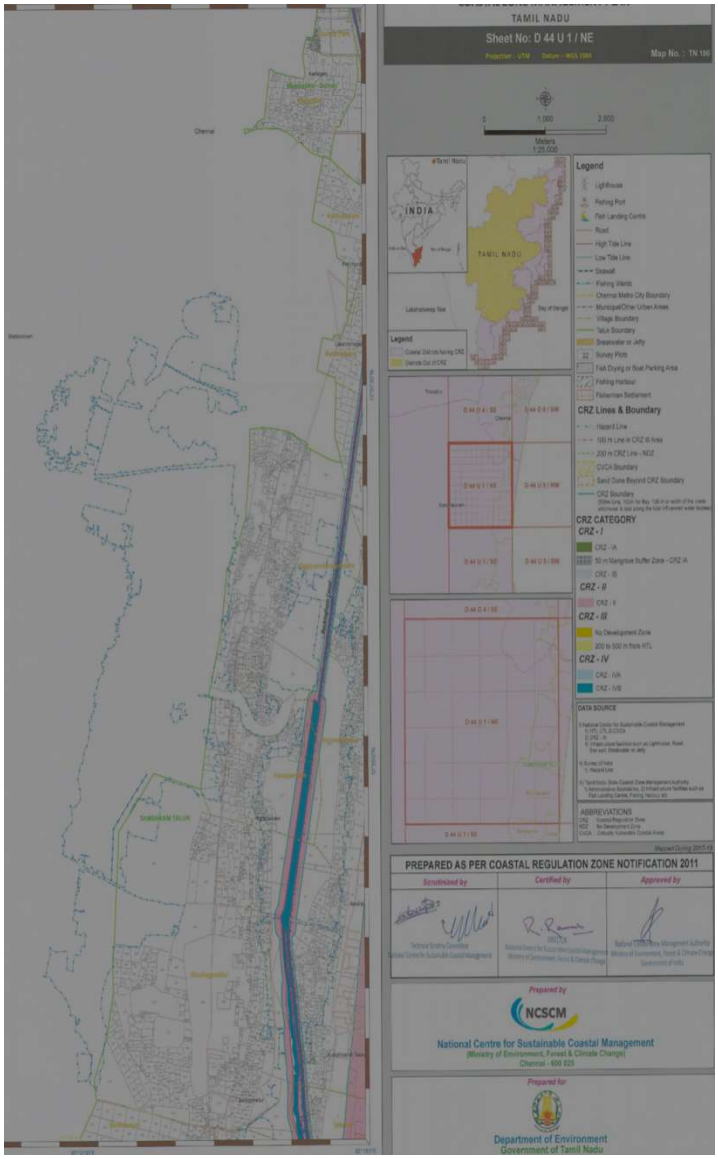
		requires definition of designated vending zones, issue of certificates of vending and identity cards to street vendors, and proposes vending fees and maintenance charges. Under the Act, each state government is required to define the public purpose for which a street vendor may be evicted and the manner of relocation, manner of giving notice, and provides for a dispute resolution mechanism. As per the Act, planning and regulation of street vending is to be undertaken at town level by the Town Vending Committee. The Act also provides for social audit of the activities of the Town Vending Committee. This act that specifically aims to protect the rights of urban street vendors and to regulate street vending activities. It provides for Survey of street vendors and protection from eviction or relocation; issuance of certificate for vending; provides for rights and obligations of street vendors; development of street vending plans; organizing of capacity building programmes to enable the street vendors to exercise the rights contemplated under this Act; undertake research, education and training programmes to advance knowledge and understanding of the role of the informal sector in the economy, in general and the street vendors, in particular and to raise awareness.	
35	State Green Committee/District Green Committee	To consider the cutting of trees in public places and public offices. Ref G.O.(Ms). no.38 dated 02.07.2021 of the Environmental Climate Change and Forest (FR.13)Department, Government of Tamil Nadu	Applicable. Wherever tree cutting is envisaged, permission to be obtained.
36	Occupational, Safety, Health and Working Conditions (Tamil Nadu) Rules 2022.	This draft rule notified on 11.04.2022	Applicable. Stipulations of the code are to be complied with during construction.
37	Code on Wages (Tamil	This draft rule notified on	Applicable.

	Nadu) Rules, 2022	11.04.2022	Stipulations of the code are to be complied with during construction.
Climate change			
38	National Action Plan on Climate Change (30.06.2008) TNSAPCC, 31.03.2015	India is faced with the challenge of sustaining its rapid economic growth while dealing with the global threat of climate change. India, in 2008, has set up National Action plan on climate change (NAPCC) which outlined policies aimed at sustainable growth and dealing with climate change concerns effectively. NAPCC outlines eight national missions to address various adaptation and mitigation measures pertaining to Solar Energy, Enhanced Energy Efficiency, Sustainable Habitat, Water, Sustaining Himalayan Ecosystem, Green India, Sustaining Agriculture, Strategic Knowledge on Climate Change.	Provisions are applicable.
39	Energy Conservation Act, 2001	Aims to reduce specific energy consumption in different sectors, and sets up a specialized Bureau of Energy Efficiency to institutionalize energy efficiency measures, monitoring, and measurement at plant and macro-levels.	Provisions applicable.
40	Energy Conservation Building code	The Energy Conservation Act 2001 that was passed by the Indian Parliament, empowered the Central Government to prescribe an Energy Conservation Building Code (ECBC). ECBC was launched in 2007 on a voluntary basis by the Bureau of Energy Efficiency (BEE and was revised in 2017. ECBC sets minimum energy efficiency standards for design and construction encouraging energy efficient design or retrofit of buildings without constraining the building function, comfort, health, or the productivity of the occupants and appropriate regard for economic considerations. Mandatory Scope Covers commercial Buildings having their	Applicable.

		Connected Load of 100kW and above or contract demand 120kVA and above and is ECBC is recommended for all new buildings and additions to existing buildings with the total load exceeding 200KW or 120kVA.	
Safeguard policies-multilateral funding agencies			
41	KFW's Sustainability Guideline (SG) Assessment and Management of Environmental, Social and Climate Aspects: Principles and Procedures, February 2022	The SG of KfW describes principles and procedures to assess the environmental, social and climate impacts during the preparation of FC measures financed by KfW. Objective of the guidelines is to define a common binding framework to incorporate environmental, social and climate standards into the planning, appraisal, implementation, and monitoring of FC measures and to enhance transparency, predictability and accountability in the decision-making processes of the internal environmental and social due diligence (ESDD) and climate mainstreaming. According to KFW's SG, World Bank Environmental and Social Standards (1-10) outlined in the World Bank Environmental and Social Framework (ESF) general and sector-specific ESHS guidelines& ILO standards are applicable and are to be complied with.	Applicable for the sub-project and compliance to be ensured during implementation.
42	The World Bank's ESF, 2018	The World Bank's Environmental and Social Framework (ESF) sets the World Bank's commitment to sustainable development through a Bank policy and a set of Environmental and Social standards that are designed to support borrower's projects, with the aim of ending extreme poverty and promoting shared prosperity. The ESF is the key E&S risk management tool which guides the borrowers to identify, assess, mitigate and report on project E&S risks, impacts and mitigation measures ant the effectiveness of their implementation. As per the guiding principles of the ESF, all projects funded by the World	The project is evaluated against the E&S Standards and National Government Regulations are followed. ESS standards applicable to the project have been provided in Chapter 7 in Table 7.1. Accordingly, this ESIA & ESMP with SEP and GRM has been prepared. LMP is to be prepared by the prospective

		Bank require the borrowers to – (a) achieve compliance with all applicable federal/national, state and local laws and regulations related to environmental and social matters; and (b) meet the requirements of the Environmental and Social Standards (ESS) outlined in the World Bank's Environmental and Social Framework (ESF).	contractor prior to start of works.

Figure 9: Buckingham canal at Okkium Thoraipakkam is under Coastal Regulatory Zone II.



3.1. Clearances / Permissions

Table 11: Clearance to be obtained by CMWSSB

Sl No	Proposed activity	Statutory authority	Applicable legislation	Status
1	Laying of collection system, Pumping main, construction of Machine holes, Lift stations, pumping stations in CRZ zone	Tamil Nadu State Coastal Zone Management Authority (TNSCZMA)	Coastal regulation zone Notification 2019	To be applied.
2	Highway crossings including Trenchless Technology for laying of pipes.	NH, NHAI, TNRDCL	National Highways Rules 1957	To be applied
3	Electrical and Electronic Connections for pumping stations/ lift stations	TNEB	TAMIL NADU ELECTRICITY SUPPLY CODE (as amended up to 31-12-2009)	To be applied
4	Traffic diversion for Construction of collection system, Machine holes, pumping mains etc.,	Deputy Commissioner of Police Traffic Chennai	MoRTH 112 SP 55 of IRC codes	To be applied
5	Delineation of land for construction of pumping stations.	District collector	Tamil Nadu Town and Country Planning Act, 1971 (Tamil Nadu Act 35 of 1972),	Total sites cleared – 7 No. of sites NOC to be obtained – 2(Refer Table 8)
6	Pipe Carrying bridge construction across B'canal	Public Works Department		Initiated by CMWSSB

Table 12: Clearance to be obtained by the Contractor

Sl. no.	Construction Activity	Statutory Authority	Statute under which clearance is required	Implementation	Supervision
1	Labour Licence and all other statutory work permits including Contract Labour& Interstate Migrant Worker	- The Contract Labour (Regulations & Abolition) Act, 1970 - The Building and Other Construction Workers	Tamil Nadu Labour Department	Contractor	CMWSSB

	License (if any)	(Regulation of Employment and Conditions of Service) Act, 1996			
2	Workmen compensation Insurance / Accident Insurance, EPF and ESIC (as applicable)	Tamil Nadu Labour welfare Fund Act	Tamil Nadu Labour Department	Contractor	CMWSSB
3	Hot mix plants, Crushers and Batching plants	Tamil Nadu Pollution Control Board (TNPCB)	Consent to establish And consent to operate under Air Act, 1981	Contractor	CMWSSB
4	Discharges from construction activities	TNPCB	Consent to establish and consent to operate under Water Act, 1974	Contractor	CMWSSB
5	Sand mining, quarries and borrow areas	Department of Geology and mining, Government of Tamil Nadu	Contractor to obtain material from the existing Government licensed mines/quarries, Contractor will require prior approval of PIU for obtaining material from a particular source. PIU to review and approve only existing licensed mines	Contractor	CMWSSB
6	Ground water extraction	Tamil Nadu Groundwater Development and Management Act 2000	CMWSSB	Contractor	CMWSSB
7	Temporary traffic diversion measures	MoRTH 112 SP 55of IRC codes	Traffic Police Chennai	Contractor	CMWSSB

4. ENVIRONMENTAL AND SOCIAL BASELINE

This chapter presents the baseline data required to understand the environmental, ecological attributes and socio-economic characteristics of the study area, the pipeline route. The baseline includes climate, meteorology, topography, geology, hydrology, drainage, rainfall, land usage, water, air, noise, soil, flora, fauna and social profile of local population. The study was conducted along the stretch of sewage water pipeline traversing throughurban areas of OkkiamThoraippakkam of TamilNadu state (referred as study area). The objective is to comprehend the current environmental conditions and socio-economic status of people which would help in comparing and assessing the impacts on E&S aspects caused by the project in pre-construction, construction and operation phases.

4.1. Methodology

The Baseline has been collected from the primary and secondary sources and E&S screening of all the project sites and alignments.

The desk review of the available documentation and reports of this project is carried out including DPR. The survey in the study area was conducted to identify the Potential Temporary Economic Impact's type and duration of impacts, entitlements, etc in the second week of October 2022. Also, the additional data were collected from relevant websites, online as well as offline. Data thus collected from the secondary sources- published and unpublished literature, government documents, reports, etc were reviewed.

The ground truthing undertaken on-site, verified and updated the required data. The secondary information collected from different sources include the Ministry of Environment, Forest and Climate Change (MOEF&CC), Census of India 2011, District Census Handbook, Geological Survey of India, Indian Meteorological Department, State Pollution Control Board (SPCB), Underground Water department, PWD, tourism and other relevant departments of the state and Central governments. The data sources are indicated at Table 13.

Table 13: Sources of E&S data

S. No.	Attribute	Parameter	Source of Data
1	Land use /cover	Land use patterns	Satellite Imagery
2	Geology	Rock formation and mineral profile	Geological Survey of India and project site study
3	Air, water, noise, soil	Measurement levels	Relevant departments.
4	Meteorology	Temperature, cloud, wind, etc.	IMD Chennai office and other studies.
5	Ecology	Existing terrestrial flora and fauna	Various sources.
6	Socio-economic aspects	Socio-economic characteristics	Census of India, 2011; District Hand Book, survey in project area

4.2. Features

The features such as climate, topography, geology, drainage, vegetative cover of Tamil Nadu state, Chengalpattu District is described in following sections.

A. Tamil Nadu state

4.2.1. Climate

The winter season in the project area commences early in December and continues till middleof March. The climate in the cold weather is pleasant. The days are bright and sunny,Under the Köppen climate classification the greater part of Tamil Nadu falls under Tropicalsavanna climate and a smaller portions of the state falls under Humid subtropical climate; theclimate of the state ranges from dry sub-humid to semi-arid. The summer in Tamil Nadu runsthroughout March, April and May and is characterized by intense heat and scant rainfall acrossthe state.

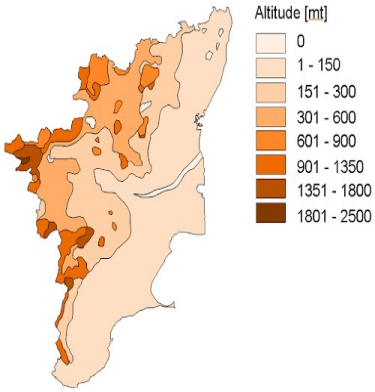
Tamil Nadu is heavily dependent on monsoon rains, and thereby is prone to droughts when themonsoons fail. The state has distinct periods of rainfall, which are the advancing monsoonperiod, South-west monsoon (from June to September) with strong southwest winds, the North-east monsoon (from October to December), with dominant northeast winds, and the Dry season(from January to May). The normal annual rainfall of the state is about 945 mm (37.2 in) ofwhich 48% is through the North East monsoon, and 32% through the South West monsoon.

4.2.2. Topography

The western, southern and the north-western parts are hilly and rich in vegetation. Tamil Naduis the only state in India which has both the Western Ghat and the Eastern Ghat mountainranges which meet at the Nilgiri hills. The Western Ghats dominate the entire western borderwith Kerala, effectively blocking much of the rain bearing clouds of the South West Monsoonfrom entering the state. The eastern parts are fertile coastal plains. The northern parts are amixof hills and plains. The central and the south-central regions are arid plains.

Tamil Nadu has a coastline of about 1076 km which is the country's second longest coastline. Tamil Nadu falls mostly in a region of low seismic hazard with the exception of the western border areas that lie in a low to moderate hazard zone.The western, southern and the north-western parts are hilly and rich in vegetation. Tamil Naduis the only state in India which has both the Western Ghat and the Eastern Ghat mountainranges which meet at the Nilgirihills.The Western Ghats dominate the entire western borderwith Kerala, effectively blocking much of the rain bearing clouds of the South West Monsoonfrom entering the state. The eastern parts are fertile coastal plains. The northern parts are a mixof hills and plains. The central and the south-central regions are arid plainson both the eastern and western coastlines. The topography of the state is represented through Figure. 10.

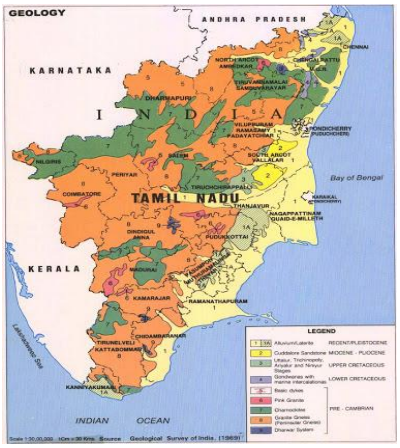
Figure 10: Topography map of Tamil Nadu state



4.2.3. Geology

Geological description of an area provides the information on the earth formation, the rocks of which it is made, the structure of those rocks and their occurrence in the area. Geologically, the Tamilnadu state comprises of Crystalline rocks of Archaean to late Proterozoic age occupying over 80% of the area of the state, while the rest is covered by the Phanerozoic sedimentary rocks mainly along the coastal belt and in a few inland river valleys. The hard rock terrain comprises predominantly of Charnockite and Khondalite groups and their migmatitic derivatives, supracrystal sequences of Sathyamangalam and Kolar groups and Peninsular Gneissic Complex (Bhavani Group), intruded by ultramafic-mafic complexes, basic dykes, granites and syenites. The sedimentary rocks of the coastal belt include fluviatile, fluvio-marine and marine sequences, such as Gondwana supergroup (Carboniferous to Permian and Upper Jurassic to Lower Cretaceous), marine sediments of Cauvery basin (Lower Cretaceous to Paleogene), Cuddalore/ Panambarai Formation (Mio-Pliocene) and sediments of Quaternary and Recent age. Geologically, the study area comes under Charnokite gneiss and Pyroxene granulites and also coastal sediments and alluvium. Geological map of Tamil Nadu is provided in Figure 11.

Figure 11: Geological map



4.2.4. Hydrology

Nearly 73% of the total area of the state is occupied by a variety of hard and fissured crystalline rocks like charnockite, gneisses and granites. The depth of open wells varies from 6 to 30 mbgl, while the depth of borewells generally varies from 30-100 m. The sedimentary formations consist of sand stones, limestones and shales whereas Quaternary sediments in the State represented by older alluvium and recent alluvium and coastal sands. In the Cauvery delta, the artesian pressure ranges between 4.5 m to 17 mbgl with free flow up to 270 m3/hr. The yield of wells in the alluvium varies from 27 to 212 m3/hr. The yield of wells in the fissured formation varies from 7 to 35 m3/hr. The map is given below in Figure 12.

Figure 12: Hydrological map

4.2.5. Drainage

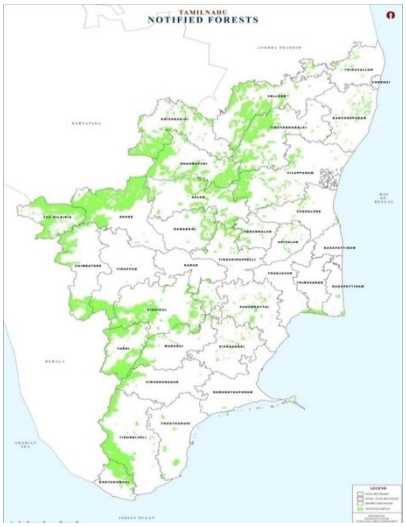
Drainage details out the river systems and the pattern formed in the form of watersheds such as streams, rivers, and lakes in the region. Also, it describes the direction of flow and the route it takes from its entry into any region till the exit into the adjacent region. The drainage pattern in Tamil Nadu is developed by the river Palar and Cheyyar and its tributaries. The drainage pattern in general is sub-dendritic and radial. All the rivers are seasonal and carry substantial flows during monsoon period. River Palar, a major river works as a drain for the district originates from Western Ghats in Karnataka state, and discharges in Bay of Bengal near Pudupattinam. The Cheyyar, a tributary of Palar river originates from the Jawadu hills of Tiruvannamalai district. It has a north easternly flow in Kancheepuram district and confluences with the Palar near Pazhalyaseevaram. Other seasonal rivers like Korattalaiar and Tandiar drain from the district partly on the northern and southern parts respectively. The map is given at Figure 13.

Figure 13: Drainage map

4.2.6. Forest

Tamil Nadu is located in the southernmost state of the Indian peninsula is spread over 130,058sq.km, which constitutes 3.96 % of the area of the country. It lies between latitude 8°05' and13 ° 34' North latitudes and 76 ° 14' and 80 ° 21' East longitudes. The Tamil Nadu State of Forest gives a detailed view of the health of the forest cover of the State based on the Forest Survey of India (FSI) and India State of Forest Report (ISFR) 2015 assessment. The State has a spectrum of nine major forest types ranging from wet evergreen forest to moist deciduous, dry deciduous, sholas, grass lands and scrub forest. The Western Ghats, the longest hill range in the state is one of the 25 global hotspots of bio-diversity and one of the three mega centres of endemism in India. The forest and tree cover of the State is about 30,952 sq. km which constitutes 23.80% of the total geographical area of the State. The map is given at Figure 14.

Figure 14: Forest area



B. Chengalpattu District

4.2.7. Climate

Chengalpattu district is situated on the northern east coast of Tamil Nadu and is adjacent to Bay of Bengal. It has a tropical wet and dry climate (Köppen-Geiger classification: Aw). The district generally experiences hot and humid climatic conditions. The humidity reaches its peak during the morning and is lowest in the evening. The months between April and June are generally hot with temperatures going up to an average maximum of 36.6oC. In winter (December - January) the average minimum temperature is 19.8oC. Monsoon season is from June to September, and brings heavy rains in the area coupled with cool breeze. Monsoon winters are largely cooler in comparison with other places in Southern India.

Table 14: Climate details Chengalpattu district

Month	MEANS					
	Daily Minimum Temperature (°C)	Daily Maximum Temperature (°C)	Minimum Temperature		Maximum Temperature	
			Value	Date	Value	Date
Jan	20.9	29.9	15.7	27-01-1969	33.9	25-01-2006
Feb	21.8	31.7	16	04-02-1989	36.6	26-02-2001
Mar	23.8	34	18.2	02-03-1989	40.6	29-03-1953
Apr	26.2	35.9	20.7	27-04-1968	42.7	30-04-1991
May	27.7	38.3	21	26-05-2005	49.1	13-05-2001
Jun	27.4	37.5	21	22-06-1961	43.2	03-06-2012
Jul	26.4	35.8	20.6	14-07-1985	40.4	06-07-2015
Aug	25.7	34.9	21.4	16-08-1967	39.6	01-08-2018
Sep	25.4	34.4	20.9	29-09-2011	39.2	28-09-2002
Oct	24.6	32.6	19.6	31-10-1974	39.4	01-10-1920
Nov	23.2	30.4	16.7	08-11-1954	35.6	02-11-1999
Dec	21.7	29.4	16.1	31-12-1947	33.1	10-12-2010
Annual	24.6	33.7	15.7	27-01-1969	49.1	13-05-2001

4.2.8. Rainfall

The pre-monsoon rainfall is almost uniform throughout the district. The coastal areas get more rain rather than the interior areas. The district is mainly depending on the seasonal rains, the distress conditions prevail in the event of the failure of rains. Northeast and Southwest monsoon are the major sources with 54% and 46% contribution each to the total annual rainfall.

Table 15: Decadal rainfall in Chengalpattu district (in mm)

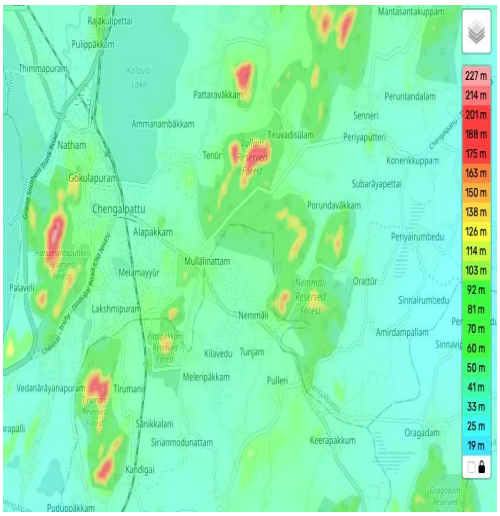
Month	Mean			
	Total Rainfall(mm)	Number of Rainy Days	Rainfall	
			Value	Date
Jan	20.0	1.4	91.7	28-01-1947
Feb	4.7	0.6	136.8	24-02-2000
Mar	3.4	0.2	88.1	05-03-1944
Apr	17.5	1.0	121.6	06-04-2005
May	49.7	1.8	214.9	17-05-1943
Jun	75.4	4.5	282.2	14-06-1996
Jul	113.1	6.7	115.4	10-07-2020
Aug	141.4	8.8	98.7	16-08-1967

Sep	143.9	7.4	199.0	30-09-1984
Oct	278.3	10.6	229.6	10-10-1943
Nov	377.3	11.5	346.6	25-11-1976
Dec	183.7	5.7	282.8	03-12-2005
Annual	1408.4	60.2	346.6	25-11-1976

4.2.9. Topography

Topography describes the shape and terrain of the land which provides details on the elevation and slope with reference to the mean sea level. Studying the terrain is important to manage the construction cost, minimize risks from natural hazards and minimize the impact of the proposed project on the environmental resources. The geographical area of the Chengalpattu district is spread into 2945 sq. km. The elevation of the area ranges from 227 amsl in the west to a sea level in the east. The major part of the area is characterized by an undulating topography with innumerable depressions, which are used as irrigation tanks. The coastal plain displays a fairly low level or gently rolling surface and only lightly elevated above the local water surfaces on rivers. The straight trend of the coastline is a result of development of a vast alluvial plain. There are a number of sand dunes in the coastal tract. The coastal landforms include estuarine tidal, mud flats or lagoons and salt marsh etc. The map is given at Figure 15.

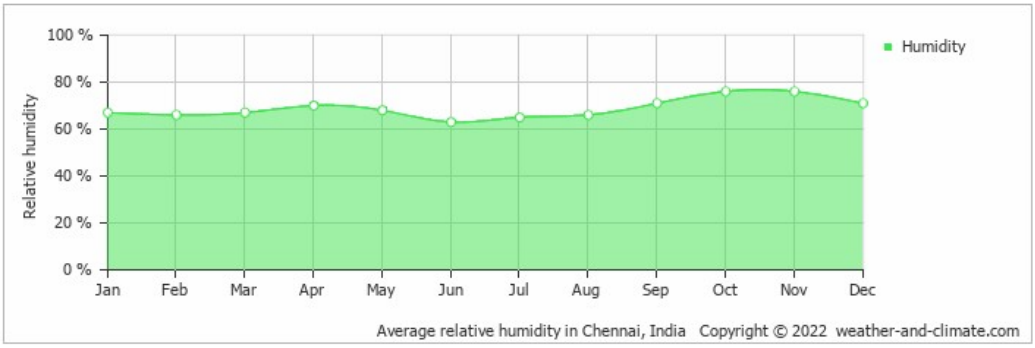
Figure 15: Topography of Chengalpattu District



4.2.10. Relative humidity

High relative humidity between 30 and 88 per cent prevail throughout the year. Relative humidity is maximum in the morning and minimum in the evening. Higher rates of relative humidity are observed between November and January i.e., 85 to 88 percent. In the months of June, the humidity is lower i.e., around 30 percent. Average relative humidity recorded were 78 percent and 68 percent in the morning and evening respectively.

Figure 16: Relative humidity of Chengalpttu District



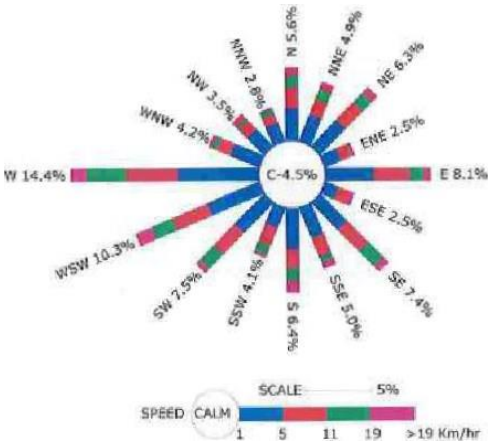
4.2.11. Cloud cover

Generally light clouds are observed in winter mornings. During pre-monsoon and the post-monsoon evenings the skies are either clear or lightly clouded. But in post-monsoon mornings as well as monsoon morning heavy clouds are commonly observed. And, the skies are light to moderately clouded in the evening time throughout the year.

4.2.12. Wind speed direction

The available data indicate the trend of wind speed direction during pre-monsoon, monsoon, post monsoon and winter season in a year, wind rose is given at Figure 17.

Figure 17: Windrose diagram



4.2.13. Hydrogeology

The Chengalpattu district is underlain by both sedimentary and fissured formations. The important aquifer system in the district are constituted by unconsolidated and semi-consolidated formations and weathered, fissured and fractured crystalline rocks. The hydrogeological study of the area is underlain by sedimentary and fissured formations. The important aquifer system is constituted by consolidated and semi consolidated formations of Granite, Gneisses, Charnokite and Sandstones, Conglomerate, Clay, Shale types of rocks. Ground water occurs under unconfined to semi confined and discontinuous, restricted to weathered residuum and fracture zones.

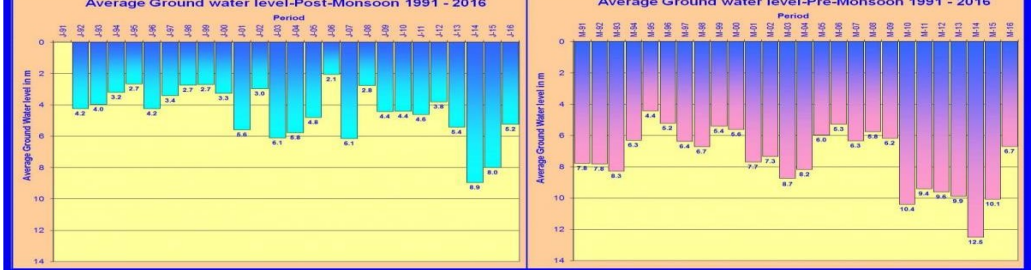
4.2.14. Ground water level

Tamil Nadu State Ground and Surface Water Resources Data Centre, WRD, Government of Tamil Nadu jointly with Central Ground Water Board (CGWB) determine the status of ground water level for each tehsil every year and publish the findings once in four years after monitoring the important wells. The Ground Water Report, 2007 declared the Thiruporur block of Kancheepuram district having 81% of long-term groundwater recharge as semi-critical area for future groundwater development.

Latest data of June 2020 indicate the average ground water level status in Kancheepuram district as 4.92 meter below ground level (BGL) as compared to the water level in June 2019 which was 6.08 metre BGL. It has thus risen by 1.6 meter BGL in 1 year from 2019 to 2020. The 25 year trend of ground water level in district is given at Figure 18

Figure 18: Ground water level from 1991-2016

Sl. No	District	Average	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
1	Post Monsoon Ground water Level in m (January)	4.5		4.2	4.0	3.2	2.7	4.2	3.4	2.7	2.7	3.3	5.6	3.0	6.1	5.8	4.8	2.1	6.1	2.8	4.4	4.4	4.6	3.8	5.4	8.9	8.0	5.2
2	Pre Monsoon Ground water Level in m (May)	7.5	7.8	7.8	8.3	6.3	4.4	5.2	6.4	6.7	5.4	5.6	7.7	7.3	8.7	8.2	6.0	5.3	6.3	5.8	6.2	10.4	9.4	9.6	9.9	12.5	10.1	6.7

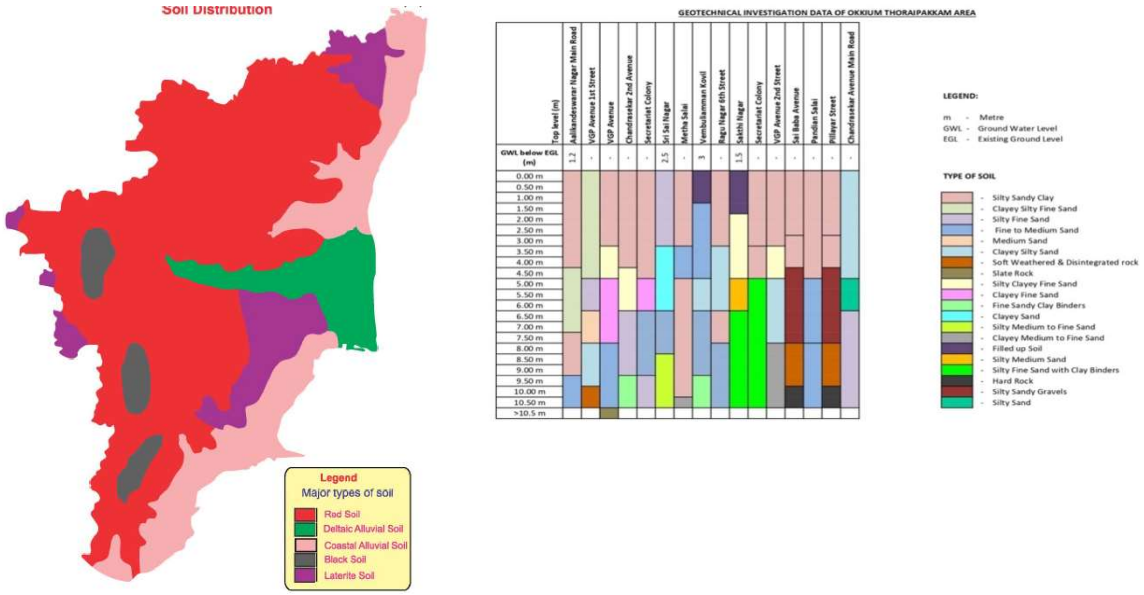


4.2.15. Soil type

It is essential to determine the potentiality of soil in the area and to identify the impacts of urban development on soil quality. The sampling locations have been identified with objectives to determine the baseline soil characteristics of the study area.

The soil analysis reveals that pH of the soil range between 8.31 to 8.76 which indicate that soil is moderately to strongly alkaline. The soil contains organic matter from 2.25% to 2.85%, which is more than sufficient. The phosphorus is below detection limit and nitrogen is less in quantity.

Figure 19: Soil Distribution



4.2.16. Air quality

Tamil Nadu Pollution Control Board (TNPCB) regularly monitors the ambient air quality of Chennai through a network of eight ambient air quality monitoring stations established under the National Air Quality Monitoring Programme (NAMP). Samples are collected for 24 hours basis twice a week, and are for the Respirable Suspended Particulate Matter (RSPM). (RSPM is particulate matter less than 10 microns) and gaseous pollutants such as Sulphur dioxide (SO2) and Nitrogen dioxide (NO2).

Ambient air quality data collected from secondary sources under the National ambient air quality management program carried out for the year 2021 taken from the samples collected from different parts of Chennai and the data relevant to area near to project area is tabulated below.

Table 16: Annual Average Air Quality Data for the year 2021

Tamil Nadu Pollution Control Board

Advanced Environmental Laboratory, Guindy, Chennai - 600 032.

