



# PRE-FEASIBILITY REPORT

## Development of Chennai Greenfield Airport at Parandur

March 2024



Tamil Nadu Industrial Development Corp. Ltd.

Louis Berger International





## ABBREVIATIONS

Abbreviation	Full Form
AMSL	Above Mean Sea Level
ASI	Archaeological Survey of India
BGL	Below Ground Level
CGA	Chennai Greenfield Airport
CGWB	Central Ground Water Board
CPCB	Central Pollution Control Board
CPR	Common Property Resources
CRZ	Coastal Regulation Zone
CTE	Consent to Establish
CTO	Consent to Operate
dB	Decibel
°C	Degree Celsius
DoECC	Department of Environment & Climate Change
EAC	Expert Appraisal Committee
EC	Environmental Clearance
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ENVIS	Environmental Information System
EPA	Environmental (Protection) Act
ESA	Ecological Sensitive Area
ESZ	Ecological Sensitive Zone
GA	Geographical Area
GC	General Condition
GDP	Gross Domestic Product
GoI	Government of India
GoK	Government of Kerala
GSHAP	Global Seismic Hazards Assessment Program
ICAO	International Civil Aviation Organization
IMD	India Meteorological Department
IS	Indian Standard
Kmph	Kilometres Per Hour
LA	Land Acquisition
MDF	Moderately Dense Forest
MoEF&CC	Ministry of Environment, Forest & Climate Change
mm	Millimetre
NBWL	National Board of Wildlife
OF	Open Forest
PA	Protected Area
PAP	Project Affected Person
PIA	Project Influence Area
RAP	Resettlement Action Plan
RFCTLARR	The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act
R&R	Resettlement & Rehabilitation



Abbreviation	Full Form
SBWL	State Board of Wildlife
SC	Schedule Caste
SEIAA	State Level Environment Impact Assessment Authority
SIA	Social Impact Assessment
SPCB	State Pollution Control Board
ST	Schedule Tribe
TOR	Terms of Reference
TNPCB	Tamil Nadu State Pollution Control Board
TIDCO	Tamil Nadu Industrial Development Corporation
VDF	Very Dense Forest



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# EXECUTIVE SUMMARY

The proposed Chennai Greenfield Airport (CGA) will be developed in an extent of 5369 acres (2172.73 Ha) at Parandur near Chennai in Kanchipuram District, Tamil Nadu. The proposed project involves dual Runway length 4040m x 45m, Taxiway, Apron, Isolation Bay and construction of Terminal building and Miscellaneous works.

- The Proposed Aerodrome Reference Point (ARP)
  - Elevation - 76m
  - Latitude - 12°57'29.57"N
  - Longitude - 79°46'53.20"E
- The Master Plan will be executed and operated in four phases to ultimately reach the capacity of 100 million.

PHASE	FROM	PASSENGERS CAPACITY
1	2029	20 million
2	2036	30 million
3	2043	20 million
4	2047	30 million

- The proposed project involves construction of Runway, Taxiway, Apron, Isolation Bay, Domestic Terminal Building & Miscellaneous works as detailed below:
  1. Dual Runway -
    - 07L / 25R - 4040m x 45m
    - 07R / 25L - 4040m x 45m
  2. RESA at both ends of area - 240m x 90m.
  3. Runway Shoulders -7.5m on both sides
  4. Taxiway - 52 M on both sides from centreline.
- The largest aircraft forecast to be using the airport are ICAO Code 4E & 4F aircraft (Critical Aircraft Considered is code 4E - B777-300ER & 4F - A380 & B777-9).
- The current land use pattern of the proposed airport project is Water Bodies, Agriculture, Dry Land and Settlements.
- Peak Hour Passenger traffic: Total Passengers
  - Year 2029- 1885
  - Year 2035 - 5014
  - Year 2044 - 11020
  - Year 2052- 17815
- About 8000 construction workers will be deployed during the construction phase temporarily.
- Total Water requirement during the construction period will be about 1188 KLD and during operation period of the proposed International Airport for domestic use and landscaping will be about approximately Phase 1: 0.85 MLD, Phase 2: 2.15 MLD, Phase 3: 2.85 MLD and Phase 4: 4.70 MLD which will be met through municipal corporation and from treatment of water from Palar River, Thenneri Lake, and Coovam Lake after permission from the concerned authority.
- The total estimated wastewater generation is expected around Phase 1: 2.28 MLD, Phase 2: 5.79 MLD, Phase 3: 9.73 MLD and Phase 4: 12.68 MLD Approx. which will be treated through STP capacity of 3 MLD for each phase.
- The estimated power requirement for the proposed Airport after completion of the construction works is about 100 MVA which will be sourced from TANGEDCO. Total solar Energy generated is 40.5 MVA Approx.



- Solid waste generated during the Construction period will be about 4TPD and during operation period of the Airport will be Approx. SWT (MSW)- 48 TPD, HWT (Hazardous)- 8 TPD, AWT (Aircraft waste)- 24 TPD at final Phase 4: 5585 kg/day, which will be disposed as per Solid Waste Management Rule 2016 and Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
- Two existing water channels pass through the project area from east to west. A large water body called Nelvoy Eri was present in the southern part of the project site. 1425 acres (576.74 Ha) i.e., 26.54% as per revenue records of the proposed Project site is water bodies will be affected by the proposed development activities and allied works of the Airport.
- There is no forest land involved thus forest clearance is not required.
- Approx. 36635 Trees will be affected due to the proposed airport project.
- There are no Eco sensitive areas within 10 km distance from the site thus wildlife clearance is not required.
- Parandur lake, a man-made wetland with an area of 496.6 acre (201 Ha) was present adjacent i.e., 1.4 Kms from the project boundary.
- There is no CRZ, biosphere and critically polluted area, state, and national boundary within 10 km distance from the site.
- The seismic zone of the project area falls in Zone III.
- The Estimated/Block Cost of the proposed development of Chennai Greenfield Airport (CGA) is Approx. INR 29,143.95 crores.

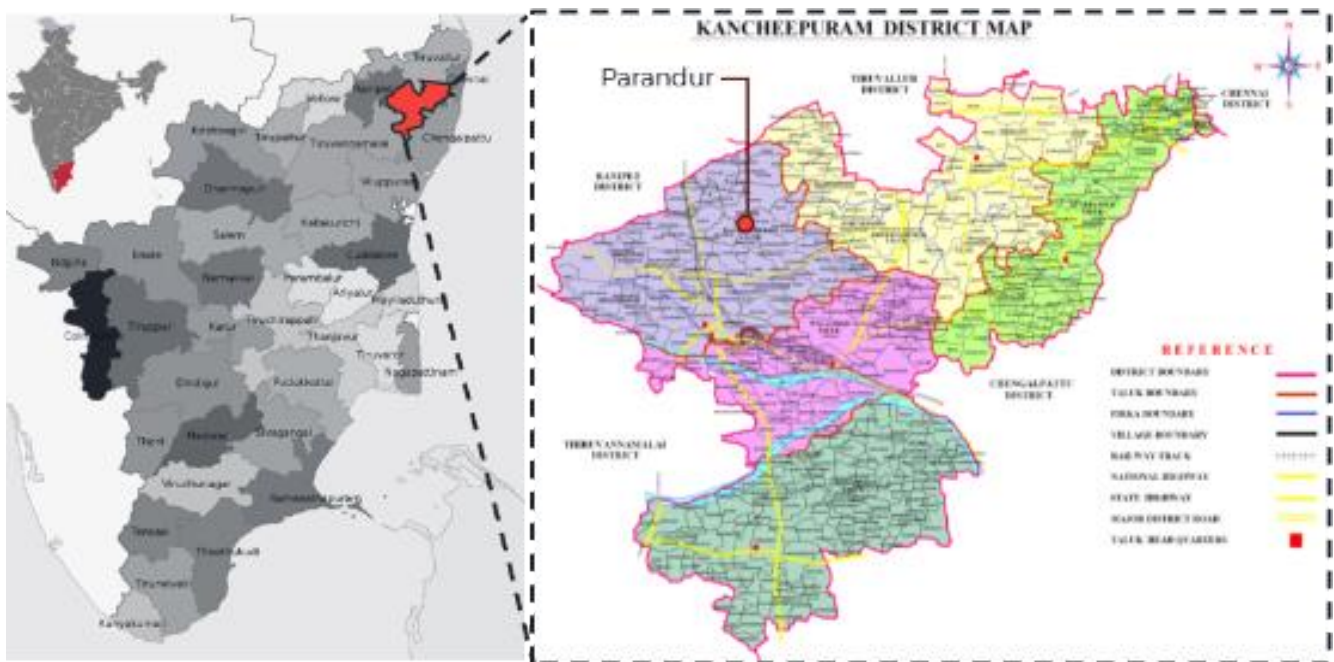
# 1 INTRODUCTION

The Government of Tamil Nadu has proposed to augment the requirement of the region by building a Greenfield International airport near Chennai with a peak passenger handling capacity of 100MPPA. Tamil Nadu Industrial Development Corporation (TIDCO) as appointed by the Government of Tamil Nadu will be the nodal agency for development of this Greenfield Airport.

The Project will also put the economic and industrial development of Parandur and the surrounding region on fast track. This greenfield airport at Parandur will be operated in a dual airport system with the existing Chennai International Airport at Meenambakkam (Chennai).

The Project site for 'Development of Chennai Greenfield Airport (CGA)' identified by TIDCO is in Parandur, in Kancheepuram District of Tamil Nadu. Louis Berger through preliminary studies, AAI Pre-Feasibility Report (March 2022), G.O.(Ms.) No.210 dated 31.10.2023 and Technical Report (August 2022) shared by TIDCO as well as based on a brief informal site visits conducted as an initial assessment of the Project site. The objective of this initial assessment is to understand the Project region, evaluation of the existing ecological sensitive areas adjacent & around the site in 10 km radius, road connectivity and assimilating information with respect to the future planned developments in the vicinity that will contribute towards a seamless and efficient access to the site.

Figure 1-1 Location Map



Source: Louis Berger Analysis

## 1.1 PROJECT PROPONENT

Tamil Nadu Industrial Development Corporation Limited is a premier industrial development agency of the Government of Tamil Nadu, established in 1965. TIDCO endeavours to achieve a balanced and continual industrial growth by promoting medium and large industries in the State through Joint Ventures. TIDCO is also the Nodal Agency for the development of various industrial corridor projects in Tamil Nadu.

TIDCO facilitates large industrial and infrastructure projects in Tamil Nadu involving large investments and huge employment potential. TIDCO is the Nodal Agency for the development of Chennai Bengaluru Industrial Corridor (CBIC), Chennai Kanyakumari Industrial Corridor (CKIC), Western Corridor (Kochi - Bangalore Industrial Corridor) and Defence Industrial Corridor projects.

TIDCO has several joint venture projects across various sectors such as Chemicals, Fertilizers, Pharmaceuticals, Textiles, Iron and Steel, Auto Components, Food & Agro, Floriculture, Engineering, Petroleum and Petrochemicals, infrastructure projects like IT/ITES Parks, Bio-Tech Parks, Special Economic Zones (SEZ), Road Development Projects and Agri Export Zones.

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## 1.2 BRIEF DESCRIPTION OF NATURE OF PROJECT

The proposed airport project involves dual Runway length 4040m x 45m, Taxiway, Apron, Isolation Bay and construction of Terminal building & Miscellaneous works, other developments in future, which requires land of about 5369 acres (2172.73 Ha).

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## 1.3 NEED FOR THE PROJECT & ITS IMPORTANCE

Air routes are the highways of the global economy, transporting people and goods over the vast distance at great speed. Aviation is massively multiplied and facilitated business and leisure opportunities, cultural exchanges, and the development of international institutional and political relationships. Airports are a major part of a country's infrastructure and foster economic activities by encouraging international commerce and tourism and generating employment.

With surging demand for large number of domestic and international companies into the sector, India's aviation industry ensures to witness a phenomenal growth in the near future. A large number of tourists and infrastructure development projects in the state will avail the facilities of Airport. The region offers unlimited scope for the growth of tourism, trade, and commercial activities.

In view of the future traffic growth, there is an urgent requirement for development of additional airport at Chennai. The direct and indirect benefits of the development activities of the Airport are as follows:

- Better infrastructure facilities for air passengers.
  - Promotion of tourism, trade, commerce, etc.
  - Increase in regional economy as it will boost tourism and commercial activities in the region.
  - Generation of more revenue to the state, hence more development of the region.
  - More employment opportunity to people.
  - More business and industrial opportunities.
- 

## 1.4 EMPLOYMENT GENERATION

The proposed project will provide direct employment during construction & operation phases. During the project operation stage for the purposes of day-to-day professional and maintenance works, additional staff will be required along with workers for commercial establishments provided in the proposed terminal building. It is expected about 8000 construction workers will be deployed during the construction phase temporarily.

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## 1.5 DOMESTIC / EXPORT MARKETS

The airport will offer unlimited scope of growth in tourism, trade, and commercial activities due to the project region's natural resources, skilled manpower, scenic beauty, rich heritage, art, and culture. The proposed project will also enhance tourism potential of nearby tourism destinations located within 50 - 100 km from the airport site and will ensure reduced traffic congestion on roads, improved safety conditions, and fast connectivity with ample capacity to cater to future demand.

## 2 ENVIRONMENTAL LEGISLATIONS

Airport development in India is subject to environmental and safety regulations. Environmental & Social Impact Assessment (ESIA) studies are conducted to assess the potential environmental & social impacts of airport projects. Safety regulations, including those related to runway design, air traffic management, and emergency response, are enforced by DGCA to ensure the safe operation of airports.

### 2.1 PROJECT CATEGORIZATION

The EIA Notification of 2006 sets out the requirement for Environmental Impact Assessment in India. This states that Environmental Clearance (EC) is required for specified activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. All greenfield projects are categorized as 'A', and all expansion projects are categorized as 'B' depending on the scale of the project and the nature of its impacts. The categorization for Airport projects is as below:

**Table 2-1 Categorization for Airport Projects**

Project or Activity		Category with threshold limit		Conditions if any
		A	B	
7(a)	Airports	All Projects	All Expansion Projects	-

Source: MoEF&CC Notification 2006 and its amendments thereafter

Category A projects require EC from the National Ministry of Environment, Forest, and Climate Change (MoEF&CC).

Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA).

The proposed project is a green field area and as per MoEF&CC Notification, all airport projects fall under Category-A and attract conditions of obtaining prior Environmental Clearance from the Ministry of Environment, Forests & Climate Change (MOEF&CC). The general condition shall be applicable for the airport projects.

### 2.2 APPLICABLE ENVIRONMENTAL ACTS AND GUIDELINES

The Airport development projects are governed by various Acts, Rules and regulations set by the Ministry of Environment Forest and Climate Change at the Central level and other regulatory agencies at the State and local levels. Various environmental standards, specifications, and guidelines of the Central Pollution Control Board (CPCB) and State level agencies will also be applicable.

It is important to note that the Central government framed an 'umbrella legislation', called the Environment (Protection) Act (EPA), 1986 to broadly encompass and regulate an array of environmental issues. The overall purpose of EPA is to establish an overall coherent policy and provide a basis for the coordinated work of various government agencies with operational responsibility for the environment and natural resources. This legislation also invests authorities with regulatory powers to address specific issues affecting the environment. The Act does not allow any person to establish an industry, operation or process that discharges or emits any environmental pollutants in excess of standards prescribed under specific rules and notifications.

The Acts, Rules, and Notifications applicable to environmental aspects for the construction and operational phases of the Airport are summarized in

Table 2-2 below and briefly described in the following sections.

Table 2-2 Summary of Relevant Environmental Acts and Guidelines

No	Act/Rules	Year	Objective	Applicable	Reason for Applicability	Authority
1	Environmental (Protection) Act	1986	To protect and improve the overall environment	Yes	As all environmental notifications, rules and schedules are issued under this act	MoEF&CC GoI, Forest, Ecology & Environment Department, CPCB, TNPCB
2	Environmental Impact Assessment (EIA) Notification and its further amendments	2006	To provide environmental clearance to new development activities following environmental impact assessment	Yes	All airport projects require clearance as per EIA Notification and further amendments	MoEF&CC, SEIAA
3	Forest (Conservation) Act	1980	To check deforestation by restricting the conversion of forested areas into non- forested areas	No	No forest land is diverted for this proposed project.	Forest Dept., TNPCB, MoEF&CC
4	Wildlife Protection Act	1972	To Protect wildlife sanctuaries and National Park	No	No impact on wildlife movement as the proposed project is away from wildlife/bird sanctuaries.	NBWL, SBWL & Chief Wildlife Warden, MoEF&CC
5	Water (Prevention and Control of Pollution) Act and Cess Act of 1977 as amended in 1988	1974	To control water pollution by controlling emissions & Water pollutants as per the prescribed standards	Yes	This act will be applicable during construction, for establishments of hot mix plant, stone crusher, Batching and WMM Plants, construction camp, workers' camp, etc.	TNPCB
6	Air (Prevention and Control of Pollution) Act as amended in 1987	1981	To control air pollution by controlling emissions and air pollutants according to prescribed standards	Yes	This act will be applicable during construction; for obtaining NOC for the establishment of hot mix plant, stone crusher, Batching and WMM Plants, workers' camp, construction camp, etc.	TNPCB





No	Act/Rules	Year	Objective	Applicable	Reason for Applicability	Authority
7	Noise Pollution (Regulation and Control) rules	2000	Noise pollution regulation and controls	Yes	This act will be applicable as vehicular noise around the proposed airport area is required to assess the noise pattern for future years and necessary protection measure needs to be considered during the planning and design stage.	TNPCB
8	The Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act	2010	Conservation of Cultural and Historical remains found in India	No	The proposed airport area is not close to any Ancient Monument, declared protected under the act.	Archaeological Survey of India (ASI), GoI, Department of Cultural Affairs, Govt. of Tamil Nadu
9	The Explosives Act (& Rules)	1884	An Act to regulate the manufacture, possession, use, sale, transport, import and export of Explosives	Yes	For transporting and storing diesel, bitumen etc.	TNPCB
10	Public Liability Insurance Act	1991	Insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling any hazardous substance and for matters connected therewith or incidental thereto	Yes	The contractor needs to stock hazardous materials like diesel, Bitumen, Emulsions etc. safely	TNPCB
11	Coastal Regulation Zone	2011	To regulate activities in the coastal zone to protect ecologically sensitive areas	No	The proposed airport area will not attract the provision of CRZ Notification, 2011.	TNCZMA, MoEF&CC
12	Hazardous and Other Wastes (Management and Transboundary Movement) Rules	2016	Storage, handling, transportation, and disposal of hazardous waste	Yes	Storage and handling of hazardous waste during construction	TNPCB



No	Act/Rules	Year	Objective	Applicable	Reason for Applicability	Authority
13	Solid Waste Management Rules	2016	Management and handling of solid waste	Yes	For disposal of solid waste generated during construction	TNPCB
14	Construction and Demolition Waste Management Rules	2016	Management of construction and demolition waste	Yes	For disposal of solid waste generated due to construction and demolition	TNPCB
15	Batteries (Management & Handling) Amendment Rules	2010	Management and handling of used lead batteries	Yes	Safe disposal of used lead batteries	TNPCB
16	E-Waste (Management) Rules	2016	An effective mechanism to regulate the generation, collection, storage, transport, import, export, recycling, treatment, and disposal of e-wastes	Yes	Handling of e-waste	TNPCB
17	Central Motor Vehicles Act	1988	To control vehicular air and noise pollution.	Yes	This rule will be applicable to construction machinery	Motor Vehicle Department
18	Minor Mineral and concession Rules	1960	For opening new quarry	Yes	Regulate use of minor minerals like stone, soil, river sand etc.	District Collector
19	The Mining Act	1952	The mining act has been notified for safe and sound mining activity	Yes	The construction of the airport will require aggregates. These will be procured through mining from quarries	Department of mining, GoTN
20	National Forest Policy (Revised)	1988	To maintain ecological stability through preservation and restoration of biological diversity	No	No Forest diversion is required for the proposed project.	Forest Dept, Gol, GoTN
21	The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act	2013	Set out rules for fair compensation and acquisition of land	Yes	The project being a green field area, hence this act will be applicable as there will be an acquisition of land.	Revenue Dept., State Govt.



No	Act/Rules	Year	Objective	Applicable	Reason for Applicability	Authority
22	Supreme Court order dated 12-12-1996 in Writ Petition (Civil) 202 of 1995 inter alia has directed that there will be complete ban on felling of Spontaneously grown trees in all forest areas in the State of Tamil Nadu	1996	Trees of spontaneous growth are not permitted for felling. For felling of trees of spontaneous growth, permission from Hon'ble Supreme Court of India is mandatory. This order is specific to Tamil Nadu	Yes	Permission for Felling and removal of trees within the project boundary	MoEF&CC, Govt of TN, Supreme Court of India
23	International Civil Aviation Organization (ICAO)	1994	To promote the safe and orderly development of international civil aviation	Yes	ICAO standards and regulations necessary for aviation safety, Security, efficiency, and regularity, as well as aviation environmental protection, must be followed for the proposed airport.	Ministry of Civil Aviation, GOI
24	CAR Section 10 - aviation environment protection Series 'A' part I	2014	Noise Management of Aircraft Operations at Airports.	Yes	Standards and regulations for management of noise during Aircraft Operations at Airports.	ICAO & DGCA
25	CAR Section 10 - aviation environment protection Series 'B' part I	2015	Climate Change Initiatives and Local Air Quality Monitoring in Civil Aviation	Yes	Standards and regulations for management of air quality during Aircraft Operations at Airports.	ICAO & DGCA
26	CAR Section 10 - aviation environment protection Series 'C' part I	2018	Carbon Offsetting & Reduction Scheme for Aviation (CORSIA)	Yes	Standards and regulations for sustainable development in the aviation sector and reduce carbon emissions at airports.	ICAO & MoCA

## 2.3 PROJECT CLEARANCES AND PERMISSIONS REQUIRED

### 2.3.1 ENVIRONMENT (PROTECTION) ACT, 1986

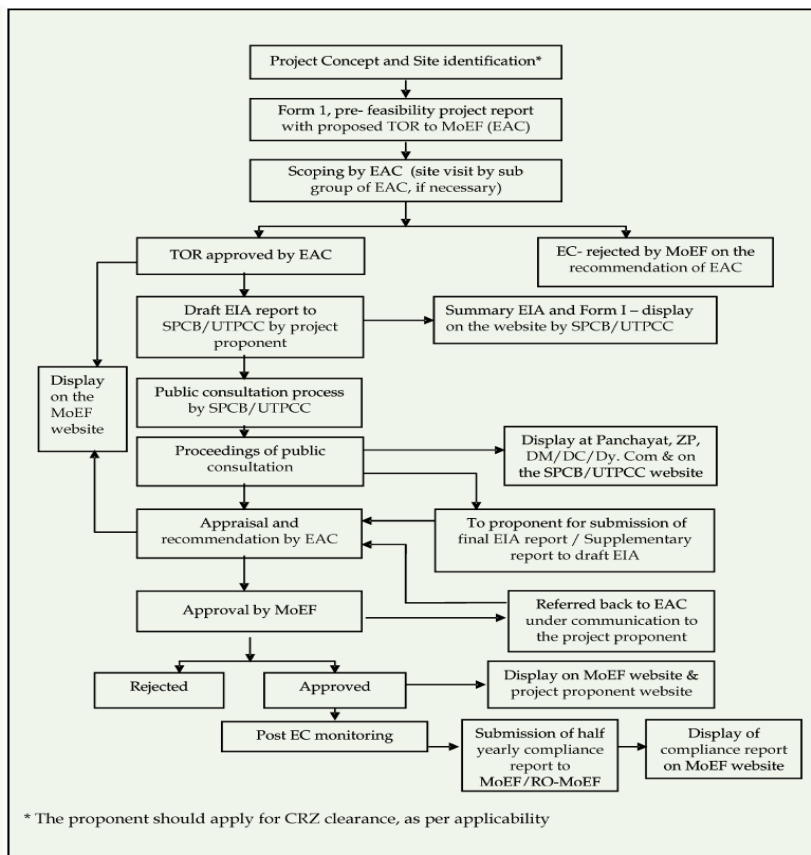
The Environment (Protection) Act was enacted in 1986 with the objective of providing protection and improvement of the environment. It empowers the Central Government to establish authorities [under section 3(3)] charged with the mandate of preventing environmental pollution in all its forms and to tackle specific environmental problems that are peculiar to different parts of the country. The Act was last amended in 1991. Under this act specified rules for discharge/emission of effluents and different standards for environmental quality. These include Ambient Noise Standard, Emission from Motor Vehicles, Mass Emission Standard for Petrol Driven Vehicles, General Effluent Standards etc. especially important for the road project. This act will be applicable during all three phases of the project namely the Pre-construction, Construction and Operational phase.

### 2.3.2 ENVIRONMENTAL CLEARANCE, 2006

The Environment Impact Assessment (EIA) Notification 2006, Ministry of Environment, Forest & Climate Change, Government of India, came into effect from 14<sup>th</sup> September 2006. The EIA Notification, 2006 specifies the requirement of prior clearance from MOEF & CC for certain development projects specified under the schedule of the Notification. The projects and activities under the Notification have been classified into two categories- Category A and Category B, based on the spatial extent of potential impacts on human health, natural and man-made resources. As per the Schedule of the Notification, the Airport projects have been classified under Physical Infrastructure including Environmental Services and are listed under item no. 7(a), including all airport projects. The categorisation related to airport projects are as follows:

The proposed project is a green field area and as per MoEF&CC Notification, all greenfield airport projects fall under Category-A and attract conditions of obtaining prior Environmental Clearance from the Ministry of Environment, Forests & Climate Change (MoEF&CC). The general condition shall be applicable for the airport projects.

Figure 2-1 Prior Environment Clearance Process for Category 'A' Projects





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### 2.3.3 FOREST CLEARANCE, 1980 AS AMENDED IN 1988, 2003

The Forest Conservation Act 1980 was enacted to help conserve the country's forests. It strictly restricts and regulates the de-reservation of forests or use of forest land for non-forest purposes without the prior approval of the Central Government. The Act lays down the pre-requisites for the diversion of forest land for non-forest purposes. At the state level, the government was empowered to declare Reserved and Protected Forests and was also given the authority to acquire land for the extension and preservation of forests.

The process of obtaining forest clearance under this varies with the area of the forest land to be diverted.

- If the area of forests to be cleared or diverted exceeds 40 hectares, the State Government/Union Territory Forest Department would forward the proposal with recommendations to MoEF&CC, New Delhi.
- If the forest land is between 5 and 40 hectares, the State Government/Union Territory Forest Department processes the proposal, but the permission is issued by MoEF&CC Regional Office.
- If the forest land is less than or equal to 5 hectares the State Government/Union Territory Forest Department can give permission.
- Restrictions and clearance procedure proposed in the Forest (Conservation) Act applies wholly to the natural forest areas, even in case the protected/designated forest area does not have any vegetation cover.

The project area doesn't require any forest area. Hence, forest Clearance will not be required. However, tree cutting permission will be required.

---

### 2.3.4 WILDLIFE PROTECTION ACT, 1972

This act is promulgated to provide for the protection of wild animals, birds, and plants and for matters connected therewith. The provisions under this act are as below:

- Section 9 of the Act mentions that no person shall hunt any wild animal specified in Schedule;
- The act prohibits picking, uprooting, damaging, destroying, acquiring any specified plant from any forestland;
- It bans the use of injurious substances, chemicals, explosives that may cause injury or endanger wildlife in a sanctuary;
- No alteration of the boundaries of a National Park shall be made except on a resolution passed by the Legislature of State;
- Destruction or damage of wildlife property in a National Park is prohibited.

The project area doesn't have any eco-sensitive areas around the 10kms radius from the Boundary. Hence, wildlife Clearance will not be required.

---

### 2.3.5 WATER (PREVENTION AND CONTROL OF POLLUTION) ACT, 1974

Water Act is the first environmental regulation that brought at the state and center levels, pollution control boards to control / regulate environmental pollution in India. Amended twice in 1978 and 88, the Act vests regulatory authority on the State Pollution Control Boards and empowers them to establish and enforce effluent standards for industries and local authorities discharging effluents.

- Section 73 Vests regulatory authority on the State Pollution Control Boards and empowers them to enforce effluent discharge standards to prevent water pollution (both for industries and local authorities);
- Section 24 of the act prohibits use of stream or well or on land disposal for polluting substances that violate disposal standards laid down by the board;



- Section 25 of the act requires an application to be made to the state board to establish any treatment and disposal system that is likely to discharge sewage or trade effluent into a stream or well or sewer on land;
- Sections 41 and 44 provide for penalties for not complying with the various provisions or directives of the board;
- Section 48 deals with offences committed by Government Departments;
- Section 55 asserts that all local authorities shall render help & assistance and furnish information to the board as required for discharge of functions, and shall make available to the board, for inspection and examination, such records, maps, plans and other documents as may be necessary.

The act empowers the board to levy and collect cess on water consumed by the industry or local authority and to utilize and augment resources for the Pollution Control Boards. In line with this provision, The Water (Prevention & Control of Pollution) Rules, 1975 were formulated.

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### *2.3.6 AIR (PREVENTION AND CONTROL OF POLLUTION) ACT, 1981*

Similar to Water Act, the Air Act vests regulatory authority on the State Pollution Control Boards and empowers them to enforce air quality standards to prevent air pollution in the country. Section 21 of the act requires an application to be made to the state board to establish or operate any industrial operation.

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### *2.3.7 MANUFACTURE, STORAGE, AND IMPORT OF HAZARDOUS CHEMICAL RULES, 1989, 2016*

These rules aim at controlling the generation, storage and import of hazardous chemicals. According to these rules, the user of hazardous chemicals has to perform the following and dispose hazardous waste as mentioned in the rules:

- Identify the potential hazards of the chemicals and take adequate steps to prevent and control such hazards;
- Develop or provide information about the chemical in the form of safety data sheets;
- Label the specified information on the container of the hazardous chemical.

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### *2.3.8 THE MOTOR VEHICLES ACT, 1988*

In 1988, the Indian Motor Vehicles Act empowered the State Transport Authority (usually the Road Transport Office) to enforce standards for vehicular pollution prevention and control. The authority also checks the emission standards of registered vehicles, collects road taxes and issues licenses. In August 1997, the Pollution under Control certificate (PUC) program was launched as an attempt to crackdown on the vehicular emissions in the States. Since this act is applicable for all states, this will be applicable for this project.

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### *2.3.9 ANCIENT MONUMENTS AND ARCHAEOLOGICAL SITES AND REMAINS ACT, 1958*

An Act formulated for the preservation of ancient and historical monuments and archaeological sites and remains of national importance, for the regulation of archaeological excavations and for the protection of sculptures, carvings and other like objects.

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### *2.3.10 ANCIENT MONUMENTS AND ARCHAEOLOGICAL SITES AND REMAINS (AMENDMENT AND VALIDATION) ACT, 2010*

This act clearly demarcates the buffer area surrounding the protected monument into prohibited area (100m) and regulated area (200m). Thus, the construction related activities shall be prohibited within the buffer area.

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### *2.3.11 THE RIGHT TO FAIR COMPENSATION AND TRANSPARENCY IN LAND ACQUISITION, REHABILITATION AND RESETTLEMENT ACT, 2013*

In India, a new bill, Land Acquisition and Rehabilitation and Resettlement Bill has been passed by the Parliament in 2013 to repeal the Land Acquisition Act of 1894. This is the first National/ Central Law on the subject of Rehabilitation & Resettlement of families affected and displaced as a result of land acquisition. Only R&R provisions will apply when private companies purchase land for a project, and the same exceeds the area thresholds set by the State Governments for such purchase.

As per this Act, compensation will be given within a period of three months from the date of the award. Where an award has been made but the affected individuals have not accepted compensation or have not yet given up possession, and the proceedings have been pending for 5 years or more, provisions of the new law will apply. This Act stipulates mandatory consent of at least 70% of affected people for acquiring land for Public Private Partnership (PPP) projects and 80% for acquiring land for private companies. Under the new legislation, compensation for the owners of the acquired land will be four times the market value in rural areas and twice in urban areas. It also stipulates that the land cannot be vacated until the entire compensation is awarded to the affected parties.

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### *2.3.12 TREE FELLING PERMISSION*

The proposed site has some trees, which is required to be cut, hence tree cutting permission will be obtained from the competent authority.

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### *2.3.13 CRZ CLEARANCE*

The project area doesn't fall in the coastal regulatory area. Hence, CRZ Clearance will not be required.

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### *2.3.14 PERMISSION OF ECO-SENSITIVE ZONES*

In the Tamil Nadu State, there are 15 wildlife sanctuaries, 15 Bird Sanctuaries, 5 National Parks, 4 Tiger Reserves, 4 Elephant Reserves and 3 Biosphere Reserves for protection and conservation of wild fauna and flora have been declared under the wildlife (protection) Act 1972. In case any project passes through Eco-Sensitive Zone of protected area or located within a 10 km distance from the project, prior permission from National Board for Wildlife (NBWL) will be required under the wildlife (protection) Act 1972 and Environmental clearance under the Environmental (Protection) Act, 1986 and EIA notification 2006 to start the construction of the project. Prior statutory permissions shall be obtained before commencement of work on the project. The project area doesn't pass through or have any eco-sensitive areas around the 10kms radius from the boundary. Hence, wildlife Clearance will not be required.

