National Competitive Bidding

Bidding Document for Providing Storm Water Drains Integrated with Waterbodies in Hosur City Municipal Corporation

ESIA Report

Volume – 5

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List of Abbreviations & Acronyms

ECSMF - Environmental, Climate Change and Social Management Framework
ESIA - Environmental and Social Impact Assessment
E&S – Environmental & Social
UGSS – Under Ground Sewerage Scheme
CPCB - Central Pollution Control Board
HCMC – Hosur City Municipal Corporation
IUCN - International Union for Conservation of Nature
OSR – Open Space Reservation
ULB – Urban Local Bodies
WRD – Water Resources Department
HR&CE - Hindu Religious and Charitable Endowments Department
ESMP - Environmental and Social Management Plan
ISWD – Integrated Storm Water Drain
SEP - Stakeholder Engagement Plan
GRM - grievance redress mechanism
PIU – Project Implementation Unit
ESHS - Environment, Social, Health, and Safety
ESSA - Environmental and Social Systems Assessment
PMU – Project Management Unit
TWAD – Tamil Nadu Water Supply and Drainage Board
AH - Animal Husbandry
HUDCO - Housing and Urban Development Corporation Limited
MSL – Mean Sea Level
DEM – Digital Elevation Model
NOC – No Objection Certificate
NbS - Nature-based Solutions
IPCC - Intergovernmental Panel on Climate Change
RCPs - Representative Concentration Pathways
CCSM4 - Community Climate System Model
TNSAPCC - Tamil Nadu State Action Plan on Climate Change
NAPCC - National Action plan on climate change
NH – National Highways
NHAI – National Highways Authority of India
SH – State Highways
TNPDCL - Tamil Nadu Power Distribution Corporation Limited
MoRTH - Ministry of Road Transport and Highways
ESIC - Employees' State Insurance Corporation
TNPCB - Tamil Nadu Pollution Control Board
GWRA - Ground Water Resources Assessment
GEC - Ground Water Resource Estimation Committee
NAAQS - National Ambient Air quality standard
CSGRC - Central Sericultural Germplasm Resources Centre
FMB - Field Measurement Book
CPHEEO - Central Public Health & Environmental Engineering Organisation
WB – Water Body
OHT – Over Head Tank

MBR – Mass Balancing Reservoir
AMRUT - Atal Mission for Rejuvenation and Urban Transformation
BMP – Biodiversity Management Plan

EXECUTIVE SUMMARY

Hosur town is located in the north western part of Krishnagiri district in Tamil Nadu. It stretches between Latitude 12°43' N and Longitude 77°49' E. The city has a population of about 4 lakhs, spread over 72.41 Km^2. The city is now known to be one of the fastest growing cities of South India with several large, medium and small industries setting their fabrication units in the city. The city has immense potential in terms of being a green and smart city, in the true sense of the words. Further, several dispersed residential layouts are coming up at great speed. Also, the current upmarket shopping centers, sandhais of the city are in dense commercial areas on the arterial roads (which are State of National Highway roads), which have grown rapidly in the recent past.

The project mainly focuses on Integrated Storm Water Drainage (ISWD) project, aimed at addressing the long-standing issues of water stagnation and flooding in the area for the Hosur City Municipal Corporation. This project aims to provide a climate resilient Storm Water Drainage System with all necessary integra mktion of all existing water bodies/waterways/macro-drains for Hosur City Municipal Corporation, rejuvenation of Water Bodies and Sponge City / Parks concept by utilizing the identified vacant lands available in the Corporation area. This project is supported by funding from KfW under SMIF-TN-III.

DESCRIPTION OF THE PROJECT

PROJECT LOCATION

Hosur city municipal corporation is in Krishnagiri District in the state of Tamil Nadu. Hosur city lies almost at the North-West of Krishnagiri district. It also touches the border of Karnataka state and it is located on the bank of the river River Ponnaiyar, 35 km out east of Bengaluru. The city has a population of about 4 lakhs and spread over 72.41 Km^2. HCMC has 45 administrative wards. This project components are spread across all the 45 wards.

Proposed Components

The proposed project components are

1. Improvements to Major Nallahs/Primary Drains for a length of 57.88km
2. Secondary and Tertiary drains for flood hotspots for a length of 16.01km
3. Rejuvenation of 16 Water Bodies
4. Development of 3 Sponge parks with park development
5. Developent of Spoge parks in 20 OSR sites

LEGAL AND REGULATORY FRAMEWORK

Environmental Climate Change and Social Management Framework (ECSMF) was developed for the project including all relevant environmental and social regulations and policies. The same adhered to National and State Environmental and Social Policies and regulatory frameworks as well as international ESHS requirements and standards as per KfW Sustainability Guideline. The prevailing key National, State level laws, rules, policies, notifications pertaining to environmental climate change and social aspects have been reviewed to the proposed ISWD project components. ESF of World Bank and kfW SG Feb. 2022 have been applied and this ESIA have been prepared in line with ECSMF Ver 2.0.