NAMP Annual Average for the Year 2021

Month and Year	Anna Nagar (Latitude:13°09'41"70" N Longitude: 80°19'99"90" E)				Thiyagaraya Nagar (Latitude: 13°03'93"93" N Longitude: 80°23'81"73" E)				Adyar (Latitude:13°01'24"10" N Longitude: 80°24'43"52" E)				Kilpauk (Latitude: 13°08'02"29" N Longitude: 80°23'48"52" E)				Nungambakkam (Latitude: 13°05'49"29" N Longitude: 80°23'92"22" E)			
	RSPM / PM_{10}	SO_2	NO_2	$PM_{2.5}$	RSPM / PM_{10}	SO_2	NO_2	$PM_{2.5}$	RSPM / PM_{10}	SO_2	NO_2	$PM_{2.5}$	RSPM / PM_{10}	SO_2	NO_2	$PM_{2.5}$	RSPM / PM_{10}	SO_2	NO_2	$PM_{2.5}$
	All the Values are in µg / m^3																			
Jan-21	76	12	23	35	83	11	22	40	49	10	20	21	54	10	21	23	60	11	22	25
Feb-21	62	10	22	25	69	11	23	31	52	10	21	21	58	10	22	23	63	11	22	25
Mar-21	58	11	21	26	62	12	22	28	51	10	21	23	53	11	21	23	56	11	21	27
Apr-21	52	11	21	24	61	12	23	28	45	10	19	21	49	10	21	21	57	11	23	26
May-21	39	8	17	18	46	9	19	22	34	7	16	16	35	8	16	18	43	8	17	19
Jun-21	40	9	18	19	43	9	20	22	35	8	16	16	40	9	18	18	44	9	19	21
Jul-21	51	11	20	21	59	11	23	24	44	10	19	18	51	11	21	20	54	10	22	21
Aug-21	50	10	21	22	60	10	23	24	45	10	19	17	52	10	21	21	55	10	21	23
Sep-21	53	11	21	22	59	10	23	23	45	10	20	19	55	10	21	22	57	10	23	24
Oct-21	50	10	21	19	58	10	21	27	48	11	20	16	55	11	20	25	54	11	21	22
Nov-21	49	10	20	22	82	11	22	51	47	9	19	19	86	12	22	52	45	9	20	19
Dec-21	57	10	21	24	58	11	22	25	54	10	21	22	57	10	20	20	58	11	22	22
Annual Average Value	**53**	**10**	**21**	**23**	**62**	**11**	**22**	**29**	**46**	**10**	**19**	**19**	**54**	**10**	**20**	**24**	**54**	**10**	**21**	**23**
Standard	*60*	*50*	*40*	*40*	*60*	*50*	*40*	*40*	*60*	*50*	*40*	*40*	*60*	*50*	*40*	*40*	*60*	*50*	*40*	*40*

Dy.CSO

Assistant Director (Lab)
AEL, TNPCB, Chennai-32.

Table 17: Air Quality Index Chennai for the year 2021

Air Quality Index, Chennai, December - 2021

Anna Nagar - 765 Type: Residential				T.Nagar 766 Type: Mixed				Adyar - 764 Type: Residential			
S.No	Date of Sampling	AQI	Remarks	S.No	Date of Sampling	AQI	Remarks	S.No	Date of Sampling	AQI	Remarks
1	03.12.2021	59	Satisfactory	1	02.12.2021	60	Satisfactory	1	01.12.2021	52	Satisfactory
2	07.12.2021	52	Satisfactory	2	07.12.2021	57	Very Poor*	2	03.12.2021	55	Satisfactory
3	10.12.2021	56	Satisfactory	3	09.12.2021	64	Good	3	08.12.2021	51	Satisfactory
4	14.12.2021	57	Satisfactory	4	14.12.2021	60	Satisfactory	4	10.12.2021	50	Satisfactory
5	17.12.2021	59	Satisfactory	5	16.12.2021	58	Satisfactory	5	15.12.2021	49	Good
6	21.12.2021	57	Satisfactory	6	21.12.2021	59	Satisfactory	6	17.12.2021	56	Satisfactory
7	24.12.2021	58	Satisfactory	7	23.12.2021	63	Satisfactory	7	22.12.2021	60	Satisfactory
8	28.12.2021	57	Satisfactory	8	28.12.2021	60		8	24.12.2021	54	Satisfactory
				9	30.12.2021	43		9	29.12.2021	57	Satisfactory

Kilpauk - 767 Type: Mixed				Nungambakkam - 895 Type: Traffic inter - section			
S.No	Date of Sampling	AQI	Remarks	S.No	Date of Sampling	AQI	Remarks
1	02.12.2021	53	Satisfactory	1	01.12.2021	57	Satisfactory
2	06.12.2021	55	Satisfactory	2	06.12.2021	58	Satisfactory
3	09.12.2021	56	Satisfactory	3	08.12.2021	56	Satisfactory
4	13.12.2021	54	Satisfactory	4	13.12.2021	60	Satisfactory
5	16.12.2021	55	Satisfactory	5	15.12.2021	59	Satisfactory
6	20.12.2021	57	Satisfactory	6	20.12.2021	56	Satisfactory
7	23.12.2021	59	Satisfactory	7	22.12.2021	57	Satisfactory
8	27.12.2021	57	Satisfactory	8	27.12.2021	59	Satisfactory
9	30.12.2021	67	Satisfactory	9	29.12.2021	60	Satisfactory

Sound level data of 10 stations of Chennai is analyzed on yearly basis. The data for the year 2017 is averaged on yearly basis both for day and night time and mentioned in Table 15. In which Pallikaranai and Velacherry are nearear to the project area.

Table 18: Monthly Average Noise level of Chennai

Stations	Pallikaranai		Velacherry		Anna Nagar		Sowcarpet		Washermanpet	
Month	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
January	73	67	66	62	66	57	67	61	71	64
February	73	67	66	57	64	54	66	64	71	63
March	73	66	70	58	66	59	77	63	70	63
April	75	69	70	61	68	63	70	65	72	65
May	78	71	69	60	67	62	67	61	70	65
June	75	71	69	62	66	64	71	80	71	67
July	79	77	71	67	65	62	66	62	71	65
August	87	88	67	68	64	60	66	61	71	64
September	79	80	68	66	64	58	66	59	69	66
October	79	81	71	71	64	58	67	60	71	64
November	73	72	87	82	66	57	65	60	73	66
December	74	74	78	77	67	57	65	59	77	73

4.2.17. Terrestrial Ecology

The South Buckingham Canal stretch lies between Adyar Creek and Kovalam Creek and situated on the eastern part of the project area. The total length of the drain is 24.22 kms. The width of the canal is in the range of 10 to 100m. This stretch by itself experiences high

flood levels during monsoon, due to rain from local precipitation. The areas south of Adyar basin inside Chennai City drains into the south Buckingham Canal. The flood from the developed area of Nanganallur, Velachery and Tiruvanmiyur normally travel southwards and get into the Pallikkaranai Lagoon. Mainly the Veerangalodai and Velacheri drains discharge into Pallikaranai Marsh drains into South Buckingham Canal.

Pallikaranai Marshland is an ecologically sensitive area found adjacent to the project area. It is a nesting ground for a large variety of migratory birds and rich with 61 species of flowering plants. This is one among the few remaining wetlands located inside Chennai City, which falls under Perungudi and Pallikaranai villages in the Kancheepuram district of Tamil Nadu, within Chennai city.

Pallikaranai marsh land outlet Canal carry's the out discharge of Pallikaranai marsh and its upstream drainage area and discharges it into the South Buckingham Canal near Kannaginagar. The Total length of the drain is 2.65kms. There are around six drains draining into Pallikaranai marsh land namely Keelakattai lake, Arasankazhaui canal, Verangalodai canal, Adambakkam lake, Velachery Drain and Rajbhawan drain and finally discharges into south Buckingham canal at Kannaginagar.The width of the drain is between 120m to 200m. The total length of the canal is uncovered and has no side walls. The project area is out of the Pallikaranai marsh land boundary, Hence there is no impact due to project.Within the project area there are no sensitive areas like forest or protected areas or nationally important / protected monuments. No eco sensitive areas are located within the subproject area.

4.3. Noise Sensitive Receptors

The receptor of noise will be close to the construction site areas, offices, religious structures, market area and other public areas for which special mitigation measures will be taken care of during construction phase by providing proper noise barrier / acoustic and other sources close to the sensitive noise receptors.

4.4. Site specific Environmental features

Table 19: Location, infrastructure details and site specific environmental features

S. No	Infrastructure	SPS / LS	Location & Environmental Feature	Site Photograph
1	Sewage pumping station	SPS 01	**Sri Sai Nagar** - Existing CMWSSB OHT site without any trees. Existing OHT has been proposed to be dismantled after commissioning of the ongoing comprehensive WSS in OkkiumThoraipakkam. The SPS site is located within park in habituated area, surrounded by Residential buildings on one side and Institutional building on other side with the road access from 2nd main road. Hence improvement to aesthetics of site, odour control mechanism, noise control are proposed along with planting trees, constructing raised compound wall, planting creepers.	
2	Sewage pumping station	SPS02	**Chandra Sekaran Avenue** - Existing CMWSSB OHT site without any trees. Existing OHT has been proposed to be dismantled after commissioning of the ongoing comprehensive WSS in OkkiumThoraipakkam The SPS site is located within park in the habituated area surrounded by Residential buildings on one side and Greater Chennai corporation office on the other side with the road access from 4th Cross Street.The odour control mechanism, compound wall on all the four sides, planting creepers and tree plantation provisions are proposed.	

3	Sewage pumping station	SPS03	**Aaligandeswarar Nagar** - Existing CMWSSB OHT site without any trees. Existing OHT has been proposed to be dismantled after commissioning of the ongoing comprehensive WSS in OkkiumThoraipakkam. The SPS site is located in the habituated area surrounded by Residential buildings on one side, vacant land another side, road access from Aaligandeswararnagar main road. The odour control mechanism, compound wall on all the four sides, planting creepers, tree plantation are proposed.	
4	Sewage pumping station	SPS04	**Soolaiama Nagar** - Existing CMWSSB OHT site, proposed to be dismantled after commissioning of comprehensive WSS.Removal of tree envisaged but may be decided during implementation. The SPS site is located in the habituated area surrounded by Residential buildings, vacant land another side, road access from Raja Nagar 6th street. The odour control mechanism, compound wall on all the four sides, planting creepers, tree plantation are proposed.	
5	Sewage pumping station	SPS 05	**Sakthi Nagar** - Existing half-done sewage collection well is available at the site.Hence, it has been proposed to use the existing infrastructure after ensuring the structural stability. The SPS site is surrounded by Industries commercial establishments and residential flats. Access to the site is from ArihantRoad.Planting trees, constructing raised compound wall, planting creepers and odour control mechanism are proposed in the site.	
6	Sewage pumping station	SPS 06	**Mettukuppam Foundry Salai** - Existing half-done sewage collection well is available at the site. Hence, it has been proposed to use the existing infrastructure after ensuring the structural stability. Asthe SPS site is located in the habituated area surrounded by Residential buildings, vacant land on another side, road access from Industrial Estate Road. The odour control mechanism with	

			compound wall on all the four sides, including tree plantation provisions are proposed	
7	Lift Stations	LS 01, LS 02 & LS 03	**CTS Road, Pandian Salai & VGP Avenue** - In addition to the 6 sewage pumping stations, 3 nos. of lift stations are proposed at the above 3 locations. Most of the lift stations are road side, diameter of road side lift stations is restricted to 2.5mts and wherever the sites are available diameter is relaxed upto 3m to 3.5m. Lift station has been proposed as buried below the road surface, provided with two sewage submersible pumps to lift sewage and pump to nearest higher Machine holes. A kiosk with panel will be erected at the side of road for pumps operation.	
8	Collection system		Collection gravity system is the pipeline network that receives the sewage from the house service connections and conveys to the pumping station. Machine holes will be constructed at the centre of the road and Pipelines will be laid connecting the Machine Holes, for the roads wider than 60ft rider mains have been proposed to avoid frequent crossings.	
9	Pumping mains		Pumping mains of varying diameter have been proposed to convey the sewage collected at the lift stations or pumping stations to the network of next zone or to the STP through CI pipelines. Pumping mains will be laid on shoulder / footpaths of the roads.Care has been taken considering the available widths while selecting the alignment of roads.	
10			It is proposed to construct pipe carrying bridge across B'canal for a length of 100m for disposal of sewage from SPS03 to Suction Well in Injambakkam SPS01. Necessary permission / clearance from PWD will be obtained before execution of work.	

All the above sites are free from encumbrances and owned by Government agencies/departments. The land records are provided in Annexure 3.No Objection for

constructing pumping stations are already obtained and Letter received from Greater Chennai Corporation (GCC) is provided in Annexure 3.The pumping main will be laid within the Right of Way of the roads belongs to Greater Chennai Corporation / Tamil Nadu Road Development Corporation. There are no social impacts envisaged.

4.5. Socio-economic profile of project area

OkkiyamThoraipakkam has experienced substantial growth over the past decade, and it serves as a residential and commercial hub for neighbourhood in the south of Chennai. A number of information technology companies are based in Thoraipakkam. It has many IT Buildings and has many plants in the middle of the road. Palm Trees are known to grow in here. Many large IT firms are located in the project area.

Socio-economic profile of rural, semi-urban and urban areas located enroute of the pipeline are mentioned in this sub-section. It is based on the secondary sources such as District Census, Statistical Handbook 2011 and Primary Census Abstract of Census 2011.

4.5.1. Social structure

The vulnerable groups such as Scheduled Caste (SC) and Scheduled Tribe (ST) population were 14.08 % and 0.53% respectively. An overwhelming majority (85.40%) population belong to other backward caste (OBC) as shown in below the table.

Table 20: Social structure

S. No	Name of the Blocks/ Municipalities	Area in Sq. Km	Scheduled Caste			Scheduled Tribe		
			Persons	Male	Female	Persons	Male	Female
1	Kattankolathur	361.02	398256	200636	197620	309220	164454	144766
2	Thirupporur	411.82	175150	88574	86576	124996	68730	56266
3	T. Kundram	352.82	196897	99401	97496	138237	76207	62030
4	St. Thomas Mount	217.94	1589297	801336	787961	128686 2	672516	614346
5	Madhuranthagam	402.91	166351	83118	82233	112891	61813	51078
6	Acharapakkam	357.04	109602	54932	54670	71005	39614	31391
7	Chithamur	338.72	121098	60620	60478	80494	44441	36053
8	Lathur	278.14	84921	42549	42372	54894	30328	25661
	Total	2720.41	2841572	1431166	1410406	217859 9	115810 3	102049 6

4.5.2. Literacy Level

It indicates that 91.4% of population was literate. It varied from under primary (including basic knowledge of reading and writing) to metric and higher education level. Amongst them the male literacy rate was higher (94.01%) compared to the females (86.61%) in the study area.

4.5.3. Occupational pattern

The occupational pattern of population in the study area covers main workers, marginal workers and non-workers. The census classified workers as main workers who had worked for the major part of the reference period i.e. 6 months or more. The marginal workers are those workers who had not worked for the major part of the reference period i.e. less than 6 months and non- workers are persons who did not work at all during the reference period. The non-workers include those engaged in unpaid household duties, students, retired persons, dependents etc. As per 2011 census, the main workers and marginal workers were 39.9% and 6.11% respectively and the non-workers constituted 53.9% of total population.

5. POTENTIAL ENVIRONMENTAL, SOCIAL IMPACTS AND MITIGATION MEASURES

This section identifies and assesses the potential changes in the environment and social aspects that could be expected from the proposed project. The impacts have been predicted for the proposed activities assuming that the impact due to the existing activities has already been covered under base line environmental monitoring and continue to remains same till the operation of the project. The proposed project activities would create impact on the environment in two distinct phases i.e., construction and operation phases. Impacts are identified, predicted and evaluated based on the analysis of the information collected from following:

- Project information (as discussed in Chapter-2) and
- Baseline information and site visits of the study area (as discussed in Chapter-4)

This section also describes mitigation measures, which have been suggested for the adverse impacts likely to be caused due to activities of both construction and operation phases of the project. The identification of likely impacts during construction and operational phases of the proposed project has been done based on likely activities having their impact on one or another environmental parameters. The details of the activities and their impacts have been worked out in the following sections.

5.1. Identification of likely impacts

Every activity and operation has either adverse or beneficial impacts on the environment. The environmental and social impact identification has been done based on proposed project activities. Potential environmental and social impacts of the proposed infrastructure components are presented in this section. Mitigation measures to minimize / mitigate negative impacts, if any, are recommended along with the agency responsible for implementation. Monitoring actions to be conducted during the implementation phase is also recommended to reduce the impact.

Screening of potential environmental and social impacts are categorized into four categories Considering subproject phases: location impacts and design impacts (pre-construction phase), construction phase impacts and operations and maintenance phase impacts.

(i) Location impacts include impacts associated with site selection and includeloss of on-site biophysical array and encroachment either directly or indirectly onadjacent environments. It also includes impacts on people who will lose theirlivelihood or any other structures by the development of that site.

(ii) Design impacts include impacts arising from Investment Program design, including technology used, scale of operation/throughput, waste production, discharge specifications, pollution sources and ancillary services.

(iii) Construction impacts include impacts caused by site clearing, earthworks,machinery, vehicles, workers, occupational health and safety. Construction site impacts include erosion, dust,noise, traffic congestion and waste production.

(iv) O&M impacts include impacts arising from the operation and maintenanceactivities of the infrastructure facility. These include routine management ofoperational waste streams, and occupational health and safety issues.

This section of the ESIA reviews possible project-related impacts, in order to identify Issues requiring further attention and screen out issues of no relevance. The Environmental and Social Screening formats are provided in the Annexure-1.

In the case of this project most of the individual elements involve simple construction and operation, so impacts will be mainly localized and not greatly significant negative impacts associated with sewage facilities such as odour are already considered in the design and siting, most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving excavation and earth movements; and being mostly located in an urban area, will not cause direct impact on biodiversity values. The project will be in properties held by the local government and access to the project location is through public rights-of-way and existing roads hence, land acquisition and encroachment on private property will not occur.

5.2. Design &Location impacts

5.2.1. Sewer system – collection and conveyance

The sewerage system is designed as a separate system of sewage collection (i.e. caters only to wastewater). Existing surface road side drains in the project area cater to collection and conveyance of runoff during rains. The underground gravity sewers will carry sewage from households to the nearest lifting or pumping station, onwards to next sewer zone or to terminal sewage pumping station from where the sewage is pumped to the existing STP.

Sewer system will cater to domestic wastewater - grey water (from kitchen and bath areas) plus black water (toilet waste/excreta), and every household outlet carrying the wastewater will be connected to the sewer network. To maximize the benefits as intended, CMWSSB will ensure that all existing septic tanks are phased out by bypassing the inlet and connecting the toilet discharge from each house directly to sewerage system.Accumulation of silt in sewers in areas of low over time, overflows, blockages, power outages, harmful working conditions for the workers cleaning sewers etc. are some of the issues that are taken into consideration during the sewer system design. Measures such as the following are included in sewer system design to ensure that the system provides the benefits as intended:

- Limit the sewer depth to 4.5mts, so that O&M of the system will be easy.
- Sewers shall be laid away from water supply lines and drains (at least 1 m), if not possible, sewer lines shall be laid below the water lines.
- In all cases, the sewer line should be laid deeper than the water pipeline (the difference between top of the sewer and bottom of water pipeline should be at least 300 mm);
- In unavoidable cases, where sewers are to be laid close to storm water drains, appropriate pipe material (that has no or least infiltration risk) shall be selected (DWC &CI pipes adopted)
- For shallower sewers and especially in narrow roads, wherever possible use small inspection chambers in lieu of Machine holes.
- Design Machine holes covers to withstand anticipated loads and ensure that the covers can be readily replaced if broken to minimize silt/garbage entry.
- Ensure sufficient hydraulic capacity to accommodate peak flows and adequate slope in gravity mains to prevent buildup of solids and hydrogen sulfide generation.

5.2.2. Sewage Pumping Stations and Lift Stations

Sewage Pump Station will also perform same function as sewage lift stations but cater to much larger area or sewage flow, and will also have several components, and occupy

comparatively larger area.At these pumping or lifting stations, the operation involves accumulation of incoming sewage in the suction well and then pumping out as the sewage level reaches the designed pumping depth. The water level in the well rises up before the pumping cycle starts and as the pumping is performed the water level goes down registering its lowest depth at the end of pumping of cycle. This cycle of rising and lowering will continue throughout the day and night. However, the duration between successive pumping cycles will significantly vary depending on the sewage generation. During morning and evening peak hours, sewage will accumulate quickly, and pumping frequency will be high. The sewage retention time in the suction well therefore varies throughout the day, with very high retention periods during the nights and mid-days.

5.2.3. Odour from Pumping Stations

In the suction wells, the sewage emits gases, which accumulated in the air above water surface. The gas may include odorous compounds like hydrogen sulfides (H2S), amines, fatty acids, aldehydes, ketones and other volatile organic compounds (VOCs). As the water level rises before the pumping cycle, it physically displaces the air, along with the odorous gas compounds. H2S is the most dominant odour causing compound and therefore can cause nuisance to nearby area. When sewage becomes stagnant, H2S is generated in the anaerobic conditions. The quantum of H2S generation depend on quantity of accumulated sewage and sewage retention time that create anaerobic conditions. Both increase in quantity of sewage accumulation and retention time will increase the H2S generation. Since most of the pumping stations are located in residential areas, it is propose to have tall compound wall with creepers, climbers, fragrance flower plants and green belt around the unit as an environmental safeguard. In addition, odour control mechanism are proposed in all the pumping stations, depending on size of the well and quantum of sewage, system is designed and proposed in BOQ, also maximum of 10m distance between sensitive receptors like residence, schools, hospitals etc., from the unit is kept as guiding factor.

5.2.4. Pumping station wells

Therefore proposal to develop green buffer zone around the facility with a combination of tall and densely growing trees in multi rows as per the land availability to control odour and also act as visual shield, and improve aesthetical appearance and mechanical odour control measures are proposed. Since human intervention is involved and safety shall be primary and critical consideration, additional protection by way of a metaled grating / grill work shall be provided over the sections (or full cross section if required) where workers will stand / work for inspection and repair/O and M purposes.

Provision of passive gas ventilation arrangement by providing a take-off vent from top of well by positioning vent in such a way that cover slab fitment / movement / drawl if required for maintenance purposes is not compromised. Height of vent to be provided appropriately and a minimum 2 m above the lintel level (top level) of window(s) / passageways / doors in the nearby adjoining buildings. Submersible sewage pumps of suitable rating, minimum submergence requirements, open impeller with cutting-tearing arrangement and high strength-corrosion resistant heavy duty construction shall be proposed.

In locations / cases where sewage flow in the present to intermediate design stage is envisaged to be low, position of the submersible pumps and design of the collection well floor by providing necessary side benching / sloped flooring to allow for higher submergence during low flow shall be made to ensure regular pump operation and avoid sewage stagnation beyond the permissible limit.

Diesel Generators shall be provided for all pump stations with space for control room. In cases of lift Station (road-side or road-center type structures with only provision of kerb-side kiosk), an electrical cut-out provision shall be made for connecting an Emergency Mobile / Skid Mounted Diesel Generator for pumping out during long period of electricity supply interruption. Develop standard operating procedures / operational manual for O&M of lifting and pump stations; this shall include measures for emerge situations. Provide training to the staff in SOPs and emergency procedures. Top Covered Lifting stations are located on side of wider roads, and diameter is limited to 2.5mts, wherever government land is available diameter criteria is relaxed.

5.2.5. Noise from pumping operations

Operation of pumps and motors and diesel generators is a major source of noise. As the pumping and lifting stations are located in the residential areas, with few located very close to the houses, noise generated from lifting / pump stations can have continuous negative impacts on the surrounding population. High inside noise levels can affect the health of operators and staff at the facilities, and therefore, noise levels needs to be maintained within and outside the plant at acceptable levels. Procure good quality latest technology high pressure pumps that guarantee controlled noise at a level of around 80 dB(A) at a distance of 1 m.

Use appropriate building materials and construction techniques for pump houses which can absorb sound rather than reflect noise, use acoustic enclosures – manufacturer specified, for all pumps, motors. Procure only Central Pollution Control Board (CPCB) approved generators to meet air emission and noise level requirements. Provide sound mufflers for ventilators in the plant rooms; and sound proof doors. Provide ear plugs designated for noise reduction to workers.

5.2.6. Energy Efficiency

Project area is mostly plain and gently sloping ground, it is therefore not technically feasible or economical to design a completely gravity system to collect sewage from individual houses and transfer the same the STP. It necessitated provision of lifting and pumping stations, which are optimized to the extent possible to minimize the overall pumping. In the current design, sewage will be collected from the houses via sewer network and conveyed by gravity to the lifting station. Lifting stations are designed just to lift the sewage to higher level and deliver it to a nearby sewer Machine holes on the higher elevation, from there it can flow again by gravity, rather than pumping directly to a pumping station. This optimized the energy consumption.

To optimize the power consumption, the hydraulic design shall follow optimal approach and the following also considered in design and selection of pumping systems. According to Manual for the Development of Municipal Energy Efficiency Projects in India (jointly developed by Bureau of Energy Efficiency (BEE) and International Finance Corporation in 2008), energy savings, at minimum, of 25% to 40% is possible with appropriate measures. The following measures have been considered and incorporated into the subproject designs wherever possible:

- Using low-noise and energy efficient pumping systems
- Efficient Pumping system operation
- Installation of Variable Frequency Drives (VFDs)

5.2.7. Utilities

Telephone lines, electric poles and wires, water lines, drains, if exists within the proposed project locations may require to be shifted. Some of the proposed sites are within OHT compound, small pump houses and old buildings. Since CMWSSB implementing comprehensive water supply system in all the added areas these existing structures will be defunct hence shall be removed. Existing structures do not involve any hazardous material (chemical) and shall be managed in compliance with C&D waste management rules, in coordination with GCC.

Provision is made in BOQ for dismantling of these structures. All the selected project sites are vacant and unused government lands, there are no notable existing utilities. Sewer lines are proposed mid of ways wherever road width is more than 18m and Rider mains are proposed on other sides. In such cases, the work may require shifting of utilities on the shoulder. To mitigate the adverse impacts due to relocation of the utilities, the contractor, in collaboration with the CMWSSB will

- Identify the locations and operators of these utilities to prevent unnecessary disruption of services during construction phase; and
- Instruct construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services

5.2.8. Site Selection of Construction Work Camps, Stockpile Areas, Storage Areas, and Disposal Areas

Priority is to locate these near the project location, but it shall be at least 100m away from residential areas, groundwater wells and surface water bodies. However, if it is deemed necessary to locate elsewhere, sites to be considered will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems.

Residential areas will not be considered for setting up construction camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution, dust, noise etc. It is also intended to prevent any social conflicts, shortages of amenities, and crime). Extreme care will be taken to avoid disposals near forest areas, water bodies, or its nearby areas. The contractor will prepare Waste Management Plan prior to construction and submit to CMWSSB.

5.2.9. Site Selection of Sources of Materials

Significant quantities of coarse aggregate and fine aggregate will be required for construction works. Contractor should procure these materials only from the licensed quarries with valid permits. Contractor should, to the maximum extent possible, procure material from existing quarries. It will be the main contractor’s responsibility to verify the suitability and legal status of all material sources and to obtain the approval of Department of Geology and Mining and local revenue administration, as required. The record should be maintained and made available for verification by CMWSSB as and when required.

5.2.10. Social and Cultural Resources

Any work involving ground disturbance can uncover and damage archaeological and historical remains. For this project, excavation will occur in project sites for foundations, laying pipelines, and for construction of underground structures at pumping/lifting stations. In the project site there are no archeologically or historically recognized sites or places close to project sites or within the project area. However in case of such finds are recognized during excavation, all necessary measures are to be taken to ensure they are protected and conserved.
Construction contractors to follow these measures in conducting any excavation work.

- Create awareness among the workers, supervisors and engineers about the chance finds during excavation work.
- Stop work immediately to allow further investigation if any finds are suspected.
- Inform State Archaeological Department if a find is suspected, and taking any action they require to ensure its removal or protection in situ.

5.3. Construction impacts

Main civil works in the subproject include laying of sewer lines and construction of sewage pumping and lifting stations at the identified sites. Sewage pumping and lifting stations works will be confined to sites, and construction will include general activities like site clearance, excavation for foundations, and creation of concrete structures will be one of the major construction activities for this project, as many of the subproject components will be fixed to concrete plinths and most will be housed in buildings with at least some concrete structural elements. Most such structures will be constructed from reinforced concrete (RC), where steel reinforcing rods and bars are placed and attached by hand to create an interior skeleton for the foundations, walls, columns, plinths, etc, and heavy-duty metal and timber/plywood formwork is bolted around the outside to build a mould into which pre-mixed concrete is poured.

Once the concrete has set, the formwork is removed, and the concrete surface is finished by masons by hand if necessary. Some buildings, such as the pump station, facilities, etc., may be constructed from brick work, in which case this work will be done using standard house-building techniques. Since these works are confined to the boundary of identified sites, there is no direct or significant interference of construction work with the surrounding land use. However, construction dust, noise, use of local roads for transportation of construction material, waste, labour camps etc., will have negative impacts, which needs to be avoided or mitigated properly.

Sewers will be laid along almost all the roads. Lateral sewers collect sewage from households provided with house service connections (proposed in this project) will be laid in all streets and roads, the larger sewers that collect sewage from tertiary sewers and convey to pumping stations will be laid mostly on wider main roads. For all the Highways and Major road crossings, trenchless technology will be adopted.

Open cut trenching method of sewer laying involves trench excavation in the road, placing sewers in the trench, jointing and testing, and refilling with the excavated soil. Pipelines proposed are of two types, DWC (Double wall corrugated) and CI (Cast iron) pipes, up to 4.5mt depth and diameter up to 600mm DWC is adopted and beyond 600mm dia, and depth more than 4.5mts irrespective of diameter CI pipes are considered.

Earth work excavation will be undertaken by machine (backhoe excavator) and include danger lighting and using sight rails and barricades. The work will also be supplemented manually where there is no proper working area (e.g. very narrow streets) for the backhouse excavators. As trenches are deep (up to 5.5 m), there is risk of collapse of trenches and/or damage to surrounding buildings, safety risk to pedestrians and traffic. Necessary precautions such as bracing / shoring in the trench will be provided for The normal working hours will be 8 hours daily, the total duration of each stage depends on the soil condition and other local features. Excavated soil will be used for refilling the trench after placing the sewer and therefore residual soil after pipe laying and refilling is not significant and needs to be disposed safely.

Although sewer laying work involves quite simple techniques of civil work, the invasive nature of excavation in the urban area where there are a variety of human activities, will

result in impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are temporary and for short duration, however, needs to be mitigated.
UGSS proposed under this area is well developed urban pockets of Chennai. Except eastern part of ECR is, all are busy and packed, hence contract company needs to take all site safety, Environmental safe guard measures strictly also PPE (Personnel Protective Equipment) to all who are at site shall be provided.

Anticipated impacts during the construction phase are discussed below along with appropriate mitigation measures to avoid, minimize or mitigate those impacts to acceptable levels.

5.3.1. Sources of Materials

Significant amount of sand and coarse aggregate will be required for this project, which will be sourced from quarries. Quarries inevitably cause extensive physical changes; as construction materials are excavated from the ground, leaving large cavities, or levelling hillsides, etc. The physical damage caused by quarries is controlled by allowing them to operate within specific limited areas only, so the damage is restricted in extent and not allowed to spread indiscriminately. Contractor should, to the maximum extent possible, procure material from existing quarries. It will be the main contractor's responsibility to verify the suitability and legal status of all material sources and to obtain the approval of Department of Geology and Mining and local revenue administration, as required. The record should be maintained and made available for verification by CMWSSB as and when required.
The construction contractor will be required to:

- Obtain construction materials only from government approved quarries with prior approval of PIU.
- PIU to review, and ensure that proposed quarry sources have all necessary clearances/ permissions in place prior to approval.
- Contractor to submit to PIU on a monthly basis documentation on material obtained from each source (quarry/ borrow pit).
- No new borrow areas, quarries etc., shall be developed for the project.

5.3.2. Air Quality

Construction work, especially from earthwork activities, coupled with dry and windy working conditions, material and debris transport, and works along the public roads carrying significant traffic and has high potential to generate dust in an air.

Significant quantities of earthwork will be conducted in the subproject, spread all over the project area. Also, emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality. Anticipated impacts include dust and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons. Dust generation from construction work in individual and confined work sites lifting and pumping stations etc., will be mainly during the initial construction phase of earth work, as the site is confined, dust can be effectively controlled with common measures. Dust generation will be significant during sewer laying along the roads. Increase in dust/ particulate matter in ambient air is detrimental and may have adverse impacts on people and environment. To mitigate the impacts, construction contractors will be required to ensure followings for all construction works:

- Provide a dust screen (6 m high) around the construction sites of pumping and lifting stations, provide 2 m high barricades for the sewer works.

- Damp down the soil and any stockpiled material on site by water sprinkling. (water sprinkled 3-4 times a day - before the start of work, 1-2 times in between, and at the end of the day). when working in the roads there should permanently be one person responsible for directing when water sprinkling needs to take place to stop the dust moving
- Reduce the need to sprinkle water by stabilizing surface soils where loaders, support equipment and vehicles will operate by using water and maintain surface soils in a stabilized condition.
- Apply water prior to levelling or any other earth moving activity to keep the soil moist throughout the process.
- Cover the soil stocked at the sites with tarpaulins and surround by dust screens.
- Control access to work area, prevent unnecessary movement of vehicle, public trespassing into work areas; limiting soil disturbance will minimize dust generation
- Use tarpaulins to cover the loose material (soil, sand, aggregate etc.,) when transported by open trucks.
- Control dust generation while unloading the loose material (particularly aggregate, sand, soil) at the site by sprinkling water and unloading inside the barricaded area; minimize the drop height when moving the excavated soil
- Clean wheels and undercarriage of haul trucks prior to leaving construction site
- Ensure that all the construction equipment, machinery is fitted with pollution control devises, which are operating correctly, and have a valid pollution under control (PUC) certificate.
- No vehicles or plant to be left idling at site generators to be at placed maximum distance from properties

5.3.3. For sewer works

- Barricade the construction area using hard barricades (of 2 m height) on both sides.
- Initiate site clearance and excavation work only after barricading of the site is done.
- Confine all the material, excavated soil, debris, equipment, machinery (excavators, cranes etc.,) to the barricaded area.
- Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated disposal area.
- Undertake the work section wise: a 500 m section should be demarcated and barricaded; open up several such sections at a time, but care shall be taken to locate such sections in different zones.
- Conduct work sequentially - excavation, sewer laying, backfilling; testing section-wise (for a minimum length as possible) so that backfilling, stabilization of soil can be done.
- Remove the excavated soil of first section to the disposal site as the work progresses sequentially, by the time second section is excavated, the first section will be ready for back filling, use the freshly excavated soil for back filling, this will avoid stocking of material, and minimize the dust.
- Backfilled trench at any completed section after removal of barricading will be the main source of dust pollution. The traffic, pedestrian movement and wind will generate dust from backfilled section. Road restoration shall be undertaken immediately after successful testing of the section.