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### *2.3.15 WILDLIFE CLEARANCE FROM SUPREME COURT IN NOTIFIED WILDLIFE AREAS*

If any project passes through a protected area, like, a National Park, Wildlife sanctuary, Bird sanctuary, Tiger Reserve or Biosphere reserve, prior wildlife clearance will be necessarily obtained from National Board for Wildlife (NBWL) and then from Hon'ble Supreme Court of India. The wildlife clearance is a prerequisite for forest clearance for diversion of forest land located in protected area. It is important to mention that even surveys and geo-technical studies in protected area, require prior clearance from the National Board of Wildlife. The project area doesn't pass through or have any eco-sensitive areas around the 10kms radius from the boundary. Hence, wildlife Clearance will not be required.

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### *2.3.16 TAMIL NADU GROUNDWATER (DEVELOPMENT AND MANAGEMENT) ACT, 2003*

The Tamil Nadu legislature passed the Ground Water (Development and Management) Act, and the Act came into force after receiving the assent of the President in March 2003. The Act is applicable to the whole State of Tamil Nadu except the Chennai Metropolitan Area which is governed by a separate Act.



*“An Act to protect groundwater resources to provide safeguards against hazards of its over exploitation and to ensure its planned development and proper management in the State of Tamil Nadu and for matters connected therewith or incidental thereto.”*

The act empowers the government through the Tamil Nadu Groundwater Authority to develop, control, regulate and administer the groundwater in the state by ensuring its optimal and efficient utilization. The act also provides for conjunctive use of surface and groundwater. The act also provides for registration of new users of wells and also prohibition of sinking wells in notified areas without permit. It empowers the authority penalize the activities not in accordance with the act regarded as offences.

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### **2.3.17 THE TAMIL NADU TOWN AND COUNTRY PLANNING ACT, 1971**

*“An Act to provide for planning the development and use of rural and urban land in the State of Tamil Nadu and for purposes connected therewith”.*

The Act provides for the preparation and implementation of Regional Plans, Master Plans, New Town Development Plans and Detailed Development Plans and other various spatial plans. The act ensures implementation through various developmental controls and polices that would be incorporated in the spatial plans. The developmental plan is being implemented at various levels through the Directorate of Town and Country planning. These plans form the basis for land use regulations within the planned area.

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### **2.3.18 THE TAMIL NADU PANCHAYATS ACT 1994**

The Tamil Nadu Panchayats Act, 1994 is an act to repeal and re-enact the Tamil Nadu Panchayats Act 1958 for establishing a three-tier panchayat raj system in keeping with the seventy-third amendment Act, 1992. It relates to the panchayats for greater participation of the people so as to make them institutions of self-government and more effective implementation of rural development program.

The Act provides for preparation and implementation of District Development Plans. Plan preparation is enforced from the Panchayat level, Panchayat union, Panchayat council, village panchayats, town panchayats, municipal councils, and the municipal corporation towards overall development plans. District Planning Committee is responsible for the overall coordination of plan preparation. The act also provides for avoidance of encroachment of public lands and protection of roadside properties (including trees) belonging to the respective government departments. The act is designed to monitor the industrial land use through the following clause under section 160:

No person shall, without the permission of the panchayat union council in panchayat villages and except in accordance with the conditions specified in such permission, construct or establish any factory, workshop or workplace in which it is proposed to employ steam power, waterpower or other mechanical power or electrical power.

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### **2.3.19 THE TAMIL NADU STATE ENVIRONMENT POLICY, 2017**

The State environment policy will strive to look at the regulatory framework, its adequacy, the awareness levels among the stakeholders, the recent judicial pronouncements and participation of technical institutions/industries in furthering the cause of environment. The Thrust Areas: Key Issues and Major Interventions are as follows:

- Air Quality: local pollution hot spots and status of current actions
- Water Quality: domestic and industrial pollution flow into water bodies and status of various interventions.
- Pollution abatement in rivers, lakes and water bodies.
- Waste Management: Municipal Solid Waste and status of adherence to MSW 2000 rules; bio-medical waste; plastic waste; hazardous waste; electronic waste,
- Coastal Zone Management: Impact on coastal regulation zone of various economic activities; progress on integrated coastal zone management.



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### **2.3.20 THE TAMIL NADU STATE WATER POLICY, 1994**

Tamil Nadu adopted a State Water Policy in 1994 along the lines of the National Water Policy of 1987. Subsequently, the National Water Policy was revised in 2002. Some of the major aspects of the policy are the following:

- Importance of water resources in the development of the State.
- Need for considering socio-economic aspects of water resource projects.
- Need for basin wide planning for equitable water use.
- Priorities for water use in the State.
- Management and development of ground water resources.
- Watershed management in rainfed areas.
- Increase in demand for non-agricultural uses.
- Management of water quality and environmental aspects.
- Need for a hydrological database for planning and management.
- Stakeholder participation in management e.g. water user associations.
- Need for proper pricing of water in different sectors.

The apex institution in the State at the policy level is the Water Resources Control and Review Council chaired by the Chief Minister. The primary agency charged with implementation of the policy is the Water Resources Organization. The Institute of Water Studies is the nodal agency responsible for water planning while the Irrigation Management Training Institute imparts training to farmers and officials. Domestic water supply (urban and rural) schemes are executed by the Tamil Nadu Water Supply and Drainage Board (TWAD) for the entire State except Chennai Metropolitan Area where is the implementing agency. TWAD executes capital projects which are handed over to the concerned local bodies for operation and maintenance. Industrial water pollution is regulated by the Tamil Nadu Pollution Control Board. Management of water quality and environmental aspects of rivers and water bodies is being monitored and coordinated by the Department of Environment.

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### **2.3.21 CONSENTS FROM TAMIL NADU POLLUTION CONTROL BOARD**

The project road shall require "Consent to Establish" and "Consent to Operate" from Tamil Nadu Pollution Control Board for establishment and operation of Hot Mix Plant (HMP), WMM, Crushers and Constructors Labour Camps (as per Schedule-I), under Water (Prevention and Control of Pollution) Act, 1974, Air (Prevention and Control of Pollution) Act, 1981) and authorization under Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008, as amended.

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### **2.3.22 OTHER LEGISLATION APPLICABLE TO CONSTRUCTION PROJECTS**

Environmental issues during road construction stage generally involve equity, safety and public health issues. The construction agencies require complying with laws of the land, which include inter alia, the following:

- Workmen's Compensation Act 1923 (the Act provides for compensation in case of injury by accident arising out of and during the course of employment);
- Payment of Gratuity Act, 1972 (gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years);
- Employees PF and Miscellaneous Provision Act 1952 (the Act provides for monthly contributions by the employer plus workers);
- Maternity Benefit Act, 1951 (the Act provides for leave and some other benefits to women employees in case of confinement or miscarriage, etc.);
- Contract Labor (Regulation and Abolition) Act, 1970 (the Act provides for certain welfare measures to be provided by the contractor to contract labour);



- Minimum Wages Act, 1948 (the employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the act);
- Payment of Wages Act 1936 (it lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers);
- Equal Remuneration Act, 1979 (the Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees);
- Payment of Bonus Act, 1965 (the Act provides for payments of annual bonus subject to a minimum of 83.3% of wages and maximum of 20% of wages);
- Industrial Disputes Act, 1947 (the Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment);
- Industrial Employment (Standing Orders) Act; 1946 (the Act provides for laying down rules governing the conditions of employment);
- Trade Unions Act, 1926 (the Act lays down the procedure for registration of trade unions of workers and employers. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities);
- Child and Adolescent Labour (Prohibition and Regulation) Act, 1986 (the Act prohibits employment of children below 14 -18 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in Building and Construction Industry);
- Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979 (the inter-state migrant workers, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home to the establishment and back, etc.);
- The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996 (all the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act; the employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for Workers near the workplace, etc.);
- The Factories Act, 1948 (the Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours and rendering information-regarding accidents or dangerous occurrences to designated authorities);

# 3 PROJECT DESCRIPTION

## 3.1 TYPE OF PROJECT

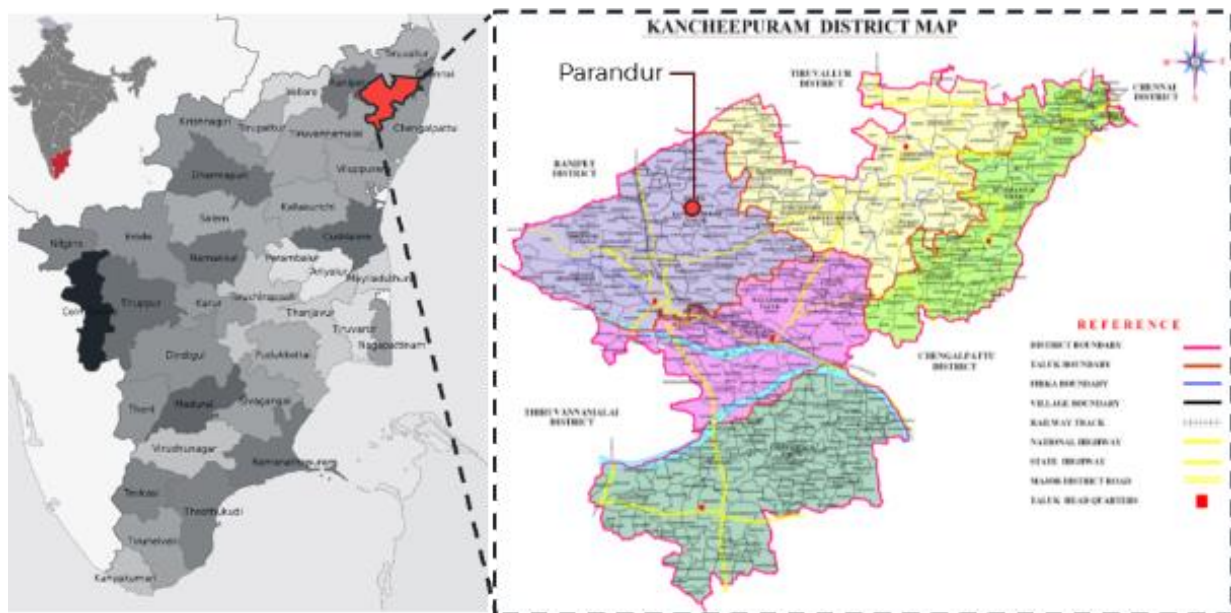
Ministry of Environment, Forest, and Climate Change (MoEF&CC) has made prior environmental clearance (EC) for Airport projects mandatory through EIA Notification dated 14th September 2006 and its subsequent amendments under Category 'A', item 7(a) of the schedule. Since the project activity involves development of greenfield airport, it requires Environmental Clearance from Central level in MoEF&CC, New Delhi.

## 3.2 PROJECT LOCATION

The Project site for 'Development of Chennai Greenfield Airport (CGA)' identified by TIDCO is in Parandur, Kancheepuram District in the northeast part of Tamil Nadu. Kancheepuram District is bounded by Chengalpattu to the east, Chennai to the northeast, Ranipet and Tiruvannamalai to the west and Thiruvallur district to the north. The district lies between 12° 91' to 12° 98' latitudes and 79° 75' to 79° 80' longitudes. The project location comprises of two revenue divisions and two taluks.

- Sriperumbudur Revenue Division - Sriperumbudur Taluk
- Kanchipuram Revenue Division - Kanchipuram Taluk

Figure 3-1 Project Location



Source: Louis Berger Analysis

## 3.3 SALIENT FEATURES

S. No	Particulars	Details
1.	Name of the Project/s	Development of Chennai Greenfield Airport (CGA)
2.	S No. in the Schedule	7(a)
3.	Latitude	12°57'29.57"N
4.	Longitude	79°46'53.20"E
5.	Elevation	76m
6.	Area	2172.73 Ha

S. No	Particulars	Details																								
7.	Topography	Flat/Plain																								
8.	Nearest Highway	National Highway-NH-48 - Bengaluru-Chennai 4-lane - 4.4 Kms- SE State Highway-SH 120, SH 50 B & MDR 651 - Passes through the site.																								
9.	Nearest Railway station	Kanchipuram Railway station - 8 Kms- SW Tirumalpur Railway station - 14 Kms- W																								
10.	Nearest Airport (Road Distance)	Chennai Airport -62 Km-E Tambaram Airport -34.5 Km-SE Arakkonam Airport -12 Km-NW Tambaram Local Flying Area -29.6 Km-SE																								
11.	Nearest Habitation	Ekanapuram, Valathur, Meleri																								
12.	Nearest Town	Kanchipuram- 15 Kms Chennai -54.53 Kms																								
13.	Existing Land Use of site (Revenue Records)	Water Bodies, Agriculture and Settlements. <table border="1"> <thead> <tr> <th>Type</th> <th>Ha</th> <th>% of Affected Coverage</th> </tr> </thead> <tbody> <tr> <td>Agriculture land (Irrigated)</td> <td>1031.21</td> <td>47.46%</td> </tr> <tr> <td>Agriculture land (Dry Land)</td> <td>355.22</td> <td>16.35%</td> </tr> <tr> <td>Built-Up Area (Road)</td> <td>29.60</td> <td>1.36%</td> </tr> <tr> <td>Govt/Poramboke Land</td> <td>173.00</td> <td>7.96%</td> </tr> <tr> <td>Water Bodies (Irrigation Tanks)</td> <td>576.74</td> <td>26.54%</td> </tr> <tr> <td>Built-Up Area (Village)</td> <td>6.96</td> <td>0.32%</td> </tr> <tr> <td>Total</td> <td>2172.73</td> <td>100.00%</td> </tr> </tbody> </table>	Type	Ha	% of Affected Coverage	Agriculture land (Irrigated)	1031.21	47.46%	Agriculture land (Dry Land)	355.22	16.35%	Built-Up Area (Road)	29.60	1.36%	Govt/Poramboke Land	173.00	7.96%	Water Bodies (Irrigation Tanks)	576.74	26.54%	Built-Up Area (Village)	6.96	0.32%	Total	2172.73	100.00%
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Total	2172.73	100.00%																								
14.	Forest Land Diversion	Nil																								
15.	Reserve Forests	Nil																								
16.	Details of trees to be cut	Approx. 36635 Trees will be affected.																								
17.	Wildlife Sanctuary	Nil																								
18.	Waterbodies	576.74 Ha i.e., 26.54% of the proposed project site is water bodies will be affected by the proposed development activities and allied works of the Airport. Manmade Wetland - Parandur Lake - 1.4 Kms- West of the project boundary																								
19.	Water requirement	Construction- 1188 KLD Approx. Operation - Phase 1: 0.85 MLD, Phase 2: 2.15 MLD, Phase 3: 2.85 MLD and Phase 4: 4.70 MLD Approx.																								
20.	Sewerage	Operation - Phase 1: 2.28 MLD, Phase 2: 5.79 MLD, Phase 3: 9.73 MLD and Phase 4: 12.68 MLD Approx. SBR treatment technology - 3 MLD for each phase																								
21.	Source of water	Palar River, Thenneri Lake, Coovam Lake is identified for the source of water. Approval/Permission from concerned																								



S. No	Particulars	Details
		authority shall be obtained before drawing surface water from canal or any other sources.
22.	Ecologically sensitive sites	Nil in 10 km radius Wetland (Manmade) - Parandur Lake - 1.4 Kms- West of the project boundary
23.	Coastal Regulation Zone	Nil, the proposed airport area will not attract the provision of CRZ Notification, 2011.
24.	Estimated Solid waste generation	Construction- 4 TPD Operation: SWT (MSW)- 48 TPD HWT (Hazardous)- 8 TPD AWT (Aircraft waste)- 24 TPD
25.	No. of families affected	Approx. 1005 families are likely to be affected.
26.	Cut & Fill soil	Cut - 10420.13 Cum Fill - 72053184.6 Cum
27.	Seismic Zone	Zone III
28.	Sub Station- Power	100 MVA
29.	Solar energy generation	40.5 MVA
30.	Project Cost	INR 29,143.95 Crores (4- Phases)



Figure 3-2 Survey of India Map

### Project: GREENFIELD AIRPORT, Parandur (near Chennai), Kanchipuram District

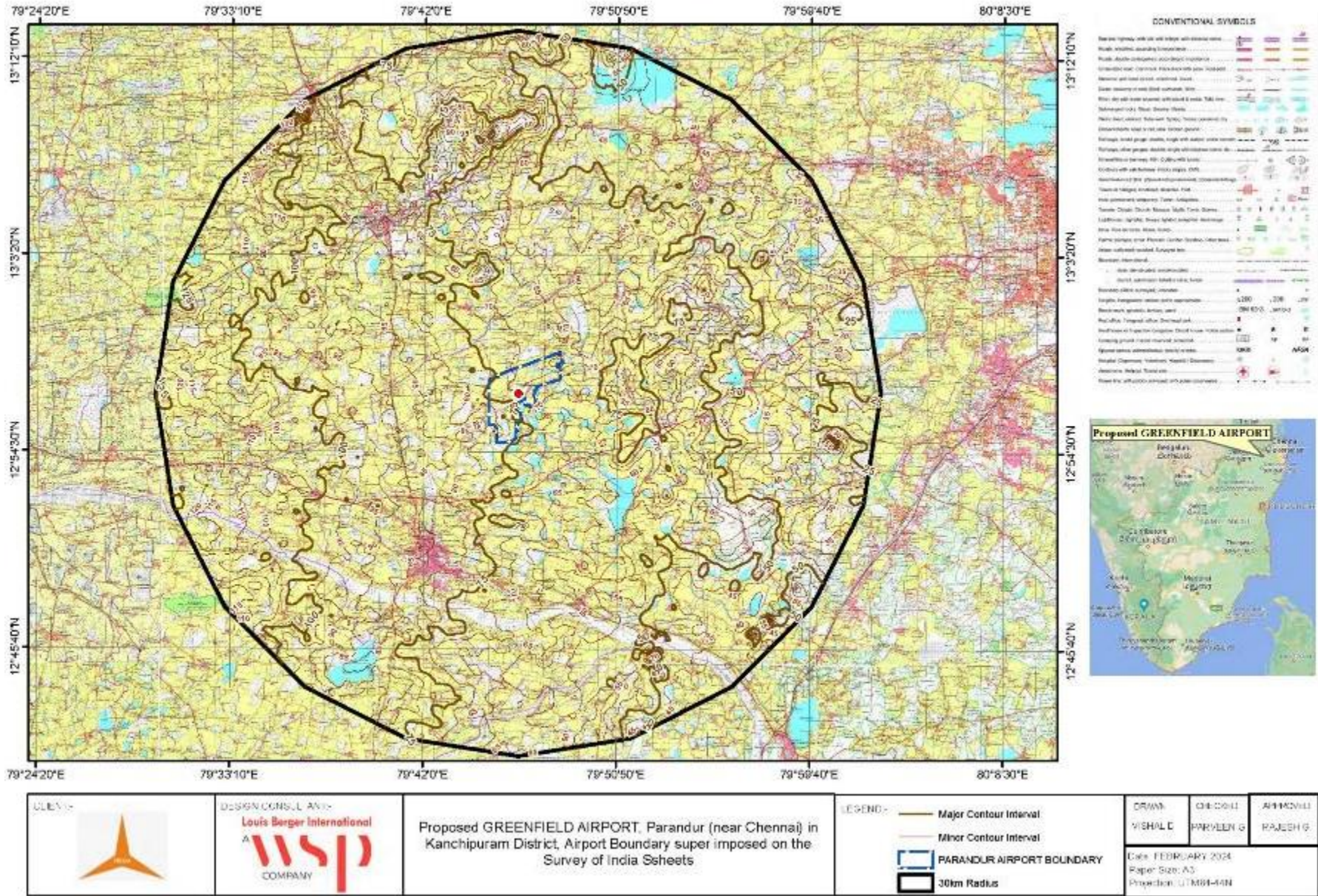


Figure 3-3 Parandur Airport Boundary Map

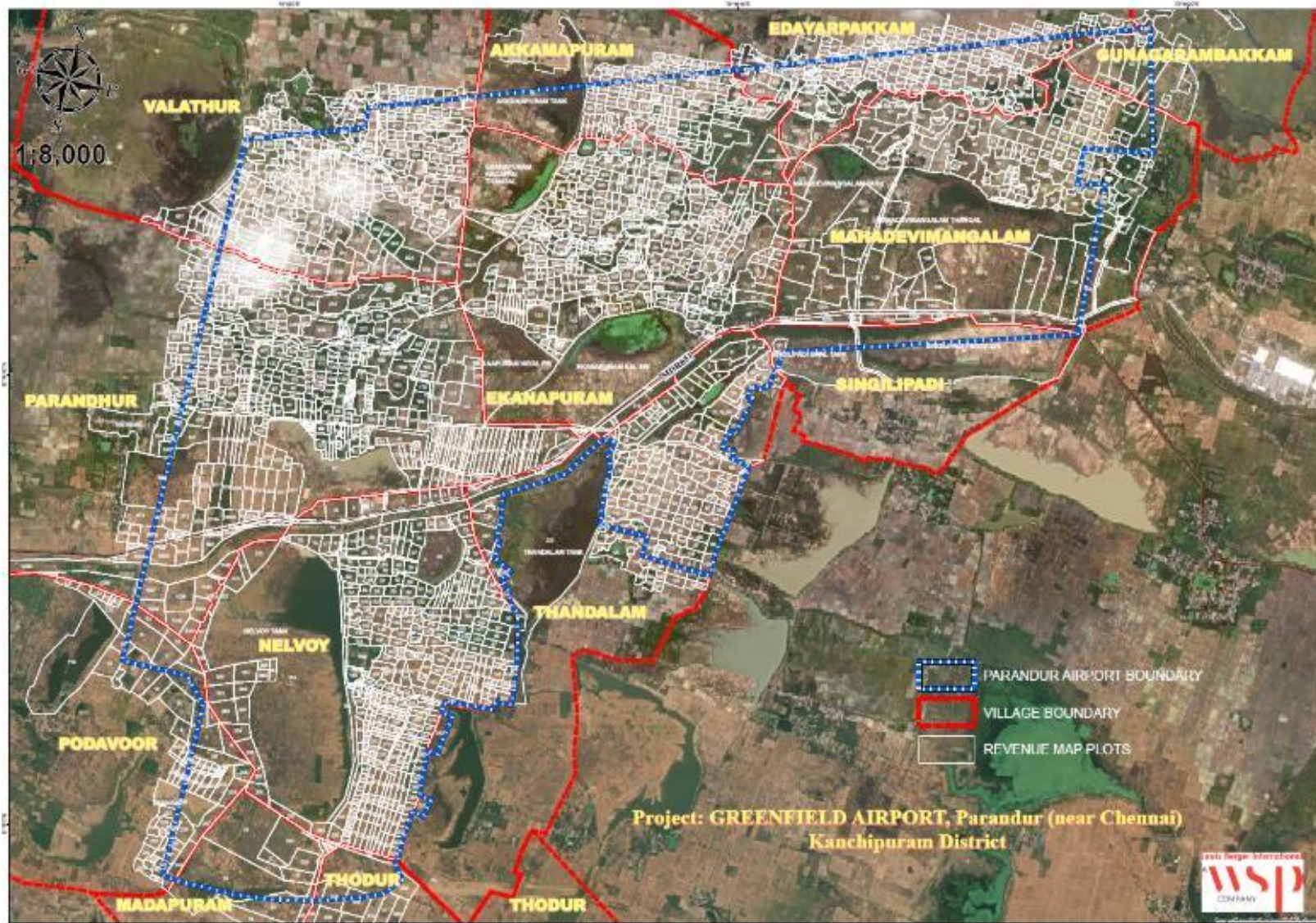




Figure 3-4 Parandur Airport Boundary Map with GPS Co-ordinates

### Project: GREENFIELD AIRPORT, Parandur (near Chennai), Kanchipuram District Proposed Airport Boundary - Co-ordinates in UTM and WGS84



STATION	EASTING	NORTHING	STATION	EASTING	NORTHING
1	794000	1242000	1	794000	1242000
2	794000	1242000	2	794000	1242000
3	794000	1242000	3	794000	1242000
4	794000	1242000	4	794000	1242000
5	794000	1242000	5	794000	1242000
6	794000	1242000	6	794000	1242000
7	794000	1242000	7	794000	1242000
8	794000	1242000	8	794000	1242000
9	794000	1242000	9	794000	1242000
10	794000	1242000	10	794000	1242000
11	794000	1242000	11	794000	1242000
12	794000	1242000	12	794000	1242000
13	794000	1242000	13	794000	1242000
14	794000	1242000	14	794000	1242000
15	794000	1242000	15	794000	1242000
16	794000	1242000	16	794000	1242000
17	794000	1242000	17	794000	1242000
18	794000	1242000	18	794000	1242000
19	794000	1242000	19	794000	1242000
20	794000	1242000	20	794000	1242000
21	794000	1242000	21	794000	1242000
22	794000	1242000	22	794000	1242000
23	794000	1242000	23	794000	1242000
24	794000	1242000	24	794000	1242000
25	794000	1242000	25	794000	1242000
26	794000	1242000	26	794000	1242000
27	794000	1242000	27	794000	1242000
28	794000	1242000	28	794000	1242000
29	794000	1242000	29	794000	1242000
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31	794000	1242000	31	794000	1242000
32	794000	1242000	32	794000	1242000
33	794000	1242000	33	794000	1242000
34	794000	1242000	34	794000	1242000
35	794000	1242000	35	794000	1242000
36	794000	1242000	36	794000	1242000
37	794000	1242000	37	794000	1242000
38	794000	1242000	38	794000	1242000
39	794000	1242000	39	794000	1242000
40	794000	1242000	40	794000	1242000
41	794000	1242000	41	794000	1242000
42	794000	1242000	42	794000	1242000
43	794000	1242000	43	794000	1242000
44	794000	1242000	44	794000	1242000
45	794000	1242000	45	794000	1242000
46	794000	1242000	46	794000	1242000
47	794000	1242000	47	794000	1242000
48	794000	1242000	48	794000	1242000
49	794000	1242000	49	794000	1242000
50	794000	1242000	50	794000	1242000
51	794000	1242000	51	794000	1242000
52	794000	1242000	52	794000	1242000
53	794000	1242000	53	794000	1242000
54	794000	1242000	54	794000	1242000
55	794000	1242000	55	794000	1242000
56	794000	1242000	56	794000	1242000
57	794000	1242000	57	794000	1242000
58	794000	1242000	58	794000	1242000
59	794000	1242000	59	794000	1242000
60	794000	1242000	60	794000	1242000
61	794000	1242000	61	794000	1242000
62	794000	1242000	62	794000	1242000
63	794000	1242000	63	794000	1242000
64	794000	1242000	64	794000	1242000
65	794000	1242000	65	794000	1242000
66	794000	1242000	66	794000	1242000
67	794000	1242000	67	794000	1242000
68	794000	1242000	68	794000	1242000
69	794000	1242000	69	794000	1242000
70	794000	1242000	70	794000	1242000
71	794000	1242000	71	794000	1242000
72	794000	1242000	72	794000	1242000
73	794000	1242000	73	794000	1242000
74	794000	1242000	74	794000	1242000
75	794000	1242000	75	794000	1242000
76	794000	1242000	76	794000	1242000
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78	794000	1242000	78	794000	1242000
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81	794000	1242000	81	794000	1242000
82	794000	1242000	82	794000	1242000
83	794000	1242000	83	794000	1242000
84	794000	1242000	84	794000	1242000
85	794000	1242000	85	794000	1242000
86	794000	1242000	86	794000	1242000
87	794000	1242000	87	794000	1242000
88	794000	1242000	88	794000	1242000
89	794000	1242000	89	794000	1242000
90	794000	1242000	90	794000	1242000
91	794000	1242000	91	794000	1242000
92	794000	1242000	92	794000	1242000
93	794000	1242000	93	794000	1242000
94	794000	1242000	94	794000	1242000
95	794000	1242000	95	794000	1242000
96	794000	1242000	96	794000	1242000
97	794000	1242000	97	794000	1242000
98	794000	1242000	98	794000	1242000
99	794000	1242000	99	794000	1242000
100	794000	1242000	100	794000	1242000

Proposed Parandur Airport Boundary  
GPS Co-ordinates

DESIGN	DESIGN/COORDINATOR	STATUS	PERIOD	APPROVED
		ISSUED	CONTINUOUS	01/2023
DATE: OCTOBER 2023 PAGE: 16/16 AS PROJECT: UTM-A-481				





Table 3-1 : Parandur Airport Boundary GPS Co-ordinates

Units→		UTM84-44N		WGS 84(DD)		Units→		UTM84-44N		WGS 84(DD)	
Point No	Remarks	Easting(X)	Northing(Y)	Latitude	Longitude	Point No	Remarks	Easting(X)	Northing(Y)	Latitude	Longitude
1	Proposed Parandur Airport Boundary	365116.320	1433603.404	12.965	79.756	51	Proposed Parandur Airport Boundary	368160.312	1431107.152	12.943	79.785
2	Proposed Parandur Airport Boundary	365117.378	1433750.098	12.966	79.756	52	Proposed Parandur Airport Boundary	368009.874	1431113.679	12.943	79.783
3	Proposed Parandur Airport Boundary	365995.574	1434064.693	12.969	79.765	53	Proposed Parandur Airport Boundary	367864.297	1431121.810	12.943	79.782
4	Proposed Parandur Airport Boundary	366877.274	1434380.544	12.972	79.773	54	Proposed Parandur Airport Boundary	367744.924	1431127.447	12.943	79.781
5	Proposed Parandur Airport Boundary	368044.598	1434798.713	12.976	79.783	55	Proposed Parandur Airport Boundary	367672.373	1431135.466	12.943	79.780
6	Proposed Parandur Airport Boundary	368957.608	1435125.780	12.979	79.792	56	Proposed Parandur Airport Boundary	367678.910	1431270.216	12.944	79.780
7	Proposed Parandur Airport Boundary	369611.430	1435359.998	12.981	79.798	57	Proposed Parandur Airport Boundary	367490.635	1431273.619	12.944	79.778
8	Proposed Parandur Airport Boundary	370236.039	1435583.751	12.983	79.804	58	Proposed Parandur Airport Boundary	367338.371	1431276.371	12.944	79.777
9	Proposed Parandur Airport Boundary	370299.442	1435340.575	12.981	79.804	59	Proposed Parandur Airport Boundary	367339.264	1431355.325	12.945	79.777
10	Proposed Parandur Airport Boundary	370384.769	1435013.310	12.978	79.805	60	Proposed Parandur Airport Boundary	367325.461	1431383.816	12.945	79.777
11	Proposed Parandur Airport Boundary	370459.567	1434726.431	12.976	79.806	61	Proposed Parandur Airport Boundary	367326.417	1431475.930	12.946	79.777
12	Proposed Parandur Airport Boundary	370253.513	1434691.966	12.975	79.804	62	Proposed Parandur Airport Boundary	367313.785	1431533.367	12.947	79.777
13	Proposed Parandur Airport Boundary	369992.463	1434648.302	12.975	79.801	63	Proposed Parandur Airport Boundary	367323.992	1431616.487	12.947	79.777



Units→		UTM84-44N		WGS 84(DD)		Units→		UTM84-44N		WGS 84(DD)	
Point No	Remarks	Easting(X)	Northing(Y)	Latitude	Longitude	Point No	Remarks	Easting(X)	Northing(Y)	Latitude	Longitude
14	Proposed Parandur Airport Boundary	369995.65 0	1434519.309	12.974	79.801	64	Proposed Parandur Airport Boundary	367309.982	1431709.725	12.948	79.777
15	Proposed Parandur Airport Boundary	369999.07 3	1434380.799	12.972	79.801	65	Proposed Parandur Airport Boundary	367278.285	1431775.150	12.949	79.776
16	Proposed Parandur Airport Boundary	370189.25 8	1434442.292	12.973	79.803	66	Proposed Parandur Airport Boundary	367301.724	1431818.201	12.949	79.777
17	Proposed Parandur Airport Boundary	370200.27 4	1434231.068	12.971	79.803	67	Proposed Parandur Airport Boundary	367299.516	1431864.963	12.950	79.777
18	Proposed Parandur Airport Boundary	370219.98 5	1433853.122	12.968	79.803	68	Proposed Parandur Airport Boundary	367223.082	1431865.145	12.950	79.776
19	Proposed Parandur Airport Boundary	370232.211	1433618.702	12.965	79.804	69	Proposed Parandur Airport Boundary	367166.255	1431778.103	12.949	79.775
20	Proposed Parandur Airport Boundary	370245.63 5	1433361.303	12.963	79.804	70	Proposed Parandur Airport Boundary	367092.941	1431665.808	12.948	79.775
21	Proposed Parandur Airport Boundary	369864.84 1	1433243.361	12.962	79.800	71	Proposed Parandur Airport Boundary	367024.925	1431561.627	12.947	79.774
22	Proposed Parandur Airport Boundary	369423.146	1433106.555	12.961	79.796	72	Proposed Parandur Airport Boundary	366903.347	1431485.967	12.946	79.773
23	Proposed Parandur Airport Boundary	368884.89 7	1432939.844	12.959	79.791	73	Proposed Parandur Airport Boundary	366758.100	1431395.577	12.945	79.772
24	Proposed Parandur Airport Boundary	368560.47 1	1432839.361	12.958	79.788	74	Proposed Parandur Airport Boundary	366639.650	1431321.864	12.945	79.771
25	Proposed Parandur Airport Boundary	368299.30 9	1432758.471	12.958	79.786	75	Proposed Parandur Airport Boundary	366671.273	1431133.790	12.943	79.771
26	Proposed Parandur Airport Boundary	368278.96 6	1432655.214	12.957	79.786	76	Proposed Parandur Airport Boundary	366668.436	1431000.100	12.942	79.771
27	Proposed Parandur Airport Boundary	368262.16 0	1432569.909	12.956	79.785	77	Proposed Parandur Airport Boundary	366698.085	1430992.062	12.942	79.771