THE ESIAR

This project specific ESIA report is prepared as per the ECSMF (version 2.0). The report is arranged into 10 chapters they are 1. Introduction; 2. Description of the Project; 3. Legal and Regulatory Framework; 4. Environmental and Social Base line; 5. Potential Environmental and Social Impacts and Mitigation Measures; 6. Analysis of Alternatives; 7. Environmental & Social Standards and Risk Classification; 8. Environmental and Social Management Plan (ESMP); 9. Stakeholder Engagement and Grievance Redressal Mechanism and 10. Institutional and Implementation Mechanism.

Base line environmental and social conditions are assessed using primary and secondary data. The secondary data helps to understand the existing environmental conditions and socio-economic characteristics, data on climate, meteorology, land usage of the study area. The environmental and social impacts arising out of the proposed project components and to establish baseline environmental and social conditions. Environmental baseline conditions are assessed for water, air, noise, soil, flora and fauna are assessed through primary survey.

The social baseline was done through a desk-based review and collection of both primary and secondary data. The baseline social impacts are assessed through a baseline survey. The baseline social assessment reveals that the proposed project sites are ULB owned vacant lands and free from any encumbrances. As per the social screening there are no Temporary/ Permanent / Economic social impacts. Based on the social screening, appropriate mitigation measures were prepared.

Environmental and Social Risk Classification and Categorization

Dimension	Justification	Risk Classification
Environmental Risk	The project will result in temporary impacts, including short-term turbidity increase, limited disturbance to aquatic habitats, temporary noise and vibration, dust generation, waste generation, and risk of accidental spillage etc., These impacts will be mitigated through ESMP measures such as controlled construction, sediment control, dust suppression, proper waste management, spill prevention, restricted working hours, and site restoration All impacts are reversible, and residual impacts are expected to be negligible to low.	**Moderate**
Social Risk	This Project involves desilting, cleaning of jungles and bushes, bund strengthening, recharge pit for drains, rejuvenation of waterbody by desiliting, weeds removal, stone pitching and turffing for bunds, pathway, tree planting, development of sponge park and OSR sites. As per the Social Impact Assessment this project doesn't envisage land acquisiton, R&R impacts (Permanent /Temporary /Economic). However, if social impacts identified during the implementation of the project will be assessed and mitigated as per ECSMF Ver 2.0. Unforseeen impacts procedures are included.	**Low**
Dimension	**Justification**	**Risk Category**
Risk Category	Based on the environmental and social conditions, necessary mitigations are proposed in the ESMP. The World Bank ESHS is included in the bid documents to handle EHS, OHS risks arising during the implementation of the project.	**B**

Environmental and Social Management plan

A project-specific Environmental and Social Management Plan (ESMP) has been prepared based on the impacts and mitigation requirements identified in the ESIA. The ESMP comprises of a set of mitigation, monitoring and institutional measures to be implemented during all project phases, including preparation, construction, decommissioning, operation and maintenance (O&M), with the objective of eliminating adverse environmental and social impacts, or reducing them to acceptable levels. The measures in the ESMP include,

- Air, noise control, groundwater, surface water and soil monitoring once in three months throughout the contract period.

- Traffic diversion during construction.
- Management of Solid and liquid waste generated by the Contractor.
- Fencing, signage and universal accessibility features for community safety.
- ESMP cost for effective implementation.

Stakeholder Engagement Consultation and Grievance Redressal Mechanism

Stakeholder consultations were conducted during the DPR preparation stage, including informal connsultation with beneficiaries, Resident Welfare Association (RWA) leaders, and elected representatives. During the implementation stage Stakeholder Engagement Plan (SEP) has been prepared to ensure continuous and meaningful engagement of stakeholders throughout the project implementation phase.

A Grievance Redressal Mechanism (GRM) has also been established to systematically record, address, and resolve grievances raised by stakeholders during project implementation in line with the provisions of ECSMF Ver 2.0.

Institutional and Implementation Mechanism

In order ensure adoption and compliance to the ESMP/ESHS during the implementation of the project the following are the various levels of institutional arrangements and implementation mechanism.

- **PMU –** TNUIFSL is the PMU/PEA will monitor the overall implementation of ESMP/ESHS through compliance reports and field visits.
- **Project Implementation Unit (PIU):** PIU will depute officials as Environmental/Safeguard officer(s) to monitor the ESMP implementation and verification of the reports submitted by the Contractors.
- **Project Management consultant (PMC):** PMC will have Environmental, Social Safeguards and ESHS experts to monitor the implementation of ESMP.
- **Contractors:** Contractor has to appoint Environmental & Social Safeguards experts, ESHS expert and Safety/ Accident Prevention officer complying with ESIAR & ESHS.
    - The Contractor has to prepare Project Area (PA)-ESMP.
    - The Contractor has to implement ESMP and report to PMC/PIU.