5.3.4. Immediate Road restoration after refilling the trench

Excavation and refilling activities disturb the top soil, and under the influence of wind, traffic, pedestrians, and other activities etc., produces dust. There is large potential to generate significant quantities of dust after refilling the trench, and prior to road relaying. It is a

common practice not to restore the road immediately after refilling the trench so as to allow sufficient time for the refilled material to stabilize naturally. Given the dry and windy conditions, and heavy traffic and other activities along the roads, the refilled trenches with loose top soil along the roads will generate maximum dust, and create very unhealthy conditions. Moreover, as the barricades/dust screens will removed after the trench is refilled, there will be absolutely nothing to control the dust generation.
Dust control activities like wetting of top soil will not be effective given the site conditions. It is therefore necessary to restore/relay the road surface immediately or take suitable steps to arrest the dust. Soil consolidation technique shall be used so that road can be restored immediately. Immediately consolidate the backfilled soil and restore the road surface, if immediate road restoration is not possible, provide a layer of plain cement concrete (PCC) of suitable mix on the backfilled trench so that dust generation, erosion is arrested and it will also provide a smooth riding surface for the traffic until the road is properly restored. Backfilled trench without any road restoration is a major source of dust.

5.3.5. Surface Water Quality

Run-off from stockpiled materials and chemicals from fuels and lubricants during construction works can contaminate water quality of the receiving water bodies and streams/rivers. Project area receives rainfall in southwest and northeast monsoon seasons, between June/July to November/December. The important water bodies such as Buckingham canal in the project area and plenty of small ponds and lakes. Hence It is important that runoff from the construction areas, which may contain silt and chemical traces do not enter these water bodies. Though impact will be temporary but needs to be mitigated and hence Construction contractor to ensure to implement necessary mitigation measures.
All earthworks be conducted during the dry season to prevent the problem of soil/silt run-off during rains.

- Avoid stockpiling of earth fill especially during the monsoon season; unless covered by tarpaulins or plastic sheet, do not stock earth/material close to water bodies (at least100 m)
- Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, only designated disposal areas shall be used.
- Install temporary silt traps, oil traps or sedimentation basins along the drainage leading to the water bodies;
- Place storage areas (with impermeable surface) for fuels and lubricants away from any drainage leading to water bodies, these should be at least 100 m away from water bodies and groundwater wells.
- Store fuel, construction chemicals etc., on an impervious floor, also avoid spillage by careful handling; provide spill collection sets for effective spill management.
- Dispose any wastes generated by construction activities in designated sites and conduct surface quality inspection according to the Environmental & Social Management Plan (ESMP).
- Construction of pipe bridges crossing of B' canals below the bed will have negative impact on water quality of B'canal and following precautionary measures to be taken.
- Conduct works in the water body (especially foundation work) only during no-flow season.
- Select a construction method which is less disruptive (e.g., precast type).
- Use spill traps / metal basins to avoid accidental spillage of construction chemicals, fuels, lubricants in the water body.
- Clean up the site immediately after construction is complete; construction debris, materials, etc., shall be cleared and pre project condition restored or improved.

5.3.6. Surface and Groundwater Quality

Another physical impact that is often associated with excavation is the effect on drainage and the local water table if groundwater and surface water collect in the voids. In the project area, groundwater table is fairly shallow, in adjacent of B'Canal water table is as high as 2m. Hence necessary care should be taken to prevent pollution of ground water during execution. In this direction contractor needs to take following measures:

- As far as possible control the entry of runoff from upper areas into the excavated pits, and work area by creation of temporary drains or bunds around the periphery of work area.
- Pump out the water collected in the pits / excavations to a temporary sedimentation pond dispose of only clarified water into drainage channels/streams after sedimentation in the temporary ponds.
- Avoid oil spillages, keep mechanical equipment and automobiles in good condition
- Consider safety aspects related to pit collapse due to accumulation of water.

5.3.7. Generation of Construction Wastes

Solid wastes generated from the construction activities are excess excavated earth (spoils), discarded construction materials, cement bags, wood, steel, oils, fuels, empty containers and other similar items. Domestic solid wastes may also be generated from the workers' camp. Improper waste management could cause odour and vermin problems, pollution and flow obstruction of nearby watercourses could negatively impact the landscape. The following mitigation measures to minimize impacts from waste generation shall be implemented by the contractor:

- Prepare and implement a Construction Waste (Spoils) Management Plan.
- As far as possible utilize the debris and excess soil in construction purpose, for example for raising the ground level or construction of access roads etc.
- Avoid stockpiling any excess spoils at the site for long time. Excess excavated soils should be disposed off to approved designated areas immediately.
- If disposal is required, the site shall be selected preferably from barren, infertile lands , sites should located away from residential areas, forests, water bodies and any other sensitive land uses.
- Domestic solid wastes should be properly segregated in biodegradable and non-biodegradable for collection and disposal to designated solid waste disposal site; create a compost pit (with impermeable bottom and sides) at workers camp sites for disposal of biodegradable waste; non-biodegradable / recyclable material shall be collected separately and sold in the local recycling material market.
- Residual and hazardous wastes such as oils, fuels, and lubricants shall be disposed off via licensed (by TNPCB) third parties.
- Prohibit burning of construction and/or domestic waste.
- Ensure that wastes are not haphazardly thrown in and around the project site, provide proper collection bins, and create awareness to use the dust bins, recycle waste material where possible.
- Conduct site clearance and restoration to original condition after the completion of construction work. PIU to ensure that site is properly restored prior to issuing of construction completion certificate.

5.3.8. Noise and Vibration Levels

All pumping stations, lifting stations and sewers are located within the town area. Sewer lines are spread over entire project area. All these sites are located within habitations, where there are houses, schools and hospitals, religious places and businesses. The sensitive receptors are the general population in these areas. Increase in noise level may be caused by excavation, particularly breaking of cement concrete or bitumen roads for laying of

sewers, operation of construction equipment, and the transportation of equipment, materials and people. Vibration generated from construction activity, for instance from the use of pneumatic drills, will have impact on nearby buildings. Trenches deeper than 2-3 m require removal of rocks (soft to hard), will generate heavy noise and vibration. This impact is negative short-term, and reversible by mitigation measures, hence the construction contractor needs to ensures followings.

- Plan activities in consultation with PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance, especially near schools and other sensitive receptors.
- Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable acoustic street barriers to minimize sound impact to surrounding sensitive receptor.
- Maintain maximum sound levels not exceeding 70 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s.
- Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity; if any building at risk, structural survey be completed prior to work, to provide baseline in case any issues from vibration, and if building is structurally unsound that measures taken to avoid any further damage.
- Horns should not be used unless it is necessary to warn other road users or animals.
- Consult local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as nights, religious and cultural festivals.

5.3.9. Accessibility and Traffic Disruptions

Excavation along and across the roads for laying of sewers, hauling of construction materials and operation of equipment on-site will cause traffic problems. Sewers are proposed along all the main roads and streets such as Old Mahabalipuram Road.All of the above roads are the arterial roads connects Chennai from east to west and north to south carrying huge traffic. These roads also centers of commercial activities. There are internal important roads within the project area connecting different parts of city. As the sewer lines are proposed to be laid within the road carriage way, it will disrupt the traffic in one-traffic lane. In the narrower roads, sewers will be laid in the center of the road, and therefore during the work traffic movement will be mostly disrupted. Works related to all the remaining components (lifting and pumping stations) will be confined to the selected sites, therefore there is no direct interference of these works with the traffic and accessibility.

The impacts due to vehicular movement and construction machinery can be minimized by using the designated routes for movement of heavy vehicles and machinery to avoid the soil compaction in areas other than the site. The transportation of construction material will be generally supplied in night when the traffic is minimum. Indicative traffic management plan given below will be updated prior to the diversion of traffic where required for the construction activities.

Hauling of construction material, equipment, construction waste, etc., to and from the work site may increase the road traffic on local roads. This will further inconvenience the local community and road users. Potential impact is negative but short term and reversible by mitigation measures.

5.3.10. For Excavation

Prepare a sewer work implementation plan and undertake the work accordingly, ensure that for each road where the work is being undertaken there is an alternative road for the traffic diversion, take up the work in sequential way so that public inconvenience is minimal, Plan

the sewer work in coordination with the traffic police, provide temporary diversions, where necessary with clear signage and effectively communicate with general public.

Avoiding conducting work in all roads in a colony at one go, it will render all roads unusable due to excavations at the same time, creating large scale inconvenience. Undertake the work section wise: a section should be demarcated and barricaded; open up several such sections at a time, but care shall be taken to locate such sections in different zones. Confine work areas in the road carriageway to the minimum possible extent, all the activities, including material and waste/surplus soil stocking should be confined to this area. Proper barricading should be provided, avoid material/surplus soil stocking in congested areas take action to immediately removed from site/ or brought to the as and when required.

Limit the width of trench excavation as much as possible by adopting best construction practices, adopt vertical cutting approach with proper shoring and bracing, this is especially to be practiced in narrow roads and deeper sewers, if they deep trenches are excavated with slopes, the roads may render completely unusable during the construction period. Leave spaces for access between mounds of soil to maintain access to the houses / properties, access to any house or property shall not be blocked completely, alternative arrangements, at least to maintain pedestrian access at all times to be provided.

Provide pedestrian access in all the locations; provide wooden/metal planks with safety rails over the open trenches at each house to maintain the access. Inform the affected local population in advance about the work schedule a week before, and a day before start of work. Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum. Keep the site free from all unnecessary obstructions.

Necessary care to be taken during excavation to protect all the property connections (water, gas, electrical, telecom, septic tanks etc.) to avoid inconvenience to the local residents and disruption to works.

Notify public by prior information notices, providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints. Provide information to the public through media newspapers and local cable television (TV) services. At work site, public information/caution boards shall be provided including contact for public complaints.

5.3.11. Hauling (material, waste/debris and equipment) activities

- Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites.
- Schedule transport and hauling activities during non-peak hours (peak hours 7 to 10 AM and 4 to 7 PM).
- Locate entry and exit points in areas where there is low potential for traffic congestion.
- Drive vehicles in a considerate manner.
- Notify affected public by public information notices, providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

5.3.12. Control dust generation

- Immediately consolidate the backfilled soil and restore the road surface, this will also avoid any business loss due to dust and access inconvenience of construction work.

- Employee best construction practices, speed up construction work with better equipment, increase workforce, etc., in the areas with predominantly commercial, and with sensitive features like hospitals, and schools.
- Consult businesses and institutions regarding operating hours and factoring this in work schedules.
- Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.

5.3.13. Socio-Economics

Sites for all projects components are carefully selected in government owned vacant lands and therefore there is no requirement for land acquisition or any resettlement. Blocking of access to the business / livelihood activities, especially during pipeline laying along the roads, may impact the income of households. However, given the alignment of pipeline within the road carriage way, and also the measures suggested for ensuring accessibility during sewer works, notable but temporary impact is envisaged. Some shops and other premises along the roads may lose business income if the access will be impeded by excavation of trenches, the presence of heavy vehicles and machinery, etc. Access disruption to hospitals, socio cultural places etc., will inconvenience public. Implementation of the following best construction measures will avoid the disturbance reduce the inconvenience and disturbance to the public.

- Inform all businesses and residents about the nature and duration of any work well in advance so that they can make necessary preparations.

- Do not block any access completely. Leave spaces for access between barricades/mounds of excavated soil and other stored materials and machinery, and providing footbridges so that people can crossover open trenches.

- Barricade the construction area and regulate movement of people and vehicles in the vicinity, and maintain the surroundings safely with proper direction boards, lighting and security personnel – people should feel safe to move around.

5.3.14. Occupational Health and Safety

Workers need to be mindful of the occupational hazards which can arise from working in confined areas such as trenches, working at heights, near the heavy equipment operating areas etc. Potential impacts are negative and long-term but reversible by mitigation measures. The construction contractor will be required to provide all at site with personnel protective equipment such as boots, Spectacles, Hand gloves Helmets and to follow all national, state and local labour laws. Develop and implement site-specific occupational health and safety (OHS) Plan, informed by OHS risk assessment seeking to avoid, minimize and mitigate risk, which shall include measures such as:

- safe and documented construction procedures to be followed for all site activities.
- Ensuring all workers are provided with and use personal protective equipment.
- OHS Training for all site personnel.
- Exclude public from the work sites.
- Documentation of work-related accidents.
- Follow International Standards such as the World Bank Group’s Environmental, Health and Safety Guidelines.
- Ensure that qualified first-aid is provided at all times. Equipped first-aid stations shall be easily accessible throughout the sites;
- Secure all installations from unauthorized intrusion and accident risks.

- Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers.
- Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted.
- Ensure the visibility of workers through their use of high visibility vests and other PPE when working in or walking through heavy equipment operating areas.
- Ensure moving equipment is outfitted with audible back-up alarms.
- Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate.
- Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.
- Provide supplies of potable drinking water.
- Provide clean eating areas where workers are not exposed to hazardous or noxious substances.

5.3.15. Community Health and Safety

- Sewers works and deep excavations along the roads and narrow streets, and hauling of equipment and vehicles have potential to create safety risks to the community. Deep excavations without any proper protection may endanger the close by buildings. Hazards posed to the public, specifically in high-pedestrian areas may include traffic accidents and vehicle collision with pedestrians. Potential impact is negative but short-term and reversible by mitigation measures. The construction contractor needs to ensure following during execution.
- Confine work areas, prevent public access to all areas where construction works are on-going through the use of barricading and security personnel.
- Attach warning signs, blinkers to the barricading to caution the public about the hazards associated with the works, and presence of deep excavation.
- Minimize the duration of time when the sewer trench is left open through careful planning; plan the work properly from excavation to refilling and road relaying.
- Control dust pollution – implement dust control measures as suggested under air quality section.
- Ensure appropriate and safe passage for pedestrians along the work sites.
- Provide road signs and flag persons to warn of on-going trenching activities.
- Restrict construction vehicle movements to defined access roads and demarcated working areas (unless in the event of an emergency).
- Enforce strict speed limit (10 - 20 kmph) for plying on unpaved roads, construction tracks.
- Provide temporary traffic control (e.g. flagmen) and signs where necessary to improve safety and smooth traffic flow.
- Where traffic is diverted around crossings, traffic control or careful selection of the exit from the working areas will be provided with the aim of ensuring that vehicles join the road in a safe manner.
- At sensitive locations particularly where there are schools and markets close to the road, awareness of safety issues will be raised through neighborhood awareness meetings
- All drivers and equipment operators will undergo safety training.

- Maintain regularly the construction equipment and vehicles; use manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

5.3.16. Construction Camps

Contractor may require setting up construction camps – for temporary storage of construction material Pipes, cement, steel, fixtures, fuel, lubricants etc.,) and stocking of surplus soil, and may also include separate living areas for migrant workers. The contractor will however be encouraged to engage local workers as much as possible. Operation of work camps can cause temporary air, noise and water pollution, and may become a source of conflicts, and unhealthy environment if not operated properly. Potential impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to ensure :

- Consult PIU before locating project offices, sheds, and construction plants.
- Select a camp site away from residential areas (at least 100m buffer shall be maintained) or locate the camp site within the existing facilities of City Corporation.
- Avoid tree cutting for setting up camp facilities.
- Provide a proper fencing/compound wall for camp sites. Camp site shall not be located near (100 m) water bodies, flood plains, flood prone/low lying areas, or any ecologically, socially, archeologically sensitive areas
- Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit.
- Ensure conditions of liveability at work camps are maintained at the highest standards possible at all times, living quarters and construction camps shall be provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation), thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., shall not be used as accommodation for workers.
- Camp shall be provided with proper drainage, there shall not be any water accumulation.
- Provide drinking water, water for other uses, and sanitation facilities for employees, drinking water should be regularly tested to confirm that drinking water standards are met.
- Prohibit employees from cutting of trees for firewood, contractor should provide cooking fuel (cooking gas) fire wood not allowed.
- Train employees in the storage and handling of materials which can potentially cause soil contamination
- Wastewater from the camps shall be disposed properly either into sewer system, if sewer system is not available, provide on-site sanitation with septic tank and soak pit arrangements (100 m away from surface water body or groundwater well).
- Recover used oil and lubricants and reuse or remove from the site.
- Manage solid waste according to the following preference hierarchy reuse, recycling and disposal to designated areas, provide a compost pit for bio degradable waste, and non-biodegradable / recyclable waste shall be collected and sold in local market.
- Remove all wreckage, rubbish, or temporary structures which are no longer required.
- At the completion of work, camp area shall be cleaned and restored to pre-project conditions, and submit report to PIU, PIU to review and approve camp clearance and closure of work site.

5.3.17. Operation and Maintenance Impacts

Operation and Maintenance of the sewerage system will be carried out by CMWSSB O&M wing. Operation will involve collection and conveyance of wastewater from houses to nearest lifting /pumping stations, operation of lifting / pumping stations to pump accumulated sewage main pumping stations, operation of main pumping stations to pump accumulated sewage to STP. Proposed project does not involve new STP and annexed with STPs already under operation. Sewage sludge contains harmful substances such as bacteria and pathogens, and nutrients like nitrogen, phosphates. Improper handling and disposal of the sludge will have adverse impacts on health and environment howevera proper sludge management is already happening in existing STPs..

5.3.18.Quality of Raw Sewage

As mentioned earlier,one of the critical aspects in STP operation is, change in raw sewage characteristics at inlet of STP may affect the process and output quality. The system is designed for municipal wastewater, which does not include industrial effluent. Characteristics of industrial effluent widely vary depending on the type of industry, and therefore disposal of effluent into sewers may greatly vary the inlet quality at STP, and will upset process and affect the efficiency, hence industrial effluents must not be allowed to system. Following measures are to be implemented:

- No wastewater from industrial premises (including domestic wastewater) shall be allowed to dispose into municipal sewers.
- Monitor regularly and ensure that there is no illegal discharge through Machine holes or inspection chambers; conduct public awareness programs; in coordination with TNPCB

Odour and Noise from Sewage lifting and pumping stations

- Various measures are such as green belt, high compound wall with climbers, so that air cant entrap in atmosphere, fragrant flower plants with land scaping and Mechanical type of odour control proposals are included in the design of these facilities giving utmost importance to odour and noise.
- Therefore it is anticipated there will not be any significant generation of odour or noise that will impact the surrounding households. Following measures are to be implemented during the operation:
- Strictly follow standard operating procedures/operational manual for operation and maintenance of lifting and pump stations.
- Ensure that operating staff is properly trained, and have clear understanding of odor issues vis a vis its relation with operational practices.
- Ensure that pumping cycles are properly followed; and there is no buildup of sewage beyond design volume in the wells.
- Conduct H2S monitoring (periodically at pumping stations and lifting stations).

5.3.19 Sewer network

During the system design life (15/30 years for mechanical/civil components) it shall not require major repairs or refurbishments and should operate with little maintenance beyond routine actions required to keep the equipment in working order. The stability and integrity of the system will be monitored periodically to detect any problems and allow remedial action if required. Any repairs will be small-scale involving manual, temporary, and short-term works involving regular checking and recording of performance for signs of deterioration, servicing and replacement of parts.

There are also certain environmental risks from the operation of the sewer system, most notably from leaking sewer pipes as untreated fecal material can damage human health and contaminate both soil and groundwater. It will be imperative therefore that the operating agency establishes a procedure to routinely check the operation and integrity of the sewers, and to implement rapid and effective repairs where necessary. There is an occupation health risk to workers engaged in sewer maintenance activities. Following measures should be followed:

- Regular cleaning of grit chambers and sewer lines to remove grease, grit, and other debris that may lead to sewer backups. Cleaning should be conducted more frequently for problem areas.
- Inspection of the condition of sanitary sewer structures and identifying areas that need repair or maintenance. Items to note may include cracked/deteriorating pipes, leaking joints or seals at Machine holes; frequent line blockages, lines that generally flow at or near capacity and suspected infiltration or exfiltration.
- Monitoring of sewer flow to identify potential inflows and outflows.
- Conduct repairs on priority based on the nature and severity of the problem. Immediate clearing of blockage or repair is warranted where an over flow is occurring or for urgent problems that may cause an imminent overflow (e.g. pump station failures, sewer line ruptures, or sewer line blockages)
- Maintain records, review previous sewer maintenance records to help identify “hot spots” or areas with frequent maintenance problems and locations of potential system failure, and conduct preventative maintenance, rehabilitation, or replacement of lines as needed;
- When a spill, leak, and/or overflow occurs, keep sewage from entering the storm drain system by covering or blocking storm drain inlets or by containing and diverting the sewage away from open channels and other storm drain facilities (using sandbags, inflatable dams, etc.). Remove the sewage using vacuum equipment or use other measures to divert it back to the sanitary sewer system.
- Prohibit/prevent disposal of wastewater/effluent from industrial units in the sewers; ensure regular checking to ensure no illegal entry of industrial wastewater into sewers
- Develop an Emergency Response System for the sewerage system leaks, burst and overflows, etc.
- Provide necessary health and safety training to the staff in sewer cleaning and maintenance
- Provide all necessary personnel protection equipment
- Do not conduct manual cleaning of sewers; for personnel engaged sewer maintenance work, there is a risk due to oxygen deficiency and harmful gaseous emissions (hydrogen sulfide, methane, etc.) provide for adequate equipment (including oxygen masks) for emergency use.

5.4 Social Impact Assessment

5.4.1 Project components and social impacts

Components wise social impacts are explained in detail in the following Table 21.

Area	Collection System (M)	MH (Nos)	Pumping Main(M)	LS (Nos)	SPS (Nos)	Name of the STP
Okkium Thoraipakkam	67351	2759	11090	3	6	1. Shollinganallur 2. Perungudi
Description	The collection system comprises of laying of sewer line with machine holes for every 30m. The line will be laid in the middle of the road by cutting open the black to portions.	The MHs are having provision for house service connections. Each MH will be able to connect five houses on either side	Pumping main with varying size (dia) (250mm to 750mm) is proposed. The pumping mains will be laid in the berm of the road within the carriage width of the ROW.	1. CTS road 2. Pandian Salai 3. VPG Avenue	1. Sri Sai Nagar 2. Chandrasekaran avenue 3. Aaligandeswarar Nagar 4. Solaiama Nagar 5. Sakthi Nagar 6. Mettukuppam Foundry Salai	It is proposed to convey the collected sewage to the two existing STPs. One is located at Sholinganallur and second is in Perungudi.
Social Impacts	The sewer line will be laid in the roads under the control of Greater Chennai Corporation. There are 12 potential temporary economic impact	The MHs will be constructed in the middle of the road. Hence there is no permanent or temporary resettlement impacts.	The land use of the project area is mostly residential. Hence laying of pumping main is devoid of permanent and temporary resettlement impacts.	The above sites are free from encumbrances and permanent or temporary resettlement impacts are not envisaged	The above sites are free from encumbrances and permanent or temporary resettlement impacts are not envisaged	The collected sewage is disposed into the existing STPs for treatment and disposal. Hence no permanent or temporary involuntary impacts.
Risk Assessment	Moderate Risk	Low Risk	Low Risk	Low Risk	Low Risk	Low Risk

Table 21: Project Components and Social Impacts Matrix

5.4.2 Social Screening Survey

The social survey was carried out on 21-10-2022 to identify the potential temporary economic impacts in the project area. As per the ECMF entitlement matrix, the potential temporary economic impacts are compensated for 7 days with notified minimum wage of Rs. 643 per day. The total of Rs. 54,012/- shall be given for potential temporary economic impacts. The survey alignment, data analysis, cut-off date and photographs are provided in the Annexure 10.

5.4.3 Awareness about the project

The respondents are well aware about the project, its purpose to provide sewer line connection, impacts, compensation, etc. The Potential Temporary Economic Impact's and other stakeholders from study area were receptive for the proposed project. The stakeholder engagement plan (SEP) is given in the Annexure. Further, the pictures of Potential Temporary Economic Impacts identified and consultations held with them are given in Annexure.

5.5 Pumping Stations and Lift Stations

Six pumping stations are proposed to pump the collected sewage to the existing STP's namely Sholinganallur and Perungudi for this project. The details of each of the pumping station is summarised below. Typical specs of the pumping station comprises of two wells with varying dia, interconnecting pipes, pumping arrangements, odour control mechanism, grit pits pumping room, transformer yard, inlet and outlet pipes, compound wall on all the four sides, tree plantation etc. This is confined to a single site. **There is no social impacts in this site.**

5.5.1 SPS -1 @ Sri Sai Nagar

The main pumping station is proposed on Sri Sai Nagar. The extent of land is 300 sq.m and the site is classified as Open Space Reserve Land (OSR) and under the possession of Greater Chennai Corporation.

The site is having one Over Head Tank (OHT) maintained by CMWSSB. This existing OHT is proposed to be dismantled after commissioning of comprehensive WSS. The site is free from encumbrances. Necessary No objection Certificate is received from Greater Chennai Corporation for this site (refer annexure 3).

The SPS site is located within park in the habituated area surrounded by Residential buildings on one side and Institutional building on other side with the road access from 2nd main road. The odour control mechanism with compound wall on all the four sides, including tree plantation provisions are proposed. **There is no social impacts in this site.**

5.5.2 SPS -2 @ Chandrasekaran avenue

The pumping station is proposed on Chandrasekaran Avenue. The extent of land is 300 sq.m and the site is classified as Open Space Reserve Land (OSR) and under the possession of Greater Chennai Corporation. The site is having one Over Head Tank (OHT) maintained by CMWSSB. This existing OHT is proposed to be dismantled after commissioning of comprehensive WSS. The site is free from encumbrances. Necessary No objection Certificate is received from Greater Chennai Corporation for this site (refer Annexure 3).

The SPS site is located within park in the habituated area surrounded by Residential buildings on one side and Greater Chennai corporation office on the other side with the road access from 4th Cross Street. The odour control mechanism with compound wall on all the four sides, including tree plantation provisions are proposed. **There is no social impacts in this site.**

5.5.3 SPS-3 @ Aaligandeswarar Nagar

The pumping station is proposed on Aaligandeswarar Nagar. The extent of land is 900 sq.m and the site is classified Revenue Land and under the possession of Greater Chennai Corporation.The site is having one Over Head Tank (OHT) maintained by CMWSSB. This existing OHT is proposed to be dismantled after commissioning of comprehensive WSS. Necessary No objection Certificate is awaited for this site (refer annexure 3). The SPS site is located within park in the habituated area surrounded by Residential buildings on one side, vacant land another side, road access from Aaligandeswararnagar main road. The odour control mechanism with compound wall on all the four sides, including tree plantation provisions are proposed. **There is no social impact in this site.**

5.5.4 SPS-4 @ Solaiama Nagar

The pumping station is proposed on Solaiamma Nagar. The extent of land is 300 sq.m and the site is classified Revenue Land and under the possession of Greater Chennai Corporation with part has been used as burial ground. The site is having one Over Head Tank (OHT) maintained by CMWSSB. This existing OHT is proposed to be dismantled after commissioning of comprehensive WSS. Necessary No objection Certificate is awaited for this site (refer annexure 3). The SPS site is located within park in the habituated area surrounded by Residential buildings, vacant land another side, road access from Raja nagar 6th street. The odour control mechanism with compound wall on all the four sides, including tree plantation provisions are proposed. **There is no social impact in this site.**

5.5.5 SPS-5 @ Sakthi Nagar

The pumping station is proposed on Sakthi Nagar. The extent of land is 14000 sq.m and the site is classified tharisu and under the possession of CMWSSB. Necessary No objection Certificate is received for this site (refer annexure 3). The SPS site is located in the habituated area surrounded by Residential buildings, Commercial buildings, vacant land on another side, road access from Arihant Road. The odour control mechanism with compound wall on all the four sides, including tree plantation provisions are proposed. **There is no social impact in this site.**

5.5.6 SPS-6 @ Mettukuppam Foundry Salai

The pumping station is proposed on Mettukuppam Foundry Salai. The extent of land 540 sq.m and the site is classified Panchayat Land and under the possession of CMWSSB. Necessary No objection Certificate is received for this site (refer annexure 3). The SPS site is located in the habituated area surrounded by Residential buildings, vacant land on another side, road access from Industrial Estate road. The odour control mechanism with compound wall on all the four sides, including tree plantation provisions are proposed. **There is no social impact in this site.**

5.5.7 LS-1@CTS road

The lift stations will be provided in the middle of the road and covered, flushed with road and a power control kiosk will be kept in the road side. A lift station typically will have one enlarged machine hole with diameter limited to 2.5m with pumping arrangements, and one control kiosk. **There is no social impact in this site.**

5.5.8 LS-2 @ Pandian Salai

The lift stations will be provided in the middle of the road and covered, flushed with road and a power control kiosk will be kept in the road side. A lift station typically will have one enlarged machine hole with diameter limited to 2.5m with pumping arrangements, and one control kiosk. **There is no social impact in this site**.

5.5.9 LS-3 @ VPG Avenue

The Lift station is proposed on VPG Avenue. The extent of land is 150 sq.m and the site under the possession of CMWSSB. The site is having one Over Head Tank (OHT) maintained by CMWSSB. This existing OHT is proposed to be dismantled after commissioning of comprehensive WSS. A lift station typically will have one enlarged machine hole with diameter limited to 2.5m with pumping arrangements, and one control kiosk. **There is no social impact in this site**

All the above sites are free from encumbrances and owned by Government agencies/departments. The land records are provided in Annexure 3.

5.6 Conclusion

However, if temporary or permanent resettlement impacts are identified in addition to the potential temporary economic impacts identified, during project implementation, the implementing agency will prepare a Resettlement Plan/ update ESIA as per the updated ECSMF and compensate the Project Affected Person(PAP) based on the entitlement matrix set out in the ECSMF.

6.ANALYSIS OF ALTERNATIVES

The present proposal consists of providing comprehensive sewerage system covering an area of 6.04 sq. km for 67.35 Km length of Collection System, which consists of 9 nos. of SPS/Lift stations and pumping mains for a length of 9.81Km to convey the sewage to the nearest existing Sewage Treatment Plant of CMWSSB.

6.1 Technology Alternatives

A comparison of Technology alternatives to the above proposal is summarized as below:

6.1.1 Decentralised System

By this system, pockets of area (zoning) have to be considered for providing UGSS in a decentralized way, which will have the following disadvantages:

- Not cost effective.
- Environmental impact is more by considering the small area in which more number of Pumping Station and Treatment Plant has to be considered in the midst of the Residential area.
- Period of completion cannot be scheduled in a comprehensive way as each pocket (zone) will be started in a different time frame.

6.1.2 Septage Management:

By this system, each household will have a separate septic tank for collection of sewage individually and it has to be decanted to the nearest Pumping Station/Treatment Plant in a definite time accordingly to cycle their individual capacity, which will have the following disadvantages against the proposal of comprehensive Sewerage System considered in this project.
The goal of:

- Eradication of open defecation cannot be achieved.
- Providing sanitation to all with the service level benchmark of 100% cannot be achieved holistically.
- Sewerage facilities on par with the erstwhile Chennai City cannot be achieved.
- Better platform for improved quality of living, development and growth of project area (Okkium Thoraipakkam) and the surrounding area cannot be established.
- Most importantly, every Citizen of the Nation to achieve fundamental right of access to the basic civic amenities/facilities cannot be achieved.

6.1.3 Infrastructure Alternatives

The sites for the construction of Pumping Station had been carefully chosen based on the availability (ownership) of land, topography for the construction of 9 nos. of SPS/LS considered in this proposal. It is also ascertained that the site is chosen so that Land alienation process is very less. As such, the site location chosen below is the best alternative considering all the factors including Social and Economic factors.

Table 22: Location & Size of land required for Construction of Pumping Station

S. No	LS / SPS	P.S. Site	Extent of land (Sq. m)	Survey No.	Classification	Ownership of land	Remarks
1.	SPS01	Sri Sai Nagar	300	18 & 19	OSR	Greater Chennai Corporation	NOC obtained
2.	SPS02	Chandra Sekaran Avenue	300	253	OSR	Greater Chennai Corporation	NOC obtained. However, public is opposing the proposed construction at this site.
3.	SPS03	Aaligandeswarar Nagar	900	205/2B	ULC	Revenue	Already OHT is available in site. Joint inspection made on 04.03.202 Enter upon permission awaited
4.	SPS04	Soolaima Nagar	450	184/1	Meikal	Revenue	Already OHT is available in site. Part of land used as burial ground by GCC. NOC rejected. It is being pursued.
5.	SPS05	Sakthi Nagar	14000	402/1B, 405 / 8A3	Punjai Tharisu	CMWSSB	NOC obtained
6.	SPS06	Mettukuppam foundry Salai	540	106/2	Panchayat Land	CMWSSB	NOC obtained
7.	LS01	Near CTS	Road Side	-	-	Greater Chennai Corporation	-
8.	LS02	Pandian Salai	Road Side	-	-	Greater Chennai Corporation	-
9.	LS03	VGP Nagar (OHT site)	50	113	GCC land	CMWSSB	Existing OHT

6.2 Conclusion

On analyzing the technology alternatives, site alternatives as stated above, considering all other factors such as taking into account of sewerage facilities already provided in the Okkium Thoraipakkam area, i.e., TNUHDB tenements, collection system already laid on both the sides of OMR for a length of about 3280 m and Balavinayagar Nagar for a length of 7184 m has also been considered for designing the collection system, it can be very well concluded that providing comprehensive UGSS for Okkium Thoraipakkam area as per above proposal is the best.

7. ENVIRONMENTAL AND SOCIAL STANDARDS

7.1 Applicable Environmental and Social Standards

Relevance of the 10 ESS standards is provided below.

Table 23: ESS Standards

Environmental and Social Standards	Relevance to this project & actions
ESS1 Assessment and Management of Environmental and Social Risks and Impacts	This project involves construction of manholes, pumping stations, laying of sewer line, pumping mains, transmission mains and also involves project utility sites. There are no sensitive or protected environmental features within the project area. The impacts due to the project construction As per National regulations the project needs CRZ clearance and requires ESIA. Hence ESIA and ESMP are prepared. ESS1 is relevant for this sub-project
ESS2 Labor and Working Conditions	Labours including migrant labour, local labours according to the skill sets will be expected to be engaged. ESS2 is relevant for this project. As per ESS2, LMP is to be prepared by the contractor. The LMP will describe the findings of the ESIA, national labor policies and practices, the types of project workers that are likely to be involved, worker influx, the procedures to apply ESS2, and a grievance mechanism. ESS2 is relevant for this sub-project.
ESS3 Resource Efficiency and Pollution Prevention and Management	There will be Air, Noise, Water pollution during the implementation and which will be managed through ECSMF. ESS3 is relevant for this sub-project.
ESS4 Community Health and Safety	Risk to community health and safety is considered as minor and manageable through ESMP. During implementation pedestrian, vehicles, labour working in the trench excavation works and laying of sewer lines and appropriate safety measures will be included in the ESMP. ESS4 is relevant for this sub-project.
ESS5 Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	There is no land acquisition, restricts on land use and involuntary resettlement requirements. Sewer mains will be laid in the centre of public roads, within the road carriage way, and pumping/lifting stations will be constructed on identified government owned vacant lands. Temporary restrictions in movement may be there due to laying of sewer mains. There may be potential temporary economic impacts to hawkers, vendors, while laying of

Environmental and Social Standards	Relevance to this project & actions
	sewer lines GRM to be in place prior to starting of the works as per updated ECSMF. ESS5 is relevant for this sub-project.
ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	The project caters to the developed urban area and project sites are located within the project area adjacent to developments, the project activities will not have impacts on natural habitat and biodiversity. Pallikaranai Marsh which is a wetland is outside the project area and not relevant. ESS6 is not relevant to this sub-project.
ESS7 Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	ESS7 is not relevant to this sub-project.
ESS8 Cultural Heritage	The project area does not have any protected site or monuments of cultural importance. However, chance find procedures have been included as part of the ESMP for compliance during project implementation. Hence ESS8 is not relevant to this sub-project.
ESS9 Financial Intermediaries	ESS9 is not relevant to this sub-project.
ESS10 Stakeholder Engagement and Information Disclosure	Stakeholder Engagement Plan is prepared and included in the ESIA. This ESS10 is applicable to the sub-project.