Units→		UTM84-44N		WGS 84(DD)		Units→		UTM84-44N		WGS 84(DD)	
Point No	Remarks	Easting(X)	Northing(Y)	Latitude	Longitude	Point No	Remarks	Easting(X)	Northing(Y)	Latitude	Longitude
28	Proposed Parandur Airport Boundary	368256.831	1432507.952	12.955	79.785	78	Proposed Parandur Airport Boundary	366680.977	1430874.153	12.941	79.771
29	Proposed Parandur Airport Boundary	368249.811	1432497.326	12.955	79.785	79	Proposed Parandur Airport Boundary	366820.472	1430808.554	12.940	79.772
30	Proposed Parandur Airport Boundary	368231.098	1432497.612	12.955	79.785	80	Proposed Parandur Airport Boundary	366798.912	1430754.044	12.939	79.772
31	Proposed Parandur Airport Boundary	368202.866	1432464.189	12.955	79.785	81	Proposed Parandur Airport Boundary	366777.014	1430763.361	12.940	79.772
32	Proposed Parandur Airport Boundary	368152.882	1432470.349	12.955	79.784	82	Proposed Parandur Airport Boundary	366762.053	1430739.087	12.939	79.772
33	Proposed Parandur Airport Boundary	368124.998	1432442.188	12.955	79.784	83	Proposed Parandur Airport Boundary	366837.860	1430666.345	12.939	79.772
34	Proposed Parandur Airport Boundary	368127.675	1432394.471	12.954	79.784	84	Proposed Parandur Airport Boundary	366879.289	1430564.329	12.938	79.773
35	Proposed Parandur Airport Boundary	368161.550	1432393.323	12.954	79.785	85	Proposed Parandur Airport Boundary	366928.737	1430539.878	12.938	79.773
36	Proposed Parandur Airport Boundary	368125.498	1432225.107	12.953	79.784	86	Proposed Parandur Airport Boundary	366959.374	1430420.343	12.936	79.774
37	Proposed Parandur Airport Boundary	368109.537	1432125.696	12.952	79.784	87	Proposed Parandur Airport Boundary	366982.601	1430308.958	12.935	79.774
38	Proposed Parandur Airport Boundary	368072.382	1432129.426	12.952	79.784	88	Proposed Parandur Airport Boundary	367006.623	1430193.759	12.934	79.774
39	Proposed Parandur Airport Boundary	368064.426	1432084.852	12.952	79.784	89	Proposed Parandur Airport Boundary	367023.479	1430038.692	12.933	79.774
40	Proposed Parandur Airport Boundary	368047.166	1432084.680	12.952	79.784	90	Proposed Parandur Airport Boundary	367038.762	1429898.103	12.932	79.774
41	Proposed Parandur Airport Boundary	368046.080	1432068.599	12.951	79.783	91	Proposed Parandur Airport Boundary	366921.788	1429879.487	12.932	79.773



Units→		UTM84-44N		WGS 84(DD)		Units→		UTM84-44N		WGS 84(DD)	
Point No	Remarks	Easting(X)	Northing(Y)	Latitude	Longitude	Point No	Remarks	Easting(X)	Northing(Y)	Latitude	Longitude
42	Proposed Parandur Airport Boundary	368040.25 2	1432039.178	12.951	79.783	92	Proposed Parandur Airport Boundary	366916.442	1429831.654	12.931	79.773
43	Proposed Parandur Airport Boundary	368043.94 2	1432000.866	12.951	79.783	93	Proposed Parandur Airport Boundary	366761.355	1429822.104	12.931	79.772
44	Proposed Parandur Airport Boundary	368120.63 7	1432006.521	12.951	79.784	94	Proposed Parandur Airport Boundary	366601.176	1429812.240	12.931	79.770
45	Proposed Parandur Airport Boundary	368124.584	1431954.522	12.950	79.784	95	Proposed Parandur Airport Boundary	366598.187	1429794.880	12.931	79.770
46	Proposed Parandur Airport Boundary	368117.663	1431946.557	12.950	79.784	96	Proposed Parandur Airport Boundary	366580.816	1429798.153	12.931	79.770
47	Proposed Parandur Airport Boundary	368250.21 0	1431917.502	12.950	79.785	97	Proposed Parandur Airport Boundary	366577.321	1429731.530	12.930	79.770
48	Proposed Parandur Airport Boundary	368217.079	1431669.357	12.948	79.785	98	Proposed Parandur Airport Boundary	366658.374	1429719.101	12.930	79.771
49	Proposed Parandur Airport Boundary	368182.662	1431411.581	12.945	79.785	99	Proposed Parandur Airport Boundary	366637.439	1429574.369	12.929	79.771
50	Proposed Parandur Airport Boundary	368161.943	1431256.395	12.944	79.785	100	Proposed Parandur Airport Boundary	366616.717	1429431.103	12.927	79.770



Table 3-2 Parandur Airport Boundary GPS Co-ordinates- 2

Units→		UTM84-44N		WGS 84(DD)	
Point No	Remarks	Easting(X)	Northing(Y)	Latitude	Longitude
101	Proposed Parandur Airport Boundary	366544.098	1429451.450	12.928	79.770
102	Proposed Parandur Airport Boundary	366554.337	1429284.603	12.926	79.770
103	Proposed Parandur Airport Boundary	366563.970	1429127.634	12.925	79.770
104	Proposed Parandur Airport Boundary	366652.628	1429113.780	12.925	79.771
105	Proposed Parandur Airport Boundary	366623.339	1428982.060	12.923	79.771
106	Proposed Parandur Airport Boundary	366547.965	1429009.876	12.924	79.770
107	Proposed Parandur Airport Boundary	366528.528	1428886.814	12.923	79.770
108	Proposed Parandur Airport Boundary	366525.767	1428809.259	12.922	79.770
109	Proposed Parandur Airport Boundary	366519.572	1428648.388	12.920	79.770
110	Proposed Parandur Airport Boundary	366509.064	1428618.888	12.920	79.769
111	Proposed Parandur Airport Boundary	366586.029	1428517.452	12.919	79.770
112	Proposed Parandur Airport Boundary	366499.571	1428415.239	12.918	79.769
113	Proposed Parandur Airport Boundary	366472.874	1428383.678	12.918	79.769
114	Proposed Parandur Airport Boundary	366412.090	1428360.282	12.918	79.769
115	Proposed Parandur Airport Boundary	366364.239	1428339.417	12.918	79.768
116	Proposed Parandur Airport Boundary	366323.493	1428325.700	12.917	79.768
117	Proposed Parandur Airport Boundary	366270.253	1428307.809	12.917	79.767
118	Proposed Parandur Airport Boundary	366220.981	1428291.437	12.917	79.767
119	Proposed Parandur Airport Boundary	366143.420	1428266.396	12.917	79.766
120	Proposed Parandur Airport Boundary	366092.813	1428250.771	12.917	79.766
121	Proposed Parandur Airport Boundary	366059.309	1428240.828	12.917	79.765
122	Proposed Parandur Airport Boundary	366015.937	1428228.510	12.917	79.765
123	Proposed Parandur Airport Boundary	365737.310	1428167.998	12.916	79.762
124	Proposed Parandur Airport Boundary	365453.728	1428138.734	12.916	79.760
125	Proposed Parandur Airport Boundary	365228.778	1428141.697	12.916	79.758
126	Proposed Parandur Airport Boundary	365055.034	1428143.986	12.916	79.756
127	Proposed Parandur Airport Boundary	364968.512	1428151.044	12.916	79.755
128	Proposed Parandur Airport Boundary	364967.831	1428449.265	12.919	79.755
129	Proposed Parandur Airport Boundary	364967.099	1428769.535	12.921	79.755



Units→		UTM84-44N		WGS 84(DD)	
Point No	Remarks	Easting(X)	Northing(Y)	Latitude	Longitude
130	Proposed Parandur Airport Boundary	364966.315	1429112.763	12.925	79.755
131	Proposed Parandur Airport Boundary	364965.680	1429390.618	12.927	79.755
132	Proposed Parandur Airport Boundary	364811.242	1429561.842	12.929	79.754
133	Proposed Parandur Airport Boundary	364623.279	1429561.413	12.929	79.752
134	Proposed Parandur Airport Boundary	364466.344	1429561.054	12.929	79.751
135	Proposed Parandur Airport Boundary	364350.803	1429560.790	12.929	79.750
136	Proposed Parandur Airport Boundary	364349.688	1430049.042	12.933	79.750
137	Proposed Parandur Airport Boundary	364348.245	1430680.532	12.939	79.749
138	Proposed Parandur Airport Boundary	364346.544	1431424.663	12.945	79.749
139	Proposed Parandur Airport Boundary	364344.941	1432126.267	12.952	79.749
140	Proposed Parandur Airport Boundary	364343.470	1432770.159	12.958	79.749
141	Proposed Parandur Airport Boundary	364342.186	1433331.905	12.963	79.749
142	Proposed Parandur Airport Boundary	364739.814	1433471.358	12.964	79.753

## 3.4 EXISTING ROAD CONNECTIVITY

The project site benefits from excellent connectivity with Chennai City and its surroundings through the well-established Bangalore-Chennai 4-lane National Highway NH-48. Notably, this highway is currently undergoing expansion to a 6-lane configuration, further enhancing its capacity. Situated approximately 4.5 km from the southern infrastructure boundary of the Proposed Airport site, NH-48 serves as a vital link.

Figure 3-5 Project Location and Site Connectivity



### 3.4.1 UPCOMING DEVELOPMENTS

To augment road connectivity, the construction of the Bengaluru Chennai Expressway (NE7) is currently underway. This significant development is expected to be completed before the commencement of airport operations, thereby providing enhanced access for proposed traffic from the project site. Commuters will have the option to utilize either the existing NH-48 or the expressway, subsequently transitioning onto the Sriperumbudur-Singaperumal koil link Highway (SH 57 - 4 Lane Road). This highway is part of the Chennai Peripheral Ring Road (Section 4) and will undergo upgrading to align with the CPRR configuration. It will seamlessly merge with the Chennai-Chengalpattu NH-32 (New NH 179B), facilitating travel southward and beyond. An alternative route for southward travel includes the route from Singuvarchatram to Waljabad (SH 120- 4 Laned road) and Oragadam (on NH 132B and SH 58). Additionally, ongoing work for the 6-laning project is progressing on the walajapet-Maduravoyal section of NH-48, which is divided into three packages. These packages are slated for completion in December 2023.

- **Planned Airport Link Road:** As part of the project, the Government of Tamil Nadu has conceived a new 6-lane Airport Link Road to establish a seamless connection between the Airport and the existing Bengaluru-Chennai NH-48. This link road is expected to originate at the Proposed Airport Expressway (NE-7) drop junction (near Project site) and intersect the existing NH-48 near Attuputhur. The alignment of the Link Road is yet expected to be finalized.
- **Chennai Metro Phase II:** Based on the government directive, Chennai Metro Rail Limited (CMRL) is in the process of preparing the detailed feasibility study for extension of corridor 4 of



Chennai Metro Phase II from Poonamallee to Parandur (44 KMs). The proposed alignment of the metro runs parallel to the existing Chennai-Bengaluru Highway and is planned to connect to Parandur from Neervalur.

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### 3.4.2 TRAFFIC FLOW DIRECTIONS

**Southbound Traffic:** Commuters have the choice to utilize either the existing Bangalore-Chennai Highway NH-48 or the upcoming Bangalore Chennai Expressway (NE7). Following this, they can transition onto the Sriperumbudur-Singaperumal koil link Highway (SH 57 - 4 Lane Road) and join the Chennai-Chengalpattu NH-32 (New NH 179B) for travel south and beyond.

**Eastbound and North Traffic:** The existing Bangalore-Chennai Highway (NH-48) serves as a route for eastbound travel. For northbound travel, commuters can use the peripheral road of the proposed airport to access the Arakkonam-Thiruttani (SH 58) and Thiruttani-Nagari (NH 716) roads, offering flexibility and connectivity options.

**Westbound Traffic:** Commuters can opt for either the existing Bangalore-Chennai Highway NH-48 along the Kanchipuram-Arcot route or the Bangalore Chennai Expressway (NE7) for convenient westbound travel.

**District Road:** A district road called Parandur Road (MDR-651) originates from the existing Bangalore-Chennai National Highway (NH-48) near Meenakshi Medical College Hospital and passes through the project site, reaching Maduramangalam Township. As indicated in the technical feasibility report prepared by TIDCO in August 2022, a proposal is in place to divert road traffic along the western and northern airport boundary through a new 4-lane road. The required land for this diversion has been earmarked.

The existing road connectivity infrastructure, including the NH-48 and upcoming express highways (NE7), forms a robust foundation for efficient access to the Proposed Airport Project site. The planned developments, such as the Airport Link Road, will further enhance connectivity and ensure smooth traffic flow to and from the Airport. However, we will also recommend expanding the current Chennai metro network to include express metro that provides direct connectivity between the existing Chennai International Airport and Proposed Airport at Parandur.

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## 3.5 DESCRIPTION OF THE ENVIRONMENT

Baseline environmental setting helps in comparing and to monitor the predicted positive impacts and negative impacts resulting from the project during the construction and operation phases. The following section describes the nature, type, and characteristics of the physical, biological, cultural, and socioeconomic components around the project area.

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### 3.5.1 PHYSICAL ENVIRONMENT

#### PHYSIOGRAPHY

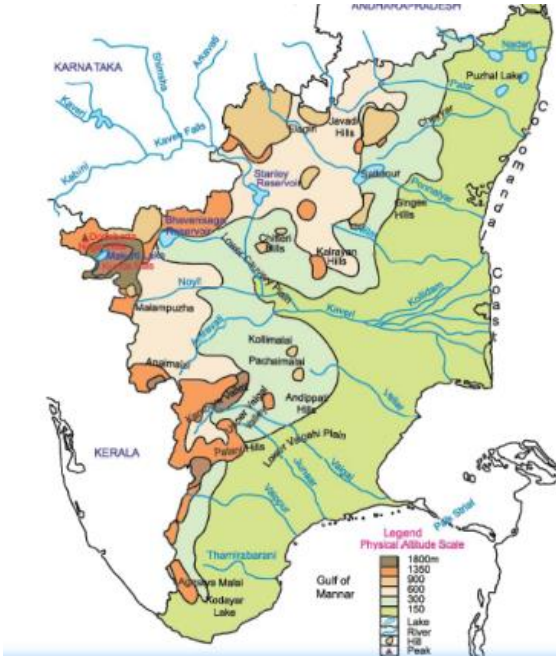
The project is located over flat to rolling terrain. The area is drained into Palar River and its tributaries. Apart from this river, there are some local ponds/streams/nallahs which cross the project which are ephemeral in nature.

The state of Tamil Nadu is divided into four physiographic units viz. Coastal Plains, Eastern Ghats, Central Plateau and Western Ghats. Kancheepuram districts falls under coastal plain. The coastal plains are further sub-divided into (i) the Coromandel Coast comprising parts of the districts of Tiruvallur, Kancheepuram and Cuddalore, (ii) the alluvial plain of Cauvery delta extending over Nagappattinam, Thanjavur Thiruvarur districts and (iii) the dry southern plains comprising parts of Pudukkottai, Ramanathapuram, Tuticorin, Tirunelveli and Kanyakumari districts. The chain of flat-topped hills of Javadis, the Shevroy, the Kalrayan and the Pachamalai hills, which are joining Cardamom hills in the south, form the Eastern Ghats. These hills rise steeply above plateau level to 1160 m above mean sea level in the Javadi hills and to 1645 m above mean sea level in the Shevroy hills.





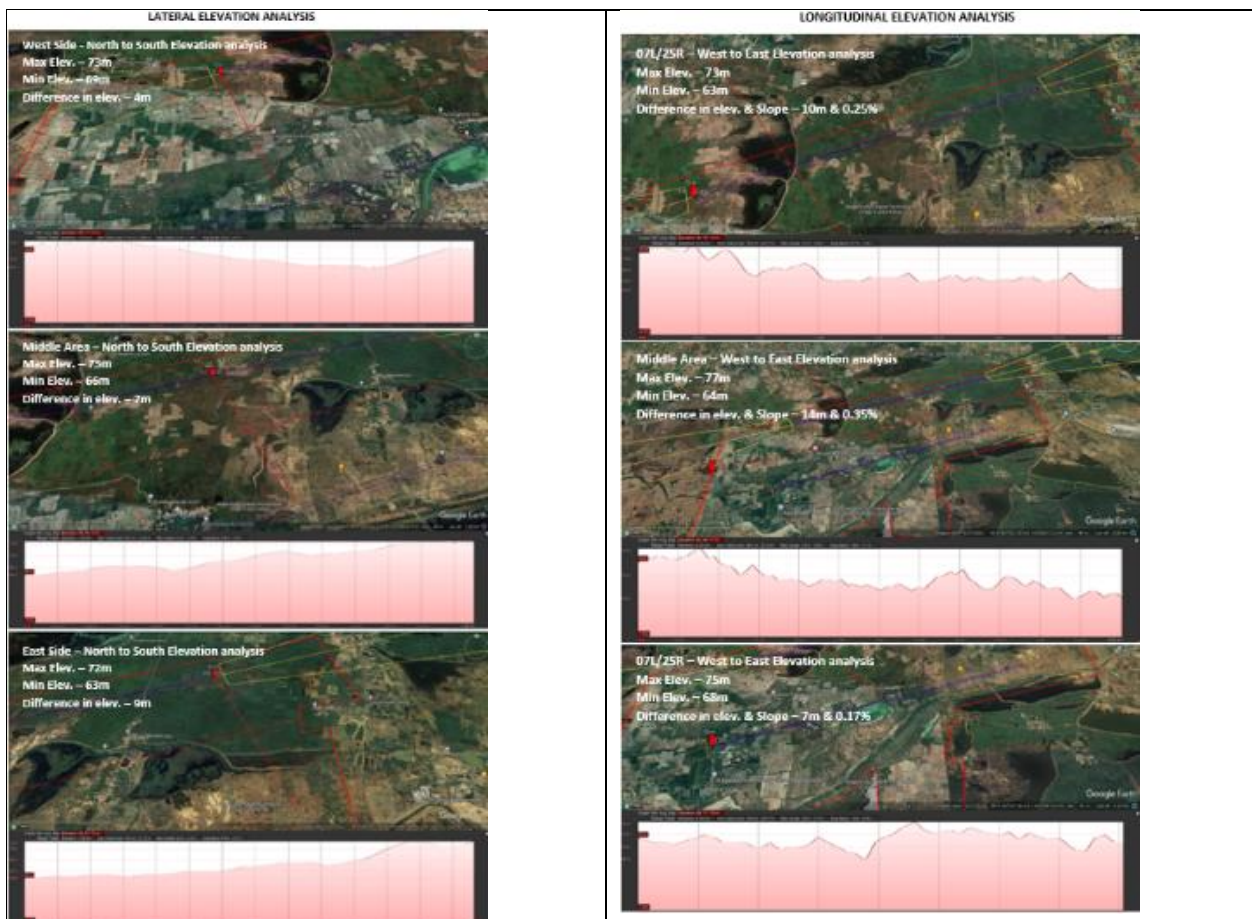
Figure 3-6 Physiographic of the Tamil Nadu



Source: <http://mapsof.net>

The topography of the project site area is fairly even. Eastern part of the area is at a lower Average Mean Sea Level. The average longitudinal gradient of the terrain is 0.30%. Earth filling may be required to keep the operational area and other infrastructure free of water stagnation.

Figure 3-7 Preliminary Lateral and Longitudinal Analysis of the Project Site



Source: Louis Berger Analysis



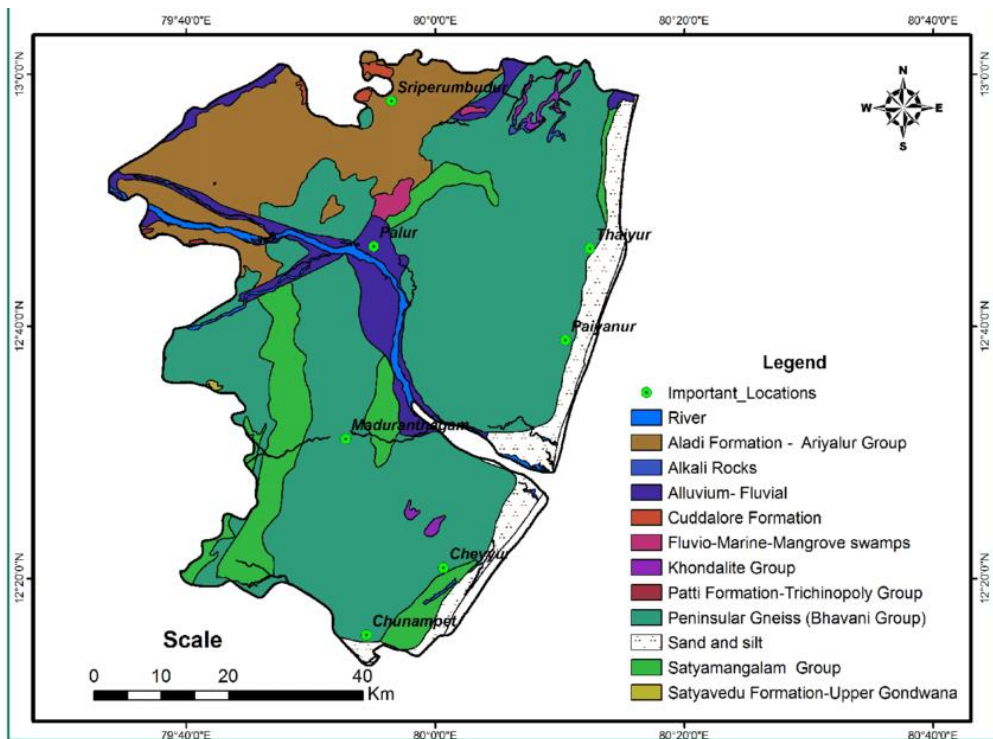
## GEOLOGY

The Kancheepuram district is underlain by a wide range of consolidated and fissured formations, from the oldest Archaeans, followed by semi-consolidated formations of Mesozoic and Tertiary ages to the unconsolidated alluvial formations of Quaternary age.

The semi-consolidated formations represent the upper Gondwanas of Jurassic to Lower Cretaceous in age and the marine bed of Cretaceous age. They comprise sediments laid down unconformably on crystalline basement which were metamorphosed subsequently. The upper Gondwana sediments consist of two stages viz. the lower Sriperumbudur stage consisting of fluvial clays, shales and feldspathic sandstones and the Sathyavedu stage representing marine sediments and boulders.

The Sriperumbudur beds occur as patches, with easterly dips at low angles. The age of Sriperumbudur is not certain, but the impressions of the Foraminifera and ammonites are suggestive of an age varying from Upper Jurassic to Lower Cretaceous.

Figure 3-8 Geology map of Kancheepuram District



Source: <http://mapsof.net>

## SOIL

The predominant soil types in Tamil Nadu state are red soils, black soils, coastal soil and laterite. The types of soils in Tamil Nadu are as given below:

- Alluvial soil
- Black soil
- Red soil
- Laterite soil
- Arid desert soil
- Forest and mountain soil

Alluvial Soil - Sediments deposited by the flowing river is alluvial soil. It occurs in the deltas of Cauvery. These soils are deficient in nitrogen & humus. Such soils are suitable for growing all types of cereals, pulses, sugarcane, vegetables oils seeds.



**Black Soil** - Black soils are formed from the lavas of mountain suitable for cotton cultivation. Black colour is due to the presence of iron. Soil is deficient in nitrogen, phosphates and organic matter, but rich in potash, lime, aluminium, calcium & magnesium. Lemon and sunflower grow well in the soil.

**Red Soil**- It consists red-oxide. Red colour soils are formed from the crystalline & metamorphic rocks, rich in iron but deficient in nitrogen, phosphorus. It has a light texture. Crops like rice, ragi, tobacco and vegetables are grown, found in all districts.

**Laterite Soil**- This soil found in the areas of high rainfall (Parts of the Nilgiris District) & temperature regions. These soils contain high content of iron oxide. These are deficient in nitrogen, phosphorus & potash. These soils are suitable for rice, ragi sugarcane, rubber, and cashew cultivation.

**Forest and Mountain Soil** - This type of soil found in Mountain regions, of Yelagiri, Shervorys, Kalvarayen, Agathiyer, & Anamalai regions. These are suitable for coffee, tea, rubber cardamom & cloves.

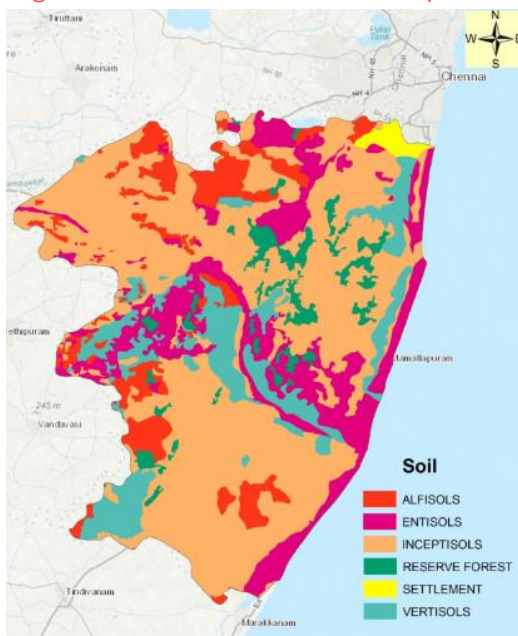
**Table 3-3: Types of Soils in Tamil Nadu and Their Distribution**

S.No	Soil	District
1	Alluvial soils	Thanjavur, Thiruvarur and Nagapattinam, Villupuram, Cuddalore, Thirunelveli and Kanyakumari.
2	Regur or the black soils	Coimbatore, Madurai, Virudhunagar, Thuthukudi and Tirunelveli.
3	Red Loams	Sivagangai, Ramanathapuram.
4	Laterite soils	Kancheepuram, Thiruvallur, Thanjavur, hill tops of western ghats and eastern ghats.
5	Saline soils	Predominantly in Vedaranyam, Coromandel coast and for about 10 km in all the coastal districts of Tamil Nadu.

**Kancheepuram District**

Soils in Kancheepuram district have been classified into 1) clayey soil, 2) red sandy or red loamy soil 3) Red sandy brown clayey soil and 4) Alluvial soil. Of the above soils brown clayey soil is the most predominant, covering more than 71 percent of the areal extent of Kancheepuram district. Alluvial soils are found on the banks of Palar, Cheyyar and other rivers. The river alluvium is transported and is seen in coastal area of this district. Sandy coastal alluvial (arenacious soil) occurs along the seacoast as a narrow belt.

**Figure 3-9: Soil Distribution map of Kanchipuram District**

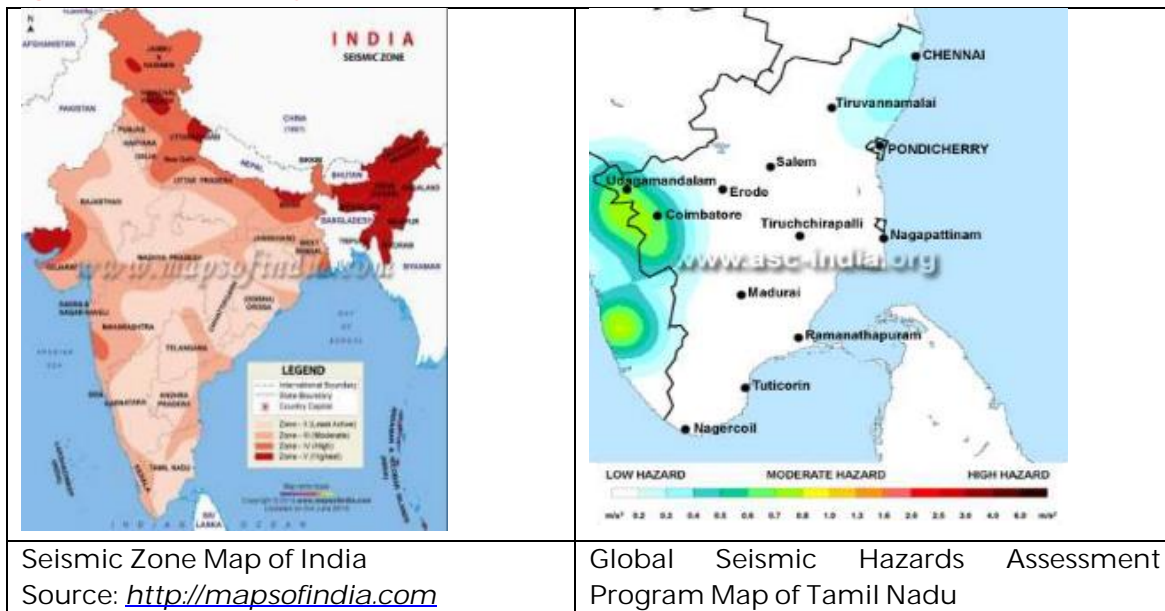


Source: <http://mapsof.net>

## SEISMICITY

The State of Tamil Nadu is a zone of low to moderate seismic activity with a sparse historical record of significant earthquakes. Seismicity/Effect due to earthquake have been accounted for by considering the seismic load in longitudinal and transverse direction. For the purpose of determining the seismic forces the country is divided into four zones (Zone II to Zone V) based on the intensity of earthquakes that a particular area may be subjected to, with Zone V comprising of areas which have been subjected to severe earthquakes & Zone II comprising areas least liable to earthquakes. The seismic loads are calculated using Response Spectrum method as per Modified clause of IRC: 6- 2010. The seismic force depends upon several factors like zone factor, Period of vibration, Soil type etc. The project falls under ZONE III of seismic zone of India. This zone is classified as Moderate Damage Risk Zone. The IS code assigns zone factor of 0.16 for Zone-3. The seismic map of Tamil Nadu has been shown in below Figure Seismic Zonation Map of India.

Figure 3-10: Seismicity map of India



### 3.5.2 BASELINE ENVIRONMENTAL MONITORING (AIR, SOIL, WATER AND NOISE)

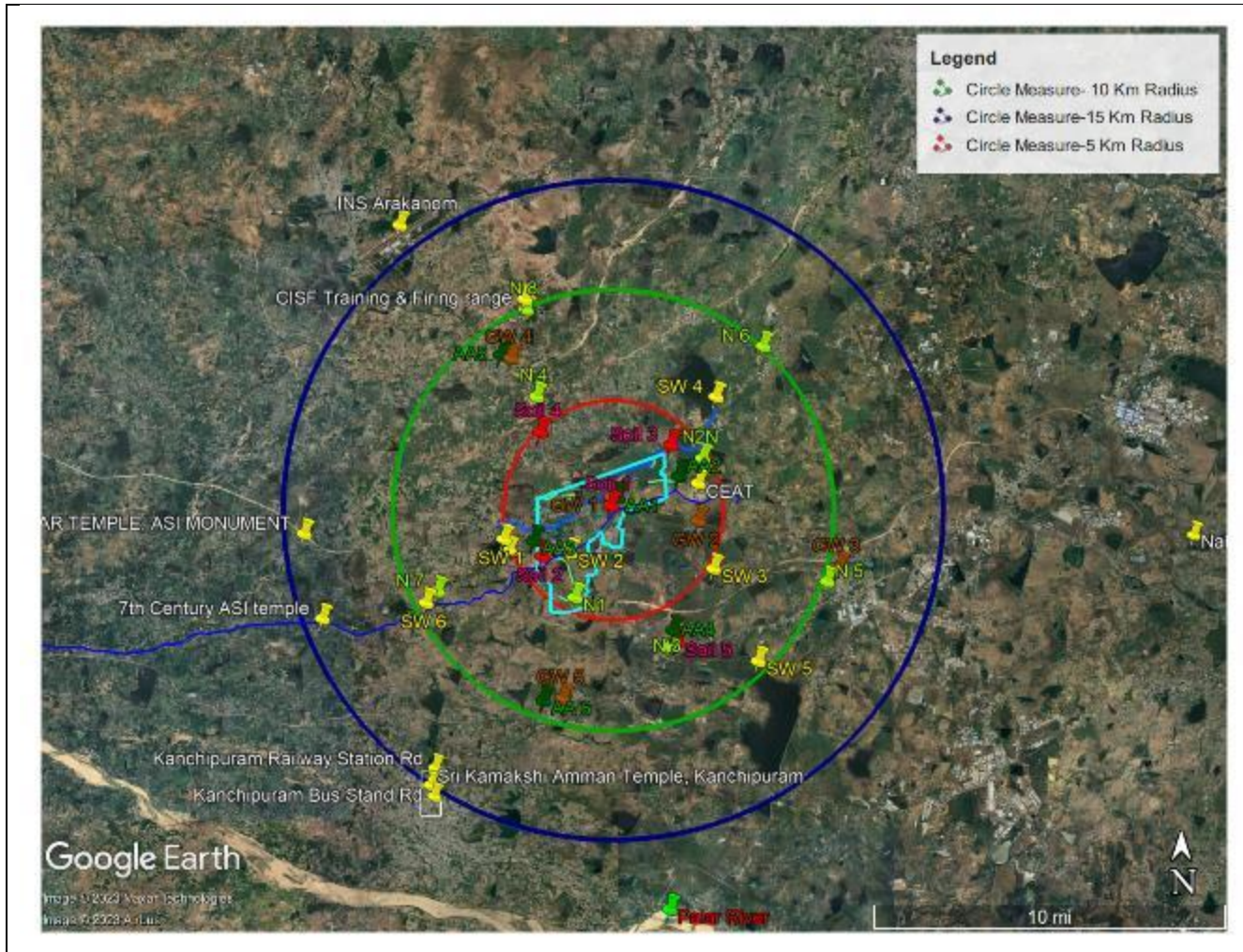
The baseline status of Ambient air, noise, soil, and water quality monitoring is to be carried out in the non-monsoon Season, as per the guidelines of the CPCB/MOEF&CC. The environmental monitoring programme provides basis for evaluating the efficiency of mitigation and enhancement measures and suggest further actions that need to be taken to achieve the desired effect. The monitoring includes:

- Visual observations.
- Selection of environmental parameters at specific locations.