1 INTRODUCTION

The Government of Tamil Nadu has been implementing urban investment projects with funds assistance from World Bank, JICA and KfW. The investments have made improvements in the living standards of the public, yet there is further scope and accordingly, Government of Tamil Nadu is presently implementing "Sustainable Municipal Infrastructure Financing Tamil Nadu (SMIF TN – Phase III)" assisted by KfW Bank.

KfW Bank has provided the Accompanying Measures (AM) Grants under SMIF TN III. The AM grant will be utilised for updation & preparation of DPRs, other technical, feasibility studies/plan, enhancing the institutional capacities on climate resilience, enhancing the monitoring capacities, enhancing the financial capacity of the ULBs, and supporting activities to meet the objective of SMIF-TN-III. Under the scheme, the Director of Municipal Administration has requested TNUIFSL to appoint a consultant to prepare Detailed Project Report (DPR) for Providing Integrated Storm Water Drains (ISWD) for Hosur City Municipal Corporation.

1.1 STUDY AREA

Hosur city municipal corporation is in Krishnagiri District in the state of Tamil Nadu. Hosur city lies almost at the North-West of Krishnagiri district. It also touches the border of Karnataka state and it is located on the bank of the river Ponnaiyar, 35 km out east of Bengaluru. The city has a population of about 4 lakhs and spread over 72.41 Km^2. There are 45 wards in the HCMC.

Figure 1-1 Project Area – Hosur City Municipal Corporation

1.2 Road Network and Pattern

The Hosur City Municipal Corporation is well connected by road network. The details of road classified as national highways, state highways and roads maintained by HCMC are as given below.

Table 1-1 Existing Road Network Within HCMC

Sl No	Name of Road	Length (Km)
1	National Highways (NH)/NHAI	19
2	State Highways (SH)	25
3	Roads maintained by HCMC	752
	Total	**796**

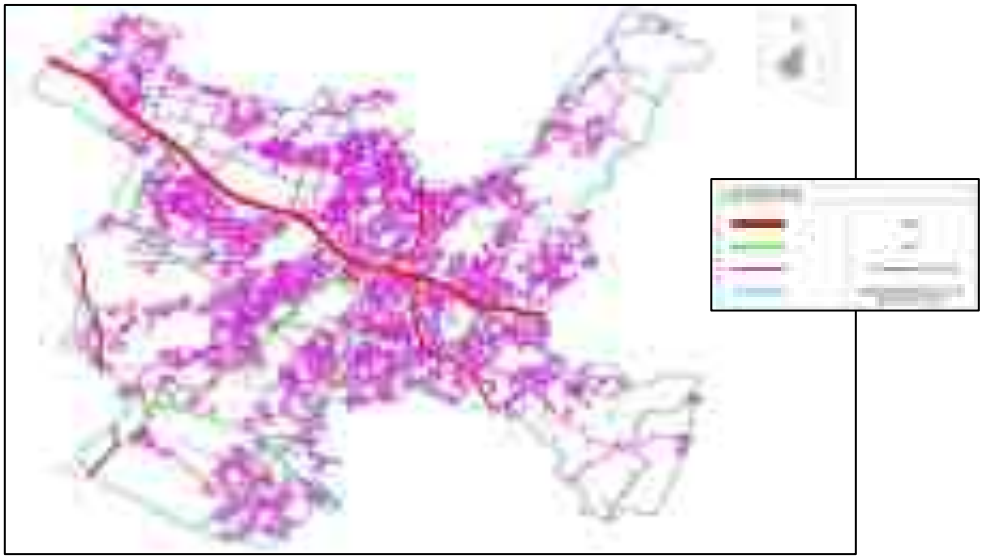


Figure 1-2 HCMC Road Network

1.3 PRESENT STATUS OF WATER SUPPLY SYSTEM

Water supply coverage for Hosur Town (Core area) is 80 % and about 20% for newly added areas. Presently piped water supply in the newly added area is very negligible. The present water supply to the Corporation is about 17 MLD (7.5 MLD mainly supplied by bore wells and 9 MLD is from Hogenakkal WS &FM [1]Project and 0.5 MLD from SIPCOT CWSS). The water is transmitted / pumped to Overhead Tank/Ground Level Reservoirs located at various places in the Town. Water is then distributed to water supply zones and areas through localised distribution networks. The total capacity of the OHT is 12.24MLD. New OHTs & MBR have been constructed under AMRUT. The total length of distribution network is 265.35km.