The relevance of Environmental Social Standards 1 to 10 of the World Bank ESF is explained in the above Table. The Subproject is likely to have numerous positive impacts on the environment and public health. No sewage treatment facility is included in the subproject as it is proposed to utilize the available capacity of existing sewage treatment plant (STP). According to technical studies, the existing STPs at Sholinganallur and Perungudi will be utilized for treating the sewage generated from the sub-project area and their existing capacities are also found to be adequate. Further, the STPs is functioning normally, and treating the sewage to discharge standards specified by Tamil Nadu Pollution Control Board (TNPCB).

Proper functioning of STPs is critical for the sustainability of new sewer infrastructure and realization of intended purpose (removing the human waste from those areas served by the network rapidly and treated to an acceptable standard) and benefits (improved environmental conditions, public health, etc.). All the above STPs are equipped with inbuilt lab facilities and the quality parameters are analysed daily in addition to the quality parameters monitored by TNPCB on monthly basis. Sludge generated from STPs is used to generate bio gas (methane CH4) by way of sludge digestion, which then used as fuel to generate electricity. The generated electricity is used to operate the STPs. The above process reduces the carbon emissions to the atmosphere by way of methane capture from the raw sludge. The digested sludge is then fed into mechanical centrifuge for dewatering

the sludge. The dewatered sludge cakes is then collected and disposed into the corporation dump site.

In order to further improve and enhance the operation of STPs, CMWSSB has taken various initiatives and appointed consultants to study the existing sludge management system at the STPs, and suggest reuse options. This will further improve the efficiency of the existing sewage treatment systems. As the subproject utilizes existing STPs that are functioning properly, no adverse impacts are envisaged.

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

8.1 Objectives

The ESMP is developed to mitigate the adverse E&S risks and impacts of sewage water line project at Okkium Thoraipakkam area. It explains the mitigation measures, responsibility, implementation phase, monitoring method, monitoring indicators and frequency during pre-construction, construction, operation and decommissioning phases. The Contractor supervised by the PIU is mainly responsible for the implementation of plans during the project life cycle. The project specific ESMP is provided in below the Table 24.

Table 24: Environmental and Social Management Plan

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
Pre-construction phase							
1.1	Engineering design and alternative analysis	Ensure that the investigation and analysis of alternative engineering design and technologies, and the route location of the proposed sewer line network (the project) cause minimum environmental and social risk and impact during the project cycle; Ensure the activities like trenching, excavation, pipes joint welding result into minimum or no loss to terrestrial ecosystem;	PIU/PMC, Contractor	Design/ Pre- construction	Review the performance of design and technology and route decided for the project; and Consult the experts and learn from the experiences gained from such projects elsewhere	Minimum E&S risk and impact; Minimum or no impact on local ecology, water bodies and forest; Minimum impact on land and livelihood of local communities; and cost effective and	Periodically

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		and Alternatives in terms of cost effectiveness, low maintenance, minimum and area for pipeline route selected along the existing roads for the project will cause minimum E&S impact. Construction of compound wall around pumping stations, chain-link mesh above with climbers and creepers are proposed to act as screen. Tree cover (depending upon space availability) along the compound wall is proposed as they are good absorbers of Sulphur dioxide. Trees, shrubs having dense foliage with a large surface area fits requirements, because leaves absorb pollutants, evergreen trees are found to be more				O&M efficient.	

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		effective, and follow mentioned species are proposed. Provide mechanical odour control equipments in the pumping stations and lifting station to mitigate odour nuisance.					
1.2	Utility relocation	Identify the common utilities to be affected such as telephone cables, electric cables, electric poles, water pipelines, public water taps, etc; and Seek prior approval and inform the concerned agencies for utilities shifting before construction starts.	PIU /PMC, Contractor/ Authority of concerned utilities	Preconstruction phase	Review detailed layout plan and site inspection	Utilities shifted in time where necessary	One time
1.3	Permits and approvals	Obtain all permits and approvals required for E&S aspects during pre-construction, construction, operation and decommissioning phases. Ensure that all necessary approvals for construction to be obtained by contractor	PIU /PMC, Contractor Contractor	Before construction commences	Keep record of all permit, approvals and authorizations	Permits and approvals are available	One to two times

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		like labour licence / labour insurance are obtained before start of construction.					
1.4	Source of Materials	Obtain construction materials only from government approved quarries with prior approval of PIU. PIU to review, and ensure that proposed quarry sources have all necessary clearances/ permissions in place prior to approval. Contractor to submit to PIU on a monthly basis documentation on material obtained from each sources (quarry/ borrow pit) No new borrow areas, quarries etc., shall be developed for the project;	PIU /PMC, Contractor	Pre-Construction and Construction Phase	Records, approvals	Approvals available	Periodically
1.5	Material storage and portable office cabin	Storing the pipeline fittings and associated materials; Establish a suitable place for site camp at the start	Contractor/ CMWSSB/ PMC	Pre- construction	Site inspection	Location and its access; and Basic facilities and civic	Semi-annually

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		of the civil works, which will allow for site offices in portable cabin.				amenities.	
1.6	Labour accommodation and facilities	Identify the suitable building in terms of location, sufficient area, access, security, basic amenities, etc. Follow all relevant provisions of the Contract Labour (Regulation and Abolition) Act, 1970, IFC guidelines, the Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act,1996, ILO convention 62-Safety provisions (Building) Convention and applicable laws for rented labour accommodation; The location, layout and basic facility provision for labour accommodation will be reviewed by the Convenor and suggestions to be communicated to the contractor prior to the	Contractor	During Pre- construction	Visual inspection; Consultations with labour, and local communities nearby; Site inspection; Facilities made available; Type of illness and its causes; and Discussions about the level of health awareness and safety precautions taken by the workers while working on the work site.	All the facilities available as per law and standards; Assess the satisfaction level of labourers; Cordial relation between labour and local communities; Easy access of first-aid box with required medicine and accessories at each working site, labour accommodation, labour and office to	Everyday

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		construction; Maintain necessary living accommodation and ancillary facilities in functional and hygienic conditions; Provide adequate number of toilets, bathing area, kitchen, safe fuel/ LPG for cooking and uncontaminated water for drinking, cooking and washing; Prohibit employees from cutting of trees for firewood; fire wood not allowed; Labour accommodation and temporary shade near work sites shall provide protection from heat, rain, flooding, insects, snakes and mosquitoes. It should have adequate provisions for emergency such as fire safety, security, etc;				workers all the time; and Arrangement made with the Doctors at then nearest government health and medical center/ private clinic.	

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		Adequate healthcare is to be provided for the workforce; Ensure adequate water supply in all toilets and urinals; Provide separate toilets/ bathrooms for women laborers and shall be screened from those for men (marked in vernacular language. Provide first aid medical kit at labour accommodation, temporary labour shed and working site; train the labour for usage of items in injury, emergency, coordinate with nearest government and private medical centers for the medical services, display the contact number of medical doctor(s) and keep a vehicle for emergency travel all the time; As per provisions of WHO and MOHFW					

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		guidelines of Covid-19, sanitizer, soap, mask, etc. should be made available in sufficient quantity and its use by the workers mandatorily and maintain social distancing all the time; The contractor will provide garbage bins in the camps and ensure that these are regularly emptied and disposed off in co-ordination with the CMWSSB / GCC. Ensure medical tests and treatment of Covid-19 positive cases immediately; and Maintain the required data and documents at site and regularly submit the compliance report to the PIU. Contractor to prepare and submit the Labour Management Plan to the project engineer.					
1.7	Public	Ensure timely and fully	PIU/PMC,	Pre- construction phase	Consultation	Methods	One time

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
	disclosure	project information dissemination through distribution of prior notice, pamphlet in local language, oral communication, meetings, websites, etc.	Contractor		with potential temporary economic impacts and other stakeholders	used for public disclosure; and Project awareness.	
1.8	Grievances redressal system	Establish the efficient grievance redressal mechanism and accordingly constitute the grievance redressal committee (GRC) as outlined in the ESIA project level with representatives of all the stakeholders as members, including women and vulnerable groups of local communities; Ensure the wider publicity of procedure, functioning and availability of GRC since the inception of the project; All the grievances received shall be acknowledged and proper recording and	CMWSSB /PMC, Contractor	Project life cycle	Review the proceeding and minutes of meetings; and Consultations with the members of GRC.	GRC established; GRC meetings held; Number of cases received and resolved; Decision taken with in a timeframe; and Court case filed or with drawn.	Monthly or as required

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		tracking should be carried out; GRC will adjudicate the complaints in 6-8 weeks depending upon the severity of case; Convenor will be the coordinator for organizing GRC meetings as required, writing the proceedings, minutes of meeting, informing the aggrieved party about the decision of GRC, etc;					
1.9	Sensitive Areas	The sensitive areas like Schools, hospitals to be provided with suitable noise barriers and safety measures, prior to the start of work in order to minimize the dust and noise impacts due to vehicle movement during construction and their effectiveness to be checked.	PIU /PMC, Contractor	Pre- construction phase	Site inspection	Location and its access; and Basic facilities and civic amenities.	Periodically
Construction and operation phases							
2.1	Labour	Contractor shall prepare	Contractor,	Construction phase	Review site	Number and	Periodically

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
	mobilizatio n	a Labour Management Plan which shall be reviewed by the Engineer incharge of PIU and approved. Accordingly, mobilize the labour on worksite for the laying of sewer line, machine hole, chambers and construction of pumping stations, lift stations and control rooms if any.	PMC/PIU		management and labourplan; and Site inspection	date of labourmobiliz ation; and Date of starting works.	
2.2	Appointme nt and Mobilizatio n of Environme nt & Safety Officer	The contractor will appoint qualified and experienced Environment & Safety Officer (ESO), who will be mobilized prior to start of works. ESO will dedicatedly work and ensure implementation of Environmental Management Plan including Occupational, Health and Safety measures during the project implementation.	Contractor	Pre-Construction Phase	Review reports and records	No compliance at site	One time
2.3.	Site clearance, Jungle clearance,	Identify the number of trees that will be affected with girth size and species type. Avoid tree	Contractor, PIU/PMC/CMWSS B	Construction phase	Site Inspection by PMC, PIU officials.	No tree cutting Minimum vegetation	Monthly

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
	Tree cutting, etc,.	cutting and loss of vegetation, shrubs, grasses, etc. to the maximum extent possible; Trees where necessary shall be removed from the construction site before commencement of construction with prior permission from the concern department and other authority as applicable; Compensatory plantation for every tree cut by way of re-plantation at ten times the trees cut; Growth and survival of trees planted shall be ensured and monitoring should be conducted at least for 3 years. Survival rate of plants shall be reported to the CMWSSB on monthly basis; Contractor shall develop plantation program for the site;				loss; Number and species of trees cut and replanted; and Survival of number and species of trees planted.	

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		Greenbelt will be developed around the site.					
2.4.	Site preparation	Disturbance to land surface contours to be kept to minimum; Maintaining the natural drainage pattern existing onsite; Adequate drains and slopes to be laid across the proposed project site prior to start of excavation work to ensure adequate cross drainage; and Ensure that the earmarked operational area for laying of pipeline and pumping house is barricaded with specific access (entry and exit) points. Barricading of the earmarked sites, besides the safety, will limit the disturbances or construction impacts to	Contractor, PIU/PMC	Beginning of construction	Site inspection	Natural drainage maintained; and Minimum excavation for drainage and levelling	One time and periodically

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		the adjacent areas within the premises. Necessary precautions such as bracing / shoring in the trench will be provided for trenches of more than 1.2 m deep or as required based on site conditions.					
2.5	Site Camp	Locate the suitable place for site camp at the start of civil works for the labours constructing sewer line/ pumping station at a place approved by the PIU; Provide water and/or other facilities at the site camp; Establish a suitable site office in portable cabin at the start of the civil works in the land provided at pumping station; and Designate the area beyond the boundary of the site as No-Go areas for all personnel on site.	Contractor, PIU/PMC	Prior to start of construction	Review approved site camp and site office layout; and Site inspection	Approved site plan layout; and Area outside the site camp and site office designated as No-go area.	Once

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		No vehicles, machinery, materials and people shall be permitted in the No-Go area at any time without the permission. Include the above in the LMP.					
2.6.	Barricading working site	Ensure that the construction site should be barricaded at all time with adequate marking, flags, reflectors etc. to isolate it from other operating areas; and Hard Barricade the pipeline route and identified construction areas at pumping station prior to construction activities.	Contractor	Prior to start of construction	Site inspection	Proper barricading in place; and Accident or casualty reported	One time
2.7	Water lines and drains	Adequate precautions should be taken while laying the sewer line to avoid the possibility of damage of existing water supply lines; and Avoid any damage to storm water drains	Contractor	During construction	Site inspection	Leakage of water	Regularly
2.8.	Stakeholder consultatio	Under take detailed mapping and analysis of key stakeholders. Based	Contractor/ PIU/PMC	Construction phase	Consultations with local communities,	Awareness level of stakeholders,	Regularly

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
	ns	on the stakeholder analysis, stakeholder engagement plan is prepared that will be updated as required; Ensure that stakeholder including impacted persons are consulted and made aware about the project's purpose, risks/ impacts, mitigation measures and time-frame; and Maintain the records and documentation of the procedure followed and the output of stakeholder engagement.			beneficiaries,potential temporary economic impacts and other stakeholders	particularly the local communities, beneficiaries of the proposed sewage water supply; and Perception of local communities, Potential Temporary economic Impacts about the project and its impact and mitigation measures.	
2.9.	Traffic management	Route for use by construction traffic with in site to be planned with proper signage, flagman, barriers and safety to minimize encountering of workers with vehicles as per National Road Safety Policy 2010. Route for movement of heavy	Contractor,PIU/ PMC	Construction phases	Review traffic management plan; and Site inspection	Implementation of traffic management plan adequately; Number of complaints received; and Incidence of accidents	

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		machinery shall be designated to avoid the soil compaction in other areas; All vehicles deployed at site shall be certified for pollution under control (PUC), undertake regular maintenance of vehicles; Transportation of construction material will be generally scheduled in night when the traffic is minimum; Holding area shall be provided within the site for vehicles waiting to deliver loads at site to avoid queuing outside the site; Ensure that the vehicles follow speed norms of the traffic department; and Investigate and respond to complaints about traffic.					
2.1	Constructio	Modern machineries	Contractor, PIU/	Construction phase	Review the	Noise level	

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
0	n material and machinery	such as JCBs, porcelain, road roller, etc. shall be used to increase work efficiency and minimize the construction period; Ensure that material transported is properly covered with Tarpaulin, etc. Schedule material deliveries after daylight hours; and Identify and repair minor leaks and prevent machineries/equipment failures.	PMC		material procurement detail; and Site inspection	and working of heavy machineries in order; and Construction material and its transportatio n follow the norms.	
2.11.	Constructio n material storage	Ready mix concrete (RMC) will be outsourced and contractor shall identify designated covered area for storage of construction material such as pipeline fittings, etc. with proper marking and measures to avoid dust emissions; Construction material stored in open shall be covered in order to avoid	Contractor, PIU/PMC	Construction phase	Site inspection; and Review the material record maintained.	Clean and organized storage site; and Incidence of injury in loading, unloading and handling the material.	Periodically

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		wind-blown dust emissions; Ensure and maintain record of proper stacking, loading and unloading of material and provide sufficient space for the movement of heavy vehicles inside the yard; Ensure handling the construction material safely by the labour;					
2.12.	Construction works (concrete, Cement, etc.)	Use ready-mix concrete outsourced for the works on pumping station and lift station site and construction of machine holes and chambers to the maximum extent possible; and If required, ensure that cement is mixed on mortar boards and not directly on the ground unless unavoidable.	Contractor	Construction phase	Site inspection	Incidence of mixing concrete on working site; Visible concrete on site; and Contamination of water and soil.	Regularly
2.13.	Top soil protection	Topsoil removed prior to commencement of construction activities shall be stored (stockpile no higher than 2 meter)	Contractor, PIU/PMC	Construction phase	Site inspection; and Assessment of disturbed	Incidence of erosion; Storage and uses of	Regularly

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		separately and reused for backfilling and landscape development with in the project area; Keep topsoil stockpiles in an area protected from the wind and water; Land disturbance shall be restricted to the footprint of the project components and remaining area will be kept undisturbed to the extent possible; Ensure suitable control of run-off during the construction phase to prevent erosion of topsoil on adjacent land and undeveloped portions of the site; and All excavations should be closed at the earliest before the start of rainy season.			(project components construction area) and undisturbed area.	topsoil; and Topsoil erosion on adjacent land.	
2.14	Noise from vehicles and machinerie	Servicing of all vehicles, machinery, power generating equipment shall be done regularly	Contractor, PIU/PMC	Construction phases	Review of monitoring records	Level of noise generated; and	Regularly

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
	s	as per the manufacturer's guidelines and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced; All machines to be used shall conform to the relevant Indian Standards (IS), will be free from patent defect, kept in good working order, properly maintained and inspected regularly; Acoustic enclosure measures will be provided during operation to reduce noise level of machinery and DG set; Construction activities shall be carried out in a planned manner restricting high noise generating construction activities only during daytime;			Random Noise measurements	Number of registered complaints	

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		Contractor will maintain the proper record for all the construction vehicles which shall have the valid fitness certificate, NOC, insurance, etc. Ensure noise level in the residential and industrial areas with in the permissible limit; Regular monitoring of noise shall be conducted at site during the operations of machines and equipment; and Technicians/mechanics working on noise generating machineries will use PPEs such as ear plug, muffler, etc.					
2.15.	Dust emissions	Avoid clearing of vegetation until absolutely necessary; Trucks carrying construction material shall be adequately covered with tarpaulin sheet to avoid the dust pollution and the material spillage;	Contractor	Construction phase	Site inspection; Incidence of dust plumes; and Review of dust emission control measures.	Emission from construction site; Incidence of dust plumes observed; Dust mitigation measures	Regularly

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		DG set shall have adequate stack height as per TNPCB requirement; Dust levels will be controlled, through spraying of water from water tankers fitted with pressurized fine spray; Maintain all generators, vehicles, vessels and other equipment in good working order to minimise exhaust fumes; and Locate soil stockpiles in sheltered areas where they are not exposed to the erosive effects of wind.				followed; and Number of complaints received.	
2.16.	Air quality	Maintain all vehicles, DG sets/generator sand other equipment in good working condition to minimise GHG emission, exhaust fumes, etc.; Avoid excavation, handling and transport of materials which may generate dust under high	Contractor	Construction phases	Site inspection; Incidence of air pollution; and Review of fuel emission control measures.	Fuel emission from vehicles; Air pollution mitigation measures followed; and Number of	Regularly

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		wind conditions or when a visible dust plume is present; Water sprinkling, cover dumping and stockpiles of lose material with plastic sheets or nets, particularly in windy conditions should be used to reduce airborne dust at construction sites; and Prevent burning, fire, use of wood for cooking in the project sites to avoid air contamination.				complaints received.	
2.17.	Underground water	Contractor shall ensure that all vehicle / machinery and equipment operation, maintenance and refueling will be carried out in such a manner that spillage of fuels and lubricants will not contaminate the ground water. Workforce will be trained about environmental pollution aspect and	Contractor	Construction &operation phases	Site inspection; and Review of spillage control measures.	Fuel or lubricant spillage; and Underground water pollution mitigation measures followed.	Regularly

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		activities should stop immediately and resume only when problem is resolved; and Faulty equipment, vehicles and other source of possible oil and lubricant contamination should be repaired on priority and must be kept in good condition all the time.					
2.18	Protection of lakes/ water bodies	Contractor shall ensure that all vehicle / machinery and equipment operation, maintenance and refueling will be carried out in such a manner that spillage of fuels and lubricants will not contaminate the water bodies and construction of pipe carrying bridges across Buckingham canal; Water bodies need to be cordoned off by using protective barriers such as green cloth and subsequently plantation;	Contractor	Construction phases	Site inspection; and Review of spillage control measures.	Fuel or lubricant spillage; and water pollution mitigation measures followed.	Regularly

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		and In case of water logging, water will be pumped out during the construction of pipelines.					
2.19	Protection of archaeological and heritage	Conduct training to impart knowledge and create awareness among the workers about the significance of archaeological, paleontological and geological aspects and the applicable Indian Treasure Trove Act, 1878; The fossils, coins, articles of value of antiquity, human skeletal and other remains or things might be exposed during construction activities. In such situation, stop the work, do not remove and damage any article; Inform the Convenor and concerned authority (Archaeological Survey of India) immediately to	Contractor, PIU /PMC	Construction phases	Site inspection; and Actions taken by the workers, PIU and ASI.	Discovery of archaeological/ paleontological material; Level of awareness among workers; and Protection and reporting of identified material when discovered.	When occurrence of chance finding

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		take-action per referred Act and recommence the work after receiving written permission; and also, prevent any type of impact on the cultural heritage, monument, etc.					
2.20	Safety of workforce	Adequate precautions shall be taken to prevent the accidents from the machineries. All machines shall confirm to the relevant Indian Standards Code and shall be regularly inspected for its working condition; Where loose soil is met with, shoring and strutting shall be provided to avoid collapse of soil. Provide job specific safety induction training, including environmental awareness and ensure daily toolbox talk to workers at the working area; Ensure availability and mandatory use of PPEs	Contractor, PIU/PMC	Construction phases	Site inspection; and Observation of workers with PPE and safety measures while working on work site.	Quantity and timely supply of PPEs; Awareness level about the use of PPEs; and Incidence of injury, accident, infirmity.	Everyday

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		at the site; Use of protective footwear and protective goggles by the workers involved in mixing of materials like cement, concrete etc. at pumping station; Use of earplugs by the workers exposed to loud noise, and those engaged in crushing, compaction, concrete mixing operations; Ensure sufficient quantity of all PPEs, necessary safety appliances such as safety goggles, helmets, boots, safety belts, ear plugs, mask, etc. to workers and staffs; Adequate measures and care to be taken while approaching any open water bodies for construction of bridges. Ensure railing around such sites are intact and					

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		in good condition; and The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labor Organization (ILO)and applicable laws of India and Tamil Nadu state as applicable.					
2.2 1	Work-zone safety Manageme nt	Temporary barricades shall be provided to delineate construction zone as well material stacking areas. The construction site and the labour facility shall be appropriately barricaded to prevent entry and accidental tress-passing of workers, staff and others into the construction sites. All operational areas shall be access controlled. Watch and ward facilities at all times shall be provided by the contractor.	Contractor, PIU/PMC	Construction phase	Site inspection	Availability of safety measures Absence of safety Incidents	Everyday

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		Proper retro reflective warning signage will be installed on the access road next to the construction site about movement of construction machinery and vehicles. In excavations for longitudinal surface road drains, culverts etc., a high visibility warning and retro reflective signage shall be displayed in vermicular language and English. Entry of unauthorized persons should be prevented. Excavations will be adequately barricaded and well lit – with signages /info boards. There shall be adequate lighting arrangement at night and adequate barricading to prevent mishaps after					

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		construction activity ceases for the day. A readily available first aid unit with necessary supplies, drinking water, resting shed, sanitation etc shall be made available in every work zone.					
2.22.	Exposure to electrical equipment	The Contractor shall take all required precautions to prevent danger from electrical equipment at pumping room, etc. and ensure that: No material will be so stacked or placed as to cause danger or inconvenience to any person or the public; All necessary fencing and lights will be provided in construction area; Deactivation and proper grounding of live power equipment and distribution lines to be ensured before initiating	Contractor, PIU/PMC	Construction phase	Site inspection; Observation of power supply system; and Electricity safety precaution taken by workers while working on work site.	Incidence of current shock, injury, electrocution	Daily

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		work; All energized electrical devices to be marked with warning signs. Use the symbol of danger as warning of high electricity voltage or current flow on cable boxes or where required to avoid any incidence of current shock or electrocution; and Provision of specialized electrical safety training to those workers working with or around exposed components of electric circuits.					
2.23.	Fire Safety	Ensure that no fires are permitted on or adjacent to site; Ensure that no smoking is permitted on the working site; Ensure that sufficient and certified fire fighting equipment are placed and maintained on the site;	Contractor	Project life cycle	Inspect Attendance register for fire fighting training conducted; and Observation of fire extinguishers and certificate at the sites.	Number of Fire incidents; Certified extinguishers in appropriate locations; and Workers knowledge to	When required

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		Equip all fuel stores and waste storage areas with fire extinguishers; Ensure that all workforce and staff on site are aware of the location of fire fighting equipment on the site; and Conduct training program on use of extinguishers, sand, etc for fire-fighting and ensure that they are trained in its operations.				operate the fire extinguisher	
2.24	Emergency response to manage cyclone and other disaster conditions	Contractor shall ensure efficient communication system in place which will be required during occurrence of any natural hazard; Evacuation plan shall be in place for the site; Evacuation plan or route is displayed clearly through signs or picture at prominent places within the sites; Ensure effective	Contractor, PIU/ PMC	Project life cycle	Inspect attendance register for training program; and Inspect fire extinguishers and certificate	DMP in place; Communication system in existence; Display of evacuation route; Capacity of workers to manage; and Disaster and emergency	When required

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		coordination within the workforce and concerned departments and display contact number of concerned persons at prominent places; and Conduct training program and mock drills to workers to deal with the disaster situations due to occurrence of cyclones and tsunami.				situations	
2.25	Demolition of existing structures from proposed PS site(if required)	Prior to carrying out any building demolition, detailed building appraisal by means of surveys and appropriate assessments shall be carried out. In case of asbestos present in the buildings, specific measures for removal and disposal have to be taken and included in the site specific ESMPs Hoarding and covered walkway is to be provided for protection of the public during the	Contractor, PIU/PMC	Construction phases	Site Inspection; Review of waste management plan; disposal registers	Air quality, noise level;	When required

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		demolition of buildings since hoarding isolates the demolition site from the public, thus preventing unauthorized access and trespassing. Metal scaffolds shall be used for top down demolition. Both bamboo scaffolds and metal scaffolds are considered acceptable provided that they are erected according to the Construction Sites (Safety) Regulations and the codes of practices on scaffolding safety. Concrete breaking, handling of debris and hauling process are main sources of dust from building demolition. Dust mitigation measures complying with the Air Pollution Control (Construction Dust) Regulations shall be adopted to minimize dust emissions.					

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		Silent type power mechanical equipment shall be used to reduce noise impact as much as practicable or possibilities of engaging man power with light dismantling tools with PPE are studied and engaged. Debris waste and other materials shall not be thrown, tipped or shot down from a height where they are liable to cause injury to any person on or near the site. Disposal of debris has to be controlled and to be reused in filling of low ground with due permissions from local authority. Wasted reinforcement will be handled as per the departmental procedure.					
2.26	Submission of updated environme	The contractor to prepared project specific ESMP.	Contactor/ PMC	Project cycle	Review of reports and records	Compliance at the site	One-time / As and when need arises

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
	ntal & social manageme nt plan (ESMP) / site environme ntal plan (SEP); ESMP implement ation and reporting						
Social aspect							
2.2 7	Compensat ion and Assistance s to potential temporary economic impacts	Provide compensation and assistance to potential temporary economic impacts; Employ people of local communities for project works with a priority to potential temporary economic impacts based on their skills; Employ the potential temporary economic impacts, particularly willing women on priority in project related unskilled, semi-skilled and skilled works as	CMWSSB/PMC/Co ntractor	Construction Phase	Verify the disbursement of compensation and assistance; and Conduct consultation with local communities	Potential temporary economic impacts were compensated at replacement cost against the income loss	One time

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		applicable; Any social impacts identified needs to be mitigated as per ECSMF					
2.28	Loss of access	The contractor shall ensure that access to connecting roads; market, residence and other places should not be blocked. In case, it is unavoidable, then alternate route should be provided to people. The community should be made aware about the diversion plan along with expected deadline for the completion of work. After completion of the work, the access should be restored as per original condition. The contractor is required to provide notice to the shop owners of the need to shift kiosk/wares displayed on ROW as soon as the work plan is ready with minimum 7 working days. No works can be	Contractor	Construction	Visual inspection	Crossing/ access closed	Regularly

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		commenced unless 100% shifted in sections ready for implementation.					
3.Decommissioning phase							
3.1	Site clearance and rehabilitation/ Post-construction clean-up	Remove all construction equipment, vehicles, surplus materials, site office facilities, temporary fencing, structures and other items from the project site including pumping stations and lifting stations; Clean up and remove any spills and contaminated soil in the appropriate manner; Do not bury discarded materials on site or on any other land not designated for this purpose; The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up.	Contractor	After completion of construction phase and operation phase	Site inspection; and Review of record of activities upon completion of construction phase and commissioning phase	Restoration of construction sites in original condition; and Sites are fully rehabilitated prior to commissioning of project	Weekly

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		Level the disturbed area and restore to a condition resembling its natural profile; and Ensure site is fully clean and tidy before the exit and prior to its handover to the officer of CMWSSB and other authorized persons.					
4. Operation and Maintenance phase							
4.1	Odour nuisance during operation of Sewage lifting and pumping stations	Strictly follow standard operating procedures / operational manual for operation and maintenance of lifting and pump stations Ensure that operating staff is properly trained, and have Clear understanding of odour issues Ensure that pumping cycles are properly followed; and there is no build-up of sewage beyond design volume in the wells Conduct monitoring	CMWSSB / Contractor	Operation and Maintenance phase	Odour control measures; monitoring of H2S and ammonia; site inspection	No odour is experience around the pumping station	Periodical

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		(periodically at all operational pumping stations and lifting stations					
4.2	Workers exposure to toxic gases in sewers and hazardous material during sewer maintenance work	During cleaning/ maintenance operation, the sewer line will be adequately vented to ensure that no toxic or hazardous gases are present in the line. Ensure availability of PPE for maintenance workers. Follow safety and Emergency preparedness plan .	CMWSSB	Operation and Maintenance phase	Site inspection	Nil grievances/ incidents	Regularly
4.3	Occupational health hazardous and safety	Use safety shoes or boots with non-slip soles, safety harnes Check electrical equipment for safety before use; verify that all electric cables are properly insulated; take faulty or suspect electrical equipment to a qualified electricity technician for testing and repair Wear safety goggles in all cases where the eyes	CMWSSB	Operation and Maintenance phase	Site inspection, verification of registeres and availability of PPEs.	Monthly reporting of different types of PPE provided.	Regularly.

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		may be exposed to dust, flying particles, or splashes of harmful liquids All workers should undergo periodic examinations by occupational physician to reveal early symptoms of possible chronic effects or allergies					
4.4	ESHS and Other risks	Sewer Lines: During O&M stage provide necessary ESHS training to the staff in sewer cleaning and maintenance. Ensure availability of PPE for maintenance workers. Pumping stations/lift stations: During O&M stage provide necessary ESHS training to the staff in pumping stations in grit handling, maintenance of wells, pumping equipment, pipeline, etc., Ensure availability of PPE for maintenance workers. STP: During O&M stage provide necessary ESHS	CMWSSB/Contractor	Operation and Maintenance phase	Site inspection progress reporting (Monthly, Quarterly, Semi-annual, Annual)	No of training conducted. Type of PPE provided t the staff. Site inspection	Regularly

S. No	Aspect	Mitigation measures	Responsibility	Implementation phase	Monitoring method	Monitoring indicator	Frequency
		training to the staff in STP operations, handling of chemicals, chlorine, other consumables. Ensure availability of PPE for maintenance workers.					
5	**Contractors planning and reporting requirements**						
5.1	Contractors reporting Reports	Preparation of Contractors ESMP/LMP/SEP/WMP/TMP/ESHS Plan and monthly complaint reports	Contractor	Pre construction/Implementation/O&M Phase	Review and approval of reports submitted by the contractor.	No of reports submitted and approved	One time/Continuous

8.2 Monitoring and Evaluation

The E&S experts of the PMC will review the updated ESMP and sub-plans submitted by the contractor and will ensure that such plans are in line with the applicable laws and regulations. The experts will supervise the implementation of plans and will report on the E&S safeguard status and performance under the project. The internal monitoring reports will at minimum include, but may not be limited to the following:

- Reporting period and context;
- Summary of project status;
- Regulatory compliance;
- Institutional set up and manpower management status;
- Environmental, social, health and safety of workers and local communities;
- Implementation status of ESMP, SEP, WMP;
- Monitoring of waste disposal and management;
- Monitoring of environmental attributes (air, water, noise) and social mitigation measures (e.g. compensation to potential temporary economic impacts at replacement value);
- Complaints and grievances redressal; and
- Stakeholder engagement and community development activities.
- Labour Management

PMC will prepare the internal monitoring report and submit to the PIU every month, and PIU will submit monthly report to TNUIFSL. Accordingly, the required budget for monitoring will be made available during the construction and the budget for operation phase will be updated and allocated later. The PIU in consultation with Contractor and PMC will update the monitoring parameters, frequency and budget as appropriate. Details of schedule of activities are given in Table 25.

Table 25: Schedule of activities

S.No.	Schedule of activities	Responsibility	Time line
1	Obtain required permits and licenses	PIU/Contractor	Prior to Pre-construction
2	Designate the Convenor	PIU	Pre- construction
3	Constitute the GRC& disclose in all the project work sites and zonal offices.	PIU	Pre- construction
4	Mobilization of EHS officer	Contractor	Prior to construction
5	Mobilization of one environment expert	PMC	During construction
6	Mobilization of one social expert	PMC	During construction
7	Social – Revalidation Survey	PMC	Prior to start of work in the 12 potential temporary economic impacts identified stretches.