Table 3-4 Baseline Monitoring Samples points

Description	Unit	No. of Locations
Ambient Air Quality monitoring- One Continuous sample for 24 Hrs as per CPCB guidelines - 6 Locations @ 2 days in a week for three months (Total 144 Air Samples)	Nos.	6
Noise monitoring- (Monthly at all locations for 3 months) - (Total 24 noise Samples)	Nos.	8
Surface water monitoring	Nos.	5
Ground water monitoring	Nos.	5
Soil quality monitoring	Nos.	5
Meteorology (wind speed, wind direction, temperature, and humidity) will be recorded for three months at one location along the alignment.	Nos.	1

Figure 3-11 Proposed Baseline Environmental Monitoring location map



Source: Louis Berger Analysis

### 3.5.3 ENVIRONMENTAL QUALITY FROM NEAREST SOURCE

To study the baseline ambient air quality scenario of the project area, the ambient air quality test report of the CEAT factory was collected as part of the secondary data. The ambient air quality data was conducted by CEAT in the month of July 2023 from 15th July 2023 to 20th July 2023. CEAT tyres factory is located to the southeast of the site within 2 kms from the project boundary, the stack height of the factory is 55M. The summary of analysis of the Ambient Air Quality monitoring results at different locations are given in the below table.

Table 3-5 Ambient monitoring results- CEAT Factory

Monitoring Station	PM 10 µg/m <sup>3</sup>	PM 2.5 µg/m <sup>3</sup>	Sox µg/m <sup>3</sup>	NO <sub>x</sub> µg/m <sup>3</sup>	CO mg/m <sup>3</sup>
Near ETP Plant	53.97	23.26	12.46	22.30	BLQ
Near TBA 1B Canteen	50.33	22.37	11.32	20.41	BLQ
Near FGS Loading Area	55.08	26.43	11.52	22.90	BLQ
Near Nitrogen yard	54.65	23.54	12.43	24.87	BLQ
Near MRS Cooling Tower	52.90	23.76	12.76	23.42	BLQ
Near WTP Plant	52.54	26.06	12.40	22.37	BLQ

BLQ: Below the limit of Qualification

Source: CEAT Tyres factory, Ambient Quality Report, July 2023



The monitoring results obtained from the nearest source indicates that the ambient air quality levels of the project area are within the Central Pollution Control Board (CPCB) limits.

### 3.5.4 METEOROLOGY

Meteorology plays an important role in transport, diffusion, and dispersion of pollutants in the atmosphere, the meteorological secondary data has been collected from the IMD. Among all other physical factors, climate is the most important factor-influencing environment because it plays a vital role in determining the evolution of landforms (erosion, soil characteristics), types of flora and fauna (ecological diversity), the productivity of ecosystems. It also has an influence on the pollution loads on the environment.

The climate of Tamil Nadu state is tropical, with distinct wet and dry seasons. According to Agro-ecological classification, the state has hot and semi-arid climate. The climate may be classified into four distinct seasons: winter (January-February), summer (March-May), southwest monsoons (June-September) and northeast monsoon (October-December).

Mean monthly maximum and minimum temperature data, wind & Relative Humidity for the period from Jan 2002 to Dec 2022 was collected from the IMD's Meenambakkam IMD Station for Kancheepuram districts and data from Arakkonam, Indian naval air station was collected for the Month of May 2023 to correlate with IMD.

Table 3-6 IMD Data collected from nearest station

S.No	Station	IMD Data	Duration
1	Chennai (Meenambakkam) -Id: 43279	Temperature, Wind, Relative Humidity	2002 To 2022
2	Chennai (Nungambakkam) -Id: 43278	Temperature, Wind	2005 To 2020
3	Arakkonam, Indian naval air station	Temperature, Wind, Relative Humidity	May 2023
4	Kancheepuram	Rainfall	2000 To 2020

Source: [https://dsp.imdpune.gov.in/user\\_request\\_list.php](https://dsp.imdpune.gov.in/user_request_list.php)

The average month wise Meteorological Data is given in below Table.

Table 3-7 Metrological data- IMD

Month	Temperature (°C)		Rainfall (mm)	Relative Humidity (%)		Avg Wind Speed (KMPH)
	Maximum	Minimum		Morning	Evening	
January	30.2	20.9	9.9	81.3	63.9	4.3
February	31.6	21.3	6.7	78.7	63.3	4.9
March	34.1	23.8	4.0	75.4	62.4	6.8
April	36.2	26.4	16.4	72.6	65.3	8.2
May	38.2	27.6	61.4	65.6	61.4	9.0
June	37.6	27.3	93.8	61.4	57.6	8.2
July	36.0	26.2	119.8	67.4	58.9	7.4
August	34.9	25.4	167.7	72.2	65.3	6.6
September	34.2	25.2	167.5	75.1	68.6	6.3
October	33.4	24.6	217.6	78.4	71.4	4.8
November	30.7	23.0	399.1	82.6	75.1	4.4
December	29.6	21.8	234.8	82.0	71.1	4.8

Source: IMD station (Meenambakkam)

### 3.5.5 CLIMATE

The climate of Tamil Nadu is essentially tropical. In May and June, the hottest months, maximum daily temperatures in Chennai average about 38 °C, while minimum temperatures average in the low 20 °C. In December and January, the coolest months, temperatures usually rise from about 21°C into the mid-about 30°C daily. The average annual precipitation, falling mainly between October and December, depends on the southwest and northeast monsoons and ranges between 630 mm and 1900 mm a year. The mountainous and hilly areas, especially in the extreme western part of the state, receive the most precipitation, while the lower-lying southern and southeastern regions receive the least rainfall.

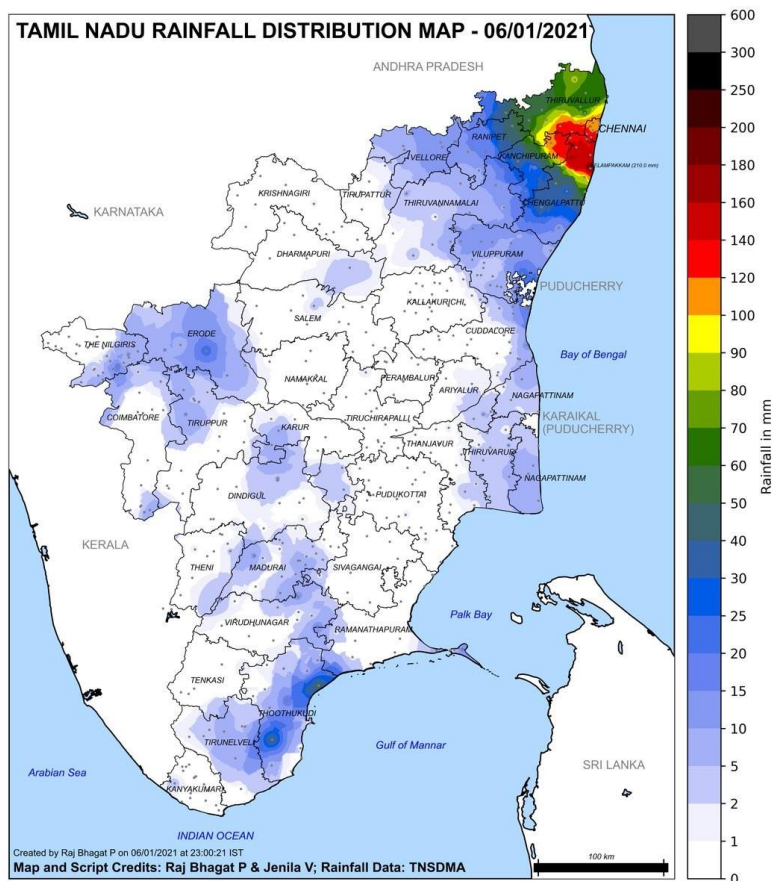
#### Kancheepuram District

Kancheepuram district generally experiences hot and humid climatic conditions. The district receives the rain under the influence of both southeast and northeast monsoons. Most of the precipitation occurs in the form of cyclonic storm caused due to the depressions in Bay of Bengal chiefly during northeast monsoon period. The southwest monsoon rainfall is highly erratic and summer rains are negligible.

### 3.5.6 RAINFALL

The twenty years of monthly average rainfall from 2000 to 2020 has been taken from the nearest IMD station. This district receive rainfall during Southwest and Northeast rainy seasons. The Southwest Monsoon which ranges from 93.8 mm to 167.7 mm and Northeast Monsoon receive rainfall from 217.6 mm to 399.1 mm. Annual rainfall of the district is 1498.7 mm. Meenambakkam recorded the second-highest rainfall in the last 73 years with 16 cm, and the highest was recorded in 1996 with 282 mm. Similarly, Nungambakkam recorded the third highest rainfall with 9 cm rain, and 27 years ago it was 347 mm.

Figure 3-12 Rainfall distribution map of Tamil Nadu

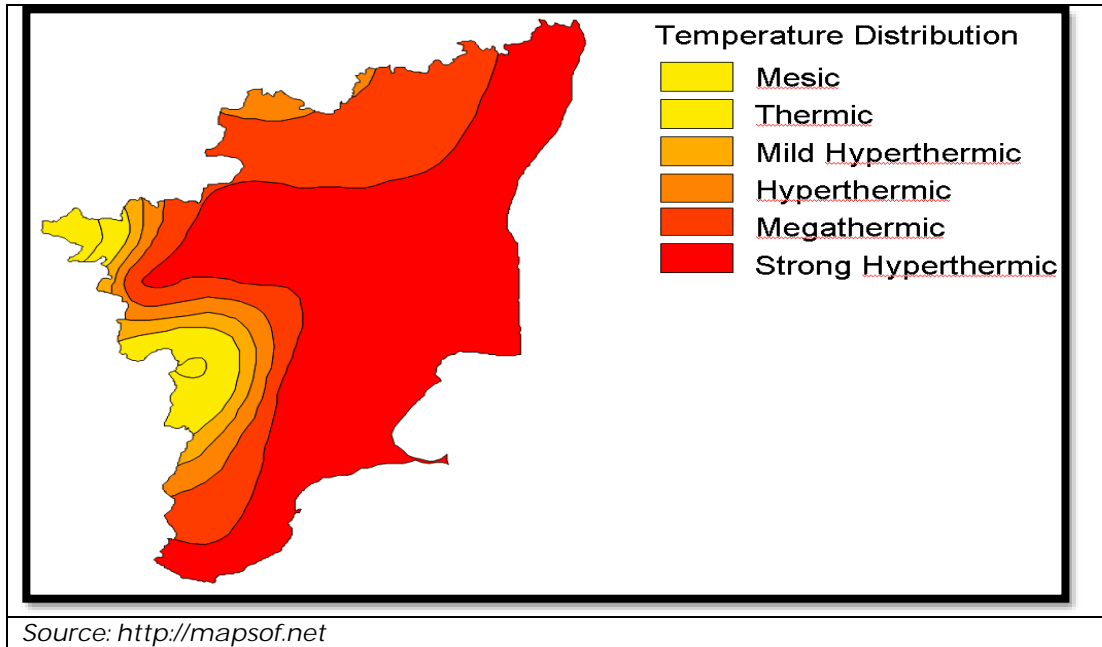


Source: <http://mapsof.net>

### 3.5.7 TEMPERATURE

The mean maximum temperatures of Kancheepuram district range from 29.6°C to 38.2°. The mean minimum temperatures of the districts vary from 20.9°C to 27.6°C. The daytime heat is oppressive, and the temperature is as high as 43.6°C. The minimum temperature in winter dropped down was 16.9°C.

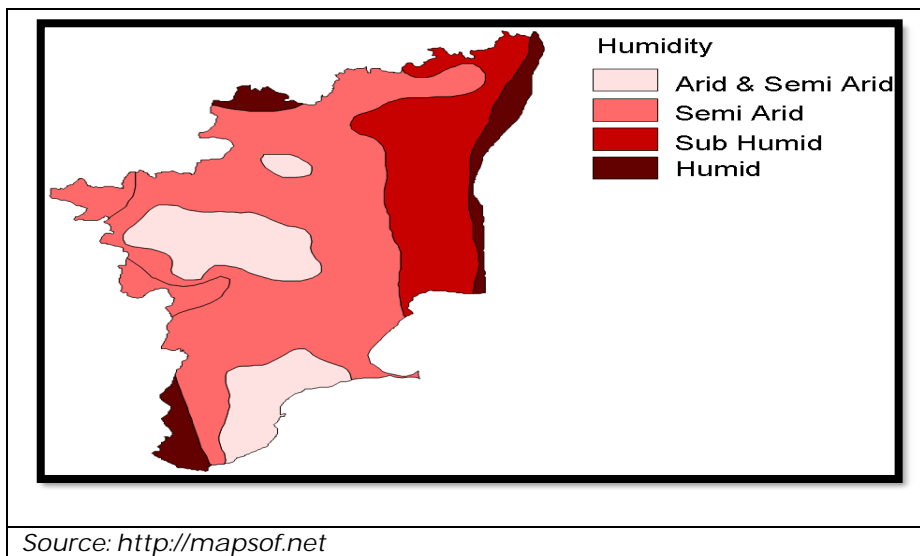
Figure 3-13: Temperature Distribution map of Tamil Nadu State



### 3.5.8 HUMIDITY

Monthly mean relative humidity of Kancheepuram district during morning hours varies from 61.4% to 82.6% and during evening hours it ranges from 57.6% to 75.1%.

Figure 3-14: Humidity map of Tamil Nadu State



### 3.5.9 WIND

Wind speed and wind direction have a significant role on the dispersion of atmospheric pollutants and therefore, the air quality of the area. Ground level concentrations for the pollutants are inversely



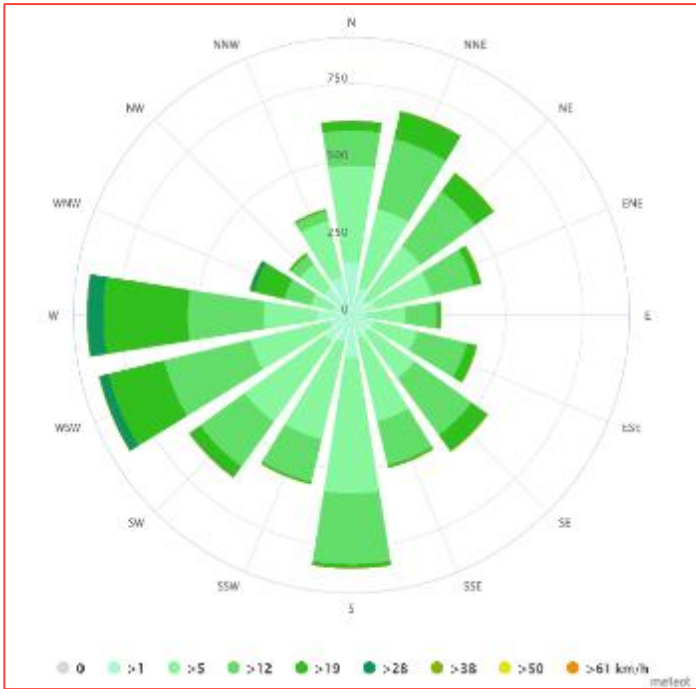


proportional to the wind speed in the down wind direction, while in upwind direction no effect will be observed and in cross wind direction partial effect due to the emission sources is observed.

#### Kancheepuram District

Average wind speed in Kancheepuram District varies from 4.3 Km/Hour to 9.0 Km/Hr. Prevailing Wind directions are West to Southwest during morning hours and East to Southeast during evening hours.

Figure 3-15 Windrose Diagram



Source: IMD

### 3.5.10 LAND USE PATTERN

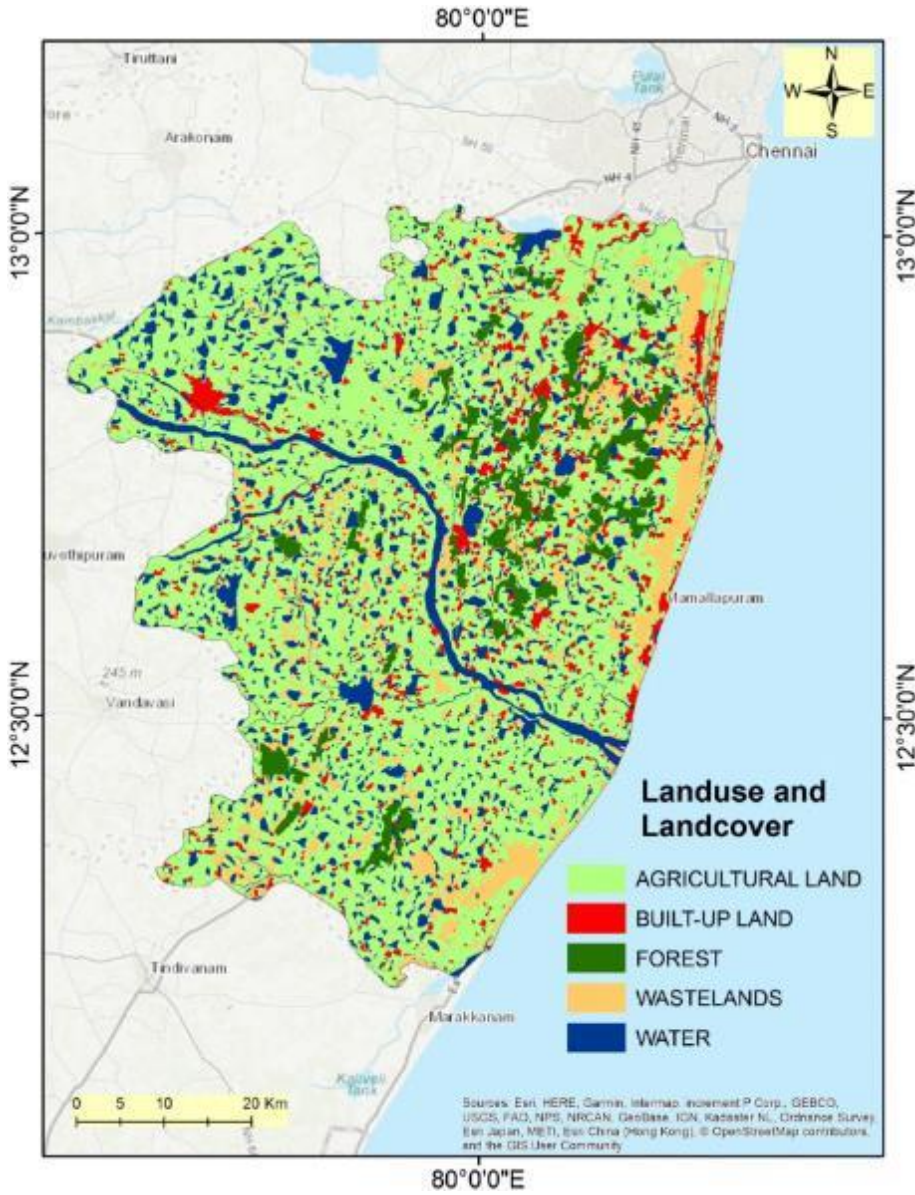
Tamil Nadu has about 5.96 percent of the Nation's population, occupies 4 percent of the land area and has 3 percent of the water resources of the Nation. The demographic changes, economic growth and social development assisted by welfare measures would in the coming decades, exert strong and competing demands on the finite natural resources of the states, such as land, water, raw materials, etc. In Tamil Nadu, the per capita availability of land is only 0.18 ha while the per capita net sown area is only 0.07 ha.

Even though the share of agricultural sector in the State Domestic Product of Tamil Nadu has declined from about 52 percent to 18 percent between 1960-61 and 2007-08, and further to 8.2 percent during 2010-11, agriculture continues to be a major source of livelihood for the rural people. Agriculture still employs about 40 percent of the workforce in the State. As a basic input for agriculture, land occupies a predominant position among all the resources required for a modern economy.

Competition between agricultural and non-agricultural sectors for land is intensifying due to the increasing pressure on land for food production, housing, and industrial expansion. Apart from agriculture, land is also required for afforestation purposes so as to maintain ecological balance, in view of the fact that the current share of forests in total geographical area of Tamil Nadu is only 16.3 percent as compared to the ecological norm of 33 percent. A harmonious balance among the various uses of land, which does not compromise on the availability of life support systems and contribute for improving the quality of life of the various sections of the population who are dependent on land is essential.



Figure 3-16: Land Use map of Kanchipuram District



Source: ICRISAT

The total land to be acquired for the project is 2172.73 Ha and the project will affect 13 villages.

Table 3-8 Actual Villages Effecting the Airport Boundary

S.No	Name of the Taluk	Name of the Village
1	Kancheepuram	Paranthur - A
2		Paranthur - B
3		Valathur
4		Podavur
5		Nelvoy
6		Thandalam
7		Madapuram
8		Thodur
9	Sriperumbudur	Singilipadi



S.No	Name of the Taluk	Name of the Village
10		Gunakarapakkam
11		Edaiyarpakkam
12		Akkammapuram
13		Eganapuram
14		Mahadevi Mangalam

The Project site has settlements in the form of residential houses, government health center, and some small-scale commercial units. Seasonal water bodies and channel as well as agriculture land, form a significant part of the existing land use of the Project site.

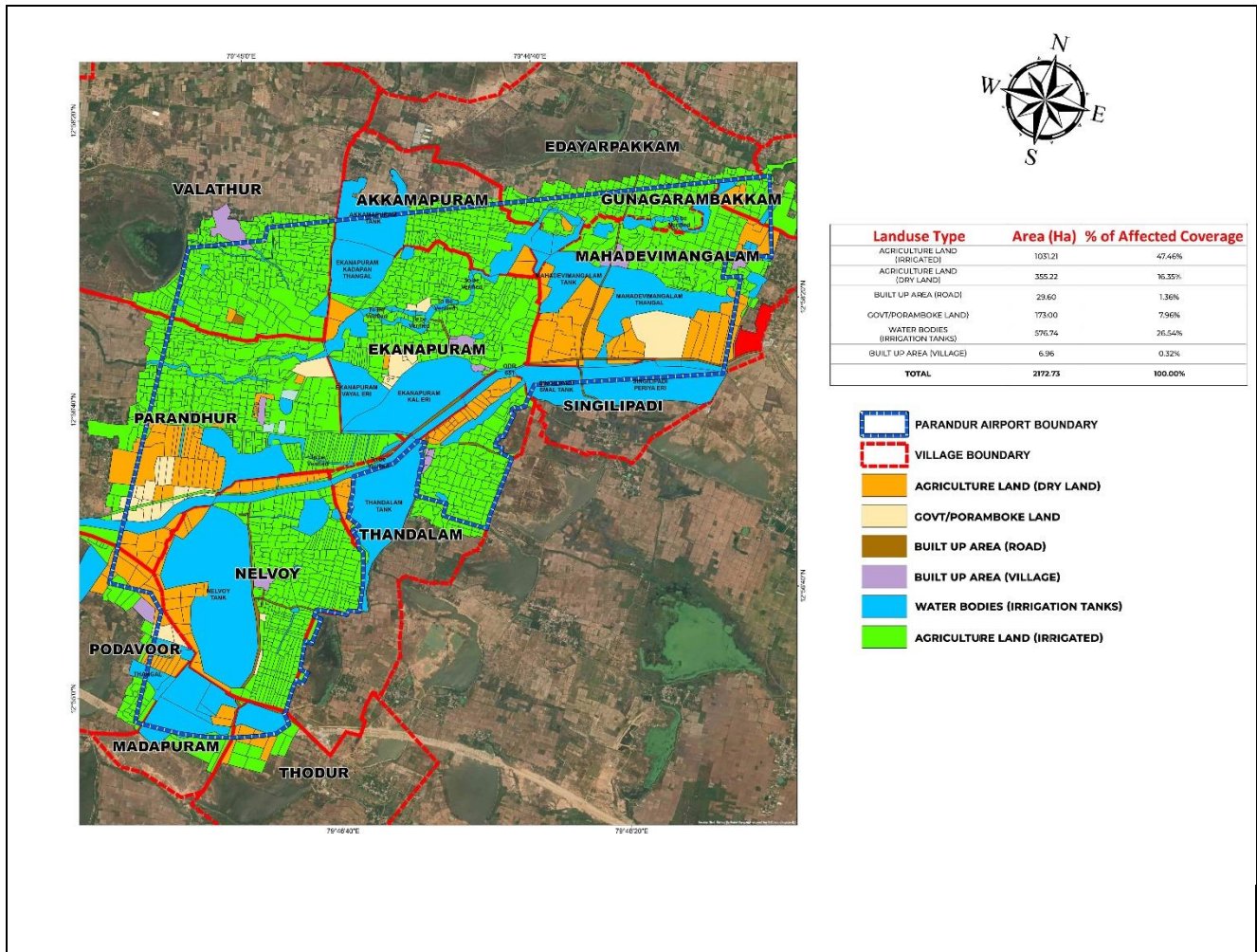
The existing land use/cover of the project as per revenue records is shown in the below Table.

**Table 3-9 Existing land use/cover of the proposed site as per revenue records**

Type	Ha	% of Affected Coverage
Agriculture land (Irrigated)	1031.21	47.46%
Agriculture land (Dry Land)	355.22	16.35%
Built-Up Area (Road)	29.60	1.36%
Govt/Poramboke Land	173.00	7.96%
Water Bodies (Irrigation Tanks)	576.74	26.54%
Built-Up Area (Village)	6.96	0.32%
Total	2172.73	100.00%



Figure 3-17 Existing Land use/Cover of the Proposed site as per revenue records



The existing land use classification as per ortho rectified imagery generated through actual ground survey by drone is shown in the below Table.

Table 3-10 Existing land use/cover of the proposed site as per drone survey

Type	Ha	% of Affected Coverage
Agriculture land	1219.83	56%
Settlements	26.21	1%
Roads	18.85	1%
Surface Water Bodies	126.37	6%
Dry Land	705.33	32%
Grazing Land	57.61	3%
Waste Land	18.53	1%
<b>Total</b>	<b>2172.73</b>	<b>100.00%</b>



Figure 3-18 Existing Land use/Cover of the Proposed site as per drone survey

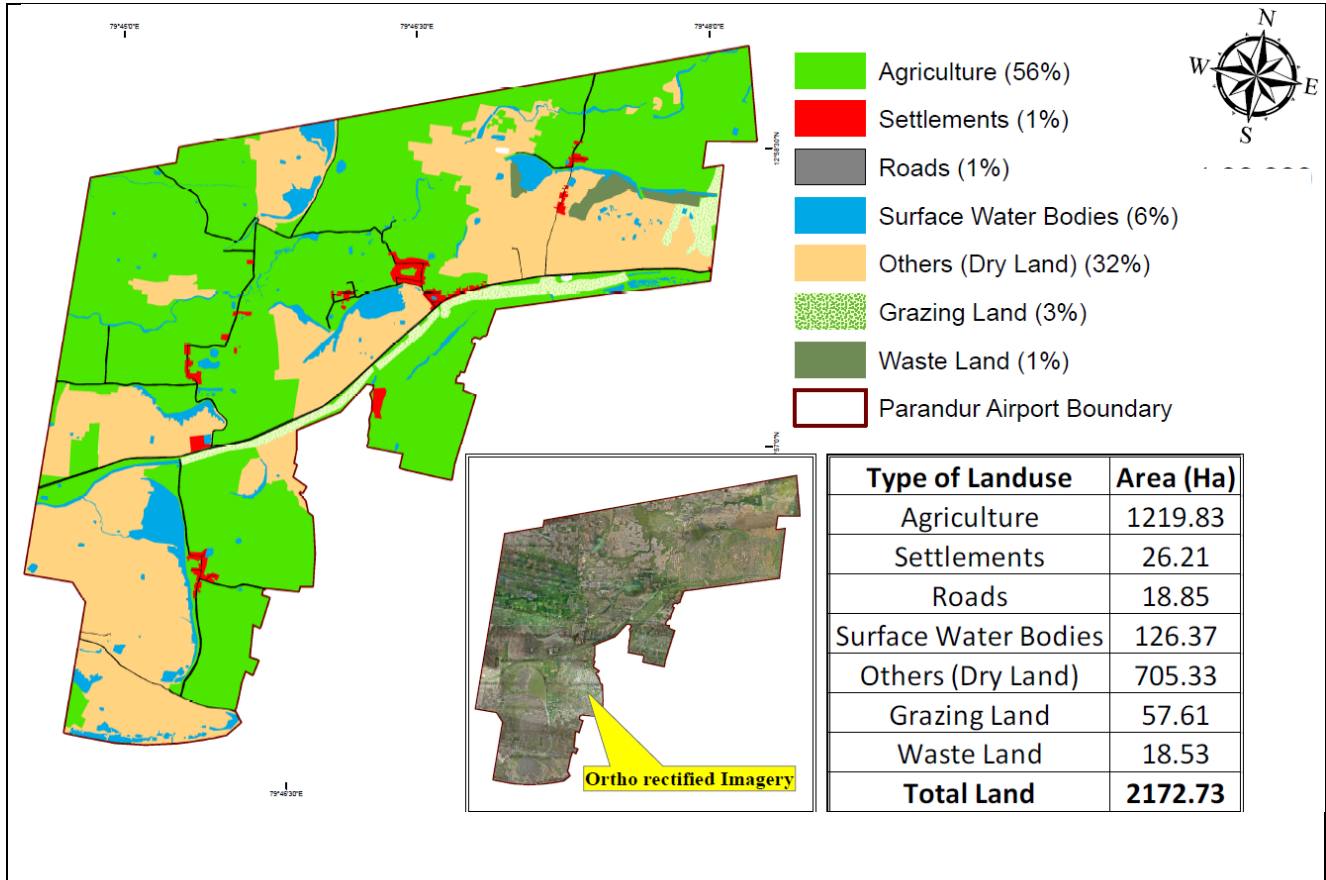


Figure 3-19 Site Photographs





3 Shri Bhagya Fibre Glass Factory and Vishnu Durgai Temple



South-side Seasonal Water Channel



4 Existing structures along the road



Paddy Drying and Transportation within the site

Source: Louis Berger Analysis

### 3.5.11 HYDROLOGY & DRAINAGE PATTERN

Kancheepuram district is part of the composite east flowing river basin and spread over a part of Palar and Cheyyar sub-basin. The drainage pattern in general is sub-dendritic and radial. All the rivers are seasonal and carry substantial flows during monsoon period. The Cheyyar, a tributary of Palar originates from the Jawadu Hills of Tiruvannamalai district. It has a northeasterly flow in Kancheepuram district and confluences with the Palar near Pazhaiyaseevaram.

The surface water hydrology in project area is governed by Palar River and its tributaries. Palar River is the major river in Tamil Nadu draining Vellore, Ranipet and Kancheepuram districts. It runs parallel to the hill ranges of the Eastern Ghats for a major part of its course. Palar river originates from Western Ghats in Karnataka state, and discharges in Bay of Bengal near Pudupattinam. It has a vast flood plain in the lower reaches but is dry for major part of the year.

A large water body called Nelvoy Eri was observed in the southern part of the Project site and this large reservoir will be used as part of Rainwater Harvesting Plan for the Project site.