Table 1-2 Existing Hosur Water Supply Details

Sl No	Description	Length/ Nos
1	Total No. of HSC Connections	39019
2	Total No. of OHT	98
3	Total No. of Sump	24
4	Total No. of Borewells	430
5	Total length of Distribution pipe line (km)	525
6	Total No. of Public Fountains	161
7	No. of Water Tankers (lorry)	1
8	**Existing Water Supply Sources**	

[1] Hogenakkal Water Supply & Flurosis Mitigation Project

Sl No	Description	Length/ Nos
a	Borewell (MLD)	8
b	Hogenakkal Water Supply Scheme (WSS)	9
	Total Water Supply	**17**

1.4 PRESENT STATUS OF UNDER GROUND SEWERAGE SYSTEM

There are no Under Ground Sewerage System in the HCMC. A DPR has been prepared TWADB for the HCMC covering 28 out of 45 wards is proposed for a length 514 km of sewer network and 29 km of pumping main, 11 Pumping Stations, 3 is planned to be constructed in two phases. Phase 1 of UGSS project taken up under KFW assisted SMIF-TN III. Phase 1 is implemented by TWAD Board under 3 packages and the project work was awarded and construction work is in progress, which includes pipeline for the length of 325.125 km, 37 lifting stations, 11 pumping stations and 2 STPs with a treatment capacity of about 32 MLD.

1.5 PRESENT STATUS OF STORM WATER DRAINS

In HCMC area, total length of road is about 796 km. The existing drains includes covered, uncovered, one side of the road and two sides of the road. The drains are classified as NALLAH /PRIMARY DRAINS and Secondary & Tertiary Drains. The storm water collected through secondary and tertiary drains are disposed into Primmary drains.

1.6 EXISTING SECONDARY AND TERTIARY DRAINS

Existing Secondary & Tertiary drains details are provided in the following table.

Table 1-3 Existing Storm Water Drain Details

S No	Type of Road	Length of Drain on both side of the road (Km)	Length of Drain on single side of the road (Km)	Total Drain Length (Km)	Drain Coverage Length (Km)
1	Asphalt Road	191.41	104.55	295.97	200.26
2	Concrete Road	54.83	50.35	105.18	77.77
3	Metal Road	11.13	11.51	22.64	17.07
4	Mud Road	10.35	13.33	23.68	18.51
5	Paver Block Road	1.01	5.33	6.34	5.84
	Grand Total	**210.60**	**185.08**	**453.81**	**319.44**

From the above table, it is infeered that the double side drain occupies about 13% of total road length, single side drain occupies 23% of the total road length and drain does not exist on 64% total road length.

1.7 MAJOR NALLAH / PRIMARY DRAINS

In HCMC area, major nallah / primary drain exists for a length of about 66 km. Out of 66km, 57.88km nallah passing through within the HCMC area and about 8km is part of Chinnar river at border of HCMC area and part of major nallah towards southeast which ultimately connecting to Pennaiyar River. Out of 57.88km nallah exist within the HCMC area, 2.3km nallah from Dharga Chandrambigai to Chinnar River and 1km nallah from Karnoor Eri to Anthiwadi Veeraraghavan Eri is maintained by WRD. Remaining length of 54.58km nallah is maintained by HCMC.