8.3 Environment Monitoring Plan

To monitor the extent of environmental impact of the proposed project, the contractor has to periodically monitor the ambient environmental quality along the proposed project area. The

monitoring requirement for the different environmental components is presented in table below:

Table 26: Stage Wise Environmental Monitoring Plan

Project Stage: Construction Air Quality Monitoring

A	Parameter	PM10, PM2.5, SO2, NOx, CO and Pb
B	Sampling Method	Use method specified by CPCB for analysis
C	Standards	National Ambient Air Quality Standards 2009, Air (Prevention and Control of Pollution) Act,1981 Or relevant CPCB standards/guidelines
D	Frequency	Once every season except monsoon during construction period
E	Duration	As per CPCB guidelines for monitoring
F	Location	Sensitive locations, especially in the downwind direction along the network alignment.
G	Measures	Wherever air pollution parameters increase above specified standards, additional measures as decided by the engineer shall be adopted
H	Implementation	Contractor through approved monitoring agencies
I	Supervision	CMWSSB

Project Stage: Construction &operation and maintenance -Water Quality Monitoring

A	Parameter	Parameters for Surface water quality standards (IS; 2296) Water pH, TDS, Total hardness, Sulphate, Fluorides, Chloride, Fe, Pb for groundwater.
B	Sampling Method	Grab sample to be collected and analysis as per Standard Methods for Examination of water and Wastewater.
C	Standards	Indian standards for Inland Surface Water (IS; 2296, 1982) and for Drinking water (IS; 10500,2012) Or relevant CPCB standards / guidelines
D	Frequency	Once every season during construction and during operation period.
E	Duration	--
F	Location	Suitable location within project area (preferable near PS, STP locations and receiving waterbody in the downstream of point of disposal)
G	Measures	At locations of variation in water quality/increased pollution, remedial measures to be adopted /all inflow channels shall be checked for pollution loads
H	Implementation	Contractor through approved monitoring agencies
I	Supervision	CMWSSB

Project Stage: Construction& Operation - Noise Level Monitoring

A	Parameter	Noise Levels on dB (A) scale
B	Sampling Method	Free field at 1 m from the equipment whose noise level are being measured Equivalent noise levels using an integrated noise level meter kept at a distance of 15m from edge of pavement
C	Standards	National Ambient Air Quality Standards in respect of Noise, Noise Pollution (Regulation and Control) Rules, 2000
D	Frequency	Seasonal during construction period
E	Duration	Reading to be taken at 15 seconds interval for 15 minutes every hour

		and then average out for analysis
F	Location	Wherever the contractor decides to locate the equipment yard. At sensitive locations such as schools, hospitals etc along the alignment
G	Measures	In case of noise levels causing disturbance to the sensitive receptors, management measures as suggested in the ESMP shall be carried out.
H	Implementation	Contractor through approved monitoring agencies
I	Supervision	CMWSSB

Project Stage: Operation and Maintenance - Odour Level Monitoring

A	Parameter	H2S level within and next PS
B	Sampling Method	Use method specified by CPCB for analysis
C	Standards	National Ambient Air Quality Standards 2009, Air (Prevention and Control of Pollution) Act,1981 Or relevant CPCB standards/guidelines
D	Frequency	Half yearly (yearly twice) and as and when based on public complaints (throughout the operation phase)
E	Duration	As per CPCB guidelines for monitoring
F	Location	All LS / SPS and Terminal PS 3 points – at inlet , upwind direction of the asset and downwind direction of asset
G	Measures	Wherever H2S parameters increase above specified standards, additional measures as decided by the engineer shall be adopted
H	Implementation	Through approved monitoring agencies – Contractor (during Implementation) / CMWSSB (during O&M)
I	Supervision	CMWSSB

Project Stage: Construction & Operation - Soil Monitoring

A	Parameter	Soil quality parameters (Pb, SAR and Oil & Grease, monitoring silt for presence of toxic metals , etc)
B	Sampling Method	Sample of soil collected to be acidified and analysed using absorption Spectrophotometer
C	Standards	Threshold for each contaminated set by IRIS database of USEPA until national standards are promulgated
D	Frequency	During the pre-monsoon post monsoon seasons each year for the entire construction and operation phase
E	Duration	Grab sampling
F	Location	At sample locations in the receiving water bodies, at the places of dumping silt, excavated earth
G	Measures	At location of increased in pollution levels, source shall be identified and measures adopted.
H	Implementation	Contractor through approved monitoring agencies
I	Supervision	CMWSSB

8.4 Cost Estimate for Environmental Management Program

The estimated ESMP implementation cost comprises of EMP as well as Compensation for the social impacts. The indicative budget for ESMP is provided in the following table.

Table 27: Cost Estimate for Environmental management program

S. No.	E&S monitoring parameters	Frequency	Responsibility	Amount (INR in lakhs)
1	Organize meetings with line departments.	Bi-annual	PIU	To be quoted in Bill No. V of Volume III (BoQ)
2	Workshop on E&S safeguards and on-job training as identified.	Annually	PIU/PMC	
3	Use of IEC material and use of media channel to create public awareness on waste management	Regularly	Contractor	
4	Consultations with stakeholders regularly	Regularly	PIU/PMC/ Contractor	
5	Meetings of GRC	Monthly	PIU	
6	Air quality monitoring	Quarterly	PMC/ Contractor	
7	Surface water quality monitoring	Quarterly	PMC/ Contractor	
8	Ground water quality monitoring	Quarterly	PMC/ Contractor	
9	Soil quality monitoring	Bi-annual	PMC/ Contractor	
10	Noise quality monitoring	Quarterly	PMC/ Contractor	
11	Wind speed and direction	Bi-annual	PMC/ Contractor	
12	Health camp, occupational health and prevention of Covid 19	Regularly	Contractor	
13	Compensation and assistance to potential temporary economic impacts & revalidation survey during project implementation.	One time* plus lump sum	PIU	
			Total	

Note:*Entitlements include 1. Provisional sum for compensation of temporary income loss minimum wage is Rs.577 per day. The estimated duration is 7 days. 3. All the 12 identifed potential temporary economic impacts are considered as BPL households. As per the updated ECSMF the one time assistance of Rs. 6700 is adopted.

9. STAKEHOLDER ENGAGEMENT AND GRIEVANCE REDRESSAL MECHANISM

Stakeholders engagement is an integral part of developing an understanding about the project and the associated risks and impacts as perceived by the public. It helps in planning and setting up priorities for project management. SEP has been prepared and is provided in Annexure 10.

9.1 Introduction

Information on Public Consultation is given adequately to the Public by means of notice, personal contact, etc. As per the World Bank policy on access to information and disclosure, the proposed project attracts Public Hearing. Proceedings of the Public Hearing/Stake Holders Meeting conducted on 17/06/2023.

9.2 Process of Stakeholder Consultation

The Public Hearing was arranged by the Chennai Metropolitan Water Supply & Sewerage Board (CMWSSB). The concerned persons having plausible take in environment and social aspect were requested to attend the meeting. Wide canvassing has been made by issuing notices door to door and keeping displays. The minutes of public consultation are as follows. The following were present during public meeting.

i. Stakeholders (Sub-project area people)
ii. Officials
iii. Social Expert
iv. Counsellors
v. Members from Residents Associations
vi. Consultants

Stake holder consultation started by EE, CMWSSB, explained the project details and listed out the street name in the respective areas.

9.3 Members present

General public, Representative of resident welfare association, NGO, Elected representatives including councillor's besides concerned officials of CMWSSB, Chennai were present. The scanned attendance sheet is provided in Annexure 6

Table 28: List of the members

Sl. No	Name	Designation
1.	S Aravind Ramesh	MLA
2.	Madhi Azhagan	Zone Chairman & MC, Depot-192
3.	T C Govindaswamy	MC, Depot-193
4.	Ekambaram	MC, Depot-195
5.	K Bharathi	Superintending Engineer (P&D), CMWSSB
6.	M Arun Kumar	Area Engineer XV, CMWSSB
7.	A Thirumalai	Deputy Area Engineer, CMWSSB
8.	A Devi	Assistant Executive Engineer (P&D), CMWSSB
9.	D Divyapriya	Assistant Engineer (P&D), CMWSSB
10.	Durai Singham	Staff, CMWSSB
11.	Thulasi Singam	Staff, CMWSSB

12.	Rajagopal	Staff, CMWSSB
13.	Murali	Staff, CMWSSB
14.	D Kuppuswamy	President, Sri Sai Nagar Makkal Sangam
15.	R Jayakumar	Secretary, PK Residents Association
16.	T Ulaganathan	Secretariat Colony Residents Association
17.	V Parthiban	General Secretary. Sholinganallur Constituency Residents Association
18.	G Kumaradas	Secretary, Raj Nagar

9.4 Welcome Speech

Welcome speech is delivered by Superintending Engineer Mrs. K. Bharathi, CMWSSB, and Chennai. She briefed the project preparation and different proposals in her speech. After her speech, Assistant Engineer (P&D) Mr. M. Arun Kumar (Area Engineer) also express his valuable suggestions.

9.5 Information Dissemination

On behalf of consultant, Mr. D.Divya Priya (Assistant Engineer, CMWSSB, Chennai) explained the objectives, scope and deliverable's pertaining to the consultancy assignment. She also explained broadly the current status of project. S. Aravinth Ramesh MLA, has explained broadly on people consideration and queries. The views of stakeholders are also taken into consideration and all the points are incorporated in minutes of meeting.

9.6 Suggestion form the participant and action taken

Table 29: Suggestion from the participant and action taken

Sl. No	Name of person/ULB	Queries	Action to be taken by CMWSSB
1.	V. Saraswathi, 2/460 Pandiyan nagar, Thorapakkam	Please do work fast by CMWSSB	Work under process
2.	P. Rajeshwari, 2/486, Pandinagar, Thoorapakkam	Please do work fast	Work under process, We do our work as soon as possible.
3.	R. Jayakumar, Secretery, P.K Resident Association. Thorapakkam Chennai 97	Please do work fast and rectify our problem	Work under process and we do our work as soon as possible
4.	B. Aesupatham, DMK memer – 195 Area, 3/999, muthal street, Solaima nagar, Thorapakkam, Chennai	Thank you for invite me in this meeting, kindly do work fast and clear our sewage problems.	Work under process and we do our work as soon as possible
5.	Karthikeyan, 48, Annai indra nagar, Okkiyum thoraipakkam	Need drinking water supply entire colony Need drainage line for entire colony	Suggestions forward to concern department

*Note: The public consultation documents and social expert documents were attached in the Annexure 6.

9.7 Minutes of Meeting

Minutes of the meeting of the Stakeholders Meeting for “Comprehensive Underground Sewerage Scheme for the Okkium Thoraipakkam Area-XV (Sholinganallur) held on 17.06.2023 at 11 A.M to 1 P.M at Area-XV, CMWSSB, KK Road, Sholinganallur, Chennai 600 119.

9.8 Conclusion

Mrs. A. Devi (Assistant Executive Engineer, CMWSSB) concluded the meeting by thanking all the participants who have attended the meeting.

10. INSTITUTIONAL AND IMPLEMENTATION MECHANISM

10.1 Implementation of proposed project and institutional arrangement

PIU

The Chief Engineer (CE) of CMWSSB supported by the concerned Superintending Engineer (SE) is overall responsible for the project management.

The Executive Engineer (EE) who will be responsible for coordination, supervision and management of all the activities related to the project. The Executive Engineer (EE) will be assisted by the Assistant Executive Engineer (AEE) and Assistant Engineer (AE).

PMC

The PMC will have Environmental and Social experts in place and supervise the implementation of the E&S safeguards, and report to PIU/ CMWSSB.

Contractor

Contractor will appoint EHS personnel who along with the Project Manager be responsible for implementation of Environmental and Social management plan and mitigation measures and submit the compliance report PIU. PIU will supervise activities of Environmental and social safeguards for ensuring adoption and compliance of ECSMF and report to TNUIFSL.

11. PROJECT BENEFITS

The sewerage project, in respect of which considerable public and social resources are being used, form a basic infrastructure for the country and an indisputable indicator of civilization and development. The works cover a number of substantial social needs and aim to improve the quality of life and to protect public health and the environment.

11.1 Upgrading the quality of life

The quality of life and the hygienic conditions in the areas where the system operates have already improved. The operation of the sewerage system has relieved these areas to a great extent from previous problems that were caused by the continuous emptying of cesspools. In the past, hotels and blocks of apartments were required to empty and maintain septic tanks and soak ways. The sewerage system provides a healthier and more appropriate way to manage liquid wastes.

11.2 Preserving the natural environment

Presently, all sewage waste is discharged in septic tanks and cesspits, resulting in the pollution of the ground water of the areas where such waste was discharged. Polluted waters then ended in the sea and caused various risks and other environmental problems. Though the areas under study are recently added in to CMA, substantial residential, commercial and industrial developments have already occurred in the obscene of the basic infrastructure such as Water supply and underground sewerage system. Implementation of comprehensive underground sewerage system would definitely enhance the natural environment. The wastewater treatment plant produces by-products such as treated bio solids and methane. Treated sludge is used as a soil-improving substance mainly for tree cultivations whilst methane is being used for electricity generation, covering part of the power, required to operate the plant.

11.3 Saving and processing waters

Water is a substantial natural resource for our country and it should be managed in the best possible manner. The tertiary treated effluent at the wastewater treatment plant can be reused for non-domestic purposes such as gardening, boilers, floor washings at industries and also for agricultural and other purposes.

11.4 Economic development and tourism

The most significant advantage of the system is maintaining sustainable development, the protection of the environment and improvement of the quality of life, with a further impact on the development of tourism and the economy in general.

11.5 Standard of living

As a result of the above, the sewerage system contributes to further development and increase of the standard of living of the City. Considering all the above advantages, there is no doubt that if we all cooperate, ourselves and our children will enjoy a better quality of life in the years to come and that we will secure a better environment to the forthcoming generations.

Annexure 1

Environment, Climate Change and Social Screening Form

Project Details		
Sl.no	**Components**	**Details**
1	Project Objective and components	Plan, Design and to prepare comprehensive DPR for providing UGSS to Okkium Thoraipakkam area in expanded Chennai city in line with the Master Plan prepared by CMWSSB.
2	Details of Alignment / Components (main components including construction activities)	• 69.63 km of Sewer line, • 2819 No of Machine holes, • 10.495 Km of Pumping Mains and • Total No of Pumping stations /Lift Stations – 9 No. • Sewage treated partly at Perungudi &Sholinganallur STPs • Drawing of all the proposed project sites are attached with this report
3	Location of the Project Sites (all sites including alignment of networks, other structures like pumping stations; offices, locations where treated waste water, sludge & C&D wastes will be disposed/reused directly, any other) Current Land use (Provide information for all sites involved in the project), any historic land use (related to heritage, or contamination) Site Survey No:/s (with ownership), Geographical coordinates of the site	Location of the project sites Okkiyam Thoraipakkam. The collected sewage treated at Perungudi STP and Sholinganallur STP, and the treated water discharged into Buckingham canal. The vacant land identified for LS 03 belongs to CMWSSB. The vacant land identified for LS, 01, 02, SPS 01, 02, 03, 04, 05, 06 belongs to GCC, obtaining NOC is under process. The identified vacant lands are free from contamination such as municipal solid waste, and not related to any Historic, Heritage site.

Proposed Resource Use

Resource Use				
Sl.no	**Proposed Resources**	**Area/ Quantity**	**Unit**	**Details**
(i).	Land Area proposed to be used: Location wise (in sq km / sq m)	16.860	Sq.Km	The collection system land area – 69.63 Km Vacant land area – 1.686 Sq.km
(ii).	Estimated energy consumption for the project activities – Source wise	2062	KWh	LS (3) SPS (6) For conventional starter
(iii).	Estimated usage of water quantity for the project: Ground Water and Surface water?	2500	KL	

Baseline Environmental Conditions

Sl.no	Environmental Aspects	Yes	No	Details (mention distance to these features in meters/kilometres, and quantities in g/kg/T as applicable. Also mention if any project components is excluded / regulated based on location/activities as per National / State regulations & need permits/follow guidance)
1	Is the project site located on or adjacent to any of the following (Provide information for all sites and alignment of the project components/subcomponents, associated activities; mention distance to these features in meters/kilometres)			
i)	Critically Vulnerable Coastal Areas, Ecosensitive Areas		No	The location of the project area is 2 km away from the Bay of Bengal Sea. A part of OkkiumThoraipakkam lies under CRZ category II.There is no ecosensitive or critically vulnerable area present near the project area.
ii)	Cultural Heritage site, Protected monuments		No	There is no cultural heritage near the project area.

iii)	Natural Forests / Protected Areas Is the project in an eco-sensitive or adjoining an eco-sensitive area or its demarcated buffers? If yes, provide details.		No	There is no forest or protected area present near the project area.
iv)	Any other Wetlands/ Mangrove/ Estuarine Region?	Yes		Pallikaranai march land is around 5 km from the project area. There is no mangrove is present near the project site.
v)	Any Natural Habitat areas, areas with natural features such as the Coasts, Lakes/ other water bodies?	Yes		The proposed LS – 03 site is located 200m to Okkiyam Maduvu (Pond) and SPS -05 is located 200 m to Buckingham Canal.
vi)	Any other Sensitive Environmental Components?		No	There is no anyother environmental sensitive components present in the project area.
vii)	Any Residences, schools, hospitals, sensitive receptors?	Yes		The proposed SPS sites are 10m to 50m of radius to the residential area.
viii)	Any culturally – socially important paths, areas/religious occupancies, sacred groves, burial grounds, tourist or pilgrim congregation areas, borders, etc?		No	The proposed sites are not falling the area of cultural importance places.
ix)	Any Drinking water source, upstream and downstream uses of rivers, etc which may be impacted by proposed discharge of treated sewage / sludge from water supply or sewage treatment plant?		No	There is no drinking water source is used for the disposal of the treated water. The treated water from the STP is further treated byUF and discharged in ponds for ground water recharge.
x)	Any Low-lying areas prone to flooding/areas of Tidal Influence used as part of the Project or near the project components?		No	There is no low-lying area for flooding in the project area.
xi)	Details of Surface water quality at intake point or Disposal point of treated sewage	Yes		The details of the intake and out fall of STP plants are meeting the TNPCB norms and the treated water is discharged in the natural ponds after UF treatment.
xii)	Any areas affected by other disasters?	Yes		Chennai recorded the highest rainfall of 1000 mm in Jan 2015.

				Further in 2004 Tsunami, Chennai coast is one of the worst affected coastal areas.
2	Groundwater: Is the site in Critical / Over Exploited condition?	Yes		The ground water is overexploited in Chennai area.
3	Is the area disaster-prone? If yes; list all disaster zone categories applicable	Yes		The Chennai city is listed as medium vulnerable category prone to flood of disaster zone. The cause of flood is by heavy rainfall.
4	Describe the soil and vegetation on site	Yes		The location is geologically classified in to sedimentary (alluvial) formation.
5	Is the site area and condition suitable for proposed development?	Yes		The project site area and condition are suitable for the construction of UGSS.
6	Describe existing pollution/contamination or degradation in the site(s)	Yes		Based on the secondary data of the condition of the environmental parameters such as ambient air, noise, soil, surface and ground water are showed under the limit of standards. But the noise level in area near the main road are above the permissible limit at night due to vehicular movements.
7	Near Dams, Barrages		No	There is no dams and barrages near the project site.
8	Any other remark on baseline condition?		No	Noise level at night in areas near the main roads are above the limit.

Anticipated Environmental Impacts: Impacts on Land, Geology and Soils

Sl.no	Impacts	Yes/ May create	No	Details (mention distance to these features in meters/kilometers, and quantities in g/kg/T as applicable. Also mention if any project components is excluded / regulated based on location/activities as per National / State regulations & need permits/follow guidance)

8.	Will the proposed project cause the following on Land / Soil?			
i)	Impact on Surrounding Environmental Conditions including Occupation on Low lying lands/flood plains		No	There is no impact on flood plains due to the product.
ii)	Substantial removal of Top Soil (mention area in sqm)		No	Excavated earth shall be used for refilling of the pipeline. The excess soil from the LS and SPS construction site shall be used for land filling of the low-lying area.
iii)	Any degradation of land / eco-systems expected due to the project?		No	There is no degradation of land or eco system involved in the project activity.
iv)	Loss or impacts on Cultural/heritage properties/precincts, features		No	There is no impact on cultural heritage due to the construction of the project components.
v)	Does the project activity involve cutting and filling/ blasting etc?		No	There is no blasting activity involved in the project activity.
vi)	Will the project cause physical changes in the project area (e.g., changes to the topography) due to earth filling, excavation, earthwork or any other activity?		No	There is no physical change in the project area due to the construction of the project components. Excavated earth shall be used for refilling of the pipeline. The excess soil from the LS and SPS construction site shall be used for land filling of the low-lying area which shall not affect any physical changes.
vii)	Will the project involve any quarrying/ mining etc?		No	There is no quarrying or mining activity involved in the project.
viii	Will the project / any of its component contaminate or pollute the Land? (for example sludge, disposal of untreated sewage/bypass)		No	The project components shall not pollute the land. The collected sewage shall be treated by the existing STP. The treated water is used for agriculture purpose and sludge is dried and used as fertilizer.

ix)	Pre-existing contamination on site/s		No	There is no pre-existing contamination on the project sites.

Impacts on Water Environment

Sl.no	Impacts	Yes/ May Create	No	Details (mention distance to these features in meters/kilometres, and quantities in g/kg/T as applicable. Also mention if any project components is excluded / regulated based on location/activities as per National / State regulations & need permits/follow guidance)
9	Will the subproject or its components cause any of the following impact on Water sources (Quantity or Quality):			
i)	Will the activities have proposed at the site(s) impact water quality (surface or underground) and water resource availability and use? Will this sub-project involve the dredging of water bodies, sea, canals, etc.	Yes		The proposed sewer network collects the sewage and pump to Sholinganallur and Perungudi STPs. The treated sewage water discharged in to the Buckingham canal.
ii)	Impacts on Water Resources		No	There is no impact on water resources.
iii)	Pollution of Water bodies/ground water nearby or downstream		No	The treated water discharged in to Buckingham canal.
iv)	Will the project affect the river /cannel flow pattern, stream pattern or any other irrigation canal?		No	The project shall not affect the flow pattern of any river or stream.
v)	Will the project result in stagnation of water flow or pondage or weed growth due to increased pollution/siltation		No	The project shall not result in stagnation of water flow.

Impacts on Biodiversity and Host Communities

Sl.no	Environmental Impacts	Yes/ May Create	No	Details (mention distance to these features in meters/kilometres, and quantities in g/kg/T as applicable. Also mention if any project components is excluded / regulated Lsbased on location/activities as per National / State regulations & need permits/follow guidance)
10	Will the subproject or its components cause any of the following impacts on Biodiversity or the neighbourhood			
i)	Will the project necessitates cutting of? Trees / Loss of Vegetation		No	There is no tree cutting activity involved.
ii)	Will the project result in Health & Safety Risks in the neighbourhood including the release of toxic gases, accident risks		No	There is no health and safety risk in the neighbourhood due to the construction of the project components. The odour that may arise from the pumping station is controlled by odour control measures proposed at the pumping stations.
iii)	Potential risk of habitat fragmentation due to the clearing activities? (e.g., Hindrance to the local biodiversity like disturbing the migratory path of animals/ birds etc.)		No	There is no potential risk of habitat fragmentation due to the project activity.
iv)	Potential Noise and Light Pollution or disturbance to surrounding habitats/communities	Yes		During excavation, construction activity generates noise pollution to the nearby residential area.
v)	Potential disruption to common property, accessibility, traffic disruptions, conflicts or disruption to the local community within the subproject area?	Yes		Utility cables, water pipe lines, TNEB lines, shall be disturbed during excavation of pipeline.

Impacts due to Storage and Wastes: Pollution and Hazards

Sl.no	Type	Yes	No	Details (mention distance to these features in meters/kilometres, and quantities in g/kg/T as applicable. Also mention if any project components is excluded / regulated based on location/activities as per National / State regulations & need permits/follow guidance)
11	Will the subproject or its components cause any impact due to storage of materials, wastes or pollution due to releases during various project activities			
i)	Will the project use or store dangerous substances (e.g., large quantities of hazardous chemicals/ materials like Chlorine, Diesel, Petroleum products; any other?		No	There is no storage of hazardous chemicals or materials like chlorine is involved in the project components.
ii)	Will the project produce solid or liquid wastes; including construction/demolition wastes (including dredging, de-weeding wastes, muck/silt, dust, sludge, C&D wastes, hazardous wastes (such as asbestos from existing network), e-wastes (from equipment)); polluted liquids?	Yes		The unused OHT at site of proposed pumping stations SPS-01 and SPS-02 are demolished. The solid waste or the liquid waste from the demolition shall be disposed in an appropriate method as per ESMP.
iii)	Will the project cause or increase air pollution or odour nuisance?	Yes		During the operation phase of LS and SPS, may generate nuisance odour to the nearby residential area. To mitigate odour control measures are proposed in all LS & PS
iv)	Will the project generate or increase noise levels which will impact surrounding biodiversity or communities?		No	There is no noise generating components involved in the project activity.
v)	Will the project generate or increase visual blight or light pollution?		No	There is no light pollution due to the project.
vi)	Will the project cause water pollution? (of waterbodies/ groundwater)?		No	There is no water pollution due to the project.
vii)	Will the project involve dangerous construction activities which may be a safety concern to workers/ host communities		No	There is no dangerous construction involved in the project. Safety measures shall be followed at the deep excavation area.

Sl.no	Type	Yes	No	Details (mention distance to these features in meters/kilometres, and quantities in g/kg/T as applicable. Also mention if any project components is excluded / regulated based on location/activities as per National / State regulations & need permits/follow guidance)
viii	Is there a potential for release of toxic gases or accident risks (e.g. potential fire outbreaks)		No	There is no potential release of toxic gases from the project.
12	Describe any other features of the project that could influence the ambient environment		No	There is no air quality disturbance due to the project activity.

Baseline Climate Data		
13. Project Area Baseline Note: Please provide details for ULB and also site. Please provide quantitative information where relevant.		
i)	Agro climatic zone	North East Agro climatic zone
ii)	No of Water Bodies in the ULB area	1
iii)	Name of the River(s) in the ULB	There is no river, but Buckingham Canal is running in the project area.
iv)	Proximity to River (kms)	No
v)	Proximity to Sea (kms)	3 km
vi)	Proximity to hilly terrains (kms)	No
vii)	High Flood Level of the River	No
viii)	Flooding Events (Years) (Based on historic data of extreme flood events and future projections based on available analysis)	In year 2005, project area continued to receive heavy rains, recording 241 mm in 24 hours on 28th October 2005, and 320 mm in 24 hours on 2nd December 2015.
ix)	Flooding hotspots in the ULB	No of flooding hotspots
x)	Available Water sources (Surface / ground)	Okkiyam Maduvu

xii)	Groundwater Level and potential zone		2-5; phreatic zone		
xiii)	Normal Temperature & long-term average; trends in changes in temperature		Normal temperature is 29-degree c. Long term average temperature is 28-degree c.		
xiv)	Rainfall trends & long-term average		Long term average rainfall is 1014 mm.		
xv)	Land Use		Proposed project sites are vacant land.		
xvi)	% of Green Cover in the ULB area		7.2%		
xvii)	% of Water Bodies/Rivers		8%		
xviii)	Seismic Zone		2		
xix)	Coverage rain water harvesting structures (in %)				
	a) Residential		90%		
	b) Commercial & Institutional		100%		
	c) Government/ULB		100%		
xx)	RWH in buildings – Mandating byelaws		Yes		
xxi)	Frequency of drought in study area. Does the area face water scarcity? Please provide details.		Number of drought year – 3 Frequency - 4		
xxii)	Frequency and intensity of cyclones in study area.		1 or 2 severe cyclones every year		
14	Climate Change Impacts in project area				
(i)	Climate signal Please select the relevant signals	Climate hazard Please select the relevant hazards	Yes	No	Details
	☐ Sea level rise ☐ Frequency of tropical storms ☐ Intensity of tropical storms ☐ Higher precipitation	☐ Salt water intrusion	Yes		The saline water intrusion in project area is being caused by over-extraction of the groundwater. This causes the water pressure in the groundwater table to drop leading to the entry of the

	amounts ☐ Shifting seasons ☐ Higher temperatures ☐ Less precipitation ☐ Lower temperatures ☐ Others				saline water from the sea which is 5 km away.
		☐ Flooding of the coast	Yes		The flood in the coastal area of Chennai was recorded in 2015 and 2021 due to extreme rainfall.
		☐ River flood		No	There is no river in the Project area. However the Buckingham canal recorded the flooding in 2015 and 2021 rains.
		☐ Bank erosion (sea/river)	Yes		The coastal area in Chennai recorded a maximum erosion of -43 m/year.
		☐ Flash flood (heavy rain)	Yes		The flash flood was recorded in 2015 and 2021 with extreme rainfall.
		☐Landslides		No	There is no landslide prone area in the project area.
		☐ Forest/Bush fires		No	There is no forest or bush near the project area.
		☐ Water shortage/drought	Yes		Decrease in rainfall has contributed to the drop in water pressure and ground water level depletion.
		☐ Effects of heat		No	There is no heat effect at the project area.
		☐ Effects of cold		No	There is no heat effect at the project area.
		☐ Effects of winds	Yes		The project area is located near the coastal area. All the project components are designed to withstand the maximum wind pressure.
		☐ Effects of air quality		No	There is no major deviations or trend in the air quality at the project area.
		☐ Effects of storm surge	Yes		The project area is located near the coast. All the project components are designed to withstand the maximum lift pressure and wind pressure.

		☐ Soil quality/land degradation		No	There is no impact or change in the soil quality. The excavated soil shall be reused for filling.
		☐ Others		No	
ii)	Energy consumption for the project? Will the project result in GHG emission?		Yes		89KW amount of energy shall be consumed. The project components of LS and SPS contain the pump which uses the electricity and emit the GHG.
iii)	Will the project affect any other water or other user? (downstream intake points of Water Supply projects, downstream water use by people, animals; irrigation)			No	There no other affect due to the project.
iv)	Is the project located in exploited ground water block?		Yes		The project is located at the over exploited ground water block. This project will increase the ground water table by treating the sewage water.
v)	Is the project area vulnerable to temperature fluctuations and drought?			No	The project area is not vulnerable to temperature fluctuations and drought.
vi)	Is the site vulnerable to hazards such as Earthquakes, Landslides, Flooding, Storm surge, Severe wind damage, Fire, Explosion, Other (specify)			No	The project area is not vulnerable to earthquakes, landslides, fire, and explosion. The project area is located near the shore and there shall be storm surge and flooding due to heavy rain.
vii)	Will the project result in generation of wastes / by-product?		Yes		The project generates the sludge. The treated sludge is used as a fertilizer and given for agriculture purpose to farmers.
viii)	Will the project impact the water resource availability (surface/ ground water) and use (effluent/sewage disposal, bypasses from STPs/PS, leachate, runoff, wastes deposition, erosion)			No	The project will not impact the water source availability.

ix)	Will the project cause flooding of adjoining low-lying areas		No	The project will not cause flooding due to the project activity. During the failure of the LS and SPS may leads to flooding and this shall be controlled by stand by diesel generators and pumps.
(x)	Will the project impact water quality or quantity in natural/constructed Lakes, or ponds		No	The project will not impact the water source availability.

Project Environmental Enhancement Measures

Sl.No	Enhancement Measures	Yes	No	Details
15	Has the subproject design considered environmental enhancement measures?			
i)	Energy conservation measures/ energy recovery options incorporated in subproject design? Quantify the reduction in CO2 emission from the sub-project.	Yes		VFD has been proposed for all SPS's and there will be 40-50% savings in energy consumption.
ii)	Has the project considered alternate /renewable energy?	Yes		The project considered saving of the energy cost per year using VFD starter in SPS/LS instead of using conventional starter.
iii)	Has the project considered waste minimization (waste reuse/recycle options/circular economy)	Yes		The treated water is proposed to utilise for existing UF plant at Perungudi. The treated sludge shall be used as fertilizer and given to farmers.
iv)	Rainwater harvesting, water recycling and other water resource enhancement measures proposed in the project?	Yes		The rain water harvesting system is proposed at the construction sites of SPS.
v)	Does the project include measures for prevention of wastage of water resource?	Yes		The waste water is collected and treated. The treated water shall be used for various purpose such as UF and ground water recharge.

vi)	What waterbody conservation/ drinking water source improvements/drought management options are being proposed?	Yes		This project will collected the sewage water from the project area and treat the sewage water for reuse purpose. This project shall enhance the ground water table and prevent the water pollution by letting sewage in the environment.
vii)	Design Considerations for protection of project components from extreme events - flood, drought, other natural disasters	Yes		The project components are designed to meet the extreme events such as flood. The SPS/ LS are designed above the HFL and ground water lifting pressure is considered for the construction of project components during heavy flood.
viii)	Greenbelt development proposed for the project?	Yes		Green belt development is proposed at the construction sites of SPS and LS.
ix)	Is the sub-project including design elements to strengthen infrastructure resilience? If so what?	Yes		The subproject shall provide the beter sanitation facility to the project area, improve the health status of the people in the locality, provide aesthetic appearance to the city.
x)	Has the project considered nature-based solutions and if so what?	Yes		The collection pipeline is designed based on the gravity.
xi)	Is the sub-project combining infrastructure and nature-based solutions? If so how?		No	
xii)	What design considerations is the project including to mitigate heat island effect?	Yes		The latest technology is proposed for pumps and electrical items to save the energy.

xiii)	What design considerations is the project including to preserve and expand green cover?	Yes		The SPS are designed with the VFD over the conventional starter for energy saving and cost saving. Wherever possible green belts are proposed in pumping stations.

Land Use, Resettlement, and/or Land Acquisition

Sl.no	Components	Yes	No	Details
1	Does the project involve acquisition of private land?		No	There is no acquisition of land for the project
2	Alienation of any type of Government land including that owned by Urban Local Body?		No	The land is owned by CMWSSB.
3	Clearance of encroachment from Government/ Local body Land?		No	The land is not under any encroachment, it is vacant land.
4	Clearance of squatters/hawkers from Government/ Local Body Land?		No	The land is owned by CMWSSB.
5	Number of structures, both authorized and/or unauthorized to be acquired/ cleared/		No	There is no acquisition of structures for the project.
6	Number of households to be displaced?		No	There is no displacement of houses for the project.
7	Village common properties to be alienated Pasture Land (acres) Acquisition / burial ground and others specify?		No	There is no acquisition of land for the project.
8	Existing land uses on and around the project area (e.g., community facilities, agriculture, tourism, private property) will be affected?		No	There is no community facility or agriculture activity is affected due to the project. The access to the property, houses shall be temporarily disturbed for a day or two due to excavation of road/street.
9	Will the project result in construction 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)?		No	The local labours are given preference for the construction works.
10	Are financial compensation measures expected to be needed?		No	There is no financial compensation involved in the project.

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?		No	
11.1	Crops?		No	The project activity shall not carry out at any agriculture land.
11.2	Fruit trees? Specify with numbers		No	There is no tree cutting involved due to the construction activity.
11.3	Petty Shops		No	There is no dislocation or temporary economic impact due to the project activity.
11.4	Vegetable/Fish/Meat vending		No	There is no dislocation or temporary economic impact due to the project activity.
11.5	Cycle repair shop		No	There is no dislocation or temporary economic impact due to the project activity.
11.6	Garage		No	There is no dislocation or temporary economic impact due to the project activity.
11.7	Tea stalls		No	There is no dislocation or temporary economic impact due to the project activity.
11.8	Grazing		No	There is no dislocation or temporary economic impact due to the project activity.
11.9	Loss of access to forest produce		No	There is no loss of vegetation or access to the forest produce due to the project activity.
11.10	Any others - specify		No	
Welfare, Employment, and Gender				
12	Is the project likely to provide local employment opportunities, including employment opportunities for women?	Yes		The local people shall get the employment during the construction of project components.
13	Is the project being planned with sufficient attention to local poverty alleviation objectives?	Yes		The construction of the project components may involve the local people as labours for the construction work. This will provide the opportunity of the

				employment for the local people and help their life to improve economically.
14	Is the project being designed with sufficient local participation (including the participation of women) in the planning, design, and implementation process?		No	The project may involve the local people including women during the construction activity. But there is no local participation during the design and planning of the project.
Historical, Archaeological, or Cultural Heritage Sites				
15	Historical heritage site(s) require excavation near the same?		No	There is no heritage site required to excavate for this project.
16	Archaeological heritage site(s) require excavation near the same?		No	There is no archaeological site required to excavate for this project.
17	Cultural heritage site(s) require excavation near the same?		No	There is no cultural heritage site required to excavate for this project.
18	Graves or sacred locations require excavations near the same?		No	There is no graves or sacred site required to excavate for this project.
Tribal Population/Indigenous People				
19	Does this project involve acquisition / alienation of any land belonging to Tribal people?		No	There is no acquisition or alienation land for this project.
20	Will the project lead to displacement / other adverse impacts on tribal / indigenous peoples?		No	There is no displacement activity involved in the project.
Beneficiaries				
Sl.no	Components	Yes	No	Details
21	Population proposed to be benefitted by the proposed project	Approx. no.:		1,41,851
22	No. of Females proposed to be benefitted by the proposed project	Approx. no.:		68,000
23	Vulnerable households /population to be benefitted	Approx. no.:		350 (Households)
24	No. of Families to be benefitted	Approx. no.:		18,000

Date: _____

Signature and name of the Borrower

Authorised Signatory

Note: This Screening sheet must be completed for each of the proposed subproject along with the DPR and ESIA Report.