Figure 3-20 Water Bodies at and adjacent to the proposed site



Source: Louis Berger Analysis

### 3.5.12 GROUNDWATER

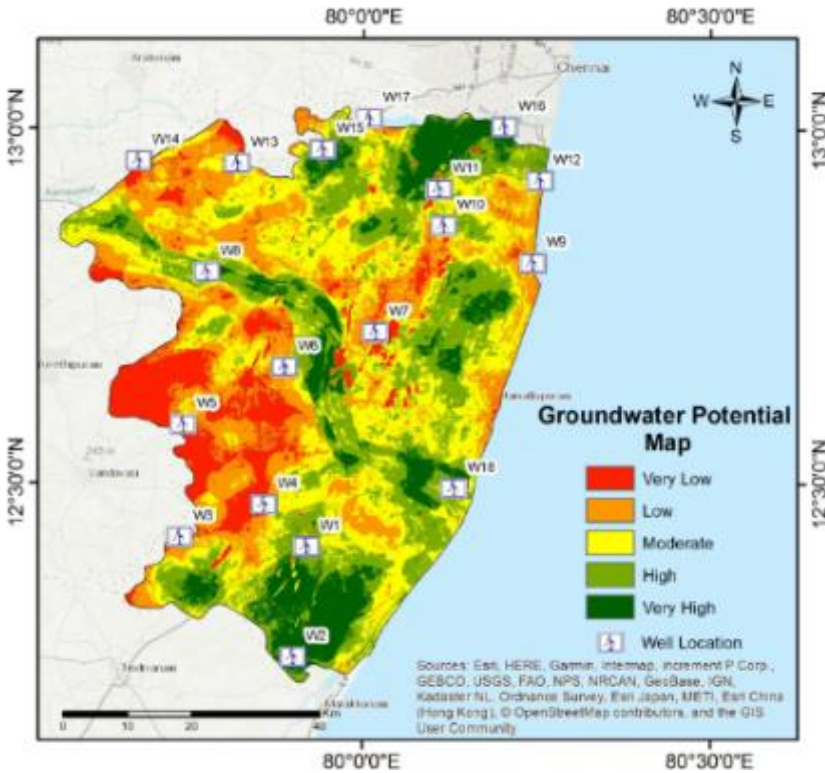
Kancheepuram district covers 13 blocks for ground water assessment. Kancheepuram and Sriperumbudur blocks fall under safe category. The gross ground water draft for all users is 69419 Ha m. Net ground water availability in Kancheepuram district is 105525 Ha m. The Present stage of ground water development in Kancheepuram district is 66% and it has been categorized as Safe. (Source: CGWB, March 2013)

Pre- monsoon ground water level is about 7.5m bgl and post-monsoon ground water level is about 4.5m bgl. (Source: TWAD,2016)

Central Ground Water Authority has not notified any area in the district. Government of Tamil Nadu vides G.O. No. 53 has banned groundwater development for irrigation in the over exploited blocks of Tamil Nadu.



Figure 3-21 Groundwater depth level of Tamil Nadu



Source: Mapsofnet.com

### 3.5.13 ECOLOGICAL ENVIRONMENT

#### WETLANDS

A Wetland is a distinct ecosystem where the land is covered by water, either salt or fresh or somewhere in between. It exists all around the world from polar to tropical region and high altitudes to dry regions. Wetlands are the ecotones or transitional zones between permanently aquatic and dry terrestrial ecosystems. Ramsar Convention has defined wetlands as “areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six meters”. A wide variety of wetlands like marshes, swamps, open water bodies, mangroves and tidal flats and salt marshes etc. exist in our country.

In terms of total wetland area (% wetland area), Kancheepuram is the leading district (80445 ha, 8.91%) and Chennai is the least (917 ha, 0.10%). There is no natural wetland or protected wetland in the project area.

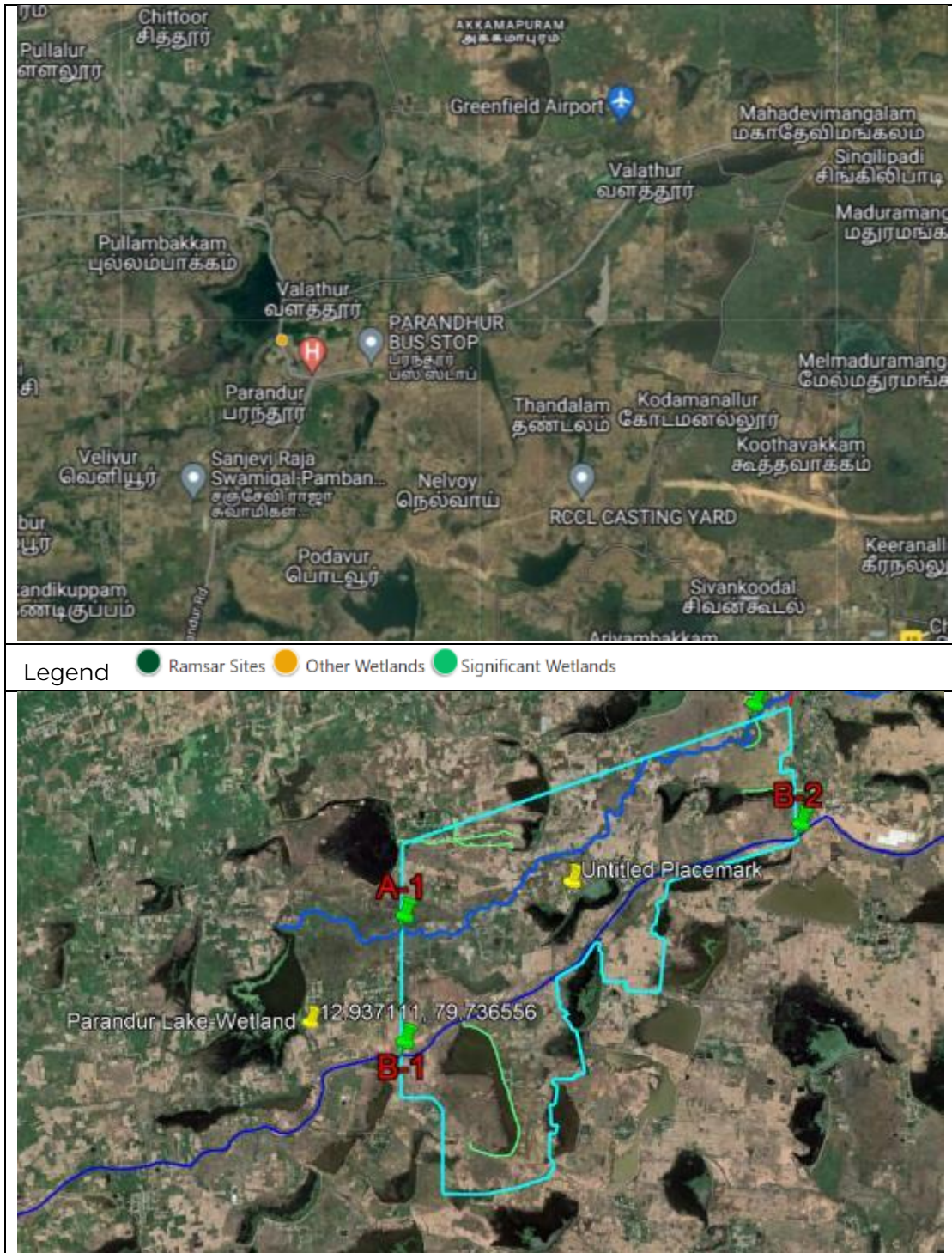
As per the desktop study, the proposed airport project has no natural wetland or protected wetlands inside the boundary.

Parandur lake, a man-made wetland with an area of 201 Ha was present 1.4 Kms adjacent to project boundary, the detail of wetland adjacent to the project boundary is shown in the below figure.





Figure 3-22 Wetland adjacent to the project site



Source: <https://indianwetlands.in/wetlands-overview/interactive-wetland-map-of-india/>

#### FOREST

The proposed airport project does not have any forest land thus forest clearance is not required.

#### FLORA & FAUNA / BIODIVERSITY

The proposed airport project does not affect any Ecological Sensitive sites in Tamil Nadu State thus wildlife clearance is not required.

There are no other major industrial activities in the site area, no environmentally sensitive area (wildlife-bird sanctuary) within the site and 10 kms radius from the boundary, and no hills or high grounds within the site area or around the site.



## TREES TO BE CUT

Approx. 36635 Trees will be affected due to the proposed airport project.

Table 3-11 Trees to be cut

Tree Types	Syntenic name	Total Numbers
Banyan	Ficus benghalensis	14
Coconut	Cocos nucifera	3718
Dates	Arecaceae	10098
Drumstick	Moringa oleifera	146
Eucalyptus	Eucalyptus sp	240
Firewood	Mesquite	4050
Guava	Psidium guajava	48
Jamun	Syzygium cumini	4
Mango	Mangifera indica	394
Neem	Azadirachata indica	15135
Papaya	Carica papaya	194
Pipal	Ficus religiosa	68
Pongame Oil	Pungamia Glabra	2130
Rain tree	Samanea saman	50
Tamarind	Tamarindus indica	190
Teak Wood	Tectona grandis Linn.	142
Tulip tree	Bignoniaceae	14
<b>TOTAL</b>		<b>36635</b>

Source: Initial Site Survey

## 3.6 ANALYSIS OF ALTERNATIVES

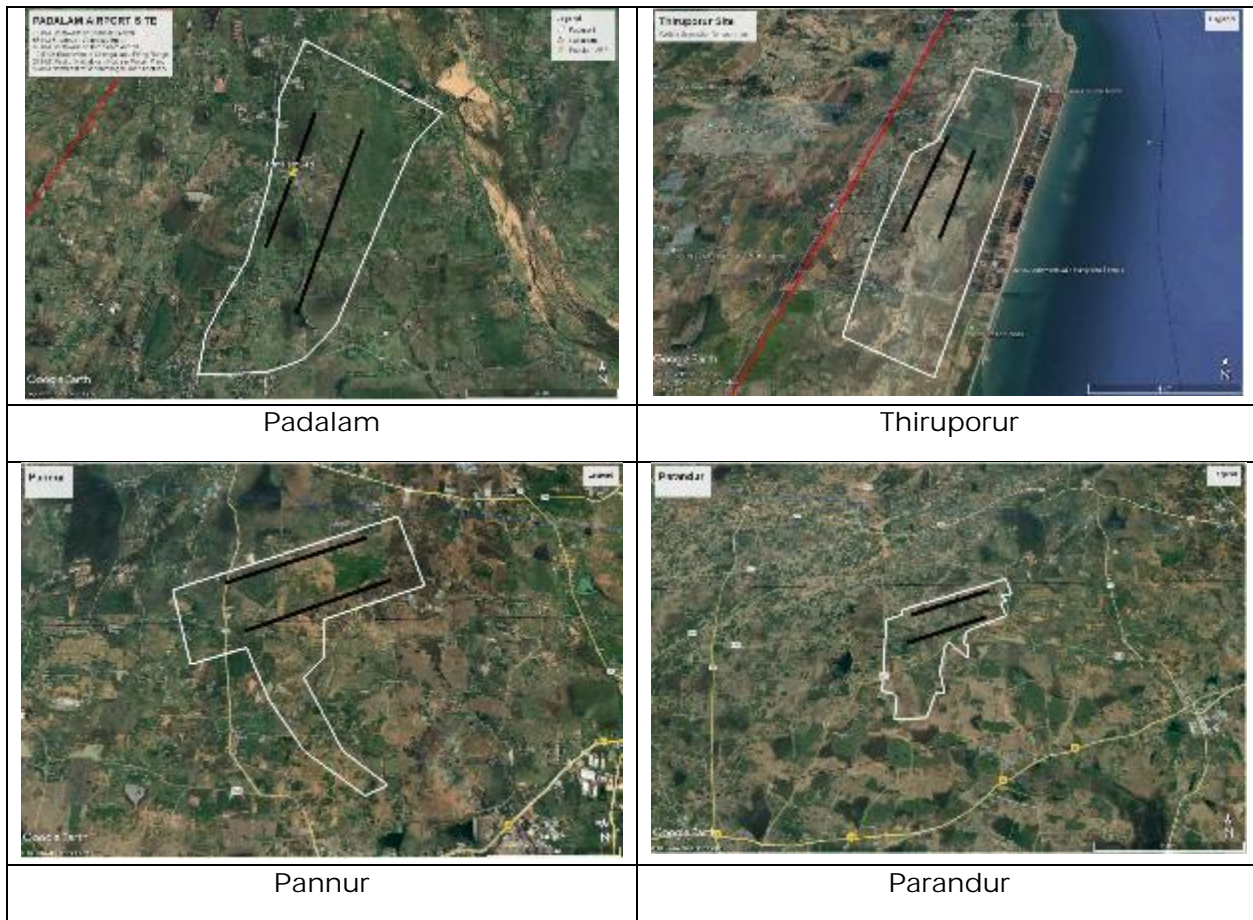
TIDCO has conducted its basic level prefeasibility studies on identified potential sites. In order to take the process to next level, TN Government has asked AAI on 29.10.2021 to conduct technical prefeasibility study on those four sites. Airports Authority of India (AAI) had visited the above sites in February 2022 and conducted a Pre-Feasibility Study for the Proposed Greenfield Airport near Chennai.

The objective of this study was to evaluate potential four sites identified by Government of Tamil Nadu with respect to their suitability for Development of the Airport. The report was submitted by AAI in March 2022 documenting the findings of this study. The details of the four sites have been outlined below.

1. Parandur: The site is located northwest of Sungavarchatram.
2. Pannur: The site is located northeast of Sungavarchatram.
3. Thiruporur: The site is located southeast of Chennai (between ECR and RG Road).

4. Padalam: The site is located 20 kilometers south of Chengalpattu.

Figure 3-23 Analysis of Alternatives- Location Map



Source: AAI Pre-feasibility Report

The Pre-Feasibility study findings are that the Padalam site falls in the restricted area of Tambaram Local Flying area under the control of the Indian Air Force. The site at Thiruporur is adjacent to the restricted area of Tambaram Local Flying area. Hence there will be considerable restrictions on the flight operations (arrival and departures), thereby reducing the capacity of the proposed Airport. The Chengalpattu Firing range is present towards the North-East of Padalam site and West of Thiruporur site. Moreover, the prohibited area of Kalpakkam Nuclear plant is at a distance of 5NM to the South of the Thiruporur site.

The ideally suited runway orientation is 07-25 (parallel to Chennai Airport main runway). The site at Padalam and Thiruporur permits 02-20 orientation potentially conflicting with the traffic of existent Chennai Airport. Considering these factors and based on the available airspace, AAI has reported that Padalam and Thiruporur sites are not feasible for development of Greenfield airport.

The study by AAI concluded that the proposed sites in Parandur and Pannur are comparatively more feasible for development of Greenfield airport as per availability of airspace and being relatively free of natural obstructions. Both sites are free of any restrictions affecting operational efficiency and do not face any hazards and other limiting factors like wildlife sanctuaries, refuse dumps and sewage outfalls. Both sites have good connectivity to Chennai City and have adequate availability of ground access and trunk infrastructure. Land availability is adequate and suitable for the present requirement and for desired runway orientation of 07/25 at Parandur site. The land available at Pannur is 4284 acres and in Parandur is 5369 acres. However, additional land may be required for the Pannur site, to the East and Southeast side of the proposed area to accommodate essential navigational aids. Moreover, it was observed that several Extra High Tension (EHT) towers exist in and around the Pannur site. Moreover, another limiting factor of the Pannur site is that there are seven existing industries within and near the site. Based on the finding of the feasibility study carried out by AAI and further detailed analysis of both Parandur and Pannur sites, the Parandur site has emerged as the most suitable site for development of Greenfield Airport for the following reasons:



- Project site in Parandur is nearer to the upcoming Chennai - Bengaluru Expressway providing for easier and cost-effective connectivity to the demand centres, apart from other road & rail connectivity as explained above.
- Number of families to be displaced is 1005 in Parandur and 1546 families in Pannur site.
- There are lesser man-made obstacles for aircraft operations in Parandur compared to Pannur, where several EHT lines exist in and around the site and there are operating industries near the site.
- Sufficient land free of structures is available in the proposed site at Parandur for the operational and other needs of the Airport. Additional land on the East and Southeast side of the proposed area in Pannur may be needed to accommodate essential navigational aids. The additional land required in Pannur will be difficult to acquire as the land in the vicinity is developed with habitations and industries.
- Future development around the airport at Parandur can be planned better due to the availability of large tracts of vacant land, whereas the project area proposed in Pannur is near Sriperumbudur Industrial Area and is relatively developed with permanent industrial and residential structures.

In view of the above, after detailed consideration and technical study, Parandur was selected by the Government of Tamil Nadu for developing a new Greenfield Airport.

# 4 PROPOSED DEVELOPMENT

## 4.1 MASTERPLAN FACILITIES

The airside of the master plan shall constitute of the following facilities.

Table 4-1 Master Plan Facilities

S. No	FACILITIES
	AIRSIDE FACILITIES
1.	Runway(s)
2.	Taxiway(s)
3.	Rapid Exit Taxiways
4.	RESA
5.	Precision Approach Category-I Lighting System
6.	Apron
7.	Contact Stand
8.	Mid-Field Passenger Terminal Building(s)
9.	General Aviation Terminal
10.	General Aviation Apron
11.	Cargo Terminal
12.	Cargo Apron
13.	Isolation Bay
14.	Cooling-Off Pit
15.	Localizer
16.	Glide Path
17.	Air Traffic Control Tower
18.	CNS (Communication & Navigation System) Facilities DVOR 1, DVOR 2, ASR 1, ASR 2, GBAS
19.	MRO (Maintenance Repair & Operations) Hangar
20.	MRO (Maintenance Repair & Operations) Apron
21.	Ground Support Equipment Maintenance
22.	Rescue And Fire Fighting Stations (ARFF)
23.	Aviation Fuel Depot
24.	Emergency Gate
	LANDSIDE / CITYSIDE FACILITIES
25.	City Side Terminal Building
26.	Multi-Level Car Parking
27.	Western Main Access Road
28.	Eastern Main Access Road
29.	Cargo Terminal
30.	Cargo Apron
31.	Cargo Docking Area & Parking Area
32.	ATC Technical Block
33.	Airside Emergency Road
34.	Airside Maintenance Road
35.	Airside Access Road
36.	Internal & Peripheral Access Roads
37.	Power Supply Sub-stations

The following Landside / Cityside / Ancillary / Utility facilities will be considered and included in the further stages of Masterplan development,



- EV Charging Stations
- Boundary Wall / Operational Fencing
- Airfield Drainage
- Customs Facilities
- IMD (Met) Facilities
- Flight Catering Facility Blocks
- Reserved Agency Facilities - AAI, DGCA, CISF, BCAS
- Police Facility Blocks
- Airport Aviation Training Centre
- Water Supply
- Aircraft Waste Management Facility
- Sewage Treatment Plant
- Solid Waste Treatment Plant
- Hazardous Waste Storage Facility
- Efficient Lighting

## 4.2 PROPOSED MASTERPLAN

The Aerodrome Reference Point Co-ordinates are provided below.

- Elevation - 76m
- Latitude - 12°57'29.57"N
- Longitude - 79°46'53.20"E

Table 4-2 Master Plan G Details

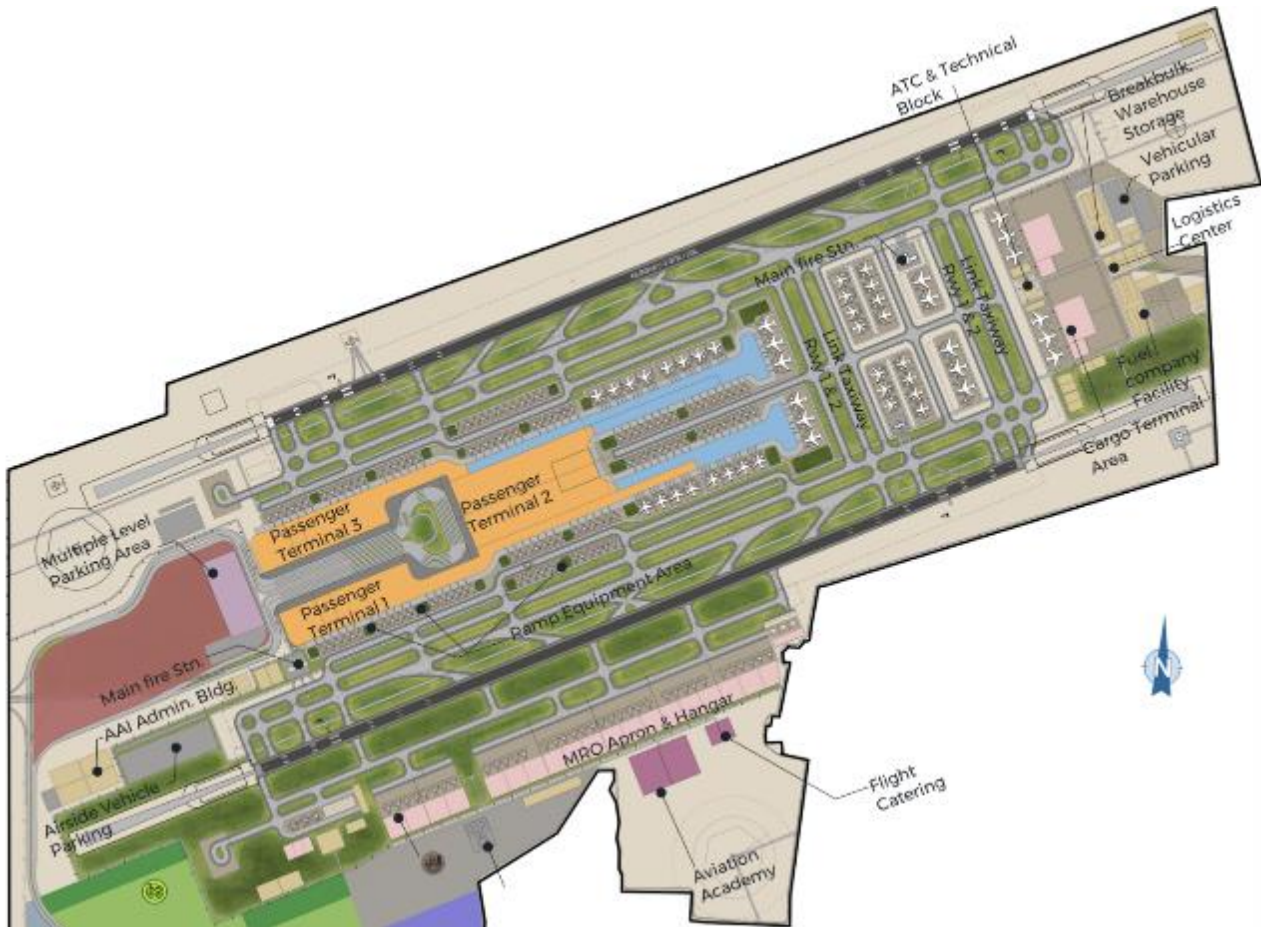
S. NO	SIGNIFICANT PARAMETERS	COUNT / SPECIFICATION
1.	Runway Dimensions	07L / 25R - 4040m x 45m 07R / 25L - 4040m x 45m
2.	Runway Shoulders	7.5m on both sides
3.	Runway Strip	Extending 140m on both sides from Runway Centerline
4.	RESA	RESA 07 SIDE = 240m x 90m RESA 25 SIDE = 240m x 90m
5.	Localizer	Provided for all Runways
6.	Precision Approach Category I Lighting S/M	Provided for all Runways
7.	Isolation Bay	07 side of the Northern Runway (07L / 25R)
8.	Taxiway Strip	Extending 52m on both sides from the Runway Centerline
9.	Rapid Exit Taxiways	12 Rapid Exit Taxiways (6 + 6)
10.	Link Taxiways	Provided wherever necessary, for effective & flexible aircraft movement
11.	Parallel Runways Separation Distance	1550m
12.	ATC Tower	Provided near 2 <sup>nd</sup> Main Fire Station
13.	CNS Facilities	DVOR 1, DVOR 2, ASR 1, ASR 2, GBAS
14.	Aircraft Refueling Facility	Provided
15.	Cooling-Off Pit	Provided
16.	Fire Stations	2
17.	Vehicular Parking	Provided
18.	Cooling-Off Pit	Provided



S. NO	SIGNIFICANT PARAMETERS	COUNT / SPECIFICATION
19.	Parallel Taxiways	2 for Northern Runway 3 for Southern Runway (2 Parallel Taxiways, 1 Partial Parallel Taxiway)
20.	Parallel Runways Connecting Taxiways	2 Connecting Taxiways (25 Side) at the East side.
21.	Apron	1 Airside Apron Area in the mid-portion.
22.	Passenger Terminal(s) & Area	Passenger Terminal 1 = 3,45,758 Sqm Passenger Terminal 2 = 4,76,915 Sqm Passenger Terminal 3 = 5,05,495 Sqm
23.	Passenger Aircraft Parking stands	Code C - 247; Code E - 26; Code F / Future - 12
24.	General aviation Parking Stands	Code B - 4; Code C - 2
25.	Cargo Aircraft Parking Stands	Code C - 28; Code F / Future - 14
26.	Cargo Terminal Area & Truck Docking Area	2,30,500 sqm
27.	MRO Hangar Stands	Code C - 24; Code E - 6; Code F / Future - 6

Source: Louis Berger Analysis

Figure 4-1 Master Plan



Source: Louis Berger Analysis

### 4.3 MASTER PLANE- FOUR PHASES

The Master Plan will be executed and operated in four phases to ultimately reach the desired capacity of 100 million. It is important to plan each phase strategically to ensure efficiency of operations during construction of every phase. The four phases are detailed below.

The project will be operated in four phases. The commencement for proposed four phases are provided below.

- Phase I (January 2029 - December 2035)
- Phase II (January 2036 - December 2042)
- Phase III (January 2043 - December 2046)
- Phase IV (January 2047 - December 2052)

The proposed construction periods for the project are provided below.

- Phase I activities will be constructed in 36 months (January 2026 to December 2028).
- Phase II activities will be constructed in 36 months (January 2033 to December 2035).
- Phase III activities will be constructed in 24 months (January 2041 to December 2042).
- Phase IV activities will be constructed in 36 months (January 2044 to December 2046).

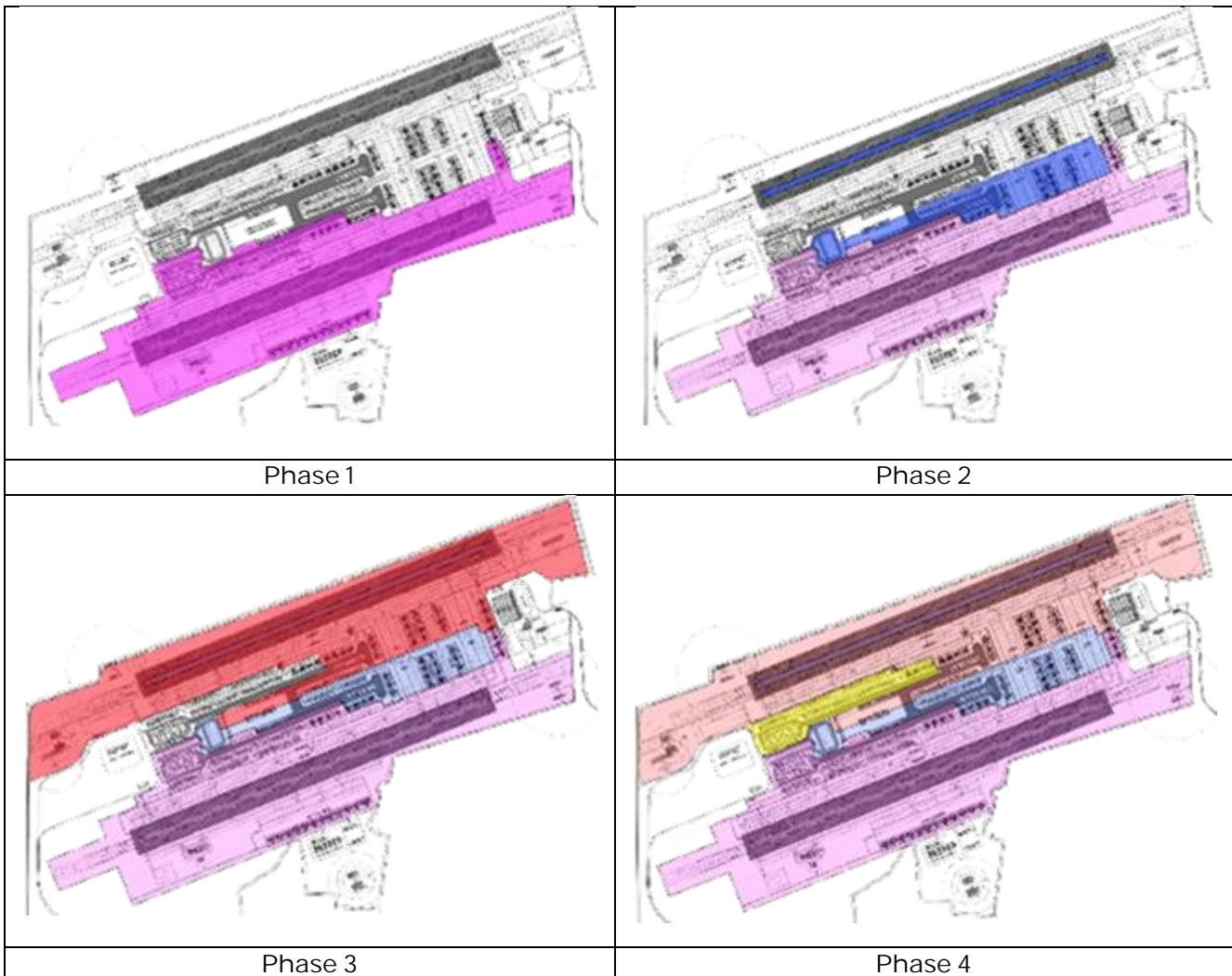


Table 4-3 Phasing Detail for Air-side Masterplan

PHASE	FROM	PASSENGERS CAPACITY	CUMULATIVE
1	2029	20 million	20 million
2	2036	30 million	50 million
3	2043	20 million	70 million
4	2047	30 million	100 million

Source: Louis Berger Analysis

Figure 4-2 Phasing Plan



Source: Louis Berger Analysis

### 4.3.1 FORECASTED PEAK HOUR PASSENGERS AND MOVEMENTS - PARANDUR

Table 4.4 and Table 4.5 projects the peak hour movement and passenger forecast for Parandur based on above methodology.

Table 4-4 Peak hour ATM forecast-Parandur

YEAR	2029	2032	2035	2040	2044	2048	2052
Domestic-Arrival	4	5	15	24	34	43	51
Domestic-Departure	4	6	16	26	36	46	55
Total -Domestic	7	9	26	42	59	75	90
International arrival	2	3	3	4	5	6	8
International departure	3	3	4	5	6	8	10



Total International	5	6	8	9	12	15	18
Combined Arrivals	6	8	18	28	40	51	62
Combined Departures	7	9	19	29	40	51	62
Grand total	10	13	30	46	64	81	98

Source: Louis Berger Analysis

**Table 4-5 Peak hour Passenger forecast - Parandur**

YEAR	2029	2032	2035	2040	2044	2048	2052
Domestic-Arrival	544	741	2077	3527	5025	6568	8124
Domestic-Departure	586	798	2237	3799	5412	7074	8749
Total -Domestic	950	1292	3622	6152	8764	11455	14168
International arrival	406	475	611	735	990	1295	1601
International departure	515	603	776	933	1257	1643	2032
Total International	925	1082	1392	1674	2256	2948	3647
Combined Arrivals	952	1209	2688	4262	6015	7863	9725
Combined Departures	1106	1391	3012	4732	6669	8717	10782
Grand total	1885	2356	5014	7826	11020	14404	17815

Source: Louis Berger Analysis

### 4.3.2 PARKING ANALYSIS

The most common modes of transit for passengers, visitors and employees to an airport is driving, taxis, and public transport. As part of the airport master planning, it is important to evaluate the short- and long-term parking requirement for all modes of private transit including third-party ride share (Ola/ Uber/ BluSmart) as well as universally accessible parking provision based on the anticipated footfall of the establishment. Besides serving as a facility for users, parking in airports is an important non-aeronautical revenue generating asset. The advent of new technologies has resulted in an increase of parking areas compatible with EV (Electrical Vehicle) Charging facilities, smart parking as well as preference for multimodal transport among passengers.