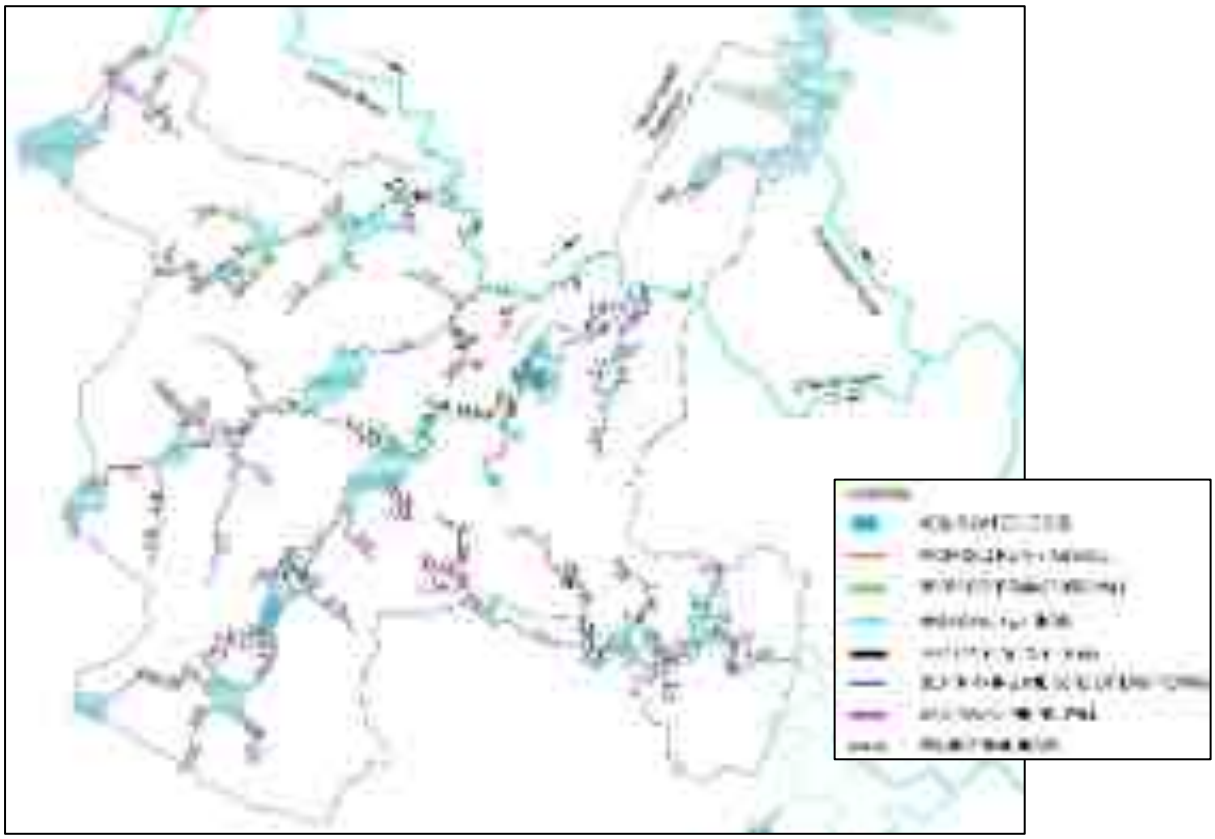


Figure 1-3 Major Nalla / Primary Drain

1.8 WATERBODY

In this project 16 number of water bodies are considered of which 2 are under the control of Water Resources Department (WRD), 2 are under HR&CE Department and 12 are with the HCMC.

Table 1-4 HCMC – Waterbodies

Sl. No	Name of water body	Ownership
1	Kesavakuttai Eri	Proposed
2	Krishnarav Eri (Look India Opp)	Proposed
3	Venkatesan Eri	Proposed
4	Santhapuram Eri	Proposed
5	Seetharaman Eri	Proposed
6	Sri Chandra Sudeshwar Kovil - Theppakulam	HR & CE

Sl. No	Name of water body	Ownership
7	Jalagandeshwar Swamy Koil (Ramanaikan Eri)	HR & CE
8	Dharga Chandrambigai Lake	WRD
9	Dhadhav Rao Lake Ashok Leyland Unit-1	WRD
10	Varatharayan Eri	Proposed
11	Pattalamman Eri	Proposed
12	Devan Eri (Therpettai Eri)	Proposed
13	Venkatappan Eri (Bedrapalli)	Proposed
14	Lakshmanarav Eri (Motta eri)	Proposed
15	Thottan Eri (Alasanatham Eri)	Proposed
16	Alasanatham Eri	Proposed

1.9 PARKS

In this project, 3 parks owned by ULB are considered for sponge development. Area details of each park is furnished below.

Table 1-5 HCMC - Parks

Sl No	Name of Park	Area (Acres)
1	Mahalakshmi Nagar	0.60
2	Samathanapuram Park	0.70
3	Devi Nagar Park	0.18

1.10 OPEN SPACE RESERVATION SITES IN HCMC

Open Space Reservation (OSR) in Tamil Nadu mandates that developers set aside 10% of land for public purpose/green/recreational use (parks, playgrounds) in new layouts, a rule enforced by CMDA/DTCP to ensure sustainable urban living, providing lung space and community amenities, and preventing development on these designated public areas. List of OSR sites is provided in the Annexure Part-B (Annexure – 14 Land Records and FMB Sketches).

In this project, 20 OSR sites are proposed for sponge concept development.

1.11 FLOODING IN HOSUR

Due to heavy rains during October 2022, unexpected flooding has occurred in the Hosur city. There are about 14 flooding inundation hot spots has been identified. Locations of inundated areas are shown in the Figure.

Table 1-6 List of Flood Hotspots

S No	Ward No	Location Name	Reason for flooding
1	6	KCC Nagar	Due to the lack of integrated drainage system
2	13	Kurinji Nagar near KCC Nagar	
3	4	Bedrapalli Outlet	Stormwater drains are not connected to the nearby major nallah / primary drain.