Indicative Enclosures:

1. Provide maps with the geographical location of the project; Google maps with project sites and project alignment
2. 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, and
3. Any other information to describe the project, locations and possible impact as required.
4. Provide relevant maps on flooding hotspots, LULC, etc
5. Land details for the project sites with (i) extent available and required, (ii) location, (iii) survey numbers, (iv) FMB extract, (v) current land use, landuse classification (vi) land ownership, alienation/acquisition status, (vii) certificate giving availability of sites required for the project by the borrower, (viii) location photographs with Geo-co-ordinates of all project sites and alignment (start, end point).

Vulnerable PAPs are those living below poverty line, SC / ST families and women headed households, Widows, Physically Challenged persons; Elderly persons above the age of 60 years among the affected families.

Annexure 2

Land Details and Photographs of proposed Pumping Station & Lift Stations sites.

S. No	Location	SPS / LS	Coordinates	Survey N0	Classification	Owner Ship	Extent of Land (Sqm)	Existing Land Use on Site	Remarks
1	Sri Sai Nagar	SPS-01	12°57'04.5"N 80°14'06.1"E	18,19	OSR(Open Space Reservation)	Greater Chennai Corporation	300	Unused OHT demolished	NOC obtained
2	Chandra Sekaran Avenue	SPS-02	12°56'06.1"N 80°13'53.5"E	253	OSR(Open Space Reservation)	Greater Chennai Corporation	300	Unused Existing OHT in the site	NOC obtained
3	Aaligandeswarar Nagar	SPS-03	12°55'54.8"N 80°14'08.7"E	205/2B	ULC(Urban Land Ceiling)	Revenue	900	Existing OHT site	NOC Under progress
4	Soolaiama Nagar	SPS-04	12°56'07.1"N 80°14'10.9"E	184/1	Meikal	Revenue	450	Existing OHT site	NOC Under progress
5	Sakthi Nagar	SPS-05	12°56'35.5"N 80°14'36.5"E	405/8A3	Punjai Tharisu	CMWSSB	14000	Vacant	NOC obtained
6	Mettukuppam Foundry Salai	SPS-06	12°56'29.4"N 80°14'03.7"E	106/2	Panchayat Land	CMWSSB	540	Vacant	NOC obtained
7	CTS Road	LS-01	12°55'29.3"N 80°13'44.6"E	-	-	Greater Chennai Corporation	-	Road Side	NOC Under progress
8	Pandian Salai	LS-02	12°56'15.4"N 80°14'43.5"E	-	-	Greater Chennai Corporation	-	Road Side	NOC Under progress
9	VPG Avenue	LS-03	12°56'22.7"N 80°14'03.0"E	113	GCC land	CMWSSB	50	Existing OHT site	Under possession of CMWSSB

SRI SAI NAGAR SPS01

CHANDRASEKARAN AVENUE PS – SPS02

AALIGANDESWARAR NAGAR MAIN ROAD PS – SPS03

SOOLAIAMA NAGAR PS – SPS04

SAKTHI NAGAR PS – SPS05 **METTUKUPPAM SALAI NAGAR PS –SPS06**

CTS LIFT STATION – LS01 **PANDIAN SALAI LIFT STATION – LS02**

VGP AVENUE LIFT STATION – LS03

Annexure 3
NOC obtained for lands and FMB sketch for proposed pumping station & Lift stations sites

Office Of Engineering Director, CMWSSB
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31 JAN 2020

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Office of the Managing Director, C.M.W.S.S.B.
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30 JAN 2020

பெருநகர சென்னை மாநகராட்சி
நிலம் மற்றும் உடைமைத்துறை

அனுப்புனர்:-

இணை ஆணையர் (பொ),
வருவாய் மற்றும் நிதி,
பெருநகர சென்னை மாநகராட்சி,
ரிப்பன் மாளிகை,
சென்னை-600 003.

பெறுநர்:-

மேலாண்மை இயக்குநர்,
சென்னை பெருநகர குடிநீர் வழங்கல் (ம)
கழிவுநீரகற்று வாரியம்,
சிந்தாதிரிப்பேட்டை,
சென்னை-600 002.

நி.ம.உ.து.ந.க.எண்.எல்இ8/1053/2019 நாள்: 30.01.2020

அய்யா,

பொருள்: பெருநகர சென்னை மாநகராட்சி - நிலம் (ம) உடைமைத்துறை சோழிங்கநல்லூர் வட்டம், ஒக்கியம் துரைப்பாக்கம் - மண்டலம் 15ல் அமைந்துள்ள பெருநகர சென்னை மாநகராட்சியின் கட்டுப்பாட்டில் உள்ள திறந்தவெளி (பூங்கா) நிலங்களை பாதாள சாக்கடை திட்டத்திற்காக சென்னை குடிநீர் வழங்கல் (ம) கழிவுநீரகற்று வாரியம் கோரியது - 5% நிலம் அத்தியாவசியம் கருதி சென்னை குடிநீர் மற்றும் கழிவு நீர் வழங்கல் வாரியத்திற்கு நிலம் மாற்றம் செய்ய மன்றத்தின் அனுமதி பெறப்பட்டது - தடையின்மை சான்று வழங்குவது - தொடர்பாக.

பார்வை: மேற்பார்வை பொறியாளர், சென்னை குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம் அவர்களின் 30.04.2019 நாளிட்ட கடிதம். (CMWSSB/CE(P)/ADB Projects/Manapakkam UGSS/SPS Sites/001/19).

2. தனி வட்டாட்சியர்/நிமஉது அவர்களின் 18.02.2019 நாளிட்ட புலத்தணிக்கை குறிப்பு.

3. மாவட்ட வருவாய் அலுவலர்/நிமஉது அவர்களின் 24.05.2019 நாளிட்ட கடிதம்.

4. மண்டல அலுவலர்-15 அவர்களின் 19.07.2019 நாளிட்ட கடிதம். (ம.அ.ம15/ந.க.எண்/02057/2019).

EE-III
3/2/20
SE(PBD)

5. ஆணையர், பெருநகர சென்னை மாநகராட்சி அவகளின் 03.10.2019 நாளிட்ட இவ்வலுவலக கடிதம்.

6. மாவட்ட வருவாய் அலுவலர்/நிமஉது அவர்களின் 06.11.2019 நாளிட்ட கடிதம்.

7. மண்டல அலுவலர்-15 அவர்களின் 29.11.2019 நாளிட்ட கடிதம். (ம.அ.ம15/ந.க.எண்/04827/2019).

S.E. (PBD) for SPK
3/2/20
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8. சிறப்பு அதிகாரி, மன்றத்தீர்மானம் எண். 024/2020, நாள்: 10.01.2020.

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பார்வை-1ன்படி, மேற்பார்வை பொறியாளர், சென்னை குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம் அவர்களின் கடிதத்தில், சோழிங்கநல்லூர் வட்டம், ஒக்கியம் துரைப்பாக்கம், மண்டலம்-15ல் அமைந்துள்ள கீழ்கண்ட அட்டவணையில் குறிப்பிடப்பட்டுள்ள பெருநகர சென்னை மாநகராட்சியின் கட்டுப்பாட்டில் உள்ள திறந்தவெளி (பூங்கா) நிலங்களை பாதாள சாக்கடை திட்டத்திற்காக சென்னை குடிநீர் வழங்கல் (ம) கழிவுநீரகற்று வாரியத்திற்கு ஒப்படைக்குமாறு கோரப்பட்டதைத்தொடர்ந்து 18.02.2019 அன்று கூட்டுப்புலத்தணிக்கை மேற்கொள்ளப்பட்டது.

பார்வை-2ன்படி, தனி வட்டாட்சியர்/நிமஉது அவர்களின் புலத்தணிக்கை குறிப்பில் பின்வரும் அட்டவணையில் கலம்-8ல் குறிப்பிடப்பட்டுள்ளவாறு அறிக்கை சமர்ப்பித்துள்ளார்.

வ. எண்	கிராமம்	இடம்	புல எண்	வகைப்பாடு	விஸ்தீரணம்	குறிப்பு
(1)	(3)	(4)	(5)	(6)	(7)	(8)
1	ஒக்கியம் துரைப்பாக்கம்	சந்திரசேகர் அவென்யூ 2 வது தெரு	253	திறந்தவெளி நிலம் (பூங்கா)	15 x 20 மீ	இத்திறந்தவெளி நிலத்தில் பெருநகர சென்னை மாநகராட்சியால் பூங்கா அமைக்கப்பட்டு பராமரிக்கப்பட்டு வருகிறது. இப்பூங்காவில் இடது புறமாக மேல்நிலை நீர்தேக்கத்தொட்டி அமைந்துள்ளது மற்றும் சிறிய பயன்பாட்டு அறை உள்ளது. இந்த பகுதியில் 15 x 20 ச.மீ இடம் பம்பிங் ஸ்டேஷன் அமைக்க தடையின்மை சான்று வழங்குவது தொடர்பாக பெருநகர சென்னை மாநகராட்சியின் பூங்காத்துறை (ம) மண்டல அலுவலரின் குறிப்புரையினை பெற்று நடவடிக்கை மேற்கொள்ளலாம்.
2	ஒக்கியம் துரைப்பாக்கம்	ஸ்ரீ சாய் நகர்	18 & 19	திறந்தவெளி நிலம் (பூங்கா)	15 x 20 மீ	இத்திறந்தவெளி நிலத்தில் பெருநகர சென்னை மாநகராட்சியால் பூங்கா அமைக்கப்பட்டு பராமரிக்கப்பட்டு வருகிறது, இப்பூங்காவில் இடது புறமாக மேல்நிலை நீர்தேக்கத் தொட்டிஅமைந்துள்ளது மற்றும் சிறிய பயன்பாட்டு அறை உள்ளது. இந்த பகுதியில் 15 x 20 ச.மீ இடம் பம்பிங் ஸ்டேஷன் அமைக்க தடையின்மை சான்று வழங்குவது தொடர்பாக பெருநகர சென்னை மாநகராட்சியின் பூங்காத்துறை (ம) மண்டல அலுவலரின் குறிப்புரையினை பெற்று நடவடிக்கை மேற்கொள்ளலாம்.

பார்வை-3ன்படி, மாவட்ட வருவாய் அலுவலர்/நிமஉது அவர்களின் மேற்படி நிலங்களை சென்னை குடிநீர் வழங்கல் (ம) கழிவுநீரகற்று வாரியத்திற்கு நிலமாற்றம் செய்வது தொடர்பான முழு- விவரத்துடன் கூடிய விரிவான அறிக்கையினை இவ்வலுவலகத்திற்கு அனுப்பி வைக்குமாறு மண்டல அலுவலர்-15 அவர்களை கேட்டுக்கொள்ளப்பட்டது.

பார்வை-4ன்படி, மண்டல அலுவலர்-15 அவர்களின் கடிதத்தில், வரிசை எண்-1ல் குறிப்பிடப்பட்டுள்ள மண்டலம்-15, வார்டு-194, ஒக்கியம் துரைப்பாக்கம், சந்திரசேகர் 2வது தெரு, புல எண். 253-ல் அமைந்துள்ள பூங்காவில் நடைபாதை, பசுமை பகுதி, திறந்தவெளி உடற்பயிற்சி கூடம் ஆகியவை பொதுமக்கள் பயன்படுத்தி வருகின்றனர். இந்நிலம் தானமாக பெறப்பட்ட திறந்தவெளி நிலமாகும். மேலும் இத்திறந்த வெளிநிலம் முந்தைய ஊராட்சியால் பூங்காவாக கட்டமைக்கப்பட்டும், பெருநகர சென்னை மாநகராட்சியால் சீரமைக்கப்பட்டும் வருகிறது. எனவே, பொதுமக்களின் முழு பயன்பாட்டில் உள்ள பூங்காவாக இருப்பதால் சென்னை பெருநகர குடிநீர் வழங்கல் (ம) கழிவுநீரேற்றும் தொட்டி அமைக்க இயலாத நிலையில் உள்ளது எனவும்,

வரிசை எண். 2ல் குறிப்பிடப்பட்டுள்ள மண்டலம்-15, வார்டு-193, ஒக்கியம் துரைப்பாக்கம், ஸ்ரீ சாய் நகர், புல எண். 18 மற்றும் 19-ல் அமைந்துள்ள பெருநகர சென்னை மாநகராட்சியின் கட்டுப்பாட்டில் உள்ள திறந்தவெளி பூங்கா தற்சமயம் இப்பகுதி மக்களின் முழு பயன்பாட்டில் உள்ளது. எனவே, பூங்காவினுள் பாதாள சாக்கடைத் திட்டத்திற்காக பம்பிங் ஸ்டேஷன் அமைக்க சென்னை குடிநீர் வழங்கல் (ம) கழிவுநீரகற்று வாரியத்திற்கு வழங்க இயலாத நிலை உள்ளது எனவும்தெரிவித்துள்ளார்.

மேற்காணும் நிலங்கள் திறந்தவெளி நிலங்கள் என்பதால் பின்வரும் விதிகளின்படி, The Parks, Playfields and Open spaces (Preservation and Regulation) Act No. 26 of 1959, Sub section (c) of Section 2 states as follows, "Open space means any land whether enclosed or not, belonging to the Government or any local authority, on which there are no buildings or of which not more than one-twentieth part is covered with buildings, and the whole or the remainder of which is used for purposes of recreation, air or light:

Also Section 6 as follows, No park, play-field or open space specified in the list published under section 4 or 5 shall, **except with the previous sanction of the Government**, be used for any purpose other than the purpose or purposes for which it was used on the date of the coming into force of this Act under sub-section (3) of section I or on the date with effect from which this Act is extended to the local area concerned under sub-section (4) of section I, as the case may be என தெரிவிக்கப்பட்டுள்ளது.

மேலும் உறுப்பினர் செயலாளர் சென்னை பெருநகர வளர்ச்சிக் குழுமம், அவர்களின் அரசுக்கு அனுப்பியுள்ள 12.05.2017 நாளிட்ட கடிதத்தில், sub-section 34 of section (2) defined the term, Tamil Nadu Town and Country Planning Act, 1971 "Public Open Space means any land whether enclosed or not belonging to the Central or any State Government or any local authority or anybody corporate, owned or controlled by the Central or any State Government, on which there is no building or of which not more that one-twentieth part is covered with buildings, and the whole or the remainder of which is used for purpose of recreation, air, or light". As per the above provision 5% of extent of OSR can alone be used for construction / development purpose எனவும் தெரிவிக்கப்பட்டுள்ளது.

திறந்தவெளி நிலங்கள் வேறு பயன்பாட்டிற்கு பயன்படுத்துவதை தவிர்த்திட வலியுறுத்தி பல்வேறு தீர்ப்புகள் மாண்புமிகு உயர்நீதிமன்றம் வழங்கியுள்ளது. போரூர் உதயா நகர் பகுதியில் திறந்தவெளி நிலத்தினை சென்னை குடிநீர் வழங்கல் (ம) கழிவுநீரகற்று வாரியத்திற்கு கழிவுநீர் உந்து நிலையம் அமைக்க வழங்கப்பட்டதை எதிர்த்து தொடரப்பட்ட வழக்கு எண். WP/10958/2010-ல் மேற்படி கழிவுநீர் உந்து நிலையம் வேறு பகுதிக்கு மாற்றம் செய்யப்பட்டதாக சென்னை குடிநீர் வழங்கல் (ம) கழிவுநீரகற்று வாரியம் தெரிவித்ததின்பேரில் மேற்படி வழக்கு 26.03.2018-ல் தள்ளுபடி செய்யப்பட்டது.

பார்வை-5ன்படி The Parks, Playfields and Open spaces (Preservation and Regulation) Act மற்றும் மண்டல அலுவலர்-15 அவர்கள் அளித்துள்ள அறிக்கையின் அடிப்படையிலும், மேற்படி இரண்டு பூங்காக்களிலும் பல வசதிகள் மேற்கொள்ளப்பட்டு பொதுமக்களின் முழு பயன்பாட்டில் உள்ளதாலும், மேலும் உயர்நீதிமன்ற அறிவுறுத்தல்கள்படியும் மேற்கண்ட பூங்கா நிலங்களில் பாதாள சாக்கடை திட்டப்பணிகள் மேற்கொள்ள அரசு மூலம் உரிய விலக்களித்திட (Relaxation) அரசாணை பெற்றிடுமாறு மேலாண்மை இயக்குநர், சென்னை குடிநீர் வழங்கல் (ம) கழிவுநீரகற்று வாரியம் அவர்களுக்கு தெரிவிக்கப்பட்டது.

பார்வை 6ன்படி நிலமாற்றம் சம்பந்தமாக முதன்மை செயலர், நகராட்சி நிர்வாகம் (ம) குடிநீர் வழங்கல் துறை அவர்களின் தலைமையில் நடைபெற்ற கலந்தாய்வுக்கூட்டத்தில், மேற்படி மேற்படி திட்டத்தை செயல்படுத்த அப்பகுதியில் வேறு அரசுக்கு சொந்தமான காலி நிலங்கள் ஏதும் இல்லாததாலும், அப்பகுதி மக்களின் பாதாள சாக்கடைக்கான அத்தியாவசியமான திட்டமாக இருப்பதாலும், சென்னை குடிநீர் வழங்கல் (ம) கழிவுநீரகற்று வாரியத்திற்கு பணிகள் மேற்கொள்ள விதிகளின்படி திறந்தவெளி பூங்காவில் 5% மட்டும் நிலம் வழங்க அறிவுறுத்தப்பட்டதால், மண்டல அலுவலர், மண்டலம் 15 அவர்களிடம் விரிவான அறிக்கை கோரப்பட்டது.

பார்வை 7ல் கண்ட மண்டல அலுவலர், மண்டலம்-15 அவர்களின் அறிக்கையில் கோட்டம் 193ல் ஸ்ரீ சாய் நகர் பூங்காவில் மொத்த பரப்பில் 6821 சதுர மீட்டரில் 5 சதவீதத்தின்படி 19 ச.மீ. பரப்பளவு நிலம் போக கோரிய 322 ச.மீ. நிலம் வரை திட்டத்திற்கு பயன்படுத்தலாம். கோட்டம் 194ல் சந்திரசேகர் அவென்யு பூங்காவில் மொத்த பரப்பு 4542 சதுர மீட்டரில் 5 சதவீதத்தின்படி 227 ச.மீ. பரப்பளவு கட்டிடங்கள் கட்டலாம் எனவும், மேலும் கட்டிடங்களின் பரப்பளவு 80 ச.மீ. போக மீதம் 147 ச.மீ. நிலம் இத்திட்டத்திற்கு பயன்படுத்தலாம் என தெரிவித்துள்ளார்.

பார்வை-14ன்படி, சிறப்பு அதிகாரி, மன்றத்தீர்மானம் எண். 023/2020, நாள்: 10.01.2020ன்படி, The Parks, Playfields and Open spaces (Preservation and Regulation) Act கருத்திற்கொண்டு முதன்மை செயலர் நகராட்சி நிர்வாகம் (ம) குடிநீ வழங்கல் துறை அவகள் தலைமையில் நடைபெற்ற கலந்தாய்வு கூட்டத்தில் முடிவெடுத்தப்படி சென்னை குடிநீர் வழங்கல் (ம) கழிவு நீரகற்று வாரியத்திற்க அத்தியாவசிய அடிப்படையில் மேற்படி புலம் தேவை என்பதாலும், மண்டல அலுவலர்-14 அவர்களின் அறிக்கையின் அடிப்படையில் கோட்டம் 193ல் ஸ்ரீ சாய் நகர் பூங்காவில் மொத்த பரப்பு 6821 சதுர மீட்டரில் 5 சதவீதத்தின்படி 341 ச.மீ. பரப்பளவு வருகிறது எனவே, கோரப்பட்ட 300 சதுர மீட்ட நிலம் வரை திட்டத்திற்கு பயன்படுத்தலாம். கோட்டம் 194ல் சந்திரசேகர் அவென்யு பூங்காவில் மொத்த பரப்பு 4542 சதுர மீட்டரில் 5 சதவீதத்தின்படி 227 ச.மீ. பரப்பளவு கட்டிடங்கள் கட்டலாம் ஆனால் தற்போதுள்ள கட்டிடங்களின் பரப்பளவு 80 ச.மீ. போக மீதம் 147 ச.மீ. நிலத்தில் மட்டும் பாதாள சாக்கடை திட்டப் பணிகள் மேற்கொள்ள சென்னை குடிநீர் வழங்கல் (ம) கழிவுநீரகற்று வாரியத்திற்கு தடையின்மை சான்று வழங்க சிறப்பு அதிகாரி, நிலைக்குழு வரிவிதிப்பு (ம) நிதி மூலமாக மன்றத்தின் அனுமதி அளிக்கப்பட்டது.

எனவே, இந்நேர்வில், மேற்படி சோழிங்கநல்லூர் வட்டம், ஒக்கியம் துரைப்பாக்கம் கிராமம், மண்டலம்-15,

- கோட்டம்-193, **ஸ்ரீ சாய் நகர்** பூங்காவில் மொத்த பரப்பு 6821 சதுர மீட்டரில் 5 சதவீதத்தின்படி 341 ச.மீ. பரப்பளவு வருகிறது எனவே, கோரப்பட்ட 300 சதுர மீட்ட நிலம் வரை திட்டத்திற்கு பயன்படுத்தலாம் எனவும் மற்றும்
- கோட்டம் 194ல் **சந்திரசேகர் அவென்யூ** பூங்காவில் மொத்த பரப்பு 4542 சதுர மீட்டரில் 5 சதவீதத்தின்படி 227 ச.மீ. பரப்பளவு கட்டிடங்கள் கட்டலாம் ஆனால் தற்போதுள்ள கட்டிடங்களின் பரப்பளவு 80 ச.மீ. போக மீதம் 147 ச.மீ. நிலத்தில் மட்டும் பாதாள சாக்கடை திட்டப் பணிகள் மேற்கொள்ள சென்னை குடிநீர் வழங்கல் (ம) கழிவுநீரகற்று வாரியத்திற்கு இதன் மூலம் தடையின்மை சான்று வழங்கப்படுகிறது.

ஒம்/-XXXX, நாள்: 30.01.2020

இணை ஆணையர் (வருவாய் (ம) நிதி)(பொ)

//உத்தரவின்படி.//அனுப்பப்படுகிறது//

30/01/2020

கண்காணிப்பாளர்/நிமஉது

1535

CHENNAI METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD

SAVE WATER

C.VIJAYARAJ KUMAR, I.A.S.,
Principal Secretary / Managing Director

D.O.Lr.No.CMWSSB/P&D/ WSS-UGSS / lands/Spl/ 2022. Dt: 10.06.2022

Dear Tmt. S.Amirtha Jothi,

Sub: CMWSSB – P&D – Providing UGSS&WSS to Newly Added Areas of Greater Chennai City – DPRs submitted for fund tie up – Alienation process to be speeded up for issue of enter upon permission for Revenue Lands identified for Construction of Sewage Pumping Stations and Water Distribution Station –requested – Reg.

Ref: 1. Lr.No.CMWSSB/P&D/13UGSS/SPL/2021 Dt:31.03.2021
2. D.O.Lr.No.CMWSSB/P&D/13UGSS/SPL/2021 Dt:26.07.2021
3. Lr.No.CMWSSB/P&D/WSS-UGSS/Revenue lands/SPL/2021 Dt:21.10.2021
4. Lr.(Ms.)No.294/MIA.1/2021-1, Dt:02.11.2021
5. Lr.No.CMWSSB/P&D/WSS-UGSS/Revenue lands/SPL/2022 Dt:06.01.2022
6. Lr.No.CMWSSB/P&D/WSS-UGSS/Revenue lands/SPL/2022 Dt:25.03.2022.

*****

CMWSSB is a statutory body which provides water supply and sewerage facilities to the residents of Chennai City. 42 ULB's were added to Chennai City during 2009 vide G.O. No.256 MA&WS department dated 26.12.2009.

As on date, out of the 42 ULB's, Water Supply Schemes (WSS) are completed in 27 areas, work under progress in 13 areas and work to be taken up in 2 areas namely Neelankarai & Semmencherry.

Similarly out of the 42 ULB's, Under Ground Sewerage Schemes (UGSS) are completed in 17 areas, work under progress in 8 areas and work to be taken up in 17 areas namely Kottivakkam, Palavakkam, Neelankarai, Injambakkam, Semmancherri, Uthandi, Madipakkam, Nandambakkam, Theeyambakkam, Vadaperumbakkam, Puzhal, Mathur, Jalladampettai, OkkiumThoraipakkam, Edayanchavadi, Sadayankuppam, Kadapakkam and left out areas of Madhavaram.

Detailed Project Reports (DPRs) have been prepared for Providing Water Supply Schemes to 2 newly added areas and Providing Under Ground Sewerage Schemes (UGSS) to 17 newly Added Areas of Greater Chennai City.

75, Santhome High Road, MRC Nagar, Chennai - 600028 Phone : +91-44-29520300, 2845 9000
email : md@cmwssb.in www.chennaimetrowater.tn.gov.in

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In this regard, it is to be stated that Announcement was made by the Hon'ble Minister, Municipal Administration on the floor of the Legislative Assembly that UGSS works in the 17 added areas of Chennai City and 2 WSS works will be taken up this year.

I invite kind attention to the references cited, wherein during preparation of DPRs for the UGSS and WSS to the added areas of Chennai City, Government Poramboke lands were identified for construction of water distribution stations and sewage pumping stations.

The following details are submitted with regard to issue of Enter Upon Permission for the lands.

A letter was sent on 31.03.2021, vide the reference 1st cited for the issue of Enter Upon Permission for 12 lands in Palavakkam(S.No.3/2), Kottivakkam(S.No.234/59A), Karappakkam (S.No.176/1), Injambakkam (S.No.14/3), Okkium Thoraipakkam(S.No.184/1 & S.No.205/2B), Uthandi (S.No.35/1), Semmenchery (S.No.395,396), Neelankarai (S.No.82/1 &Sy.No.83), Nandambakkam (S.No.136/1A1).

Subsequently request was sent for issue of Enter Upon Permission for 6 lands in Palavakkam (S.No.43), Jalladampettai (S.No.135/3 & S.No.231/1), Uthandi (S.No.3/1), Puzhal (S.No.279) and Semmencherri (S.No.402) on 21.10.2021, vide the reference 3rd cited.

Out of the 18 lands for which request were made, With regard to land in Nandambakkam (S.No.136/1A1) NOC have been issued by Industries Department on 02.11.2021 vide reference 4th cited and alienation proposal has been sent to the Government.

With regard to land in Puzhal (S.No.279), alternate land was identified at Puzhal (S.No.377) and request was sent for issuance of Enter Upon Permission on 25.03.2022 vide reference 6th cited.

The details of land are as follows :

S. No.	Land requested	UGSS / WSS	Survey No.	Land Extent required	Classifi -cation	Date of Application	Present status
1	Palavakkam Anna Salai	UGSS	3/2	(15m x 20m, 300 sq.m.)	Meikkal	25.09.2018 Reminder sent on 20.03.2019, 10.08.2019, 20.02.2020, 14.05.2020, 29.09.2020, 31.03.2021, 26.07.2021, 06.01.2022	RDO inspection has been made Enter upon Permission awaited

1539

S. No	Land requested	UGSS / WSS	Survey No.	Land Extent required	Classifi -cation	Date of Application	Present status
2	Kottivakkam Venkateswara Nagar	UGSS	234/ 59A	(38m x 22m, 836 sq.m.)	ULC Land	27.10.2013 Reminder sent on 20.03.2019, 10.08.2019, 20.02.2020, 14.05.2020, 29.09.2020, 31.03.2021, 26.07.2021, 06.01.2022	Enter upon Permission awaited
3	Karappakkam Near Statistical Department site	UGSS	176/1	(100m x 100m, 10000 sq.m.)	Tharisu	25.10.2019 Reminder sent on 20.02.2020, 14.05.2020, 29.09.2020, 31.03.2021, 26.07.2021, 06.01.2022	Proposal has been sent by RDO on 08.03.2022 Enter upon Permission awaited
4	Uthandi Gangaiamman koil street Near Uthandi WSS site	UGSS	35/1	(22m x 15m, 330 sq.m.)	Tharisu	31.12.2019 Reminder sent on 14.05.2020, 29.09.2020, 31.03.2021, 26.07.2021, 06.01.2022	Enter upon Permission awaited
5	Semmenchery Ezhilmigu Nagar	WSS	395 & 396	(100m x 100m, 10000 sq.m.)	Tharisu	24.03.2015 Reminder sent on 20.03.2019, 10.08.2019, 20.02.2020, 14.05.2020, 31.03.2021, 26.07.2021, 06.01.2022	Joint inspection made on 14.03.2022 Enter upon Permission awaited

1541

S. No.	Land requested	UGSS / WSS	Survey No.	Land Extent required	Classifi -cation	Date of Application	Present status
6	Nandambakkam Near River View road (IDPL Land)	UGSS	136/ 1A1	(54m x 19m, 1026 sq.m.)	Industri al land	29.01.2019 Reminder sent on 06.02.2019, 20.03.2019, 16.04.2019, 10.08.2019, 20.02.2020, 14.05.2020, 31.03.2021, 26.07.2021, 06.01.2022	NOC issued (for 600 sq.m) by Industries dept on 02.11.2021 Tahsildar sent proposal to RDO on 05.05.2022
7	Palavakkam Jaishankar Nagar	UGSS	43	(25m x 20m, 500 sq.m.)	Tharisu	21.10.2021 Reminder sent on 06.01.2022	Enter upon Permission awaited
8	Jalladampettai Kannadasan street (Anchenaya nagar, Near Casa Grande)	UGSS	135/3	(15m x 15m, 225 sq.m.)	Tharisu	21.10.2021 Reminder sent on 06.01.2022	Enter upon Permission awaited
9	Jalladampettai Gandhi Street	UGSS	231/1	(20m x 20m, 400 sq.m.)	Tharisu	21.10.2021 Reminder sent on 06.01.2022	Enter upon Permission awaited
10	Uthandi Sampath street	UGSS	3/1	(50m x 50m, 2500 sq.m.)	Grama natham	21.10.2021 Reminder sent on 06.01.2022	Enter upon Permission awaited
11	Puzhal Kanchi Nagar 1st street	UGSS	377	(40m x 30m, 1200 sq.m.)	Grama natham	25.03.2022	Enter upon Permission awaited
12	Semmencherri Semmencheri	WSS and UGSS	402	(150m x 150m, 22500 sq.m.)	Tharisu	21.10.2021 Reminder sent on 06.01.2022	Enter upon Permission awaited

1543

S. No	Land requested	UGSS / WSS	Survey No.	Land Extent required	Classifi -cation	Date of Application	Present status
13	Okkium Thoraipakkam Soolaima Nagar	UGSS	184/1	(20m x 25m, 500 sq.m.)	Meikal	26.05.2014 Reminder sent on 20.03.2019, 10.08.2019, 20.02.2020, 14.05.2020, 29.09.2020, 31.03.2021, 26.07.2021, 06.01.2022	Already OHT is available in site Joint Inspection made on 04.03.2022 Enter upon Permission awaited
14	Okkium Thoraipakkam Aaligandeswarar nagar	UGSS	205/2 B	(30m x 30m, 900 sq.m.)	ULC	26.05.2014 Reminder sent on 20.03.2019, 10.08.2019, 20.02.2020, 14.05.2020, 29.09.2020, 31.03.2021, 26.07.2021, 06.01.2022	Already OHT is available in site Enter upon Permission awaited
15	Injambakkam Harichandra Salai	UGSS	14/3	(40m x 40m, 1600 sq.m.)	Manda veli	27.10.2013 Reminder sent on 20.03.2019, 10.08.2019, 20.02.2020, 14.05.2020, 29.09.2020, 31.03.2021, 26.07.2021, 06.01.2022	Used by GCC for parking SWM electric vehicles Enter upon Permission awaited
16	Vadaperumbakkam Samuel Nagar	UGSS	201/3 3, 34A	(20m x 20m, 400 sq.m.)	Burial Ground	04.10.2018 Reminder sent on 07.02.2019, 29.04.2019, 10.08.2019, 02.02.2020, 14.05.2020, 29.09.2020, 31.03.2021, 26.07.2021, 06.01.2022	NOC obtained from GCC on 21.10.2021 Enter upon Permission awaited

1545

S. No.	Land requested	UGSS / WSS	Survey No.	Land Extent required	Classifi -cation	Date of Application	Present status
17	Neelankarai Junction ECR and Singaravelan salai	WSS	82/1	(40m x 40m, 1600 sq.m.)	Govt.v acant land, Fisheri es depart ment	29.09.2020 Reminder sent on 31.03.2021, 26.07.2021, 06.01.2022	Enter upon Permission awaited
18	Neelankarai Kapaleeshwarar Nagar 3rd main road North	WSS	83	(20m x 30m, 600 sq.m.)	ULC	29.01.2019 Reminder sent on 20.03.2019, 10.08.2019, 20.02.2020, 14.05.2020, 26.07.2021, 06.01.2022	Enter upon Permission awaited

Hence, Enter Upon Permission for 18 lands are yet to be received from District Collector. With regard to these lands a D.O. letter has been sent vide reference 2nd cited dated 26.07.2021 and also a request letter has been sent vide reference 5th cited on 06.01.2022.

In particular it is to be stated that, tenders have been called for the Neelankarai WSS on 23.03.2022 with the due date for opening on 29.04.2022. Tender has been received on 29.04.2022 and it is under evaluation. The Administrative Sanction for the scheme was also awarded vide G.O.(Ms)No.62, Municipal Administration & Water Supply (MA2) Department, Dated 28.04.2022. Hence any one of the lands in Sl.No.17 & 18 is urgently needed for taking up the works.

It is to be stated that the DPRs for the 1 WSS and 16 UGSS were submitted to the funding agencies viz. TUFIDCO and TNUIFSL for funding under AMRUT 2.0 and KfW. The DPRs are being appraised by the TUFIDCO&TNUIFSL.