**Table 4-6 Peak hour travel demand**

Year	Phase	Capacity of Airport, million passengers	Parking Requirement
2029-2035	Phase 1	20	6200
2036-2042	Phase 2	50	8000
2043-2046	Phase 3	70	8600
2047-2052	Phase 4	100	9500

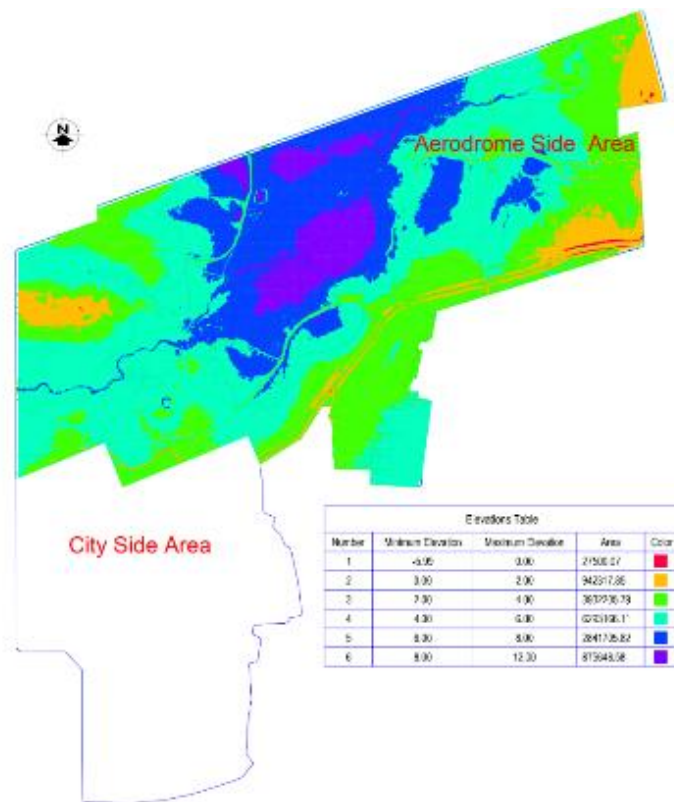
Source: Louis Berger Analysis

For the most appropriate strategy of estimation that considers adequate parking for visitors as well as the employee/ staff working within the facility, the masterplan is provisioned for a requirement of 12,500 ECS for CGA.

### 4.3.3 SITE PREPARATION

The site is fairly flat and even with a longitudinal gradient towards the northeastern edge of the site. Low-lying areas in the north central region have resulted in multiple seasonal water retention beds within the project site. As part of the airport development plan, the site area limited to aerodrome (both airside and landside, access roads) and Nelvoy Eri shall be prepared as of now. The site shall be filled to be raised 1.5m above HFL which is considered as 0.6m above top of the sub-grade (Refer figure 4-3 for cut and fill range to be employed for CGA development).

Figure 4-3 Cut & Fill Range for Airport Development



Source: Louis Berger Analysis

Table 4-7 Cut & Fill Details

Name	Type	Cut Factor	Fill Factor	2D Area	Cut (in cu.m.)	Fill (in cu.m.)	Net (in cu.m.)
Surface Earthwork	Full	1.000	1.000	14912544.2	10420.13	72053184.6	72042764.5

Source: Louis Berger Analysis

#### 4.3.4 CONSTRUCTION REQUIREMENT

The proposed Airport requires general construction materials viz. steel, cement, RMC, sand, aggregates, bricks, etc. will be used for infrastructure development like building construction, road laying, service area development, etc. These materials will be procured from nearby markets as per requirements and transportation facilities will be provided by construction contractor. Airport being a service industry does not process any raw material or deal in production of products.

Table 4-8 Construction Material

Item	Unit	Quantity
Aggregate	MT	10246858
Soil	MT	47319980
Sand	MT	4824185
Cement	MT	1172649
Bitumen	MT	88037
Steel	MT	130368
High Tensile	MT	2061
Structural Steel	MT	105110
Water	KL	10889618

Source: Louis Berger Analysis

### 4.3.5 RESOURCE OPTIMIZATION / RECYCLING AND REUSE

The resource optimization is always pre-requisite for any development project. In quest towards resource optimization in proposed project, the tradition practices are substituted by modern practices involving water reduction, rainwater harvesting, energy conservation, etc. As per the NBC, 2016, the per capita water requirement varies with building type. Measures have been proposed to reduce the consumption of fresh water through efficient practices and devices. Some of these practices include:

- Regulating flow rate of fixtures used in toilets.
- Dual plumbing system
- By installations of sensor-based urinals such as magic eye sensor, the water use is reduced to 0.4 liters per flush.
- A normal tap works at a flow rate as high as 20 lpm. Use of low flow faucets along with other water saving devices such as auto control valves, pressure reducing devices, aerators and pressure inhibitors for constant flow, magic eye solenoid valve and self-operating valves can result in 25 - 50% of water savings.
- Rainwater harvesting for ground water recharge.

TIDCO shall be following Electrical designing done with reference to Indian Electricity (IE) rules, National Building code (NBC) of India and as per the guidelines of Energy Conservation Act (ECA) for optimum utilization of energy. Designing of Airfield Ground Lighting (AGL) & Navigation & Communication System is based on ICAO.

### 4.3.6 ELECTRICITY

#### POWER DEMAND

The estimated total power is 100 MVA as shown in Table below:

Table 4-9 Airport Power Requirement

Phases	Use	Area (Sq. Mtr)	Area (Acre)	Max demand (MVA)
1 & 2	Airside	6092371	1505	35
	Landside	1149425	284	15
Total		7241796	1789	50
3 & 4	Airside	6897594	1704	40
	Landside	833243	206	10
Total		7730837	1910	50
1, 2, 3 & 4	Gross Total	149726633	3699	100

Source: Louis Berger Analysis

#### MAIN 220/11KV SUBSTATION

Main substations will be setup from each source of 220KV, located within the area provided by the airport to the supply authorities. Two 220KV feeders will be taken from each source from separate busbars of the supply authority. One supply source will be feeding the airport at one side of the entire circuit and the other will be feeding the remaining 50% of the entire system. Based on survey by our team, two possible sub stations have been identified at Ariyaperumbakkam and Sunguvarchathiram at an approximate distance of 12KM and 11KM respectively from site.

#### STANDBY DIESEL GENERATOR (DG) SETS

Instead of larger capacity sets, smaller capacity DG sets of varying capacities between 250 KVA to 2250 KVA depending upon requirement of load canters are considered for emergency power supply. These are of lowest decibel levels. In case of power failure, the generators will be on automatic operation by 3 position automatic change over switch. Where UPS are not required, the generators will be automatically operated and connected to the 433 V switchgear. This ensures that all Panel Boards of less essential loads will be OFF, and the necessary essential Panel Boards will be ON until the supply is normalized. This panel immediately starts supplying the essential loads to the Terminal



Building including visual aids and Navigational Aids system, meteorological equipment, essential security lighting, obstacle lights, and floodlighting.

**Table 4-10 Standby Generators Power Requirement for International Airport**

No	Buildings	Essential Load(kW)
1	Terminal	523
2	Cargo	160
3	Fuel Farm	180
4	Control Tower (ATCT)	1,000
5	Hanger	300
6	Fire Station	150
7	Water Supply	70
8	Sewage Treatment	60
9	Aeronautical Equipment's	3,723
10	Power supply, security & others	100
Total		6,266 kW
	Conversion	p.f. 0.8
	Total Essential Generators Loads	7,832.5 kVA
	Diesel Generator Units Required	2,000 kVA x 4 Units + 2nos Standby

Source: Louis Berger Analysis

#### ILLUMINATION

All lighting fixtures should be LED type having efficacy more than 120 Lumen/ Watt and the external lighting shall be combination of Solar or All-in-one type Solar lights.

#### 4.3.7 ALTERNATE SOURCE OF ENERGY

Conventional sources of energy that cater to the high energy demand of developments like airports, are a significance source of carbon dioxide emissions. It is important that as planners and custodians of a model project like CGA, we preemptively plan to utilize solar energy to reduce the carbon footprint of the project and towards net-zero emissions subsequently. While the cost of installation of photovoltaic panels can be seemingly high, the life-cycle cost and impact analysis ensure their productivity and economic benefit.

The minimum performance standard for CGA to be set at 27MWA for solar energy generation, the conceptual master plan is planned to include 100 acres area of solar farm with a potential to generate 40.5MVA.

#### ADDITIONAL SUSTAINABLE MEASURES

Sustainability measures beyond utilization of alternate sources of energy also shall focus on reducing the power demand of the overall development. Following are a few suggestive measures and performance standards that will facilitate this sustainable strategy.

- Baggage Handling Systems - provision for Linear Induction Motors (LIM) and Linear Synchronous Motors (LSM)
- Lifts/elevators - provision of machine room-less elevators with regenerative power
- Escalators and moving walkways- provision of speed drives
- Lighting - provision of high efficiency light-emitting diode (LED) lighting and maximizing daylight control.
- UPS systems provision of eco - mode 'N' UPS systems for telecom rooms in lieu of 2N UPS systems

#### 4.3.8 WATER SUPPLY

Water demand is basically divided into two categories namely Potable and Non-potable. Potable and non-potable water demands are assessed based on different types of demands for various purposes. Potable water is basically for drinking, cooking, or any usages that come into contact with humans, some specific HVAC purposes, for specific vehicular maintenance purposes etc. Non-potable water is used in areas where lesser quality of water serves the purpose like, irrigation, cleaning, flushes etc.

**Table 4-11 Different Facilities and illustrations of end users**

Facility	Example of End Uses
Terminals	Toilets, urinals, bathroom and kitchen faucets, dishwashers
Office Buildings	Window cleaning, Interior plant watering, toilets, urinals, faucets
Rental Car Center	Fleet vehicle washing, outdoor irrigation
Ground Transportation	Vehicle washing
Parking	Snow removal, street cleaning
Fire and Police Stations	Fleet vehicle washing, fire suppression
Hotels	Toilets, showers, ice machines, swimming pools, spas, laundry
Central Heating/Cooling Plant	Boiler, cooling
Maintenance and Services	Runway rubber removal, employee break rooms and restrooms
Airlines/Aircrafts/Cargo	Aircraft cleaning, on-board aircraft water, de-icing

The objective of the planning strategy is to minimize the use of potable water over the long term. The water supply system shall be planned to utilize and draw minimal water from the sources in the vicinity of the airport. Adjustments based on the actual requirement can be adjusted during the actual maintenance of the utilities. This will ensure operability of all systems on a continuing basis while working towards the overarching objective of reducing and mitigating the demand for fresh water.

**Table 4-12 Location of Water Sources and Distance from CGA site**

S. No.	Name of Water Source	Approx. Distance (km)
1	Palar River	21
2	Thenneri Lake	10
3	Coovam Lake	5

Source: Louis Berger Analysis

The water requirement for the airport zone consists of the aeronautical and non-aeronautical areas. In the previous sections of this report, the water requirements of passengers, visitors, staff, commercial facilities, air and land side facilities, residential, as well as irrigation for planted area, firefighting, etc. has been estimated. The total requirement of water supply for the airport is shown in table below.

Considering transmission losses of 15% and unanticipated losses / wastages for another 15%, and additional 30% is drawn from the source.

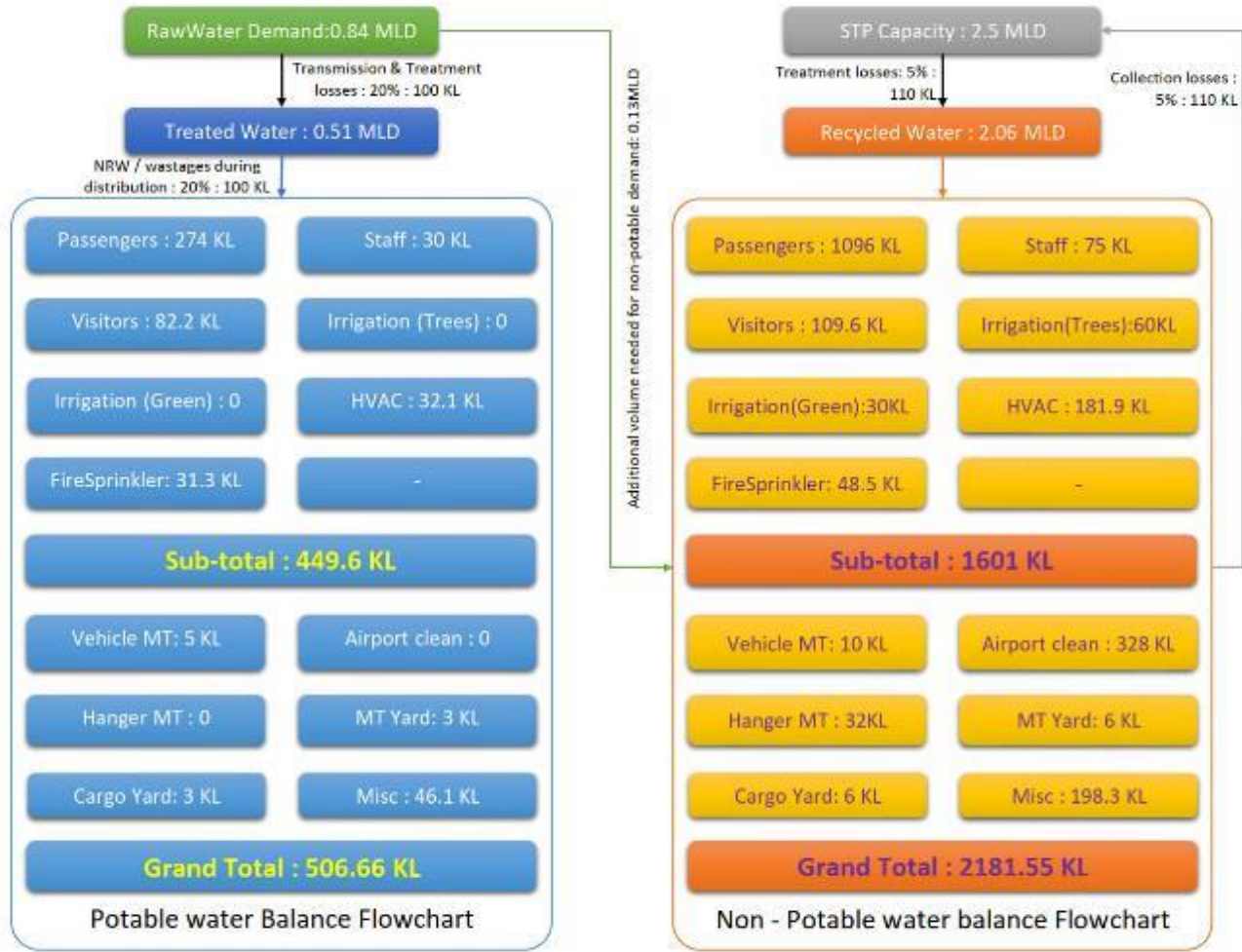
**Table 4-13 Summary of Total Water Demand**

Description		Phase 1	Phase 2	Phase 3	Phase 4
Total Potable water demand (MLD)		0.71	1.87	4.20	4.20
Total non-potable water demand (MLD)		2.18	5.49	8.23	11.91
Wastewater generated from non-potable water	80% of supplied non-potable water	1.75	4.39	6.58	9.53
Wastewater generated from Potable water	75% of supplied potable water	0.53	1.40	3.15	3.15
Losses in collection network	5.00%	0.11	0.29	0.49	0.63
STP capacity proposed		2.50	5.50	9.50	12.00
STP losses	5.00%	0.11	0.28	0.46	0.60
STP treated water output		2.06	5.23	8.78	11.44



Additional no-potable water needed for water balance		0.13	0.26	-0.56	0.47
Actual potable water demand		0.51	1.33	2.01	3.00
Total water volume/Demand that should be tapped from source (Treated / Potable water)		0.84	2.13	2.81	4.67
	say	0.85	2.15	2.85	4.70

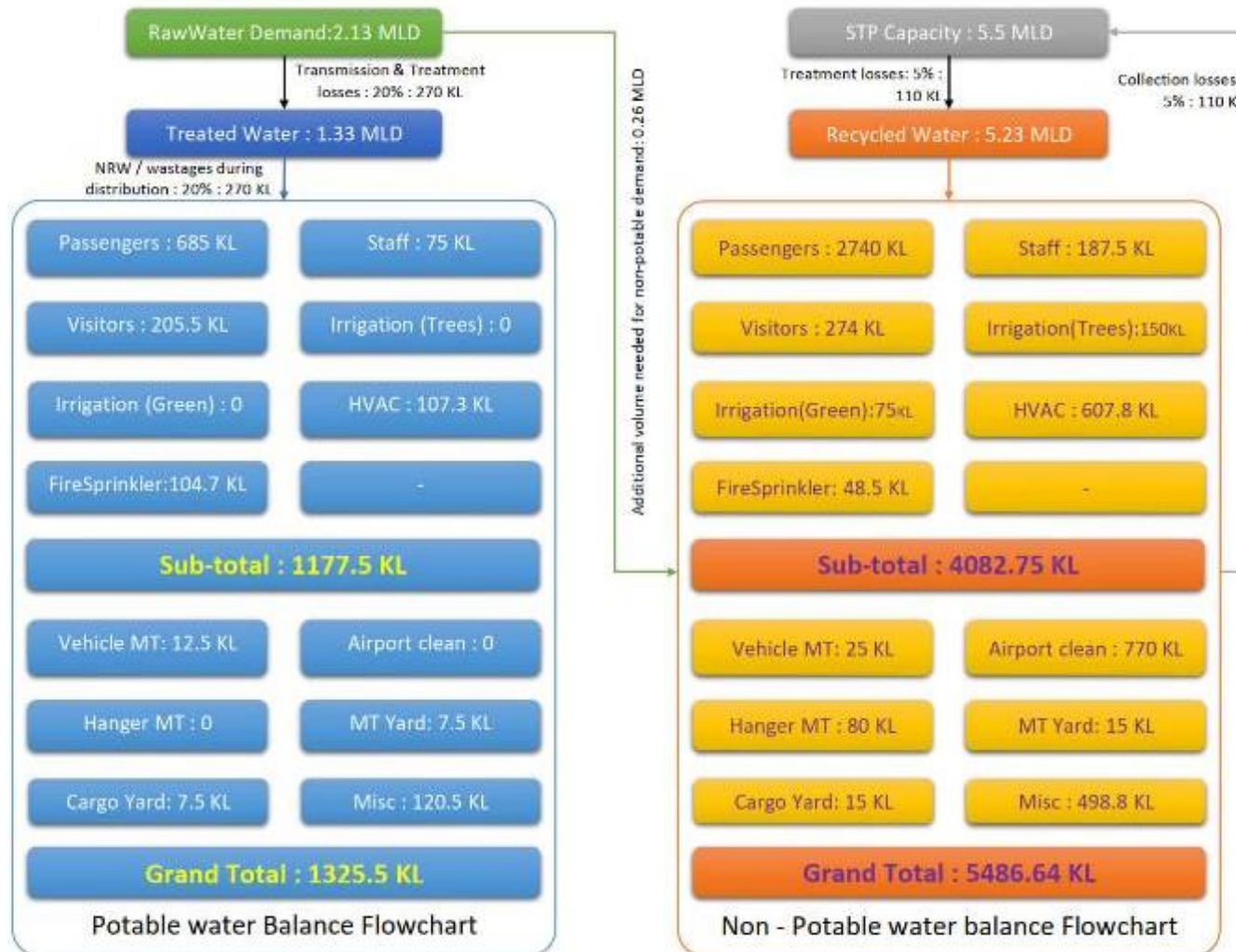
# Water Balance Diagram - Phase 1





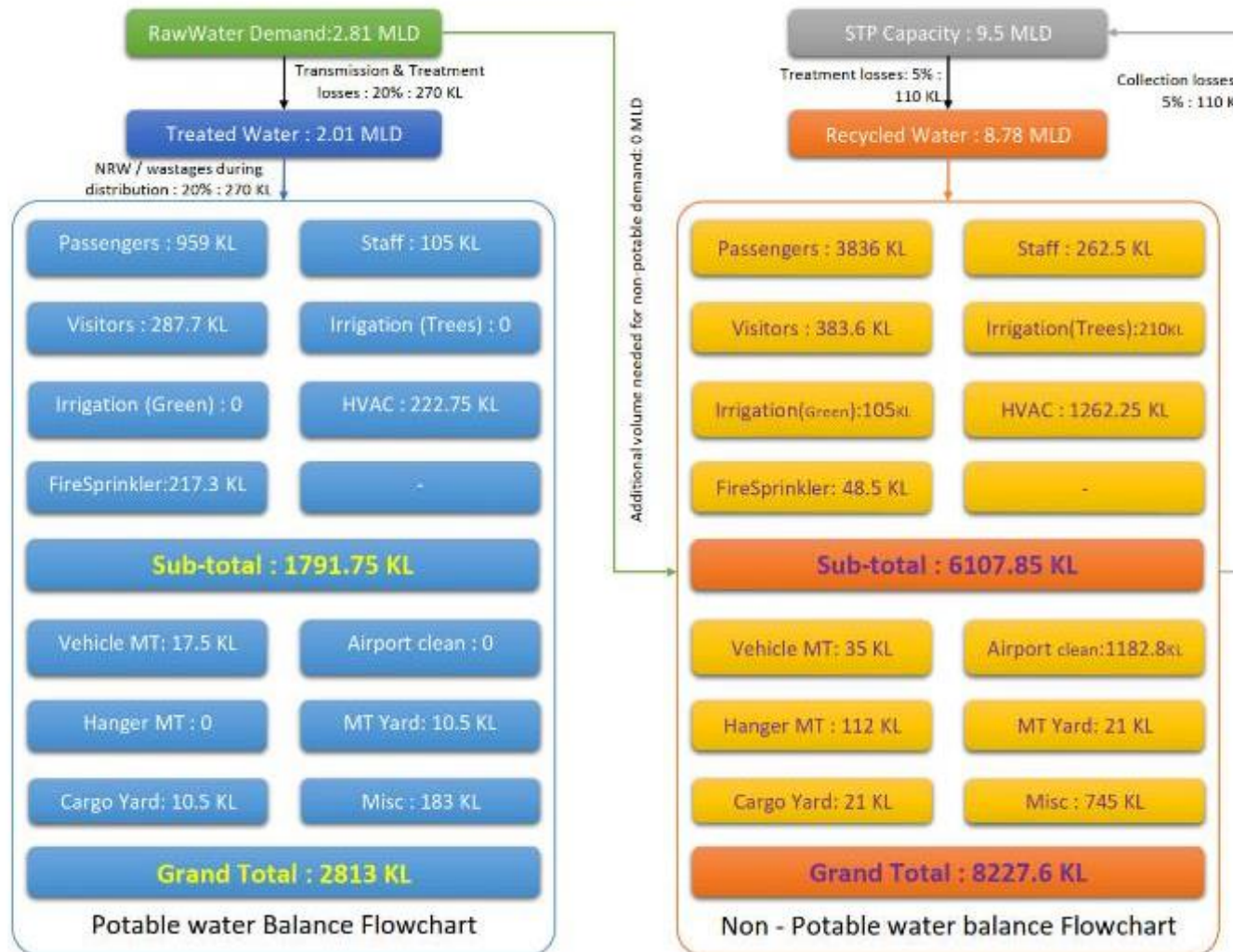


## Water Balance Diagram - Phase 2



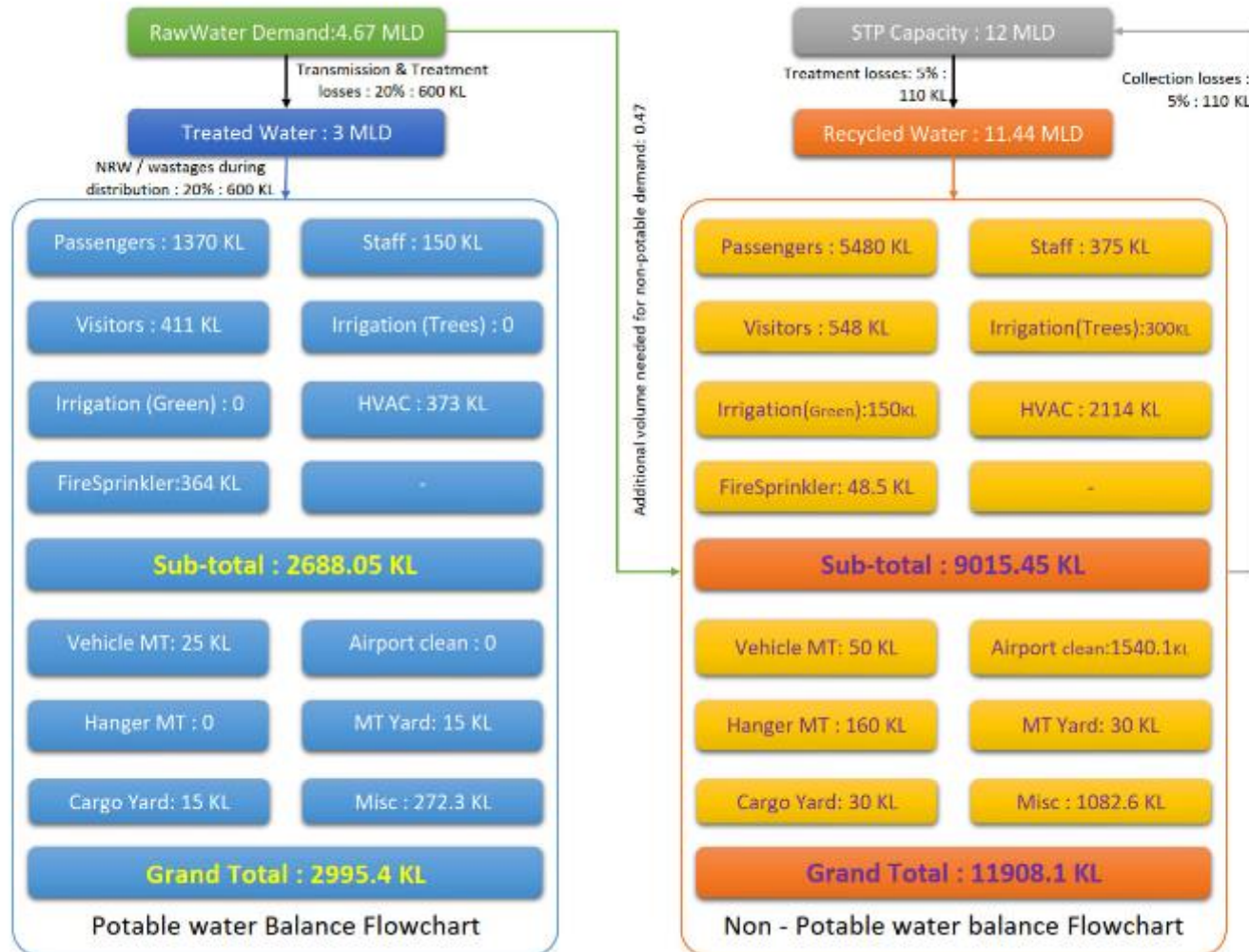


### Water Balance Diagram - Phase 3





### Water Balance Diagram - Phase 4



### 4.3.9 SEWAGE

All water that is supplied will not be getting converted into wastewater. Depending on the type of demand, the wastewater generation will vary. In general, the wastewater generation for potable and non-potable will be significantly different. For the present assessment purposes, it is assumed that 75% of potable water that will be supplied will be converted into wastewater and 80% of non-potable water supplied will be converted into wastewater.

Sewage will be generated as a consequence of use of potable water. A small proportion of the potable water flow will be "lost," being used for various external cleaning purposes and discharged into the surface water drainage system rather than the sanitary sewage system. Bearing in mind that construction site will be above the natural groundwater table, the rate of infiltration into the sewerage system will be modest.

The net increase in base flow due to infiltration is most unlikely to exceed the amount of potable water used for external cleaning purposes and which is consequently "lost" into the storm water system. Thus, the gains and losses can be assumed to balance, and design of the sewerage system on the basis of the unadjusted potable water figures presented in above sections. In general, as per CPHEEO, 85% of the total supplied water converts into wastewater, which shall be collected through the sanitary sewage system or collection network. Wastewater generated from hangars, aircraft washings, Cargo & GSE workshop will be passed through Screens, Oil-Water separator & Grit Chamber. Overflow will be sent to STP for further treatment.

#### STP Scheme

- Advanced Sequential Batch Reactor (SBR)
- Pressure sand filter + Activated carbon filter
- Disinfection (online chlorination followed by UV sterilizer)
- Ultra-filtration (UF) &
- Reverse Osmosis (RO)

Table 4-14 Wastewater Generated

	Phase	Factor for potable water	Factor for non-potable water	Sewage Generated (MLD)
1	2026	0.75	0.8	2.28
2	2030	0.75	0.8	5.79
3	2045	0.75	0.8	9.73
4	2052	0.75	0.8	12.68

Source: Consultant Analysis. Values in Million Liters per Day (MLD).

SBR treatment technology has been selected since, it is a batch process, it can take variable flows of sewage and there is a better control over treated water quality.

#### SEWAGE TREATMENT PLANT

Airports are improving their water sustainability in a variety of ways, from recycling runway cleaning water to installing more efficient restroom fixtures. Airports use water for everything from building to day-to-day operations, from airfield to terminal. However, in an age of climate change and water shortage, many airports are implementing water-saving and environmental methods as different as the airports themselves.

Because of its massive influence on the surrounding ecosystem, the treatment of airport sewage has presented a slew of new issues. The scale design and process selection of sewage treatment facilities in airports are optimized using a multi-objective decision approach. The uncertainty in influent concentration and passenger throughput are always considered. The concentration of airport sewage is higher than that of typical urban sewage, the volume of airport sewage treatment is affected by changes in passenger throughput, and the utilization rate of the complete sewage treatment plant must be more than or equal to 70% for efficient functioning of STP.



## DESIGN PARAMETERS

The raw sewage characteristics are a function of level of water supply and per capita pollution load. Thus, the level of water supply plays a major role in deciding the concentration of pollutants. Other significant factors are settlement and decomposition in sewers under warm weather conditions, partially decomposed sewage from septic tanks, lifestyle of the population, etc. The best way to ascertain the sewage characteristics is to conduct the composite sampling once a week for diurnal variation on hourly basis from the nearby existing sewage outfall or drain.

The samples should be analyzed for the following parameters: pH, Temperature, Colour, Odour, Alkalinity, TSS, Volatile SS, BOD (Total & Filtered), COD (Total and Filtered), Nitrogen (NH<sub>3</sub>, TKN, NO<sub>3</sub>), Phosphorus (Ortho-P & T-P), Total Coliforms and Fecal Coliforms, TDS, Chloride, Sulphates, Heavy Metals (if there is a chance of industrial contamination). Since this is a greenfield project, no samples will be available to begin with. So, based on the raw sewage quality monitoring experiences, the following typical concentrations can be taken for design purpose.

Table 4-15 Design Parameters

Sl.	Parameters	Inlet	Outlet
1.	pH	6.5-8.5	6.5 - 8.5
2.	TSS	250 mg/l	<10 mg/l
3.	BOD	300 mg/l	< 10 mg/l
4.	COD	500 mg/l	< 100 mg/l
5.	Oil & Grease	50 mg/l	< 5 mg/l

Source: Louis Berger Analysis

### Screen Chamber

Prior to the actual treatment of the wastewater, a screen chamber will be provided. In this chamber removable type mechanical bar screens will be provided for removal of various large size elements, such as paper, cloth, plastic, which may hamper the satisfactory functioning of subsequent units of the STP, if not removed at early stages.

### Oil & Grease Trap

The oil & grease trap will be provided to collect oil and grease trace coming with sewage. Collected oil & grease will be stored in a drum and disposed of in environmental sound manner.

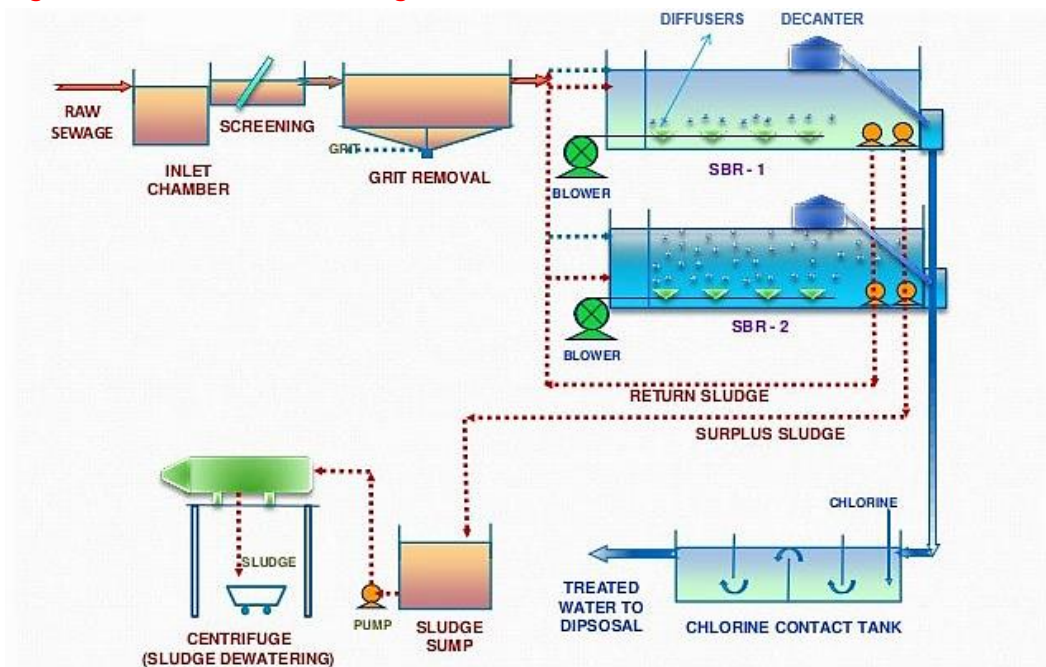
### Equalization Tank

As the quantity of the flow is non-uniform in nature, an equalization tank will have to be provided. By the provision of an equalization tank, wastewater characteristics will become homogeneous in nature and, therefore, better treatment can be achieved in the subsequent units of the STP. Diffused aeration will be provided in this tank to stir the contents of the tank completely.