S No	Ward No	Location Name	Reason for flooding
4	11	GRT Bagalur Road	Stormwater drains are not connected to the nearby major nallah / primary drain.
5	25	Hosur Bus stand	Drain outlets are clogged with debris and storm drains are hydraulically inadequate
6	24	Old Bengaluru Road	Due to narrow width of drain and floating debris
7	24	Ram nagar - 1	Low lying area
7a	24	Ram nagar - 2	
7b	24	Ram nagar - 3	
7c	24	Ram nagar - 4	
7d	24	Ram nagar - 5	
8	24	Ramanaiken lake outlet	Due to dense bushes
9	26	Kalegunda	Surface runoff adjacent to Deven Eri and surplus of Deven Eri discharges to Kalegunda small pond.
9a	26	Kalegunda – Indian Oil bunk	
10	23	Mahalakshmi nagar Dharga	Due to dense bushes.
11	15	Manjunathan Nagar	Low lying area
12	22	Annai Nagar - Railway Underpass	Integrated storm drainage facilities don't exist
13	39	Railway Underpass - Hosur Railway station	Integrated storm drainage facilities don't exist
14	23	Anthiwadi Circle	Integrated storm drainage facilities don't exist

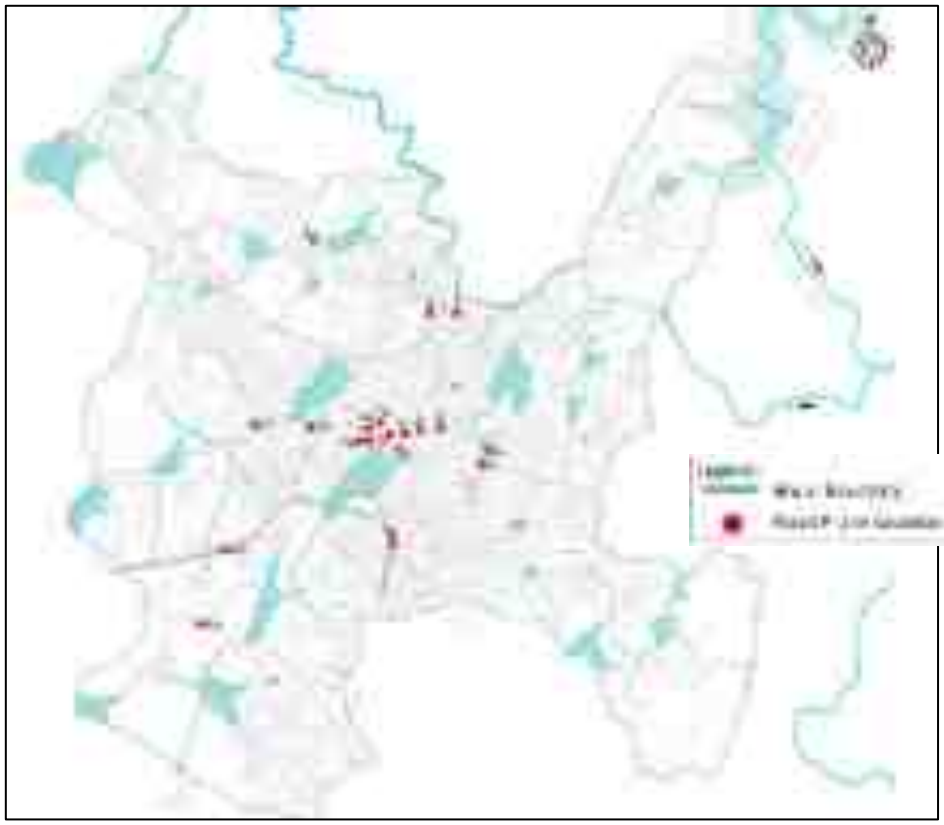


Figure 1-4 Flood Hot Spots

1.12 NEED FOR THE PROJECT

There are several risks that can pose a threat to the city's growth. A case in point is the unexpected flooding of the city due to heavy rains in October 2022. During the flood event on 20 October 2022, the area received a maximum rainfall intensity of 70 mm/hour. The existing major nallah/primary channels are overflowing due to the heavy downpour and many houses are submerged. The city lacks a network of storm water drains that dispose rainwater/storm water into waterways in a scientific manner. There is a need for an integrated plan for storm water drains in the city that can make the city resilient to face heavy downpours, which only seem like the norm with climate change. To prevent these, it is proposed for integrated storm drainage system to connect missing links in the drains for safe disposal of the surface runoff and to mitigate the flooding hot spots covering entire HCMC area. Groundwater level of Hosur is in semi critical stage. Hence nature-based rainwater harvesting techniques are required to reduce instantaneous peak runoff and to improve the ground water recharge.