As per guidelines of AMRUT 2.0, the lands for construction of water distribution station and sewage pumping stations have to be under the procession of CMWSSB and the funding agency may inspect the lands during appraisal.

1547

I am to state that all the above lands are situated in the added villages of Chennai Corporation where the Water supply and proper sewage disposal are to be developed in war footed manner, forecasting the growth of population in the above mention areas. Hence I request that enter upon permission may kindly be issued for initiation of the projects at our end.

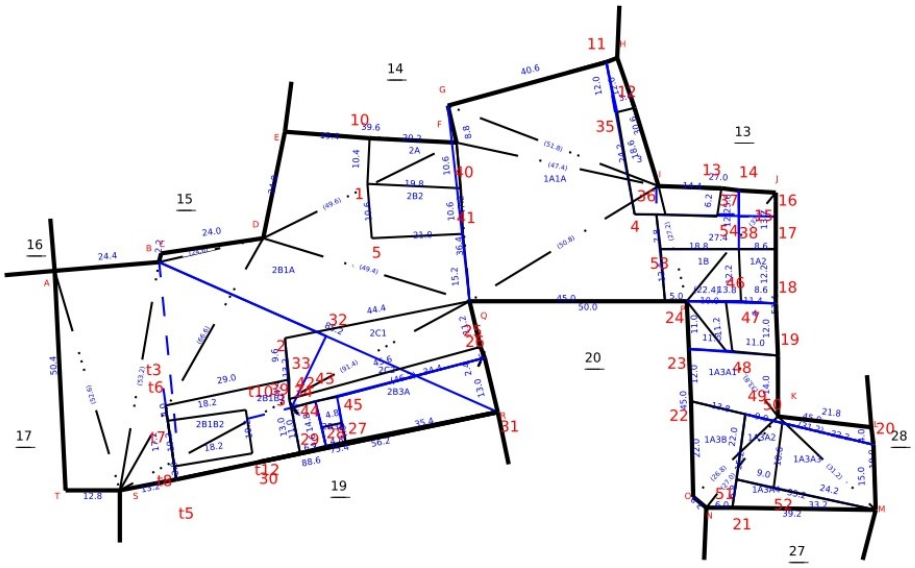
With regards,

PRINCIPAL SECRETARY / MANAGING DIRECTOR

To
Tmt. S.Amirtha Jothi, I.A.S.
District Collector,
Chennai District,
Chennai – 600 001

Copy Submitted to:
Additional Chief Secretary to Government
Municipal Administration and Water Supply Department
Secretariat,
Chennai – 600 009.

District : Chennai	Survey No : 18
Taluk : Sholinganallur	Area : Hect 00 Ares 99.13
Village : Okkkiyam Thorambakka [9]	Scale : 1 : 1416



Date of Issue: 17-07-2022 23:08:42 mv.260

Survey and Settlement Department, Government of TamilNadu

District : Chennai

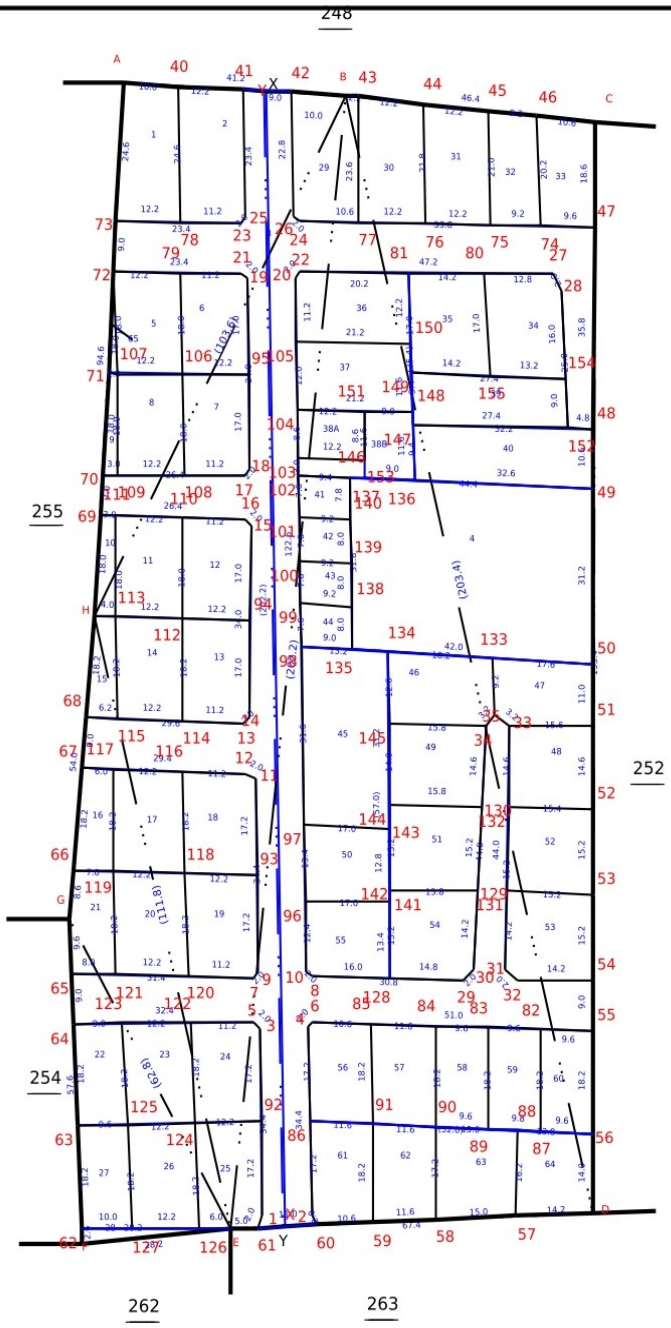
Taluk : Sholinganallur

Village : Okkkiyam Thorambakka [9]

Survey No : 253

Area : Hect 01 Ares 80.50

Scale : 1 : 1103



Date of Issue: 17-07-2022 23:12:02

mv.240

Survey and Settlement Department, Government of TamilNadu

District : Chennai

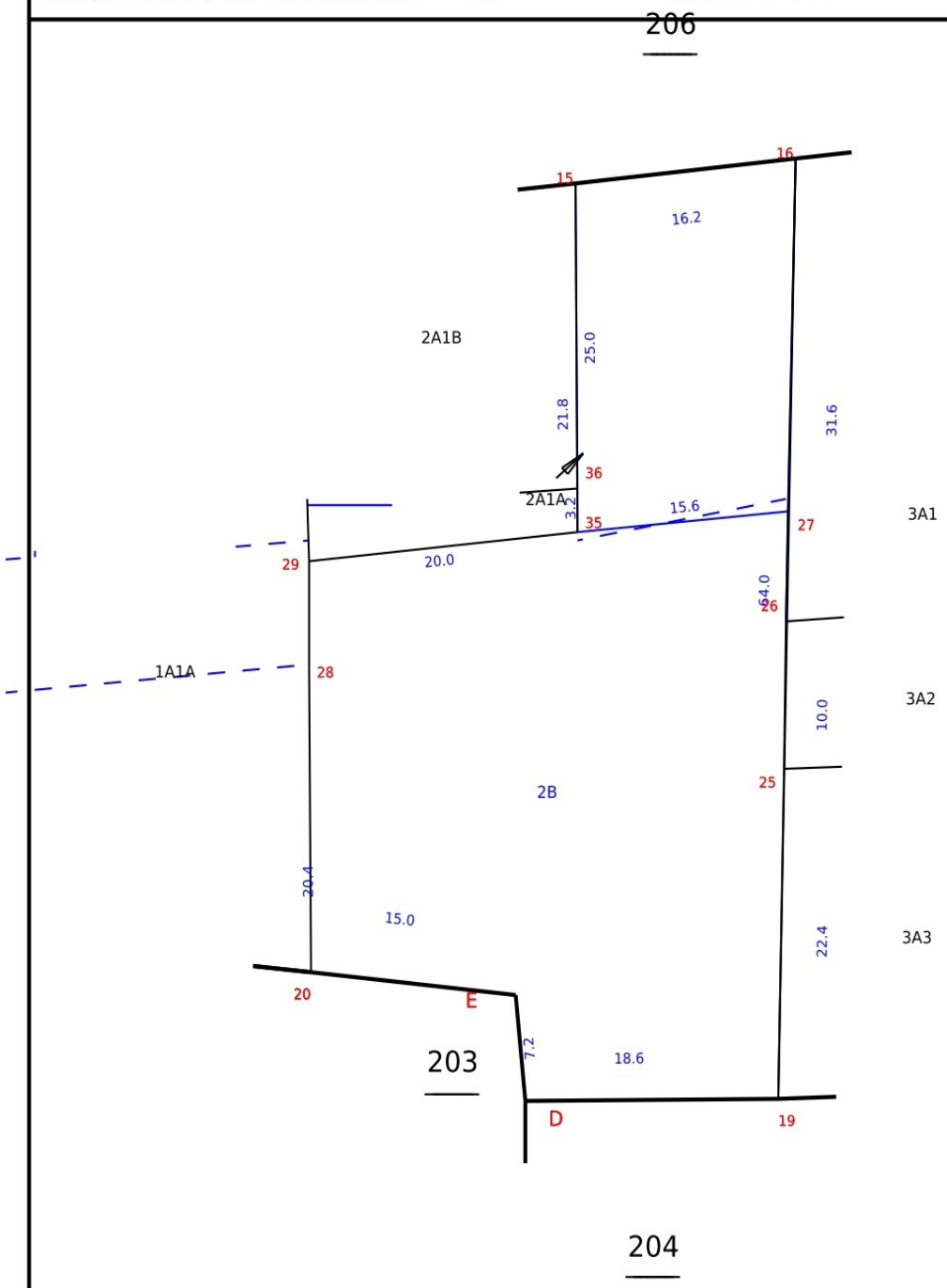
Taluk : Sholinganallur

Village : Okkkiyam Thorambakka [9]

Survey No : 205/2B

Area : Hect 00 Ares 15.89

Scale : 1 : 400



Date of Issue: 16-07-2022 16:24:33

mv.240

Survey and Settlement Department, Government of TamilNadu

District : Chennai

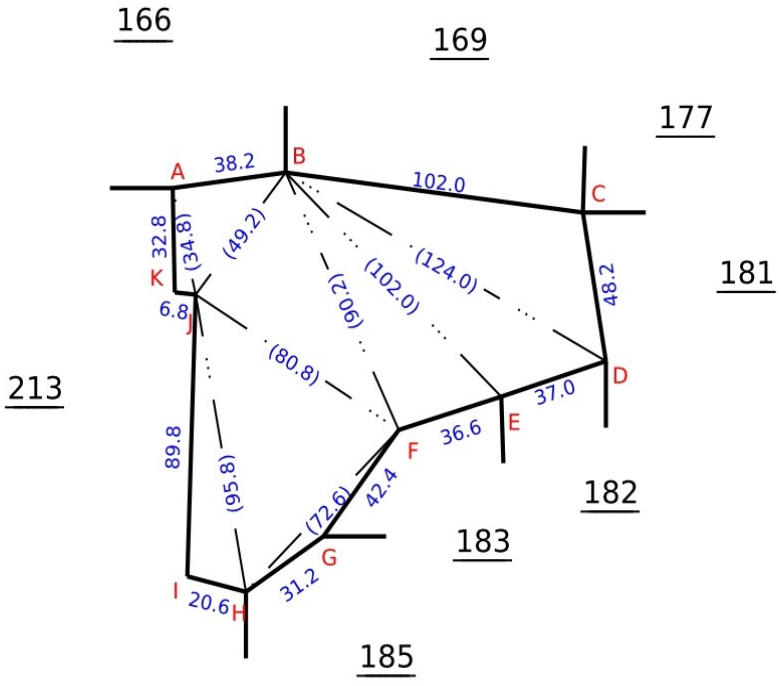
Taluk : Sholinganallur

Village : Okkkiyam Thorambakka [9]

Survey No : 184

Area : Hect 01 Ares 32.00

Scale : 1 : 2000



Date of Issue: 16-07-2022 15:46:30

mv.240

Survey and Settlement Department, Government of TamilNadu

District : Chennai

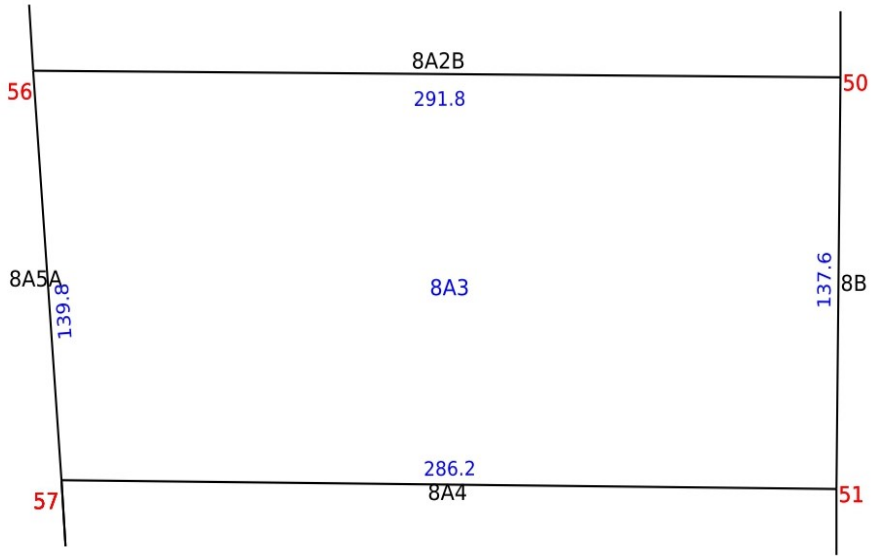
Taluk : Sholinganallur

Village : Okkkiyam Thorambakka [9]

Survey No : 405/8A3

Area : Hect 04 Ares 9.83

Scale : 1 : 2125



Date of Issue: 16-07-2022 15:48:20

mv.260

Survey and Settlement Department, Government of TamilNadu

District : Chennai

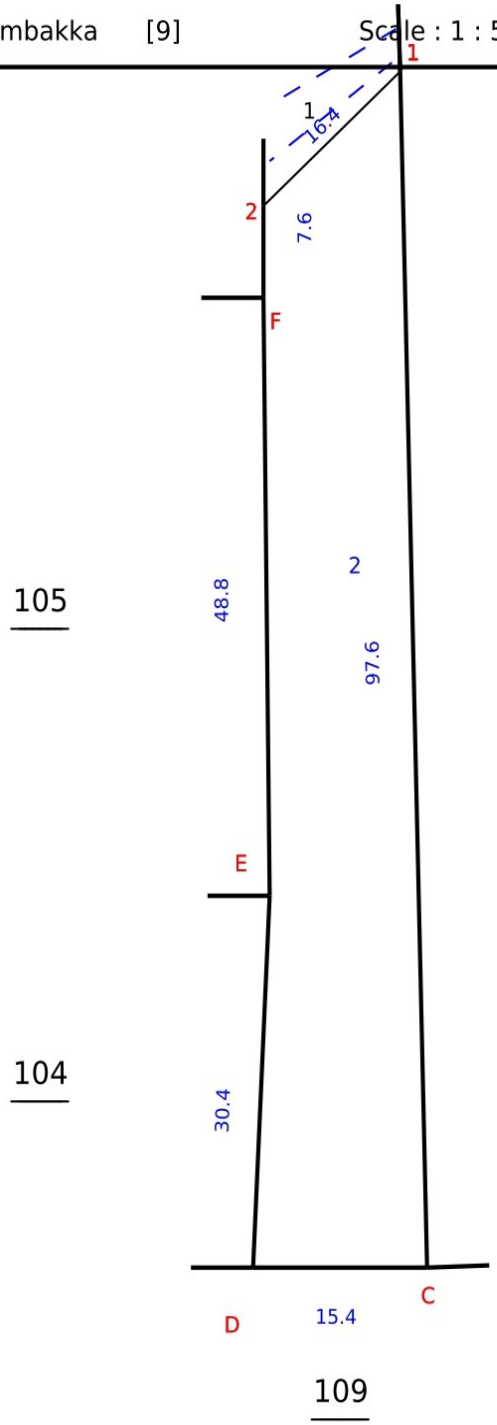
Survey No : 106/2

Taluk : Sholinganallur

Area : Hect 00 Ares 12.50

Village : Okkkiyam Thorambakka [9]

Scale : 1 : 518



Date of Issue: 16-07-2022 15:53:58

mv.240

Survey and Settlement Department, Government of TamilNadu

District : Chennai

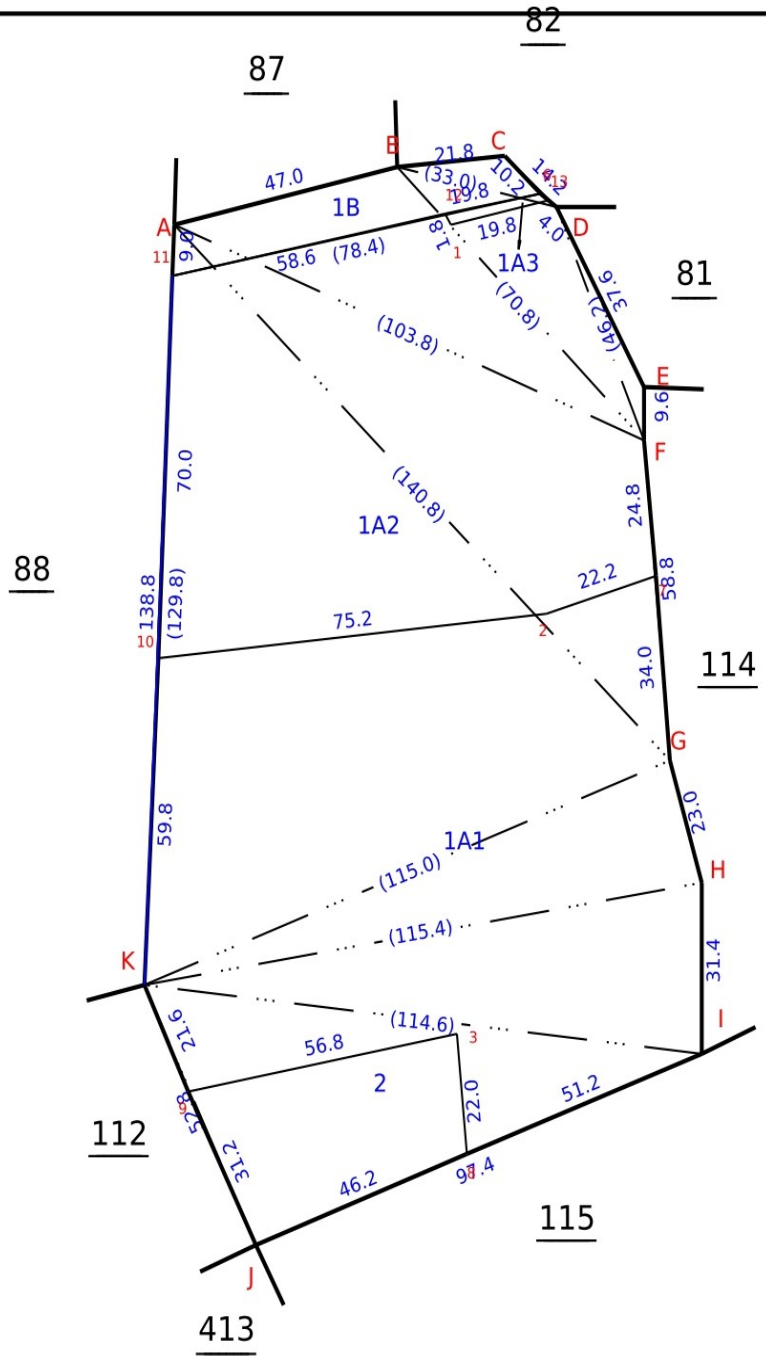
Taluk : Sholinganallur

Village : Okkkiyam Thorambakka [9]

Survey No : 113

Area : Hect 01 Ares 79.50

Scale : 1 : 1150



Date of Issue: 17-07-2022 23:10:26

mv.240

Survey and Settlement Department, Government of TamilNadu

Annexure 4
Public Information Notice Template

Public Announcement
Providing Underground Sewerage System to OkkiumThoraipakkam

Under this project, works are being conducted by xxxx Contractor to provide sewerage network in Okkium Thoraipakkam area in Greater Chennai Corporation.

As part of this, works for laying pipeline / sewerage network will be taken up in -------- road---/ street/ lane ……. From……to (provide dates).

We request you to kindly co-operate for smooth implementation of the works.

We also request you to drive vehicles / pedestrians to walk carefully

Inconvenience caused is regretted.

PIU - Contact No.
Contractor – Contact no.

Annexure 5
Sample Grievance Registration Form

(To be available in Tamil and English)

The _____Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.
Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

<table>
<tr><td>Date</td><td colspan="2">Place of registration</td><td colspan="4">Project Town

Project:</td></tr>
<tr><td colspan="6">Contact information/personal details</td></tr>
<tr><td>Name</td><td colspan="2"></td><td>Gender</td><td>* Male
* Female</td><td>Age</td><td></td></tr>
<tr><td>Home address</td><td colspan="5"></td></tr>
<tr><td>Place</td><td colspan="5"></td></tr>
<tr><td>Phone no.</td><td colspan="5"></td></tr>
<tr><td>E-mail</td><td colspan="5"></td></tr>
<tr><td colspan="6">Complaint/suggestion/comment/question Please provide the details (who, what, where, and how) of your grievance below:

If included as attachment/note/letter, please tick here:</td></tr>
<tr><td colspan="6">How do you want us to reach you for feedback or update on your comment/grievance?</td></tr>
</table>

FOR OFFICIAL USE ONLY

Registered by: (Name of official registering grievance)	
Mode of communication: Note/letter E-mail Verbal/telephonic	
Reviewed by: (Names/positions of officials reviewing grievance)	
Action taken:	
Whether action taken disclosed:	Yes No
Means of disclosure:	

Annexure 6
Calculation of Energy efficiency by using VFD starter for pumps

S. No	Description	Pump HP	Energy Consumption per day using conventional starter (kWh)	Energy Cost per day @ Rs.6.35 using conventional starter	Energy Cost per Year using conventional starter	Energy Consumption per day using VFD starter (kWh)	Energy Cost per day @ Rs.6.35 using VFD starter	Energy Cost per Year using VFD starter	Energy Cost Saving	% of energy efficiency for one year (2025)
1	Sri Sai Nagar SPS01	10 HP (3 Nos)	132	832.20	301752.00	73.02	464.00	166928.55	134823.45	55.32
2	SPS02 - Chandra Sekaran	40 HP (3 Nos)	572	3632.20	1307592.00	282.09	1791.25	644850.34	662741.66	49.32
3	SPS03 - Alagandeswarai Nagar	80 HP (3 Nos)	596	3784.60	1362456.00	307.16	1950.44	702157.59	660298.41	51.54
4	SPS04 - Soolaiamman Nagar	7.5 HP (2 Nos)	88	558.80	201168.00	37.11	235.64	84830.55	116337.45	42.17
5	SPS05 - Sakthi Nagar	35 HP (3 Nos)	435	2762.25	994410	186.70	1185.53	426789.21	567620.79	42.92
6	SPS06 - Mettukuppam Salai	15 HP (3 Nos)	239	1517.65	546354	124.99	793.69	285728.92	260625.08	52.30

Annexure 7
Stakeholders Engagement Plan

Pre-Construction
An overall consultation with the general public and other stakeholders has been planned by CMWSSB prior to start of project construction for the UGSS to Okkiyam Thoraipakkam.

During Construction
The engagement with the project stakeholders will be continued as required during the project implementation and the strategy is provided as below.

Stakeholder Engagement and Information Disclosure Strategy				
Project : Underground Sewerage Scheme in Okkium Thoraipakkam – Laying of *collection system, trunk main/pumping mains, and construction of Lift Stations/ Pumping Stations*				
Target stakeholders	**Information to be disclosed**	**Proposed engagement & disclosure method**	**Timing of Engagement**	**Responsible Parties**
1. Project Affected Persons- impacted by temporary economic or physical displacement- tenants/ hawkers/ vendors on alignments	• Project design details, alignments and their impacts • Provisions for compensating economic and physical displacement, timelines for completing rehabilitation • Communication on final rehabilitation/ compensation approved by govt. • Grievance mechanism in place	• FGDs and small group consultations • Print-Newspaper, Newsletter / leaflets/ Pamphlet • Radio information capsules	• At least twice- before & after compensating • During alignment/ PS works	• PIU/CMWSSB • Contractor
Households / people residing along alignment of transmission lines or in proximity to PS sites	• Project design details, planned alignments and their impacts • Design and site alternatives explored for impact minimization • Accidents and road safety/ traffic	• Newsletters/ pamphlets/ flyers • Focus group discussions • TV-Radio-Print-	• Continuous, as required in construction stage • One week prior to start of construction in the respective stretches	• PIU/CMWSSB • Contractor

Stakeholder Engagement and Information Disclosure Strategy				
Project : Underground Sewerage Scheme in Okkium Thoraipakkam – Laying of *collection system, trunk main/pumping mains, and construction of Lift Stations/ Pumping Stations*				
Target stakeholders	**Information to be disclosed**	**Proposed engagement & disclosure method**	**Timing of Engagement**	**Responsible Parties**
	management issues and measures planned to be in place; • Information on likely disruptions to services and arrangement during construction including its duration and likely timings • Management of air and noise pollution; Disruption to services and arrangement during construction • Community and Occupational Safety measures planned for; • Excavation works-sludge/ earth disposal plans • Labour management plans/ proposed camp sites • Grievance mechanism process	Digital based information dissemination • Helpline/ Toll-free numbers displayed at project locations and prominently accessed areas • Suggestion boxes at site offices	•	
Other Interested Parties: • Resident Welfare Associations (RWAs) • Elected Reps of Municipal Corporation	• Project design details, planned alignments and their impacts • Design and site alternatives explored for impact minimization • Accidents and road safety/ traffic management issues and measures	• One-on-one meetings • Formal Small group meetings • Open forums and Town-hall meetings	• Continuous, as and when required during construction	• PIU/CMWSSB • Contractor

Stakeholder Engagement and Information Disclosure Strategy				
Project : Underground Sewerage Scheme in Okkium Thoraipakkam – Laying of *collection system, trunk main/pumping mains, and construction of Lift Stations/ Pumping Stations*				
Target stakeholders	**Information to be disclosed**	**Proposed engagement & disclosure method**	**Timing of Engagement**	**Responsible Parties**
• Civil Society Organisations • Print and Tele Media • Staff of Line departments • Service providers and duty bearers • Staff of Municipal Corporations • Community / Religious leaders • Regulatory agencies	planned to be in place; • Information on likely disruptions to services and arrangement during construction including its duration and likely timings • Community and Occupational Safety measures planned for WTP/ OHSR constructions and transmissions; • Excavation works-sludge/ earth disposal plans • Labour management plans/ proposed camp sites • Grievance mechanism process	for RWAs and ERs • Formal presentations to closed groups like regulators, service providers and duty bearers		
Civil Works Contractor, staff & subcontractors	• Project design details, alternatives, planned alignments and their impacts • Baseline information on environmental and social aspects • Project's induced environmental and social risk • Accidents & road safety/ traffic management measures planned • Orientation on EHS provisions • Sexual harassment provisions and	• Provisions in Bid/ contract documents • One-on-One and formal small group meetings/ discussions • Formal presentations/ training to contractors project management team	• Once, at the time of contract signing and orientation during pre-construction phase • Periodic briefings and orientation at site • Feedback as and when required on site and monitoring reports	• PIU/CMWSSB • Contractor

Stakeholder Engagement and Information Disclosure Strategy				
Project : Underground Sewerage Scheme in Okkium Thoraipakkam – Laying of *collection system, trunk main/pumping mains, and construction of Lift Stations/ Pumping Stations*				
Target stakeholders	**Information to be disclosed**	**Proposed engagement & disclosure method**	**Timing of Engagement**	**Responsible Parties**
	requirements • Labor Management Procedures • Orientation on RAP implementation and requirements • ESIA requirements and measures proposed • Grievance mechanism proposed under the project, requirements • Feedback on consultant/ contractor implementation and supervision reports			

S. No.	Aspect	Mitigation measures	Responsibility	Implementation stage	Monitoring method	Performance Indicator	Frequency
1	Public disclosure	Placement of hoarding at public and prominent places indicating in English and Tamil language project details, name and contact number of Convenor and the Contractor.	Convenor/ Contractor	Pre-construction phase	No. of hoardings and locations chosen	Effectiveness of message communicated	Once
2	Conduct consultations	Understand the perception of stakeholders, the positive	PMC E&S experts, Contractor EHS	Project life cycle beginning from	Site observations,	Procedure followed for	Conduct consultatio

	with the beneficiaries, local communities and other stakeholders	and negative impact of the project; Analyse the concerns and issues of potential temporary economic impacts, local communities and other stakeholders; Address the concerns raised as per ESMP provisions; and Implementation of project with a Gender responsiveApproach.	officer/ Project Manager and Convenor of PIU	the early stage of pre-construction	Review of available documents; Support or opposition of stakeholders inproject activities; Project progress level; And Consultations conducted with stakeholders.	conducting consultation; No. of meetings/ consultations held; No. of participants in each meeting; Profile of participants such as male and female; Type and severity of issues raised; Response and action taken; Awareness level aboutthe project; Temporary loss of potential temporary economic impacts compensated	ns with the beneficiaries,localcommunities and other stakeholders

						Favourable social atmosphere towards project and support to participation in project activities; and Increased engagement in terms of number and level of stakeholders and women in the project activities.	
3.	Effective functioning of GRC	Resolve the E&S related complaints and disputes in a time bound manner amicably without any cost.	GRC members headed by the authority	Project life cycle beginning from the early stage of pre-construction.	Site inspections; Consultations held with potential temperary economic impacts, and other stakeholders; Project related E&S complaints received inwriting or verbally.	Adequacy of information & dissemination about the GRC and its objectives among the stakeholders; No. of GRC meetings held and timeframe; GRC members present in each meeting;	Whenever required

						No. of complaints/grievances received and resolved; Time taken; Satisfaction of affected parties; and Court cases filed or withdrawn.	
4.	Organize meetings with line departments to seek project support as required	Coordination and meetings with the line departments, namely District Administration, SPCB, PWD, Traffic Police, GCC/ ULBs/ Town Panchayat and line agencies; Understand the role of line department and support envisaged for project implementation and operation; and Obtain an update related to potential temporary economic impacts, beneficiaries and other stakeholders.	PIU CE/ SE/EE	Project Planning stage onwards	Review the feedback of participants of the meeting; Date, time, and venue fixed as per suitability of other departments; Communicated information in advance (letter signed by the CE/SE of the CMWSSB); Presentation about the project (PPT),including objectives of the meeting,	No. of officials participated in the meetings and signed the attendance sheet; Relevant information shared; Comments/suggestions offered, Effectiveness of meeting in project implementation and operation; Improved communication, coordination	Semi annually

					expectations from the participants; and Q&A details.	helpful in project activities; Increased understanding about the project related tasks; and Other facilitation roles.	
5.	Public awareness about the project	Organize public events and engage all stakeholders like related government departments, local communities, beneficiaries of the project, women's group, NGOs in project areas.	PIU, PMC, Contractors	Pre-construction stage and onwards	Review the public awareness activities undertaken; Feedback of target groups to assess the effectiveness of such activities.	People understand importance of project and need for environmental and social sustainability;	Semi annually

Stakeholder engagement format

S.No.	Activities	Details of Meetings/Consultations
1.	Officials who conducted meetings and consultations with the PAPs and other stakeholders in project villages	
2.	Name of locations and number of person participated	
3.	Profile of stakeholders (shopkeepers, residents, women, officials from other department, etc. as applicable)	
4.	Date of meetings/ consultations held	
5.	Issues and demands raised by the PAPs and other stakeholders	
6.	How these problems and demands are being solved?	

Appendix 7.1

Proceedings of the Public Hearing/Stake Holders Meeting conducted on 17/06/2023

Information on Public Consultation is given adequately to the Public by means of notice, personal contact, etc. As per the World Bank policy on access to information and disclosure, the proposed project attracts Public Hearing.

The Public Hearing was arranged by the Chennai Metropolitan Water Supply & Sewerage Board (CMWSSB). The concerned persons having plausible take in environment and social aspect were requested to attend the meeting. Wide canvassing has been made by issuing notices door to door and keeping displays. The minutes of public consultation are as follows.

The following were present during public meeting.
1. Officials
2. Social Expert
3. Counsellors
4. Members from Residential welfare association

Stake holder consultation started by EE, CMWSSB, explained the project details and listed out the street name left out in the respective areas.

ULB to explain the designed service levels and the need for reduction in service levels. Both during floods and drought ULB will strive to maintain a reduced service level.

Social Expert: Do you face Water problem during summer?

RWA: The water stagnation was there for more than 2 months during raining season and we could not even step out from the house even for basic needs, sometimes our houses was flooded and the situation was very worst. Our daily livelihood was affected fully. The children were affected more than anything.

Social Expert: Do the ULB help you in clear the water?

Respondent: The over flowed septic tank water comes to the road, which is the situation in most of the apartments. In some of the apartment sewage water is taken out by the metro water by using the Motor.

Social Expert: In summer how many days you get water?

RWA: We don’t get water for 4 to 5 months in every summer

Social Expert: Than how do you manage for house hold purposes?

RWA: We use our own bore well water for all our household purposes. We spend money on RO, water Cans eventhough we pay water tax to the government.

Social Expert: whenever the new DPR released the collective ideas and opinion received from the common people which is my role to give as a report on this to the government. I also register that do you have drainage connection? What are all the problems do you face with the connection with sewage and without sewage? If you register your opinion one by one which will be helpful for me to register.

RWA: We already submitted the list of areas which does not have sewage connection. The water stagnation remains; in previous govt. the collection station is not maintained properly the pumping station is also not maintained properly. The sand in the widen road is accumulated in collection well and pipes got bracken we don't know which is relocated or not we don't know. We are completely depended on the septic tank.

Social Expert: Can you please tell me the situation of your area during the flood?

RWA: During the rainy season the sewage water is missing with septic tank water, in some areas bypassing the water with other areas without removing the blockage, which creates the Mosquitos problems

RWA: can you please let us know the time period to complete the project?

Social Expert: in next three years?

RWA: In our area the places where the blockage resists which needs to be corrected and removed before the rainy season. Under water sewage is the major concern in comparison with other issues like water scarcity, health and sanitation issues and so on. The work should be started before rainy season.

Mrs. Devi (Assistant Executive Engineer, CMWSSB) concluded the meeting by thanking all the participants who have attended the meeting.

Feedback forms

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

தேதி: 17.06.2023

பெயர் :	M. V. Ramana Murthy
பதவி / தொழில் :	
முகவரி :	plot No: A3 Chandrasekaran Avenue 1st Main Road Tholiyapakkam.
கைபேசி எண் :	9176420068.
மின்னஞ்சல் :	

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

தேதி: 17.06.2023

பெயர் :	D. Kuppuswamy
பதவி / தொழில் :	Sri SAI Nagar president Sri SAI Nagar makkal sangam
முகவரி :	1/404 IInd cross street Thuraipakkam Chennai 97
கைபேசி எண் :	9382232002
மின்னஞ்சல் :	twinstar.dks@gmail.com

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

பாதாள சாக்கடை திட்டம் கட்டாயம் துரிதமாக நிறைவேற்ற வேண்டி கேட்டு கொள்கிறேன்.