### Sequencing Batch Reactor (SBR)

The SBR system consists of a tank, aeration and mixing equipment, a decanter, and a control system. The central features of the SBR system include the control unit and the automatic switches and valves that sequence and time the different operations. SBR manufacturers should be consulted for recommendations on tanks and equipment. It is typical to use a complete SBR system recommended and supplied by a single SBR manufacturer. It is possible, however, for an engineer to design an SBR system, as all required tanks, equipment, and controls are available through different manufacturers. This is not typical of SBR installation because of the level of sophistication of the instrumentation and controls associated with these systems. The SBR tank is typically constructed with steel or concrete. For industrial applications, steel tanks coated for corrosion control are most common while concrete tanks are the most common for municipal treatment of domestic wastewater. For mixing and aeration, jet aeration systems are typical as they allow mixing either with or without aeration, but other aeration and mixing systems are also used. Positive displacement blowers are typically used for SBR design to handle wastewater level variations in the reactor.

Figure 4-4 Schematic drawing of STP

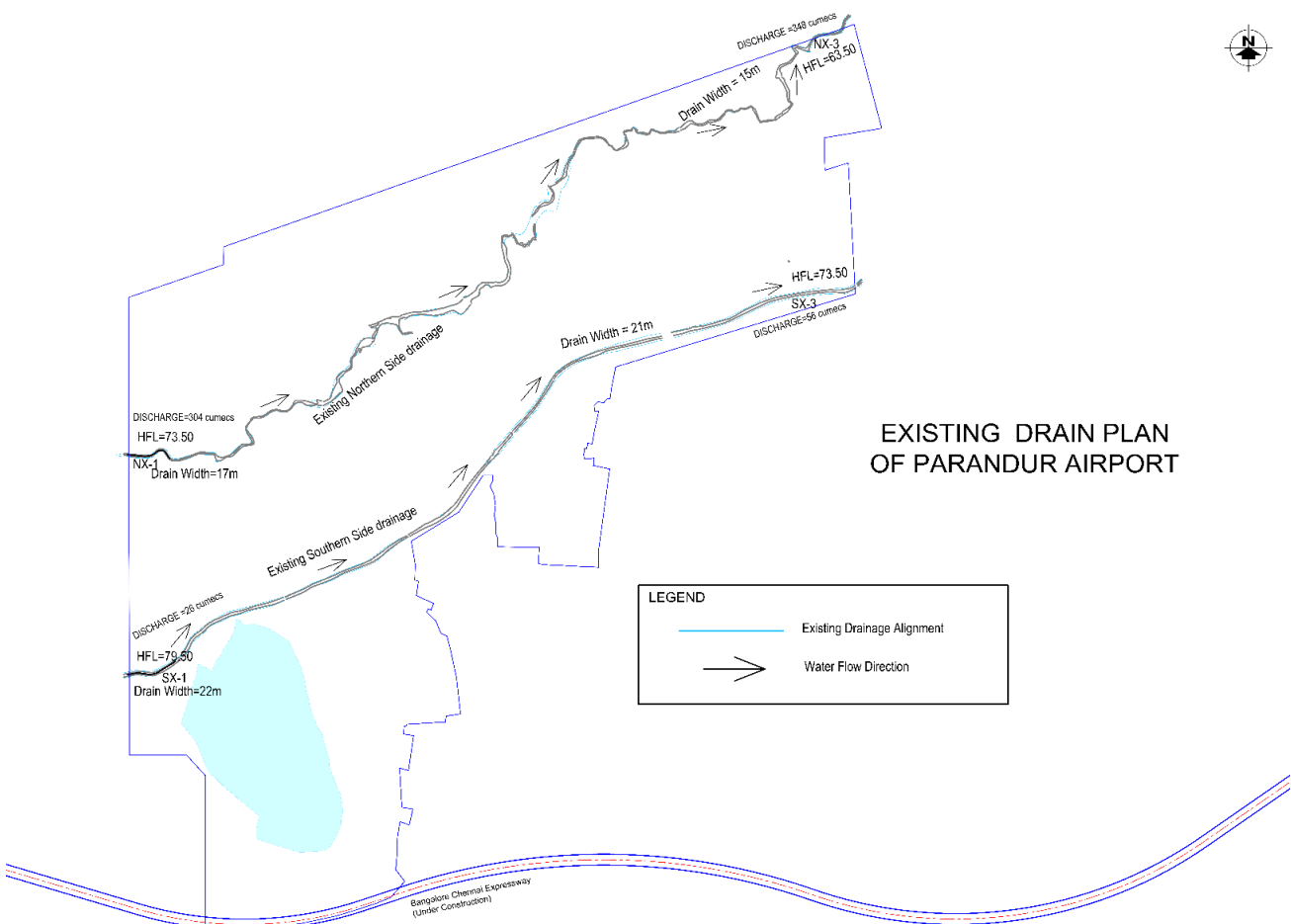


Source: Secondary source

### 4.3.10 DRAINAGE

The assessment of the existing topography of the project site informs that the storm water runoffs from the site can be easily diverted into two existing streams, currently flowing through the site from west to east directions as shown in the figure below.

Figure 4-5 Existing Natural Streams flowing through the Proposed Project Site



Source: Louis Berger Analysis

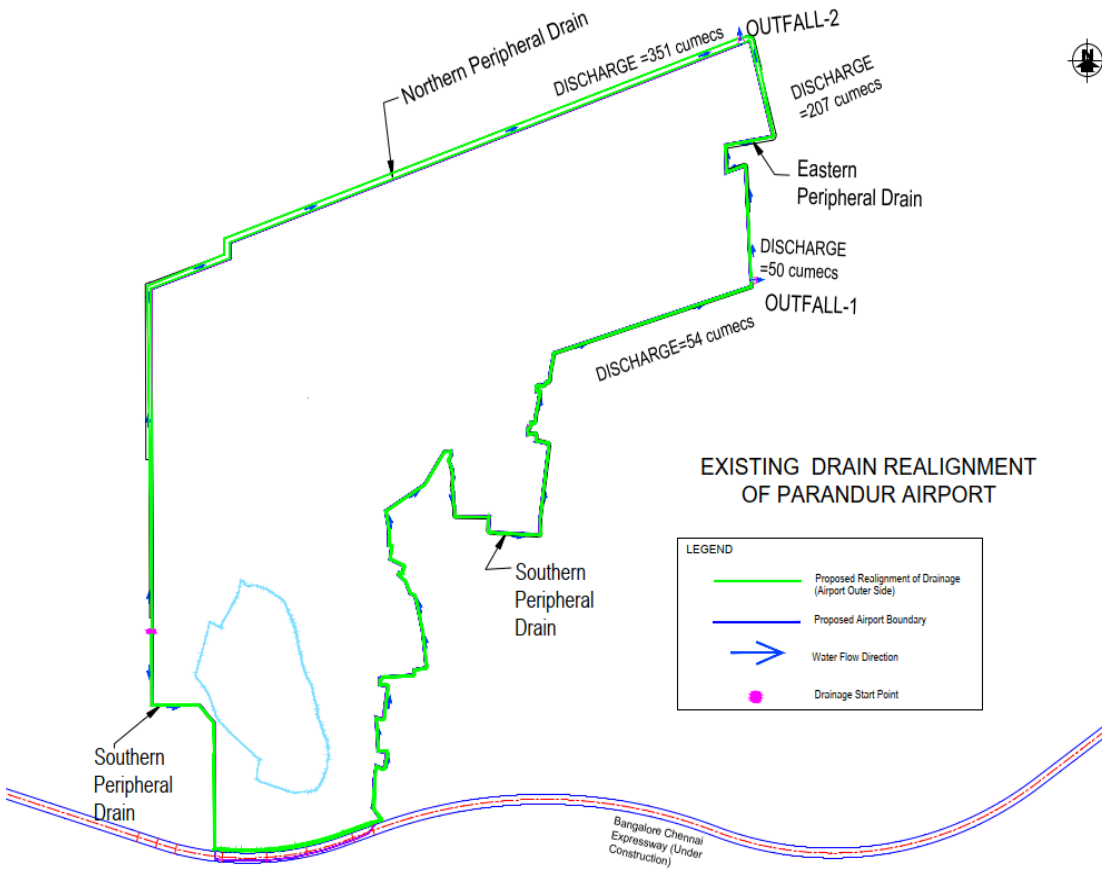


Imitating the natural slope of the existing topography, the site is proposed to be graded to maintain a slope from western to eastern boundary of the project site as a contextual basis for the planning of the storm water drainage network. This slope has been designed to limit the maximum velocity of storm water flow within an acceptable limit. The drainage network proposal is inclusive of the following strategies:

- **NPD-01:** The existing Northern drain (originates from the spill of the Parandur water tank & after re-aligning, it is named as Northern Peripheral Drain, NPD-01) after collecting all the runoffs from external site, is proposed to be diverted all along the Western & Northern proposed boundaries of the project site. It shall discharge a part of its runoff (94.80 cumecs) into an existing Akkamapuram water tanks before disposing its remaining collected runoffs (350.81 cumecs) into the D/S existing natural drain course (Outlet-2) at North-East corner of the project site boundary (shown in figure below). The external drain NPD-01 has been proposed in trapezoidal shape with its bed in concrete and side slopes pitched with stone for the purpose of recharging the existing ground strata.
- **SPD-01:** The existing Southern drain is proposed (originates by off-taking water from an existing weir on the Palar River & after re-aligning, it is named as Southern Peripheral Drain, SPD-01) to be running all along the Western and Southern project boundaries. The realigned SPD-01 drain shall be discharging its external runoffs (53.72 cumecs) rejoining into an existing irrigation channel at South-East corner of the project boundary at Outlet-01. This is shown below in Figure 4-8. The external drain SPD-01 has been proposed in trapezoidal shape with its bed and side slopes pitched with stone for the purpose of recharging the existing ground strata also.
- **EPD-01:** Another Eastern Peripheral Drain (EPD-01) has been proposed running all along the Eastern project boundary. The EPD-01 drain will collect surface runoff from the major drains of internal area of project site and shall discharge its accumulated runoffs at the North-East corner (Outlet-2) of the project boundary, where NPD-01 (North Peripheral Drain -01) & INPD-01 (Internal North Peripheral Drain -01) will also discharge its runoffs. The EPD-01 drain is shown below in Figure 4-8. The external drain EPD-01 has been proposed in trapezoidal shape with its bed and side slopes pitched with stone for the purpose of recharging the existing ground strata also. From this North-East corner disposal Point, the runoffs will be moving towards the Cooum water tank, situated in North-East direction of the project boundary. In further, the spill water of Cooum tank will be discharging through the natural existing drain up to the Bay of Bengal Sea.
- **Internal Drains:** Internal major drains have been planned slopping from West to East direction. However small minor cross drains have been planned from South to North & North to South directions from the centre line of the project site joining the major internal drains, which are proposed to be running mainly from West to East direction. All the proposed external peripheral drains (NPD-01, SPD-01, & EPD-01) and internal network of drains (INPD-01, D-01 to D-41 & ISPD-01) with their proposed alignments, flow directions & outfall locations are shown below in Figure 4-9. The surplus/ spill water from the re-modelled NELVOY water tank and the runoffs from the internal drains D-01 to D-03 are to be diverted into a drain ISPD-01 (Internal Southern Peripheral Drain -01) running internally all along the Southern project boundary and proposed to be discharging its runoffs (54.29 cumecs) into the existing Irrigation channel at South-East corner of the project boundary at Outlet-1. This is shown below in Figure 4-8.
- **Proposed Shape of drains:** All the external peripheral drains; NPD-01, SPD-01, SPD-02 & EPD-01 have been proposed in trapezoidal shape (side slope 1.5H:1V) with its bed in concrete and side slopes pitched with stone. Whereas all the internal drains; INPD-01, D-01 to D-41, SPD-03 and ISPD-02 are proposed in rectangular shape in concrete to minimise the requirement of top width space of the drains.

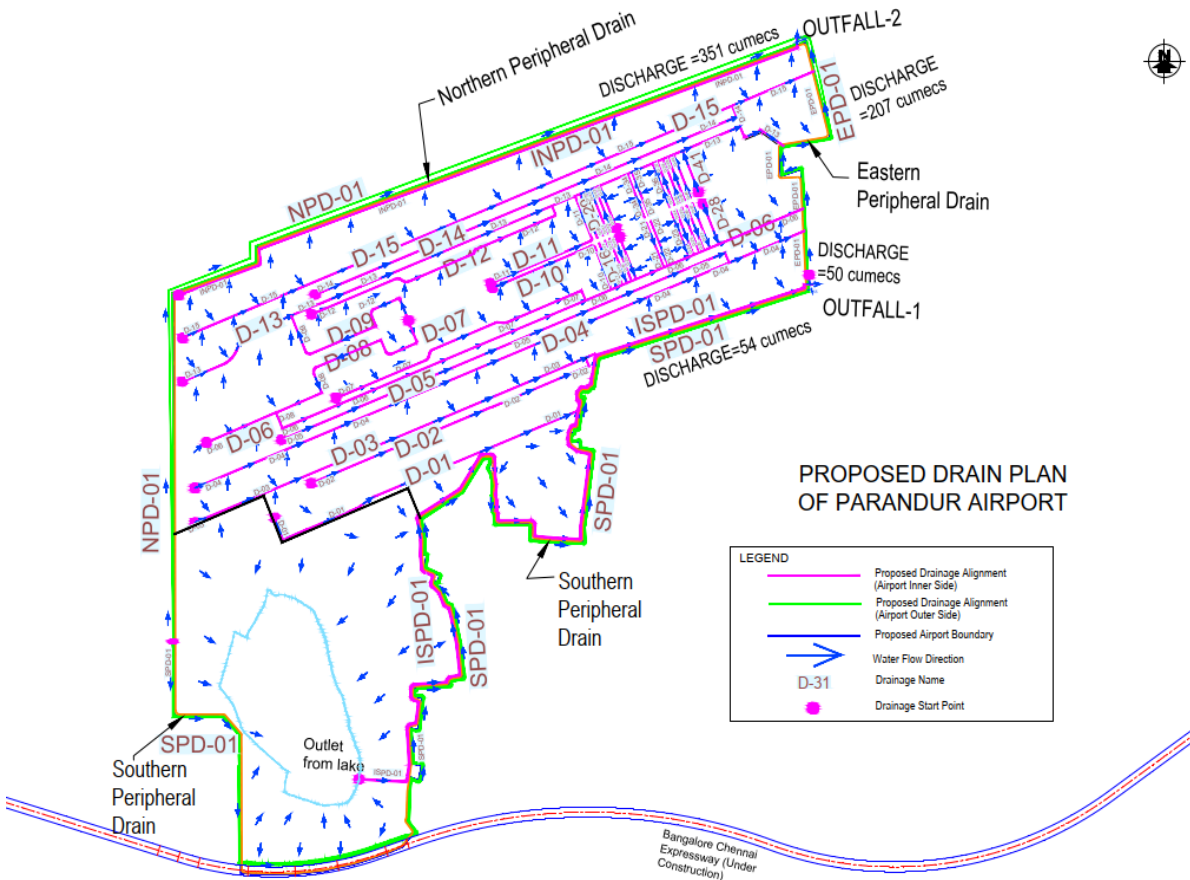


Figure 4-6 Proposed Diversion of existing Peripheral Drains & Water from Nelvoy Eri



Source: Louis Berger Analysis

Figure 4-7 Proposed Drainage Plan



Source: Louis Berger Analysis



### 4.3.11 RAINWATER HARVESTING & NELVOY TANK

For an inevitable need of potable water supply & irrigation water for land scape area, the Rainwater Harvesting has become an essential component in any project site. Besides augmenting the supply through the public water sources, Rainwater Harvesting also provides benefits of controlling floods and erosion offsite downstream of the airport while preserving and even creating in some cases a sustainable ecosystem for an area. The grading of the topography of the Project site has been aligned with the conceptual planning for rainwater harvesting arrangement to reduce the storm runoffs and the size of required drainage network system.

The water table in the project site area has been found at about 8 to 10m deep below the existing ground level and so more or less about 8m deep boring can be proposed for recharging the ground in the form of rainwater harvesting in deep strata. Therefore, it has been proposed to provide RWH structures in the bed of all the proposed length of Internal peripheral drains @ 100m centre to centre spacing to recharge the ground as well as to reduce the runoff flow discharge in the peripheral drains. The deep boring RWH structures have not been proposed in the bed of internal drainage network system to avoid any possibility of saturation of filled earth strata and further the possibility of settlement of filled soil. All the external peripheral drains (NPD-01, SPD-01 & EPD-01) are proposed to be constructed in trapezoidal shape with their bed and side slope dry stone pitched so that they can facilitate to recharge the existing ground water table. In continuation of proposing RHW system, the existing Nelvoy water tank near the South-West boundary of the project site is proposed to be developed for water storage tank, which shall be fed by runoffs from 595.2 ha internal catchment area of project site. After full filling the water storage capacity of the proposed developed NELVOY tank, the spill water from the water tank shall be allowed to divert into the proposed Internal South Peripheral Drain (ISPD-01 drain) through a proper hydraulic regulating outlet gate.

The proposed top area of Nelvoy Water Storage Tank is approximately 123.40 Ha and if we consider the runoff coefficient 0.90 and the average annual rainfall depth 1121.30 mm (from the records of past 21 year's rainfall data) in the project area, the water depth required in Nelvoy water storage tank is 4.62 m (assuming 5 % runoff volume, i.e., a discharge of about 14.34 cumces, if required) is allowed to spill out from the Nelvoy water tank into the Internal South Peripheral Drain-01 (ISPD-01). The proposed water storage capacity of the Nelvoy tank will be about 5.69 MCM. A preliminary estimated calculation of proposed Nelvoy water storage capacity is shown below in Table 4-16.

Table 4-16 : Proposed Water Storage Capacity of Redeveloped Nelvoy Eri

Total Runoff area for Nelvoy tank =	595.2	Ha
Assumed maximum runoff coefficient =	0.90	
Average Annual rainfall depth (Year 2000 to 2021) =	1121.3	mm
Average annual runoff volume in Nelvoy Tank =	6007042	CUM
Average annual runoff volume in Nelvoy Tank =	6.007	MCM
Proposed Top Area of Nelvoy Water Storage Tank =	123.40	Ha
	1234000	sqm
Water depth required in Nelvoy tank for storage of avg. annual runoff volume (assuming 5 % runoff volume, i.e., a discharge of 14.34 cumces) is allowed to spill out from the Nelvoy water tank into the drain ISPD-01 =	4.62	m
Assumed Free Board in Tank above HFL =	0.60	m
Total required depth of Nelvoy Water Tank =	5.22	m
Say,	5.25	m
Proposed storage capacity of Nelvoy Water Tank =	5.69	MCM

### 4.3.12 WASTE MANAGEMENT

Airport Operations primarily experiences various types of waste, including - Municipal Solid Waste (MSW), Construction and Demolition Debris (CCD), Aircraft Waste (Deplaned Waste), Compostable Waste, Hazardous and Industrial Waste and Lavatory Waste. Airport Council International's (ACI) Policy and Recommended Practices Handbook provides guiding principles for waste management at airports.

Figure 4-8: Preferred Waste Hierarchy



Source: United Nations Environment Programme (UNEP)

### MUNICIPAL SOLID WASTE (MSW)

This is the type of waste that airports have the most choice in managing. MSW is made up of everyday items that are used and discarded, such as aluminium and steel cans, glass bottles and containers, plastic bottles and containers, packaging bags, paper products, and cardboard. Airport MSW comes from four primary sources as follows:

- (1) Terminal waste - from public areas and airport administrative offices;
- (2) Tenant waste - from terminal retail and concessions;
- (3) Airline waste - from airplanes and airline offices; and
- (4) Cargo waste - from cargo operations

### WASTE FROM AIRCRAFT OR AIRCRAFT WASTE

Waste from airplanes (deplaned waste) is a specific type of MSW that is removed from passenger aircraft. Almost 20% of an airport's total MSW comes from deplaned waste after flights. Deplaned waste includes "galley waste" - materials typically collected by airline caterers as part of the de-catering process, including compactor boxes, waste carts (bags), food carts, and bonded carts - which may be subject to more rigorous disposal methods.

### HAZARDOUS WASTE

These types of waste products consist of oils, solvents, and other chemical waste from activities such as aircraft and ground vehicle washing and cleaning, fuelling operations, aircraft maintenance and repair including painting and metalwork, engine test cell operations, de/anti-icing operations, ground vehicle maintenance, and abandoned aircraft. These types of wastes tend to be closely regulated by state law, and require special treatment, storage, and disposal, and therefore this document does not address hazardous and industrial waste management.

### APPROACH & METHODOLOGY

Airport Council International's (ACI) Policy and Recommended Practices Handbook provides guiding principles for waste management at airports; "Airports should promote the culture of avoiding solid waste generation and, where possible, extracting value from remaining waste with the ultimate goal of sending zero waste to landfills."

The ACI Policy Handbook provides a waste decision hierarchy, that shows - in order of decreasing priority - what constitutes the best overall environmental waste management choices: to avoid; to reduce; to reuse; to recycle; and finally, to dispose with the ultimate goal of eliminating waste going to landfills. By this decision hierarchy, the first consideration should be given to minimize the generation of waste at the airport, and additionally, include opportunities for cost savings through improved management of waste, the feasibility of waste recycling at the airport, and the potential for generation of revenue from airport waste.



EU Directive (2008/98/EC) also describes a priority order of waste prevention and management legislation and policy options: prevention; preparing for re-use; recycling; other recovery; and disposal. The directive recognizes that “waste hierarchy generally lays down a priority order of what constitutes the best overall environmental option in waste legislation and policy”, however sometimes it could be justified to depart from such hierarchy in order to address specific waste streams that would require correlating needs of technical feasibility, economic viability and environmental protection. Waste hierarchy can differ in their nomenclature; however, the main objective is achieved if one understands that the most important principle is to try to reduce waste to the minimal extent possible.

#### WASTE AVOIDANCE

Waste avoidance should be at the top of any waste management hierarchy, as it is in the ACI and EC policies on waste management. Waste avoidance refers to the measures to be implemented before a substance becomes waste.

#### WASTE REDUCTION

Reducing waste can contribute to airport sustainability and to cost savings. Some reduction efforts may include more economical use of materials, while some may divert to another process such as recycling. All processing of waste requires effort and energy, but by extension, any activity that might contribute to reducing the amounts of waste also decreases transportation emissions and energy necessary to process it.

#### WASTE REUSE

Airports may reuse and repurpose materials by using contractual requirements with tenants to require waste minimization activities, such as use of specific materials, cleaners, or paints. The reuse or repurposing of recovered materials also reduces the demand for new materials, for example reducing mining of aluminium ore.

#### WASTE RECYCLING

A common way to reduce the amount of waste is to establish a recycling program. Approximately 75 percent of the waste stream at airports is recyclable or compostable, with paper being the largest single category of MSW generated by the airline industry. With recycling, residual waste is reduced and energy and materials are recaptured. There are two types of recycling found at airports that correspond to the two types of waste - MSW and CDD. MSW recycling can offer cost savings but requires development and implementation of an effective recycling process by the airport, which will pose costs as well. CDD recycling can be a large source of savings in terms of materials and cost but requires careful planning to realize those savings.

#### ESTIMATION OF (APPROXIMATE POSSIBLE) WASTE GENERATION

Estimation of Waste that will be generated from an airport is a very case specific study. It depends on many parameters like type of flights, regional traffic (passengers) and their lifestyles, climatic conditions etc.

Table 4-17 Classification and Generation of Waste Estimation at CGA

SWT (MSW)	0.603	48.24	48	TPD
HWT (Hazardous)	0.0965	7.72	8	TPD
AWT (Aircraft waste)	0.3005	24.04	24	TPD

Source: Louis Berger Analysis

# 5 SOCIAL IMPACT ASSESSMENT

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## 5.1 NEED FOR SOCIAL IMPACT ASSESSMENT

The loss of private assets resulting in loss of income and displacement makes social impact assessment an important input in project design while initiating and implementing developmental interventions. An understanding of the issues related to social, economic, and cultural factors of the affected people is critical in the formulation of an appropriate rehabilitation plan. A detailed social impact assessment (SIA) therefore needs to be carried out to make project design responsive to social development concerns. SIA also helps in enhancing the project benefits to poor and vulnerable people while minimizing or mitigating concerns, risks, and adverse impacts.

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## 5.2 OBJECTIVE OF THE STUDY

The main objective of the study is to ensure that the project addresses the adverse impacts on the livelihood of the people and that nobody is left worse off after implementing RAP and those affected have access to project benefits, during project construction as well as operation stage.

The report aims to highlight the social problems and suggests general and typical mitigation measures to alleviate social problems of the project-affected people such as loss of livelihood, displacement, and loss of access to community facilities through widening of roads, bypasses, service roads, underpasses, and other facilities. The specific objectives of the SIA/RAP are as follows:

- To carry out a socio-economic, cultural, and political/institutional analysis to identify the project stakeholders and social issues associated with the project.
  - To assess the extent of asset loss and undertake the census of potential project affected people.
  - To develop a Resettlement Action Plan (RAP) in consultation with the affected people and project authorities.
  - To identify likely occurrence of HIV/AIDS resulting from the influx of outside labourers and others and develop a strategy to reduce their incidence; and
  - To develop a consultation framework for participatory planning and implementation of proposed mitigation plan.
- 

## 5.3 SCOPE OF THE STUDY

The study will begin with the identification of social issues and stakeholders and communities, including socially and economically disadvantaged communities. The focus of SIA will be on identifying local population likely to be affected by the project either directly or indirectly and undertake census survey. The scope of the study includes the following:

- Identifying key social issues associated with the proposed project and specifies the project's social development outcomes.
- Assessing potential social and economic impacts both during the construction phase and in the operation phase.
- Reviewing policies, regulations and other provisions that related to resettlement and rehabilitation of project affected people and other social issues.
- Social screening of various project components and likely impacts in terms of land taking (loss of houses, livelihood, etc.), and resultant involuntary resettlement and provide inputs (in terms of magnitude of impacts and likely costs for mitigation) in preparing appropriate mitigation plans.
- Screening the social development issues in the project area and its vicinity and design the social services that may be provided by the project to improve the quality of life and achieve the projects economic and social goals.



- Update the profile of the population and available infrastructure facilities for services in the project affected area.
- Based on the assessment of potential social and economic impacts establish criteria that will assist in the formulation of strategies; to the extent possible maximize project benefits to the local population and minimize adverse impacts of the project interventions on the affected communities.
- Inform, consult, and carry out dialogues with the project stakeholders on matters relating to project design, objectives, and implementation and provide specific recommendations to avoid/minimize high social risks.
- Screen the social development issues in the project area and its vicinity and accordingly design the social services that may have to be provided by the project in order to improve the quality of life.
- Identify likely loss of community assets (e.g. school, community assets) including the religious structures and common property resources (e.g. forest, grazing land) the impacts of their loss on the local population.
- Assess the impact of influx of construction workers and others (both during civil works and operation of the project) on the incidence of HIV/AIDS and other diseases and develop a strategy to control them.
- Assess the capacity institutions and mechanisms for implementing social development aspects of the project implementation including the social safeguard plans and recommend capacity building measures; and,
- Develop monitoring and evaluation mechanism to assess the social development outcomes.

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## 5.4 METHODOLOGY

Approach and methodology mainly consist of quantitative and qualitative tools and techniques. The study was conducted in two phases.

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### 5.4.1 PHASE - I PRE-SURVEY ACTIVITIES

#### COLLECTION AND REVIEW OF PROJECT LITERATURE

This phase intends to familiarize with the concerned and important stakeholders to identify and collect the available literature and to scope of the activities. This involved two-pronged approach (a) discussions with Project Implementing authorities and other concerned, b) collection of available relevant project literature. Consultations will be held with concerned revenue officials to establish the ownership of land. Literature review and consultations formed the basis for identification of key stakeholders.

#### RAPID RECONNAISSANCE SURVEY TO FAMILIARIZE FIELD ACTIVITIES

In addition to review and consultations, rapid preliminary field visits will be conducted as part of ground truthing exercise. It provides the elementary idea about field research preparation and also helps for pilot testing of questionnaires and checklists.

#### SCOPING AND OTHER PRE-SURVEY ACTIVITIES

Both the review and rapid reconnaissance survey helps in finalizing the study instruments and inception report detailing the final methodology and work plan.

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### 5.4.2 PHASE - II SURVEY ACTIVITIES

#### CENSUS AND SOCIO-ECONOMIC HOUSEHOLD SURVEY

The social team will conduct a census study within the project site. The database will be used later to identify structures coming within proposed project area. The survey also includes comprehensive examination of people's assets, important cultural or religious sites, and common property resources. The process includes collecting details of owner or occupant of the structure, its type and usage and dimensions. A structured format will be used to collect all the relevant information on project PAPs



and their structures. The following methodology will be adopted to finalize the likely to be affected persons/assets along the project area.

a. Identification of project affected persons (PAPs) and families (PAFs)

For agricultural land affected Title Holders' identification, the likely to be impacted land survey numbers which is derived from Land Plan will be taken into consideration. In this process the Title Holders (THs) and Non-Title Holders (NTHs) of the project stretch will be included in Resettlement action plan (RAP).

b. Census survey of affected structures/assets

In order to identify and establish the legal entitlement of the property, a 100 percent census survey method will be adopted. The door-to-door interview helps eliciting information on affected properties belonging to both title and non-titleholders. The property identification exercise will be undertaken within proposed project site. Prior to initiation of physical identification of the structures, detailed discussions will be held with concerned officials to collect information on ownership of property and other required details if any. To carry out the census survey, an exhaustive interview schedule will be prepared and tested for its smooth administration.

All the affected structures belonging to titleholders will be incorporated in resettlement action plan. Their location, size, geometry, type of construction of the structures, name of the owner(s), etc. will also be recorded. This survey is an important tool for preparing resettlement action plan. The following points of census survey include:

- Loss of immovable assets by type and degree of loss.
- Physical measurements of the affected assets/ structures including their replacement valuation.
- Categorization and measurement of potential loss.
- Status of ownership
- Legal right on the likely to be affected assets.

c. Socio-economic base line survey on sample basis

The socio- economic survey of 25 % of PAHs will be conducted to attain a representative database. The aim of the baseline socio-economic survey is to determine distribution of socio-economic groups on the map, analysis of social structure and income resources of the PAPs, inventories of the resources which the PAP use as well as the data on the system of economic production.

d. Consultations

The consultations will be undertaken with various stakeholders at village levels for dissemination of information about the proposed project.

## QUALITATIVE SURVEY

Qualitative surveys will be conducted for evaluation of both affected population and Implementation capacities. The qualitative survey includes focus group discussions and in-depth interviews with various sections of people such as women, knowledgeable persons and community leaders to elicit their expectations and suggestions, which will support and provide additional information collected through quantitative survey.

## ASSESSMENT OF LIVELIHOOD LOSSES

The study will try to identify people losing their livelihood directly or indirectly. The consultative process will pave the way to develop rehabilitation strategies that helps for income generation and other remedial and restoration measures. The preliminary consultations will be conducted with project affected people, villagers, knowledgeable persons and community leaders of the village.

## RESEARCH TOOLS AND INSTRUMENTS

Various social research tools are employed to ensure that, all issues related to the study need to be adequately addressed so that a meaningful package of deliverables can be developed. The entire



exercise was carried out through an appropriate mix of social research techniques including desk research through review of information, concerned government departments and project authorities. Structured and semi-structured interviews, group discussions with the affected people and relevant government agencies and community were undertaken. The study used various instruments to collect information for the different stakeholders involved in the project.

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## 5.5 PROJECT INFLUENCE AREA

A detailed accounting of the socio-economic profile of the Project Influence Area (PIA) has been prepared which traces the CPIA's economic performance of the past and establishes the likely growth prospects of the future. The output of this Chapter is the economic growth prospects of the CPIA with respect to certain selected economic variables and serves as the basis for arriving at a realistic traffic growth rate, for different vehicle categories. The direct project influence area is identified as the vicinity on both sides of the project road. The socio-economic profile of the project influence areas is prepared based on secondary official sources of information.

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### 5.5.1 TAMIL NADU AT A GLANCE

#### AREA AND LOCATION

Its capital and largest city is Chennai (formerly known as Madras). Tamil Nadu lies in the southernmost part of the Indian Peninsula and is bordered by the union territory of Puducherry and the South Indian states of Kerala, Karnataka, and Andhra Pradesh. It is bounded by the Eastern Ghats on the north, by the Nilgiri, the Anamalai Hills, and Kerala on the west, by the Bay of Bengal in the east, by the Gulf of Mannar and the Palk Strait on the southeast, and by the Indian Ocean on the south. The state shares a maritime border with the nation of Sri Lanka.

Tamil Nadu is the eleventh-largest state in India by area and the sixth most populous. Tamil Nadu was ranked as one of the top seven developed states in India based on a "Multidimensional Development Index" in a 2013 report published by the Reserve Bank of India. Its official language is Tamil, which is one of the longest-surviving classical languages in the world.

#### CLIMATE AND RAINFALL

Tamil Nadu is mostly dependent on monsoon rains, and thereby is prone to droughts when the monsoons fail. The climate of the state ranges from dry sub-humid to semi-arid. The state has two distinct periods of rainfall:

- Southwest monsoon from June to September, with strong southwest winds.
- Northeast monsoon from October to December, with dominant northeast winds.