1.13 SCOPE OF THE ESIA

The Environmental and Social Impact Assessment (ESIA) for Intergrated Strom Water Drains for Hosur City Municipal Corporation includes,

- To understand the existing status of physio-chemical, ecological and demographic and socio-economic baseline status of the project area.
- To study the baseline environmental and social conditions of the project area.
    - Assess the potential environmental and social impacts arising out implementation of proposed project components.
    - Identification of potential impacts on various environmental and social components due to project activities
    - Provide a Project Specific Environmental and Social Management Plan (ESMP) with mitigation, monitoring and institutional measures
    - Ensure compliance with regulatory requirements
    - Project specific stakeholder engagement and effective Grievance Redressal Mechanism
    - Estimation of Cost for implementation of Environmental and social Management Plan (ESMP) and Environmental and Social Monitoring Action Plan (ESMAP).

2 DESCRIPTION OF THE PROJECT

2.1 PROJECT AREA

Hosur is having two rivers 1. Ponnaiyar River and 2. Chinnar River. River Ponnaiyar is flowing along the border of Hosur and Chinnar is crisscrossing Hosur. The city of Hosur is located in the Ponnaiyar river basin, specifically on the banks of the South Pennar (Ponnaiyar) river. The main river flowing through Hosur is the Ponnaiyar River (also known as Thenpennai River or South Pennar River). It is a major river that originates in Karnataka's Nandi Hills and flows through Tamil Nadu, with Hosur situated on its banks and eventually joining the Bay of Bengal.

Chinnar river basin is a tributary of the Ponnaiyar river. The Chinnar river originates in the Bannerghatta hill ranges near Bangalore and joins the Ponnaiyar river near Hosur. While there is no single "Chinnar river" running through the city itself, this tributary is the relevant one in the Hosur area and is also part of the larger Chinnar sub-basin in the region.