Kuppuswamy

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

தேதி: 17.06.2023

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

பெயர் :	V. பார்த்திபன்
பதவி / தொழில் :	பொருளாளர், Sholinganallur Constituency Residents Association
முகவரி :	Plot no. 3, Ist Main Road, Sri Sai Nagar, Thoraipakkam, Chennai-97
கைபேசி எண் :	9791030148
மின்னஞ்சல் :	parthi@imsc.res.in

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

பாதாள சாக்கடை திட்டத்தை மனதார [illegible] Pumping Station
[illegible]

V P 17/6/23
கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

தேதி: 17.06.2023

பெயர் :	KARTHIKEYAN
பதவி / தொழில் :	PRIVATE
முகவரி :	48, Annai India Nagar Okkiyam Thuraipakkam
கைபேசி எண் :	9840650776
மின்னஞ்சல் :	ANNA.CHN97@gmail.com

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

- Need drinking water supply for entire colony
- Need drainage ~~clean~~ line for entire colony

PLEASE DON'T LEAVE US OUT

Karthy
கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

தேதி: 17.06.2023

பெயர் :	T. Ulaganathan
பதவி / தொழில் :	Secretariat colony Association President
முகவரி :	176, Secretariat Colony, Chennai-97
கைபேசி எண் :	9841132505
மின்னஞ்சல் :	—

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

குறிப்பிட்ட காலத்திற்குள் பாதாள சாக்கடை திட்டத்தை. அமுல்படுத்த வேண்டும். ஏற்கனவே முடிவு செய்யப்பட்ட கழிவுநீரேற்று Pumping Station அமைக்கவும்.

T. Ulaganathan

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

தேதி: 17.06.2023

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி.
தலைமை செயலக குடியிருப்பு.
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

பெயர் :	N SRIRAMAN
பதவி / தொழில் :	RETIRED
முகவரி :	PLOT NO. 30 - B. I St STREET PARTHASARATHY NAGAR. THORAPPAKKAM
கைபேசி எண் :	9840839571
மின்னஞ்சல் :	SRIRAMANN@2004 G.Mail.Com.

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி. தேதி: 17.06.2023
தலைமை செயலக குடியிருப்பு.
ஒக்கியம் துரைப்பாக்கம்.
சென்னை – 600 097.

பெயர் :	S.P. Vasudevan
பதவி / தொழில் :	IT
முகவரி :	Sai nagar 2nd Cross Plot No 75 1B/38A
கைபேசி எண் :	9884004135
மின்னஞ்சல் :	spvasu@rediffmail.com

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

✓

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி, தேதி: 17.06.2023
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

பெயர் :	[illegible]
பதவி / தொழில் :	[illegible]
முகவரி :	
கைபேசி எண் :	9840882980.
மின்னஞ்சல் :	—

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

தேதி: 17.06.2023

பெயர் :	Y - வினயா
பதவி / தொழில் :	195 வது வட்ட துணை செயலாளர்
முகவரி :	4/18 சிவசுப்ரமணியன் நகர் 3வது PTC கோவில் துரைப்பாக்கம் சென்னை-97
கைபேசி எண் :	9600147107
மின்னஞ்சல் :	துரைப்பாக்கம்

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

இந்த சேவைகள் மழைநீர் கால்வாய் கழிவுநீர் பாதை மாற்றங்கள் இவை அனைத்து செய்து தரும்படி கேட்டுக்கொள்கிறோம்

கையொப்பம்

Y. வினயா

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு சுவட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி. தேதி: 17.06.2023
தலைமை செயலக குடியிருப்பு.
ஒக்கியம் துரைப்பாக்கம்.
சென்னை – 600 097.

பெயர் :	D. பத்மினி திலீப் (Exm.c) 195
பதவி / தொழில் :	வார்டு உறுப்பினர் (Exm.c)
முகவரி :	எண்-4/189 ராஜீவ்காந்தி நகர், காந்திநகர் துரைப்பாக்கம், சென்னை-97.
கைபேசி எண் :	9962057648
மின்னஞ்சல் :	600097.

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

இந்த வேலைகள் அனைத்தும் பாதாளசாக்கடை, மழைநீர் கால்வாய், மெட்ரோ குடிநீர் இணைப்பு இவை அனைத்தும் செய்து தருமாறு தாழ்மையுடன் கேட்டுக் கொள்கிறேன்.

D.P

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

தேதி: 17.06.2023

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

பெயர் :	N.D. [illegible]
பதவி / தொழில் :	Rtd. Section Officer
முகவரி :	Plot 157, Sectt. Colony Che-97
கைபேசி எண் :	9445232141
மின்னஞ்சல் :	ndbdass@gmail.com

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

[illegible] (EB, Road work, [illegible]) [illegible] (Minutes of the Meeting) [illegible]

கையொப்பம்

[signature]

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு சுவட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

தேதி: 17.06.2023

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

பெயர் :	G. குமாரதாஸ்,
பதவி / தொழில் :	செக்ரடரி ராஜ் நகர்
முகவரி :	எண் - 84A ராஜ் நகர் 5வது தெரு, துரைப்பாக்கம், சென்னை-97.
கைபேசி எண் :	9444896959
மின்னஞ்சல் :	600097.

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

மழைநீர் வடிகால், பாதாள சாக்கடை, மெட்ரோ குடிநீர் இணைப்பு இவை அனைத்துடன் செய்து தருமாறு தாழ்மையுடன் கேட்டுக் கொள்கிறேன்.

G. குமாரதாஸ்

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

தேதி: 17.06.2023

பெயர் :	V. சின்னப்பன் Ex mc
பதவி / தொழில் :	சுய தொழில்
முகவரி :	6C. P.T.C காலணி துரைப்பாக்கம் சென்னை-97
கைபேசி எண் :	9884896428
மின்னஞ்சல் :	இல்லை

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

தேதி: 17.06.2023

பெயர் :	B. ஏசுபாதம்.
பதவி / தொழில் :	திரு. உறுப்பினர் 195 வட்டம்.
முகவரி :	3/999, தெரி தெரு, சுணைமா நகர், துரைபாக்கம், சென்னை - 97.
கைபேசி எண் :	9444136498.
மின்னஞ்சல் :	yesubalan1959@gmail.com.

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

ஆலோசனை கூட்டத்தில் சேர்த்துக் கொள்ள எங்களை அழைத்தமைக்கு நன்றி தெரிவித்து கொள்கிறேன். தாங்கள் மேற்கொள்ளும் திட்டத்தில் உடனே அனைத்து [illegible] நல்ல முறையில் [illegible] தர வேண்டுகிறேன்.

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

தேதி: 17.06.2023

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

பெயர் :	S.T. இராஜகோபால்.
பதவி / தொழில் :	நகர் பகுதி பிரதிநிதி.
முகவரி :	3/1210 இரண்டாவது தெரு. திருமலை நகர். துரைப்பாக்கம் செ-97
கைபேசி எண் :	81223107[illegible].
மின்னஞ்சல் :	

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

தங்களின் மேலாண்மை திட்டம் விரைவில் முடித்து தருமாறு வேண்டி விரும்பி கேட்டுக் கொள்கிறேன்.

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

தேதி: 17.06.2023

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

பெயர் :	R. Jayakumar
பதவி / தொழில் :	Secrty, P.K. Residents Assn.
முகவரி :	3/187, Sastri Srinivasan Salai, Thoraipakkam, Chennai-97.
கைபேசி எண் :	94440 63657, 77080 62603.
மின்னஞ்சல் :	jaya_60kumar@yahoo.co.in.

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

நான் இந்த Project ஐ உடனே ஆரம்பித்து வேலை செய்ய
இறைவனை வேண்டுகிறேன்.

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

தேதி: 17.06.2023

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

பெயர் :	P. Venkatesan
பதவி / தொழில் :	Civil.
முகவரி :	72/1, Kannan Kudil 5th Cross St Thoraipam, Chennai - 97
கைபேசி எண் :	9789839784
மின்னஞ்சல் :	

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

P. வெங்கடேசன்

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

தேதி: 17.06.2023

பெயர் :	K. Thirunavukkarasu
பதவி / தொழில் :	Resident
முகவரி :	Chandrasekaran Avenue
கைபேசி எண் :	9789021059
மின்னஞ்சல் :	arasukt@gmail.com

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி, தேதி: 17.06.2023
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

பெயர் :	சி. கிருஷ்ணன்
பதவி / தொழில் :	M.S. (Retd)
முகவரி :	496. Scott Colony
கைபேசி எண் :	9952958740
மின்னஞ்சல் :	

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

1. Construction of work of drain should not be hindrance to the public for drinking water lorry, cars & septic tank clearance
2. I presume this work will be started after water connection is given to all houses of Scott Colony

கையொப்பம்

P. G[illegible]
17/6/23

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

தேதி: 17.06.2023

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி,
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

பெயர் :	E. Kamalakkannan
பதவி / தொழில் :	Retired
முகவரி :	3/36, New st Sri Nagar Thiruvanmiyur ch-97
கைபேசி எண் :	9884697259
மின்னஞ்சல் :	

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

pl do it as quick as possible

கையொப்பம்

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

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பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

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தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

தேதி: 17.06.2023

பெயர் :	P. நாகேஸ்வரி
பதவி / தொழில் :	
முகவரி :	2 486 பாண்டியன் நகர் தரைப்பாலம்
கைபேசி எண் :	9841175183
மின்னஞ்சல் :	

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

வினைகள் திட்டத்தை செயல் படுத்தவும்

கையொப்பம்

P. Nagaswari

சென்னை பெருநகர் குடிநீர் வழங்கல் மற்றும் கழிவுநீரகற்று வாரியம்

கலந்தாய்வு கூட்ட கருத்து படிவம்

பாதாள குழாய் மூலம் கழிவுநீர் அகற்றும் திட்டம் –

ஒக்கியம் துரைப்பாக்கம்

இடம்: சென்னை குடிநீர் மேல்நிலை நீர் தேக்க தொட்டி, தேதி: 17.06.2023
தலைமை செயலக குடியிருப்பு,
ஒக்கியம் துரைப்பாக்கம்,
சென்னை – 600 097.

பெயர் :	V. தாமோதரன்
பதவி / தொழில் :	
முகவரி :	தலைமைச் செயலக குடியிருப்பு 2 460 பாண்டியன் சாலை.
கைபேசி எண் :	9677203358
மின்னஞ்சல் :	

உங்கள் கருத்துக்கள் மற்றும் ஆலோசனைகளை பதிவு செய்யவும்

குடிநீர் வடிகால் மற்றும் கழிவுநீர் பணிகளை விரைந்து முடிக்கவும்

கையொப்பம்

K. V. Damodaran

Photographs

Annexure 8
Waste management plan

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
1.	Upkeepofstorage/ yard	Dispose-off the waste from the material storage to the designated site; and Ensureregular collectionandremoval of refuse and litter from the working site, office, labour accommodation, etc.	Contractor	Construction phase	Visual Inspection	Incidence of contamination	Daily
2.	Labour accommodation	Place sufficient number of garbage bins/containers at prominentlocations of the project working sitesandlabour accommodations; Ensure emptying the garbage bins and dispose-offfromthelabouraccommodation regularly in a hygienic manner; Dispose-off domestic waste water into drainage; Ensure sufficient number of bathingand ablution facilities in labour accommodations, sheds, and all the site staff; Create awareness about the importance and safe disposal of waste at work sites,	Contractor	Construction phase	Visual inspections; andRecordsofwaste disposal.	Incidenceofstaff notusing facilities; and Incidence of pollution.	Daily

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
		labouraccommodation and surroundings among the workers; and Imparttrainingabouthandlingthedifferenttypesofwastes,wastemanagement,including hazardous waste.					
3.	Waste management measures	Collect all waste bins, containers from all sites; Collect recyclable wastesseparatelyand arrange for its collection by the authorized vendor; Prevent littering and pollutionbyconstructionstaffat work sites byproviding bins or waste bags in sufficient locations; Provide separate bins/containers for hazardous materials and mark these clearly; Store hazardous / polluting materials on impermeable ground until disposed-off or collected by the authorized vendor;	Contractor	Throughout project life cycle	Regular audits of the CWMP implementation; Visual inspection of waste collection and disposal; and Construction areas for littering	CWMP inplace; Extentto which CWMP is complied with; Presenceoflitter; Extentof filling rubbish bins; Total volume of general and hazardouswaste storage capacity onsites; Extent of waste segregation; and Frequency of waste collection and disposal	Daily/ weekly as applicable

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
		Donotallowanyburningorburying of waste on site; and Dispose of rubble and otherwasteconstructionmaterials atthe designated site.					
4.	Disposal of residualconstructi on debris, excessoilandothe r materials	The contractor shall identify the site for debris and waste disposal that should be finalized prior to start of theearthworks; Apply good practices and minimize the construction debris by the optimum use of material; Reusetheexcavatedsoilandother materialinbackfilling, landscaping,fillinglow lying area and public places. Yet the unused residue of soil and sedimentation left will be disposed of; Ensure that disposed waste do not cause soil and ground water pollution; Contractor should ensure that designated landfill site should be located in non-residential area at least 1000 meter away so that residents, flora and fauna are not impacted;	Contractor	Construction phase	Audit of excess and residual construction material disposal recordsand data; and Visual inspection.	Excavated soiland other wastes visible; and Cleanliness and maintenance of sites.	Dailyand regularly.

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
		Regularly clean up concretes pilled during construction; Sweep / rake / stack excess aggregate / stone chip / gravel / pavers into piles; Emptied cement and other material bags, containers and unusable bins sold to a licensed vendor; Dispose excess and residual waste to the designated site; The training should be imparted to all staff about the effects of waste and litter and follow the appropriate disposal procedures; and Construction waste at site should be handled as per Construction and Demolition Waste Management Rules, 2016.					
5.	Hazardous waste disposal	Ensurethatcontaminants (includingcement)are not placeddirectlyonthegroundtoprevent runoff reaching the water resources; Ensure that the spillage of fuels,	Contractor	Construction and operation phases	Audit of hazardous material disposal recordsand data; and	Incidenceofnon-compliancewith safety procedures concerning hazardouswaste material;	Daily or as required

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
		oil, lubricants collected does not contaminate the soil and water; Ensurethetrainingofworkforceabout environmental pollutionandits management; Ensure disposal of hazardous waste at the designated site by the authorized vendor and prevention of pollution therein; Ensurehazardousmaterials such as solventbasedpaints, fuel, cleaning and polishing chemicals are handled with extreme precaution during their storing, transportation, and usage. Such material should be stored on impervious space/ floor; Ensure that only trained workers are involved in collection, storage, and disposal process; Allprecautions, safety and health measures are followed; Dispose of non-recyclableandrecyclablemetalobjectsthrough authorized vendor; and Regularly audit the recordsmaintainedfor hazardous			Visual inspection of hazardous materials handling, storage areas and disposal practices.	Availability of spillage kits; Incidence of spillage of hazardous materials on site; and Evidence of leaks and contamination of soil and water	

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
		and other waste generated and disposaltodesignated site.					
6.	Closure and rehabilitation of construction and labour sites	Contractor to restore the original condition of the site prior to demobilization; Uponworks completion, clear all structures, rubbish,fill-inandsealallthepitsandtrenches; Removeallconstructionequipment,vehicles, equipment, waste and surplusmaterials, temporaryfencingandotheritemsfromthe site; Clean up and remove any spills and contaminated soil in theappropriate manner; Donotburydiscarded materials on site or any other land not designated for this purpose; Handoverthe completed constructionsiteandthesitesusedformaterialstorageand labour accommodationsandshedswillbe handed over; and Handover the project site after completionof operation phase.	Contractor	After completion of the civil works in construction phase	Physicalverificationofthesiteaswellasitemslistedintherecordsof contractor; and Rehabilitation measures conducted after completion of construction and operation works.	Clean andclearsite; Site rehabilitated; and Original condition of construct ion and other sites restored	Onetime

Annexure 9
Socio economic details of Potential Temporary Economic Impacts

S. No.	Name	Gender	Age	Education	Marital Status	Family Members	Residential Structure / Ownership status	Type of Commercial structure	Average Income per day	Vulnerablecategory
1	Munusamy	Male	58	Primary	Married	4	Rented	Cobler	400	No
2	Balraj	Male	43	Primary	Married	5	Rented	Cocunut Sale	500	No
3	Papathy	Female	68	-	Married	5	Rented	Flower sale	400	No
4	Umar	Male	42	Middle	Married	3	Rented	Food stall	800	No
5	Narasimman	Male	65	Primary	Married	4	Rented	Toys sale	400	No
6	Gowri	Female	65	Middle	Married	2	Rented	Flower sale	400	No
7	Mageshwari	Female	46	Middle	Married	4	Rented	Fruits sale	500	No
8	Kothandapani	Male	53	Middle	Married	3	Rented	Toys sale	400	No
9	Prema	Female	51	Primary	Married	4	Rented	Cocunut sale	500	No
10	Asif	Male	28	Degree	Unmarried	1	Rented	Tea Shop	800	No
11	Jeyavel	Male	30	Degree	Married	3	Rented	Tyre shop	1000	No
12	Raman	Male	54	Middle	Married	4	Rented	Tea shop	900	No

Survey alignment Map

Potential Temporary Economic Impacts identified under the project


Chennai,TN,India
Gangai Amman Koil Street, Thuraipakkam,
Chennai, 600097, TN, India
Lat 12.933373, Long 80.234098
10/21/2022 04:05 PM GMT+05:30


Chennai,TN,India
Gangai Amman Koil Street, Thuraipakkam,
Chennai, 600097, TN, India
Lat 12.933586, Long 80.233834
10/21/2022 04:08 PM GMT+05:30


Chennai,TN,India
Gangai Amman Koil Street, Thuraipakkam,
Chennai, 600097, TN, India
Lat 12.933447, Long 80.233997
10/21/2022 04:02 PM GMT+05:30


Chennai,TN,India
Gangai Amman Koil Street, Thuraipakkam,
Chennai, 600097, TN, India
Lat 12.933622, Long 80.233543
10/21/2022 04:10 PM GMT+05:30


Chennai,TN,India
SH 49A, Thuraipakkam, Chennai, 600097, TN, India
Lat 12.933352, Long 80.232510
10/21/2022 04:33 PM GMT+05:30


SELVA FAST FOOD &
Gandhi Road, Mettukuppam, Chennai - 600 007
Chennai,TN,India
Kamarajar Street, Thuraipakkam, Chennai, 600097, TN, India
Lat 12.940975, Long 80.235888
10/21/2022 04:39 PM GMT+05:30


Chennai,TN,India
Ealim Street, Thuraipakkam, Chennai, 600097, TN, India
Lat 12.941437, Long 80.236030
10/21/2022 04:49 PM GMT+05:30


Levista
INSTANT COFFEE
Chennai,TN,India
Rajiv Garden Street, Thuraipakkam, Chennai, 600097, TN, India
Lat 12.943877, Long 80.238580
10/21/2022 05:05 PM GMT+05:30

Annexure 10
Labour Management Plan

LMP shall be prepared by the contractor following the requirements of the ESS2 on Labour and Working Conditions. The LMP is a living document, which is initiated early in project preparation, and is reviewed and updated throughout development and implementation of the project. Outline for LMP is provided below which is indicative and shall be made specific to the sub-project.

Description	Mitigation Measures	Responsibility	
		Implementation	Supervision
Applicable Laws	The contractor should ensure the compliance of applicable Indian Labour Laws such as Factories Act 1948, Building and Other Construction Workers Act 1996, Inter State Migrant Workmen Act 1979, Contract Labour (Regulation & Abolition) Act 1970, Workmen Compensation Act 1923, Child Labour (Prohibition & Regulation) Act 1986, Minimum Wages Act 1948, Employee State Insurance Act 1948, Employees Provident Fund Act 1991, Payment of Wages Act 1936, Payment of Bonus Act 1965, Equal Remuneration Act 1976, Payment of Gratuity Act 1972 and other International Labour organization conventions as ratified by India.	Contractor	PIU/PMC
Applicable Licences	Labour Licence and all other statutory work permits including Contract Labour& Interstate Migrant Worker License. Workmen compensation Insurance / Accident Insurance, EPF and ESIC.	Contractor	PIU/PMC
Site layout	The location of the site, design and basic facility provision in the labour accommodation will be reviewed and approved by the PIU prior to the construction;	Contractor	PIU/PMC
Facilities	Maintain necessary living accommodation and ancillary facilities in functional and hygienic conditions; Provide adequate number of toilets separate for men	Contractor	PIU/PMC

Description	Mitigation Measures	Responsibility	
		Implementation	Supervision
	and women workers, bathing area, kitchen, safe fuel/LPG for cooking and uncontaminated water for drinking, cooking and washing; Ensure adequate water supply in all toilets and urinals; The labour camp should have protection from heat, rain, flooding, insects, snakes and mosquitoes. It should have adequate provisions for emergency such as fire safety, security, etc; Require the non-discrimination and harassment and should be socialized/basis for training, and covers potential ethnic discrimination.		
Health and Safety	Provide first aid medical kit at labour accommodation; train the labour for usage of items in injury, emergency, coordinate with nearest government and private medical centers for the medical services, display the contact number of medical doctor(s) and keep a vehicle for emergency travel all the time; necessary HIV/AIDS prevention measures will be taken at labour camp; HIV/AIDS awareness program will be organized by the contractor's Environment & Safety Officer; Where feasible, manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; ULB shall ensure proper segregated storage, collection, transport, treatment and	Contractor	PIU/PMC

Description	Mitigation Measures	Responsibility	
		Implementation	Supervision
	disposal of all wastes following the SWM / C&D waste Rules 2016; remove all wreckage, rubbish, or temporary structures which are no longer required;		
Labour use	The total number of workers to be employed on the project, and the different types of workers: direct workers, contracted workers, temporary or seasonal workers and community workers. (Where numbers are not yet firm, an estimate should be provided) broad description and an indication of the likely characteristics of the project workers e.g. local workers, national or international migrants, female workers, workers between the minimum age and 18; details of the migrant workers, labour camp location should be shared with local Police station as per regulatory norms.	Contractor	PIU/PMC
Grievance	Establish a mechanism for grievance redressal for both direct and contract labourers, disclose contact details of officials concerned. Sign boards and GRC name boards should be written in local, multilingual languages and English at the labour camp.	Contractor	PIU/PMC
Policies and Procedures	Provide workers with contracts with fair terms and conditions Require the contractor to preferentially engage unskilled local workforce form the local communities Make all contracted workers to follow the rules for on-	Contractor	PIU/PMC

Description	Mitigation Measures	Responsibility	
		Implementation	Supervision
	site behaviour (with colleagues) and conduct in the community. Conduct induction and toolbox talks outlining expected conduct and local community values. Introduce disciplinary measures for violations and misbehaviours. Set the minimum age of project workers eligible for any type for work. Train the labour for environmental protection, occupational and community health and safety and gender equality. Follow the equal wages policy without any discrepancies or gender partialities. Ensure minimum legal labour standards as per ILO regulations (child/forced labour, no discrimination, working hours, minimum wages) are met with. Contractors shall implement codes of conduct concerning employment and workforce behaviour (including but not limited to safety rules, zero tolerance for substance abuse, environmental sensitivity of the area, dangers of sexually transmissible diseases and HIV/AIDS, gender equality and sexual harassment, respect for the beliefs and customs of the populations and community relations in general).		

Annexure11

Carbon Emission calculation for 186 MLD STP Plants (54 MLD; 60 MLD; 12 MLD and 60 MLD) at Perungudi

Description	Direct Emissions	Indirect Emissions	Other Indirect Emissions
Emission t/a	11,248	9,532	1,968
Percentage of total plant emissions	49.4%	41.9%	8.7%

Description	From Direct Emissions	From Indirect Emissions	From other Indirect Emissions
Utilization of biogas through sludge digestion (t/a)	213	-	-
Reduction of purchase of electricity (t/a)	-	2183	-
Green Belt development with 300 Spider lilly plant t/a	**8.7**	-	-

Carbon Emission calculation for 90 MLD STP Plants at Sholinganallur (18 MLD; 18 MLD; 18 MLD and 36 MLD)

Description	Direct Emissions	Indirect Emissions	Other Indirect Emissions
Emission t/a	5,442	4,612	953
Percentage of total plant emissions	49.4%	41.9%	8.7%

Description	From Direct Emissions	From Indirect Emissions	From other Indirect Emissions
Utilization of biogas through sludge digestion (t/a)	104	-	-
Reduction of purchase of electricity (t/a)	-	1056	-
Green Belt development with 300 Spider lilly plant t/a	**8.7**	-	-

The carbon emissions of sewage treatment plants are divided into three parts: direct emissions, indirect emissions, and other indirect emissions.

Direct Emissions:
Direct GHG emissions from sewage treatment plants are mainly CO_2 from the aerobic decomposition and conversion of organic matter in the biological treatment process, CO_2 and CH_4 from the anaerobic digestion process, N_2O from the denitrification process, and direct emissions from other links.

Indirect emissions:
The purchased electricity consumed by the operation of blowers, pumps, aerators and other equipment in the sewage treatment plant generates indirect emissions.

Other indirect emissions:
Indirect GHG emissions from the purchased medicines, purchased raw materials, and fuel transportation consumed by the sewage treatment plant.

The CO_2, CH_4, N_2O and other greenhouse gases emitted by the sewage treatment plant are uniformly measured by the amount of CO_2produced. According to the global warming potential (GWP), the potential value of $CO_2$is 1, and the potential values of $CH_4$and N_2O are 23 and 296 respectively; $CH_4$and N_2O can be converted into carbon emission equivalent according to the corresponding potential values.

Direct emissions
It is the amount of CO_2directly emitted during sewage treatment. According to the "Greenhouse Gas Inventory Protocol-Corporate Accounting and Reporting Standards", in the total GHG emissions, the CO_2emissions of wastewater must be included.
The calculation formula of CO_2production is:

$$M_{CO_2}=Q*EF_{CO_2}$$

In formula : M_{CO_2} Biological treatment process emissions, in g

Q Amount of sewage treated during calculation, in m^3

EF_{CO_2}The emission factor

Indirect emissions
During the operation of the sewage treatment plant, blowers, pumps, aeration equipment and other equipment consume a large amount of electricity, the carbon emissions of the purchased electricity during the production process are the indirect emissions of the sewage treatment plant, the calculation formula:

$$M_{CO_2 \bullet E}=E*EF_{CO_2 \bullet E}$$

In formula:

$M_{CO_2 \bullet E}$	Indirect CO2 emissions from power consumption, kg;
E	Power consumption, unit: kw/h;
$EF_{CO2 \bullet E}$	The emission factor of electric energy consumption, in $kgCO_2/kw \bullet h$

Other indirect emissions
Some chemicals are used in the sewage treatment process, such as disinfectants, flocculants, etc., the formula for calculating carbon emissions of purchased chemicals:

$$M_{CO_2 \bullet Y}=\sum Y_i*EF_{CO_2 \bullet Y_i}$$

In formula:

$M_{CO_2 \bullet Y}$	Indirect CO2 emissions from chemicals consumption, in kg;

Y_i Consumption of medicine i, unit: kg;

$EFCO_2 \cdot Y_i$ i The emission factor of CO_2 consumed by chemicals, in kgCO_2/kg.

Each chemicals calculated its CO_2 emissions with corresponding emission coefficients. The emission factor of coagulant is 25kgCO_2/kg of coagulant, and the emission factor of disinfectant is 1.4 kgCO_2/kg of agent.

From the analysis of the GHG emission composition of the whole plant, it can be seen that the GHG directly discharged from the sewage treatment process and the indirect discharge generated by the power consumption are the main emission sources, accounting for 48% and 40.6% of the total discharge of the whole plant respectively. In direct emissions, direct CO_2 emissions accounted for 84.9%, direct emissions of CH_4 accounted for only 9.3%, and N_2O emissions accounted for 5.8%. Among the GHG indirect emissions generated by power consumption, the power consumption of the production process reached 98.2% of the power consumption of the whole plant, and the aeration unit consumed the largest power consumption, which was 52.4% of the power consumption of the whole plant, the power consumption of the three parts of the unit reached 89.3% of the power consumption of the whole plant. Among other indirect emissions, chemical consumption accounts for a relatively low proportion of the plant's GHG emissions.

Mitigation measures:

The process design cause gaps in the composition of GHG emissions, if anaerobic processes are used, CH_4 emissions will increase significantly, and indirect emissions from chemical consumption will also increase significantly. For reducing direct GHG emissions, ecological treatment processes such as stabilizing ponds, constructed wetlands, building greenhouses, cultivating aquatic plants, and planting trees, use plants to absorb nutrients such as nitrogen and phosphorus in sewage, absorb CO_2, and transform into plant bodies. Using the canopy area of the plant and the corresponding carbon fixation coefficient, the amount of GHG recovered by the ecological process can be determined.

CH_4 recovery can be used as energy combustion, on the one hand, the CO_2 produced by combustion has a lower warming potential than the direct emission of CH_4; on the other hand, it can save energy consumption and reduce GHG emissions. If CH_4 can be recycled, it can reduce GHG emissions by 672.57 t/a, and it can also reduce power consumption and reduce costs. Moreover, CH_4 is a renewable energy source, which meets the requirements of the country's low-carbon circular economy development.

Indirect emissions from power consumption accounted for 40.6%, the working effects of blowers, water pumps, aerators and other equipment during operation are carefully designed to reduce inefficient energy consumption and save power consumption.

Annexure12
Immediate Incident Notification Form

Any Major Incident occurring on the Construction site of the Sub-Projects or caused by the Construction activities shall be reported by the Contractor/ Borrower / PIA to the Project Executing Agency (PEA) as soon as possible and not later than 24 hours after the incident occurred.
Definition of Major Incident:

Any social, labour, health and safety, security or environmental incident or accident having or which would reasonably be expected to have a negative impact on the Project. This may include explosions, fires, spills or workplace accidents which result in serious or multiple injury or major pollution. Any Injury of any employee (of Contractor or subcontractors/ suppliers) that causes loss of working time (Loss Time Injury) is considered as a major Incident.

Guidance for Accidents and Incidents Reporting

1 Basic Information

- *date, time, weather / lighting / conditions*
- *statement of facts*
- *details of deaths, injuries, damage, immediate losses*
- *details of witnesses*
- *details of whether scene was secured / photographed*
- *details of any item tested / sampling / sent for testing / removed from scene*
- *details of person leading investigation*
- *time lapse between accident and investigation*

Basic data should be clear, unambiguous, and factual (i.e. free from interpretation). Any gaps in the data should be highlighted and addressed in the investigation.

2 Investigation

- *reconstructed timeline of events, with the incident/accident in the mid-point, and linked events streamed either side, with clear identification of individuals/teams/third parties (e.g. contractors) that are linked and therefore require interviewing*
- *robust but sensitive questioning of witnesses and linked individuals/third parties to*
- *clarify facts, assist with timeline reconstruction and advance the investigation. Statements/ notes of interviews to be included.*

The investigation must follow the facts, witnesses and linked individuals/third parties and the timeline, and not be constrained by the incident/accident event in isolation.
In case publications on the event are available, these should be attached to the report (e.g. press articles, online articles, radio and TV- spots).

3 Analysis

- *using basic data, interview outcomes and reconstructed timeline, identification of:*
  - *immediate causes*
  - *underlying causes (actions in the past that have allowed or caused undetected unsafe conditions/acts)*
  - *root causes (generally organisational/management failings, sometimes not directly/ obviously in relation to accident/incident regarding location/time)*

- *identification of absent/inadequate/failed/unused risk identification,- management- and control measures, reference/gap analysis against relevant national legislation and against the international standards as applicable and agreed upon for the Project*
- *conclusions and summary of root causes and underlying causes for the accident/incident.*

Analysis must be sufficiently rigorous to go wherever the investigation has led. Identification of root, underlying and immediate causes must be sufficiently credible and robust to withstand third-party scrutiny.

4 Way forward

- *for EACH root cause, underlying and immediate cause, a corrective/preventive action is required (these may be numerous and interlinked)*
- *for EACH action, a named person with sufficient resource to deliver upon it and a clear timeline (action plan) is required. In addition, a named person should have overall responsibility for monitoring / reporting on progress (with timelines).*
- *demonstration, that all actions together will prevent recurrence; evidence that current risk assessments/procedures have been revised to reflect this*
- *details of communications to stakeholders, to include a concise summary of the investigation, including the action plan, and lessons learned.*
- *details of ongoing support and assistance to those impacted directly or indirectly by the accident.*

Types of reportable injury

The death of any person
All deaths to workers and non-workers, with the exception of suicides, must be reported if they arise from a work-related accident, including an act of physical violence to a worker.
Specified injuries to workers

- fractures, other than to fingers, thumbs and toes
- amputations
- any injury likely to lead to permanent loss of sight or reduction in sight
- any crush injury to the head or torso causing damage to the brain or internal organs
- serious burns (including scalding) which:
  - covers more than 10% of the body
  - causes significant damage to the eyes, respiratory system or other vital organs
- any scalping requiring hospital treatment
- any loss of consciousness caused by head injury or asphyxia
- any other injury arising from working in an enclosed space which:
  - leads to hypothermia or heat-induced illness
  - requires resuscitation or admittance to hospital for more than 24 hours

Source:http://www.hse.gov.uk/riddor/reportable-incidents.htm

IMMEDIATE INCIDENT NOTIFICATION

1. Incident Details

Project Company		**Date of incident**			
		Time of Incident			
Location of incident		**Type of Incident**	**Environmental**	☐	
			Injury	*Workforce*	☐
				Public/Local community	☐
			Social incident (e.g. violent labor unrest)	☐	

2. WHAT HAPPENED

Brief description of incident

3. INJURED WORKERS

Employee / Contractor	Sex	Age	Job Title / Description	Time with company	Cause	Injury Type (Major / Fatal)

4. INJURED MEMBERS OF PUBLIC

Name	Sex	Age	Community	Place of Residence	Cause	Injury Type (Major / Fatal)

5. ENVIRONMENTAL INCIDENT

Type (Spill / Gas Release)	Total Loss (Litres /kG)	Cause	Damage

6. WITNESSES TO INCIDENT

Name	Sex	Place of	Description of incident

		Residence	

7. OTHER RELEVANT INFORMATION				
Have the authorities been informed?	**Yes**	☐	**No**	☐
Please provide further information here				
Media attention?	**Yes**	☐	**No**	☐
Please provide further information here				
Any effects off-site?	**Yes**	☐	**No**	☐
Please provide further information here				
Photographs taken? *(please include them in this report)*	**Yes**	☐	**No**	☐

Date	
Which immediate corrective actions have been taken after the accident? By whom?	
Please describe here if the accident lead to changes into the works organisation or process, if specific equipment has been acquired/mobilised, if protection measures were implemented, if works have stopped etc.	

Person completing form:				
Name and position:				
Contact details:	**Phone**		**Email**	