The annual rainfall of the state is about 945 mm (37.2 in) of which 48 per cent is through the north-east monsoon, and 32 per cent through the south-west monsoon. Since the state is entirely dependent on rains for recharging its water resources, monsoon failures lead to acute water scarcity and severe drought. Tamil Nadu is divided into seven agro-climatic zones: northeast, Northwest, west, southern, high rainfall, high altitude hilly, and Cauvery Delta (the most fertile agricultural zone).

#### AGRICULTURE

Tamil Nadu has historically been an agricultural state and is a leading producer of agricultural products in India. In 2008, Tamil Nadu was India's fifth biggest producer of rice. The total cultivated area in the State was 5.60 million hectares in 2009-10. The Cauvery delta region is known as the Rice Bowl of Tamil Nadu. In terms of production, Tamil Nadu accounts for 10 per cent in fruits and 6 per cent in vegetables, in India.

The state is the largest producer of bananas, turmeric, flowers, tapioca, the second largest producer of mango, natural rubber, coconut, groundnut and the third largest producer of coffee, sapota, Tea and Sugarcane. Tamil Nadu's sugarcane yield per hectare is the highest in India. The state has 17,000 hectares of land under oil palm cultivation, the second highest in India.

#### INDUSTRIES

Traditionally, Tamil Nadu has always been in the forefront of industrialization with a strong presence in the manufacture of engineering and auto components, textiles, leather, sugar etc. During the post



liberalization period since 1991, private Sector began to take over the lead in the industrial development of the country. In the different scenario, States started taking the initiative in the new and competitive environment and Tamil Nadu was one of the earliest to seize the opportunity and announced its Industrial Policy in 1992 itself. This policy became the cornerstone and laid the foundation for the rapid growth of new industries in the State. This policy became the harbinger of growth that facilitated the electronics and automobile industry revolution in Tamil Nadu by attracting major projects from Industrial giants.

## EDUCATION

Tamil Nadu is one of the most literate states in India. Tamil Nadu has performed reasonably well in terms of literacy growth during the decade 2001-2011. A survey conducted by the industry body Assocham ranks Tamil Nadu top among Indian states with about 100 per cent Gross Enrolment Ratio (GER) in primary and upper primary education. One of the basic limitations for improvement in education in the state is the rate of absence of teachers in public schools, which at 21.4 per cent is significant. Tamil Nadu has 37 universities, 552 engineering colleges 449 Polytechnic Colleges and 566 arts and science colleges, 34335 elementary schools, 5167 high schools, 5054 higher secondary schools and 5000 hospitals.

## CULTURE

Tamil Nadu has a long tradition of venerable culture. Tamil Nadu is known for its rich tradition of literature, art, music and dance, which continue to flourish today. Tamil Nadu is a land most known for its monumental ancient Hindu temples and classical form of dance Bharatanatyam. Unique cultural features like Bharatanatyam (dance), Tanjavor, and Tamil architecture were developed and continue to be practiced in Tamil Nadu.

## TRANSPORT SYSTEM

### Road

Tamil Nadu has a transportation system that connects all parts of the state. Tamil Nadu has an extensive road network, providing links between urban centers, agricultural market places and rural areas. There are 29 national highways in the state, covering a total distance of 5,006.14 km (3,110.67 mi). The state is also a terminus for the Golden Quadrilateral project, that connects Indian metropolises like (New Delhi, Mumbai, Bengaluru, Chennai and Kolkata). The state has a total road length of 167,000 km (104,000 mi), of which 60,628 km (37,672 mi) are maintained by Highways Department. This is nearly 2.5 times higher than the density of all-India road network. The major road junctions are Chennai, Vellore, Madurai, Trichy, Coimbatore, Salem, Tirunelveli, Tuticorin, Karur, Krishnagiri, Dindigul and Kanyakumari. Road transport is provided by state owned Tamil Nadu State Transport Corporation and State Express Transport Corporation. Almost every part of state is well connected by buses 24 hours a day.

### Railways

Tamil Nadu has a well-developed rail network as part of Southern Railway. Headquartered at Chennai, the Southern Railway network extends over a large area of India's southern peninsula, covering the states of Tamil Nadu, Kerala, Puducherry, a small portion of Karnataka and a small portion of Andhra Pradesh. Express trains connect the state capital Chennai with Mumbai, Delhi and Kolkata. Chennai Central is gateway for train towards north whereas Chennai Egmore serves as gateway for south. Tamil Nadu has a total railway track length of 5,952 km (3,698 mi) and there are 532 railway stations in the state. The network connects the state with most major cities in India.

### Airports

Tamil Nadu has four international airports namely Chennai International Airport, Coimbatore International Airport, Tiruchirappalli International Airport and Madurai International Airport. Salem Airport and Tuticorin Airport are domestic airports. Chennai International Airport is a major international airport and aviation hub in South Asia. Besides civilian airports, the state has four air bases of the Indian Air Force namely Tanjavor AFS, Tambram AFS, Coimbatore AFS and two naval air stations INS Rajali and INS Parundu of Indian Navy.





## Seaport

Tamil Nadu has three major seaports located at Chennai, Ennore and Tuticorin, as well as seven other minor ports including Cuddalore and Nagapattinam. Chennai Port is an artificial harbour situated on the Coromandel Coast and is the second principal port in the country for handling containers. Ennore Port handles all the coal and ore traffic in Tamil Nadu.

## Tourism

The tourism industry of Tamil Nadu is the largest in India, with an annual growth rate of 16 per cent. Tourism in Tamil Nadu is promoted by Tamil Nadu Tourism Development Corporation (TTDC), a Government of Tamil Nadu undertaking. According to Ministry of Tourism statistics, 4.68 million foreign (20.1% share of the country) and 333.5 million domestic tourists (23.3% share of the country) visited the state in 2015 making it the most visited state in India both domestic and foreign tourists. The state boasts some of the grand Hindu temples built in Dravidian architecture. The Brihadishwara Temple in Tanjavoor, Gangaikonda Cholapuram and the Airavatesvara Temple in Darasuram built by the Cholas and the Shore Temple along with the collection of other monuments in Mahabalipuram (also called Mamallapuram) have been declared as UNESCO World Heritage Sites. Erwadi in Ramanathapuram district is one of the major Islamic tourist attraction site.

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### 5.5.2 KANCHEEPURAM DISTRICT AT A GLANCE

Kancheepuram district is situated on the northern East Coast of Tamil Nadu and is adjacent by Bay of Bengal and Chennai city and is bounded in the west by Vellore and Thiruvannamalai district, in the north by Thiruvallur district and Chennai district, in the south by Villuppuram district in the east by Bay of Bengal. It lies between 11° 00' to 12° 00' North latitudes and 77° 28' to 78° 50' East longitudes. The district has a total geographical area of 1704.79 Sq.Kms and coastline of 87.2 Kms. Kancheepuram, the temple town is the district headquarters. For administrative reasons, the district has been divided into 2 revenue divisions comprising of 5 taluks with 520 revenue villages. For development reasons, it is divided into 5 development blocks with 274 Village Panchayats.

#### POPULATION DETAILS

According to 2011 census, the District had population of 11.18 lac, which is about 1.54% of the total State population. The total population of the District was 11,18,219 in which 5,62,309 were Male and 5,95,910 were Female. In rural 5,66,361 and in Urban it was 5,51,858.

#### WORKERS

The total main workers of the District was 3,90,785 persons forming 41.9% of total population in the District. Of this, 2,85,207 were male workers and 1,05,578 were Female workers and 2,00,585 were from rural and 1,90,200 were from Urban and 29,981 were of cultivators and 65,988 of Agricultural labourers and 22,965 of Household industry and rest in other activities ie 2,71,851.

#### RAINFALL

The pre-monsoon rainfall is almost uniform throughout the district. The coastal taluks get more rains rather than the interior regions. This 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 donors with 54% and 36% contribution each to the total annual rainfall.

#### AGRICULTURE

Agriculture is the main occupation of the people with 20% of the population engaged in it. Paddy is the major crop cultivated in this district. Groundnuts, Sugarcane, Cereals and Millets and Pulses are the other major crops.

#### FOREST

The total forest area in the district is 23,586 hectares, it spread interior regions and around the district. In this forest area there are 366.675 hectares for Reserved Land. 76.50 Metric Tonnes lands are cultivated in Fuelwood and 8.039 Tonnes in Cashew.



## RIVERS

The Palar River is one of the most important river running through the district. Tanks and wells are the main sources of irrigation in this district.

## HILLS

There are only a few hills of considerable elevation in the district. The southern part of Maduranthakam taluk contains small hills.

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### 5.5.3 PROFILE OF PROJECT TALUKS

#### KANCHEEPURAM TALUK

Kancheepuram Taluka of Kancheepuram district has a total population of 497,711 as per the Census 2011. Out of which 248,707 are males while 249,004 are females. In 2011 there were a total 124,877 families residing in Kancheepuram Taluka. The Average Sex Ratio of Kancheepuram Taluka is 1,001.

As per Census 2011 out of total population, 55.3% people live in Urban areas while 44.7% live in the Rural areas. The average literacy rate in urban areas is 86% while that in rural areas is 73.1%. Also the Sex Ratio of Urban areas in Kancheepuram Taluka is 1,006 while that of Rural areas is 996.

The population of Children of age 0-6 years in Kancheepuram Taluka is 52211 which is 10% of the total population. There are 26502 male children and 25709 female children between the age 0-6 years. Thus as per the Census 2011 the Child Sex Ratio of Kancheepuram Taluka is 970 which is less than Average Sex Ratio ( 1,001 ) of Kancheepuram Taluka.

The total literacy rate of Kancheepuram Taluka is 80.27%. The male literacy rate is 77.83% and the female literacy rate is 65.86% in Kancheepuram Taluka.

#### SRIPERUMBUDUR TALUK

Sriperumbudur Taluka of Kancheepuram district has a total population of 510,836 as per the Census 2011. Out of which 258,881 are males while 251,955 are females. In 2011 there were a total 125,938 families residing in Sriperumbudur Taluka. The Average Sex Ratio of Sriperumbudur Taluka is 973.

As per Census 2011 out of total population, 56.8% people live in Urban areas while 43.2% live in the Rural areas. The average literacy rate in urban areas is 87.5% while that in rural areas is 78.9%. Also the Sex Ratio of Urban areas in Sriperumbudur Taluka is 976 while that of Rural areas is 970.

The population of Children of age 0-6 years in Sriperumbudur Taluka is 58036 which is 11% of the total population. There are 29724 male children and 28312 female children between the age 0-6 years. Thus as per the Census 2011 the Child Sex Ratio of Sriperumbudur Taluka is 952 which is less than Average Sex Ratio ( 973 ) of Sriperumbudur Taluka.

The total literacy rate of Sriperumbudur Taluka is 83.74%. The male literacy rate is 79.28% and the female literacy rate is 69.04% in Sriperumbudur Taluka.

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## 5.6 RIGHT TO FAIR COMPENSATION AND TRANSPARENCY IN LAND ACQUISITION, REHABILITATION & RESETTLEMENT (RFCTLARR) ACT, 2013, GOVT. OF INDIA

The most relevant Indian regulation for facilitating resettlement and rehabilitation is the RFCTLARR Act, 2013. This Act is the principal document for procedures to be followed for acquisition of private land by the Government for public purposes and for determining compensation. The Act ensures that no person is deprived of land under this Act and entitles PAPs to a hearing before the actual acquisition. The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (RFCTLARR) Act, 2013 has been effective from January 1, 2014, has subsided all other prevailing Acts and Notification, in this regard, from January 1, 2015.

The key features of the new land acquisition act are as follows:

- Schedule I outlines the proposed minimum compensation based on a multiple of market value.



- Schedules II and III outline the resettlement and rehabilitation (R&R) entitlements to landowners and livelihood losers, which shall be in addition to the minimum compensation per Schedule I.
- The Schedules IV lists out other land acquisition acts, which will be repealed with 1 year after LAAR is effective.

The provisions of this Act Under Section 2(1) relating to land acquisition, compensation, rehabilitation, and resettlement, shall apply, when the appropriate government acquires land for its own use, hold and control, including for Public Sector Undertakings and for public purpose. Under RFCTLARR Act, 2013 for land acquisition for various types of projects, provisions of consent have been inbuilt to secure the interest of the stakeholders.

### 5.6.1 RESETTLEMENT & REHABILITATION ENTITLEMENT FRAMEWORK

The R&R entitlement framework has been formulated based on the guiding principles outlined in the Policy. This R&R framework will be adopted to formulate the Resettlement Action Plan. The basic principles of R&R entitlement and compensation structure is provided in below Table.

Table 5-1: Basic Principles governing Compensation Structure

Sl. No.	Category of Impact	Eligibility for Entitlement	Relevant RFCTLARR Act 2013 Provisions	
			Entitlement	Provisions
1	2	3	4	5
1	Loss of Land	Titleholder	1. Market value of land. This will be determined as per Sections 26 to 29 of RFCTLARR Act 2013 by Collector. 2. Amount equivalent to current stamp duty and registration charges on compensation amount for replacement of lost assets.	<ul style="list-style-type: none"> <li>▪ Applicable as per RFCTLARR Act 2013.</li> <li>▪ PAPs that have received the compensation on or before 31st December 2013 will be provided Additional compensation as per RFCTLARR Act 2013.</li> <li>▪ This is as per Section 24 of RFCTLARR Act 2013 wherein it is mentioned.</li> <li>▪ The Collector shall publish a summary of the Rehabilitation and Resettlement Scheme along with declaration referred to in sub-section (l)</li> </ul> <p><i>... Provided that no declaration under this sub-section shall be mde unless the summary of the Rehabilitation and Resettlement Scheme is published along with such declaration:</i></p> <p><i>... Provided further that no declaration under this sub-section shall be made unless the Requiring Body deposits an amount, in full or part, as may be prescribed by the appropriate Government toward the cost of acquisition of the land:</i></p> <p><i>... Provided also that the Requiring Body shall deposit the amount promptly so as to enable the appropriate Government to publish the declaration within a period of twelve months from the date of</i></p>

Sl. No.	Category of Impact	Eligibility for Entitlement	Relevant RFCTLARR Act 2013 Provisions	
			Entitlement	Provisions
1	2	3	4	5
				<p><i>the publication of preliminary notification under section 11 of the Act.</i></p> <p><i>... Provided that where an awarded has been made and compensation in respect of majority of land holdings has not been deposited in the account of the beneficiaries, Then, all beneficiaries specified in the notification for acquisition under section 4 of the said Land Acquisition Act, shall be entitled to compensation in accordance with the provisions of this Act.</i></p>
			Land Value factor	<ul style="list-style-type: none"> <li>▪ Scale 1 to 2 based on the distance of project from urban area, as may be notified by appropriate government. Illustrative scale (0-10 km=1), (10-20=1.20), (20-30 km=1.40), (30-40 km=1.80), and (40-50 km=2).</li> </ul>
		Affected Family/Person	Land for land	<ul style="list-style-type: none"> <li>▪ <i>Not applicable</i></li> </ul>
2	Loss of other Immovable Assets	Titleholder	Value of Assets attached to land or building	<ul style="list-style-type: none"> <li>▪ This will be provided to affected families as per the RFCTLARR Act 2013 (provision under First Schedule SI.No.2 (ref. Section 29 of the said Act).</li> </ul> <p>(1) The collector in determining the market value of the building and other immovable property or assets attached to the land or building which are to be acquired, use the services of a competent engineer or any other specialist in the relevant field, as may be considered necessary by him.</p> <p>(2) The Collector for the purpose of determining the value of trees and plants attached to the land acquired, use the services of experienced persons in the field of agriculture, forestry, horticulture, sericulture, or any other field, as may be considered necessary by him.</p> <p>(3) The Collector for the purpose of assessing the value of the standing crops damaged during the process of land acquisition,</p>

Sl. No.	Category of Impact	Eligibility for Entitlement	Relevant RFCTLARR Act 2013 Provisions	
			Entitlement	Provisions
1	2	3	4	5
				<p>may use the services of experienced persons in the field of agriculture as may be considered necessary by him.</p> <ul style="list-style-type: none"> <li>This will be provided along with the loss of land and/or the structure which will be finalized by the Collector (revenue department).</li> </ul>
3	Loss of Land, Structure and other immovable assets (1.2)	Titleholder	Solatium	<ul style="list-style-type: none"> <li>As per RFCTLARR Act 2013 - Under section 30(1) of the said Act.</li> <li>The compensation is calculated for land, structures and such assets attached to the building or land as applicable and the total of all considered before considering the 100% solatium.</li> </ul>
4	Loss of Land and other assets	Titleholder	Additional 12% compensation on market value of land.	<ul style="list-style-type: none"> <li>As per RFCTLARR Act 2013 - Under section 30(3) of the said Act.</li> <li>In addition to the market value of the land provided under section 26, the Collector shall, in every case, award an amount calculated at the rate of twelve per cent. per annum on such market value for the period commencing on and from the date of the publication of the notification of the Social Impact Assessment study under sub-section (2) of section 4, in respect of such land, till the date of the award of the Collector or the date of taking possession of the land, whichever is earlier</li> </ul>
5	Land/ Structure	Titleholder	Stamp duty and registration fee.	<ul style="list-style-type: none"> <li>The stamp duty and other fees payable for registration of the land or house allotted to the affected families shall be borne by the Requiring Body.</li> </ul>

### 5.6.2 OTHER ALLOWANCES UNDER RFCTLARR ACT 2013

In addition to the compensation for land, structures and other minor assets, the affected persons will be eligible for other allowances as per RFCTLARR Act 2013. The details are provided in the table below.

Table 5-2: Allowances as per RFCTLARR Act 2013

Allowance	Amount in INR	Remarks
Transportation Allowance	50,000	One-time grant
Employment Allowance	500,000	One-time grant for each affected family with eligible candidate.

Allowance	Amount in INR	Remarks
Subsistence Allowance	3,000	Per month till one year after displacement for each affected family
	50,000	additional for SC/ ST affected family
Grant for artisans and small traders	25,000	One-time grant for small traders

### 5.6.3 SCHEDULED CASTE & SCHEDULED TRIBES ORDERS (AMENDMENT) ACT, 2002

The Act provides for the inclusion in the lists of Scheduled Tribes (ST), of certain tribes or tribal communities or parts of or groups within tribes or tribal communities, equivalent names or synonyms of such tribes or communities, removal of area restrictions and bifurcation and clubbing of entries; imposition of area restriction in respect of certain castes in the lists of Scheduled Castes (SC) and the exclusion of certain castes and tribes from the lists of SCs and STs.

### 5.6.4 RESETTLEMENT POLICY & LAND ACQUISITION FRAMEWORK

The guidelines are prepared for addressing the issues limited to this project for resettlement and rehabilitation of the PAPs. This policy has been developed based on the Right to Fair Compensation and Transparency in Land Acquisition, Resettlement & Rehabilitation (RFCTLARR) Act, 2013.

## 5.7 R&R BENEFITS FOR PROJECT AFFECTED FAMILIES

- The resettlement and rehabilitation (R&R) benefits shall be extended to all the Project Affected Families (PAF) whether belonging to below poverty line (BPL) or non- BPL. The details are provided in the entitlement matrix. For tribal the following provisions will be adhered.
- Each Project Affected Family of ST category shall be given preference in allotment of land.
- Tribal PAFs will be re-settled close to their natural habitat in a compact block so that they can retain their ethnic/linguistic and cultural identity.
- The Tribal Land Alienated in violation of the laws and regulations in force on the subject would be treated as null and void and-the R&R benefits would be available only to the original tribal landowner.

## 5.8 PRINCIPLES AND POLICIES ADOPTED FOR THE PROJECT

The core involuntary resettlement principles for this project are: (i) land acquisition, and other involuntary resettlement impacts will be avoided or minimized exploring all viable alternative sub-project designs; (ii) where unavoidable, time-bound resettlement action plan (RAP) will be prepared and PAPs will be assisted in improving or at least regaining their pre-project standard of living;(iii) Consultation with PAPs on compensation, disclosure of resettlement information to PAPs , and participation of in planning and implementing sub-projects will be ensured; (iv) vulnerable groups will be provided special assistance (v) payment of compensation to PAPs for acquired assets at replacement rates; (vi) payment of compensation and resettlement assistance prior to the construction contractor taking physical acquisition of the land and prior to the commencement of any construction activities; (vii) Provision of income restoration and rehabilitation; and (VIII) establishment of appropriate grievance redress mechanisms.

## 5.9 ENTITLEMENT MATRIX

The broad entitlement matrix comprising the R & R compensation and assistance is presented below.

- The titleholder PAPs will receive compensation for land and assets, as decided by the competent authority.



- The titleholders are entitled to receive compensation for land/assets at replacement cost, R & R assistance and allowances for fees or other charges. They should be given advance notice to harvest non-perennial crops, or compensation for lost standing crops. They will have the right to salvage material from existing structures.
- The RFCTLARR Act 2013, represents a significant milestone in the development of a systematic approach to address resettlement issues in India and significantly closes the gap between Indian national policies and operational policy of the World Bank.

Based on these, the following core involuntary resettlement principles are applicable:

- Avoid or minimize land acquisition and involuntary resettlement impacts by exploring all viable alternative designs.
- Where displacement is unavoidable, prepare time-bound RAP for PAPs so that they are not worse off than the present socio-economic condition after the implementation of the project. In other words, assist affected persons in improving their former living standards and income earning capacity with additional assistance to vulnerable groups.
- Ensure wide range of meaningful consultations with stakeholders including likely PAPs on compensation, disclosure of resettlement information, participation of PAPs in planning and implementation of the resettlement program to suitably accommodate their inputs and make rehabilitation and resettlement plan more participatory and broader based.
- Facilitate harmonious relationship between the Executing Authority and PAPs through mutual co-operation and interaction.
- Ensure payment of compensation and resettlement assistance prior to taking over the possession of land and commencement of any construction activities.
- Provision of rehabilitation assistance for loss of livelihood/income.
- Establishment of institutional arrangements such as grievance redress mechanism, NGO.

Eligibility of different categories of PAFs will be as per the Entitlement Matrix shown in the section below.

**Table 5-3: Eligibility for Compensation/ Assistance**

Sl. No.	Eligibility
1	The unit of entitlement will be the family.
2	Titleholder PAFs will be eligible for compensation as well as assistance.
3	In case a PAFs could not be enumerated during census but has reliable evidence to prove his/her presence before the cut-off date in the affected zone shall be included in the list of PAPs after proper verification by the grievance redress committee.
4	PAFs from vulnerable group will be entitled for additional assistance as specified in the Entitlement Matrix.
5	PAFs belonging to BPL category will be identified at the time of disbursement of Compensation. They will get benefits as detailed in Entitlement Matrix.
6	PAFs will be entitled to take away or salvage the dismantled materials free of cost without delaying the project activities.
7	If a notice for eviction has been served on a person/family before the cut-off date and the case is pending in a court of law, then the eligibility of PAP will be considered in accordance with the legal status determined by the court and the PAP will be eligible for compensation/assistance in accordance with the RAP provisions.

Table 5-4: Entitlement Matrix

Sl. No.	Category	Unit of Entitlement	Details	
			Entitlement	Entitlement as per Policy
Loss of Land and structures - (Titleholder/customary/usufruct right holders)				
1	Loss of Agricultural Land	Titleholder	Compensation at replacement cost or actual market value or as decided by the Competent Authority	<ul style="list-style-type: none"> <li>• Direct purchase at negotiated price (or) compensation for land at replacement value</li> <li>• If the residual plot (s) is (are) not viable, the affected person becomes a marginal farmer any of the following two options are to be given to PAP, subject to his/her acceptance: <ul style="list-style-type: none"> <li>• The PAP remains on the plot, and the compensation and assistance paid to the tune of required amount of land to be acquired</li> <li>• Compensation and assistance are to be provided for the entire plot including residual part, if the owner of such land wishes that his/her residual plot should also be acquired</li> </ul> </li> <li>• Reimbursement of registration and stamp duty charges</li> </ul>
2	Total loss of home/ commercial land and structure	Titleholder	Compensation at replacement cost Special Provision for Vulnerable	<ul style="list-style-type: none"> <li>• Direct purchase at negotiated price (or) compensation for land at replacement value</li> <li>• Compensation for loss of affected structural area will be paid at the replacement cost to be calculated as per latest prevailing basic schedules of rates (BSR) without depreciation.</li> <li>• Shifting assistance of Rs 50000</li> <li>• Right to salvage material from the demolished structure and frontage, etc</li> <li>• Reimbursement of registration and stamp duty Charges</li> <li>• For vulnerable groups losing residential/ commercial structures and do not have any other Housing units within limit of</li> </ul>





Sl. No.	Category	Unit of Entitlement	Details	
			Entitlement	Entitlement as per Policy
				the local bodies, shall be given preference to allot a house under any housing scheme at cost under IAY/RAY
<b>Livelihood Losses</b>				
3	Income/Livelihood Losses	Titleholders losing income through business	Rehabilitation Assistance	<ul style="list-style-type: none"> <li>Subsistence grant of Rs. 3000 per month for one year from the date of Award.</li> <li>One Time grant for artisans, small traders Rs. 25000</li> </ul>
		Titleholders losing income through agriculture	Rehabilitation Assistance	<ul style="list-style-type: none"> <li>Title holders losing their primary source of income due to displacement will be provided one time grant of Rs. 500000</li> <li>One Time Resettlement Allowance Rs. 50000</li> <li>One Time grant for artisans, small traders Rs. 25000</li> <li>Employment opportunity for PAPs in the subproject works, if available and if so desired by them.</li> </ul>
<b>Loss of Trees and Crops</b>				
4	Loss of Trees	a) Land holders b) Sharecropper c) Lease holders	Compensation at Market value to be computed with assistance of horticulture department	<ul style="list-style-type: none"> <li>Advance notice to PAPs to harvest fruits and remove trees</li> <li>For fruit bearing trees compensation at average fruit production for next 15 years to be computed at current market value</li> <li>For timber trees compensation at market cost based on kind of trees</li> </ul>
	Loss of Standing Crops at the time of acquisition, if any	a) Land holders b) Sharecropper c) Lease holders	Compensation at Market value to be Computed with assistance of agriculture department	<ul style="list-style-type: none"> <li>Advance notice to PAPs to harvest crops</li> <li>In case of damage to standing crops, cash compensation at current market cost to be calculated of mature crops based on the current production.</li> </ul>
<b>Other Impacts</b>				
5	Cattle Shed		Special Assistance	<ul style="list-style-type: none"> <li>Affected Families having Cattle Shed or petty shop shall be given Rs. 25000 for the construction of cattle shed/shop</li> </ul>

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## 5.10 STAKEHOLDERS' CONSULTATION

Consultative procedures have been a critical but important front in the entire social assessment process. Public consultations in social impact assessment facilitates to make a rapport with the villagers in the project villages and provide basic inputs. In this regard, the social assessment ensures the involvement of local communities through participatory planning through structured consultations would endorse and integrate important resettlement issues in the project cycle.

For the purpose of preliminary stakeholder's consultation, a team of social experts will visit the total project area. In the process of information dissemination, collecting relevant data and to acquaint with social requirements of the project, government officials, key informants & knowledgeable person and other stakeholders will be consulted. The preliminary consultation meetings will be conducted in the villages during carrying out of Social Surveys. As the magnitude of impacts is more in most of the villages, primary importance will be given in all these villages.

The preliminary consultations will undertake with various stakeholders at village levels for sharing the information about the project. Prior intimation will be given to the villagers and the local public representatives of the respective village to participate in the preliminary consultations. The village wise issues and concern will be discussed, and suggestions made by the participants will be recorded. The range of discussion includes perception, attitude, benefit, problem, suggestions recommendation and solution on social, economic, engineering viability of the project.

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## 5.11 REHABILITATION & RESETTLEMENT BUDGET

### 5.11.1 COST AND BUDGET

The budget is an indicative of outlays for the different expenditure categories. These costs will be updated and adjusted to the inflation rate as the project continues and in respect of more specific information such as additional number of projects affected people during the implementation, unit cost will be updated if the findings of the district level committee on market value assessment justify it.

The estimated budget for resettlement action plan for the project which include land acquisition cost, structures cost and contingency is prepared as per the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act-2013. The resettlement cost estimate for this project includes eligible compensation as per entitlement matrix and support cost for RAP implementation. Contingency provisions of about 1% of the total cost of R & R component will be considered in the budget mainly to meet the inflation and to meet the cost of additional land acquisition if required. The valuation of losses will be considered based on consultation with the revenue officials as well as with the project affected population. Some of the major items of this R&R cost estimate are outlined below and the R&R budget is presented in below.

- Compensation for Land
- Compensation for structures and other immovable assets at their replacement cost
- RAP implementation cost

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### 5.11.2 COMPENSATION FOR LAND

The total land needs to be acquired for the proposed project is 5369 Acres for the development of proposed airport. The land price will be calculated as per the Circle/Guidance Value in the respective villages. If the Land rates are not available for any village, land rate in nearby village will be considered for the same. For calculating the cost of structures/buildings, the rate will be derived as per the Schedule of Rates received from the concerned Department. The compensation for the other assets (Bore well/Well/Hand Pumps etc.) likely to be affected will be as per the Replacement Value obtained from the local public during sit visit. The details of Village wise Land Rates as per the prevailing Circle/Guidance rate will be derived from the Website of Registration Department, Government of Tamil Nadu (<https://tnreginet.gov.in/portal>).



The compensation for land, structures and other Minor Assets will be paid by the competent authority to the PAPs as per the RFCTLARR Act 2013.

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### **5.11.3 COMPENSATION FOR STRUCTURES**

The replacement cost of structure will be estimated based upon the average of prevailing market value (collected during site visits from local public) of the structure. While calculating compensation for structures we consider as per its nature and usage. The solatium of 100 percent of the rate of affected structures will be included for final compensation. The measurements and area of the structure likely to be affected will be derived from the Topographical data as physical measurement of affected structures may not be possible due to various factors prevail at site from the public.

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### **5.11.4 COMPENSATION FOR OTHER MINOR ASSETS**

The replacement cost of other minor assets will be estimated based upon the actual cost incurred by the affected persons which will be collected from the public during site visits. The number of other minor assets such as Wells, Bore Wells, Hand Pumps, Pump Houses, Sump, Pits, Taps etc. will be derived as per the topographical data.

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## **5.12 REVIEW OF LEGAL POLICY PROVISIONS AND IMPLEMENTATION CAPACITY**

Relevant national and state legislation and regulations will be reviewed. To study implementation arrangements and its capacity in delivering the R&R services verification of these arrangements and in-depth interviews with authorities will be conducted.

# 6 PROJECT SCHEDULE AND COST ESTIMATES

## 6.1 PROJECT COST ESTIMATES

The construction of the proposed project will be implemented immediately after obtaining Environmental Clearance from MoEF&CC and CTE from TNPCB. The construction period of the Development of Chennai Greenfield Airport (CGA) is about two & half years from the start date to complete the entire project and commission of the proposed building, runway, etc. The Estimated/Block Cost of the proposed development of Airport is estimated about Rs. 29,143.95 Crores (4 Phases).

Table 6-1: Block Cost Estimate

Block Civil Cost Estimate						
S.No.	Description	Amount (INR Crore)				
		Phase-1	Phase-2	Phase-3	Phase-4	Total (Phase-1 to 4)
1	Site Preparation	4,045.30	-	-	-	4,045.30
2	Terminal					
a	Passenger Terminal	2,061.46	3,092.19	2,061.46	3,092.19	10,307.31
b	Cargo Terminal	321.27	-	321.27	-	642.53
c	General Aviation Terminal	-	128.51	-	-	128.51
3	ATC and Technical Block	785.78	-	-	-	785.78
4	Runway and Taxiway System	583.94	48.07	525.85	27.09	1,184.95
5	Apron and Parking	455.53	547.74	418.17	790.76	2,212.20
6	Utilities	503.30	52.02	67.55	7.00	629.86
7	Roads	909.62	516.71	136.55	296.96	1,859.84
8	Nav Aids, Airfield Lighting and other electrical works	176.69	31.70	68.22	35.50	312.11
9	Fire Fighting	83.62	-	68.62	-	152.25
10	Boundary Wall and Retaining Wall	108.75	-	-	-	108.75
11	Multilevel Car Parking including Open Parking	38.09	632.38	155.59	-	826.06
12	Other Building works	498.81	19.72	451.99	41.73	1,012.25
13	Solar System	180.00	-	150.00	-	330.00



14	Miscellaneous work a) Landscaping work b) CCTV System	24.41	-	114.20	-	138.61
A	Total (Block Civil Cost)	10,776.57	5,069.05	4,539.47	4,291.23	24,676.32
	Contingency (10%)	1,077.66	506.91	453.95	429.12	2,467.63
B	Total	11,854.22	5,575.96	4,993.42	4,720.35	27,143.95
(i)	Land Cost	2,000.00				2,000.00
C	Total	13,854.22	5,575.96	4,993.42	4,720.35	29,143.95

## 6.2 ENVIRONMENTAL BUDGET

The budgetary cost estimates for environmental management activities shall be about 1% of the project cost. The Detailed cost will be submitted in Environmental Impact Assessment Report.