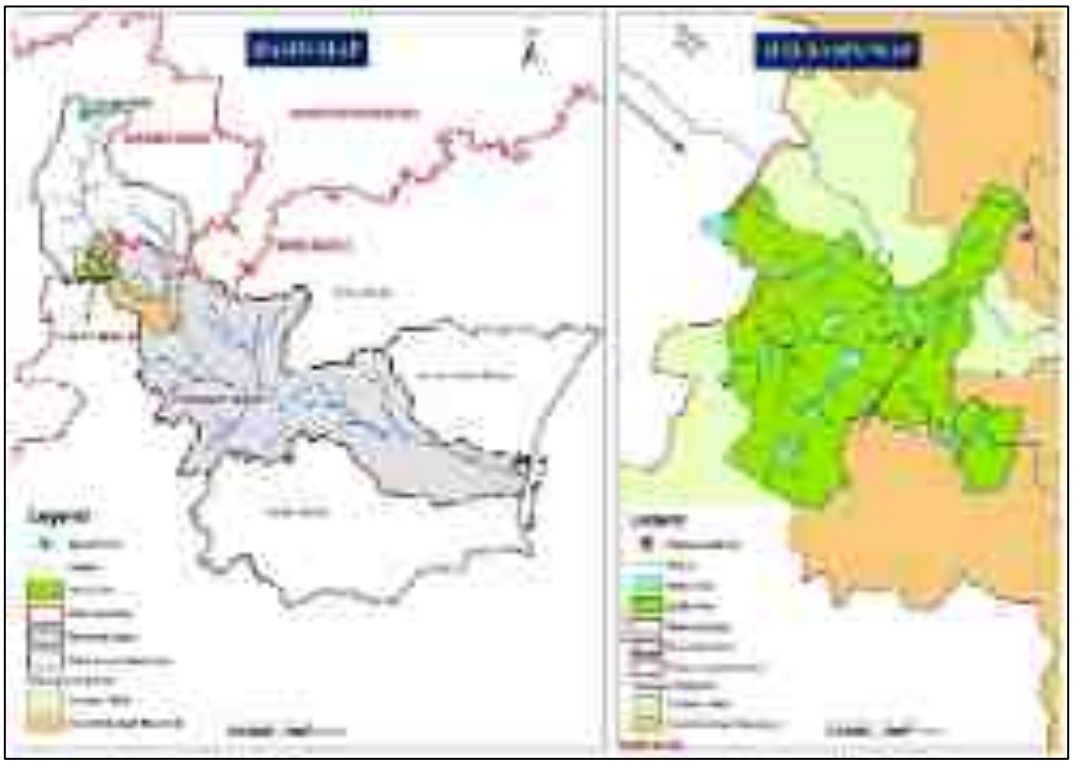


Figure 2-1 Pennaiyar & Chinnar River Basin and Project Area

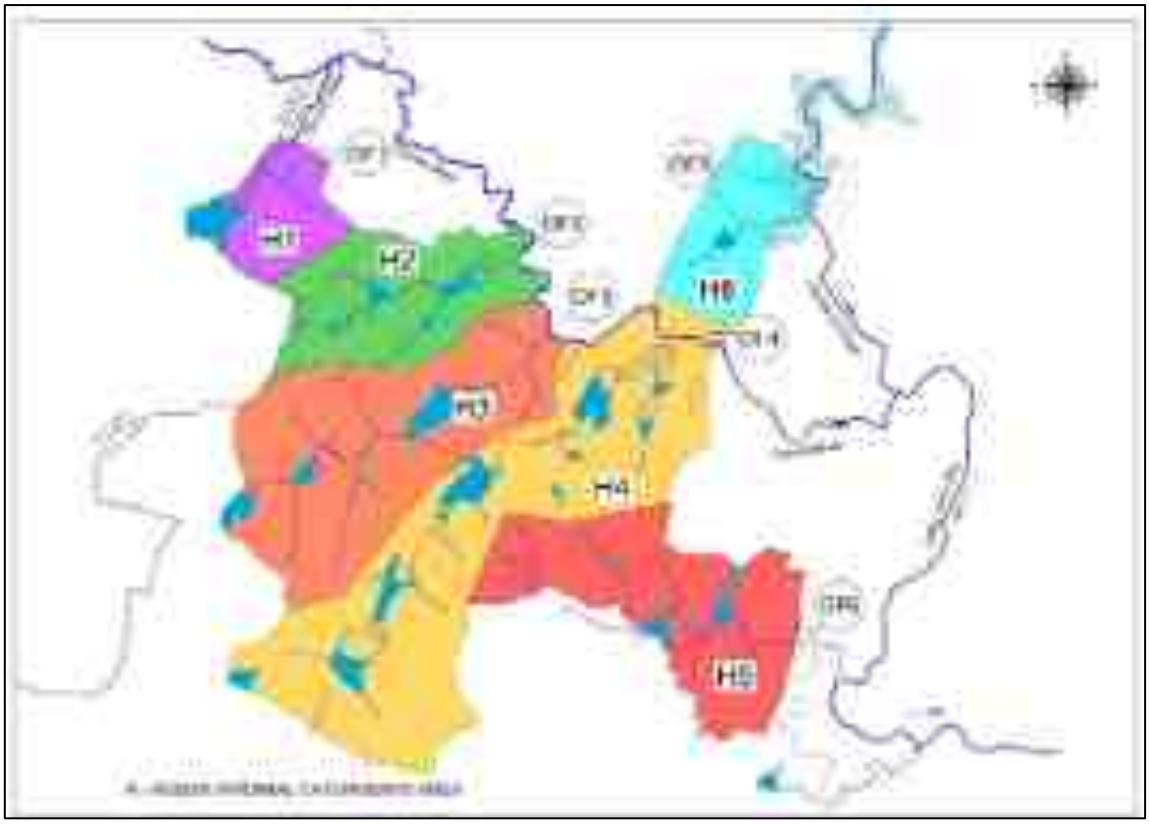


Figure 2-2 HCMC Area Major Drainage Catchments

Based on the topographic survey. DEM is prepared. The entire HCMC area is divided into six major drainage catchments. Out of 6 major drainage catchments, 4 catchments discharge into Chinnar river (Major Nallah/Primary Drain) and 2 catchments discharge into Ponnariyar river (Major Nallah/Primary Drain) and the details as follows.

Table 2-1 HCMC Area Major Drainage Catchments

S.No	Catchment Details	HCMC Drainage Catchment Area (Sq.km)	Major Nallah Length (km)	Disposal points
1	H1	4.19	3.75	Chinnar River
2	H2	8.81	7.50	Chinnar River
3	H3	17.36	18.15	Chinnar River
4	H4	29.80	16.37	Chinnar River
5	H5	12.25	11.16	Ponnaiyar River
6	H6	4.66	0.97	Ponnaiyar River
Total		**72.41**	**57.88**	

Number of water bodies and parks located in each sub drainage catchment are listed below. Sub Drainage Catchment in HCMC area with water bodies and parks are shown in below Figure.

Figure 2-3 HCMC Area Catchment Delineation

Table 2-2 HCMC Area Catchment Delineation

Sub Drainage Zone	Sub Catchment Area (sq km)
SC-1A	4.51
SC-2A	3.14
SC-2B	3.35
SC-2C	2.15
SC-3A	2.09
SC-3B	3.01
SC-3C	4.77
SC-3D	5.63
SC-4A	8.44
SC-4B	7.72
SC-4C	4.24
SC-4D	4.94
SC-5A	2.89
SC-5B	2.05
SC-6B	4.65
SC-6A	8.83
Total	**72.41**

2.2 PROJECT COMPONENTS

The overall project components are:

1. Improvements to Major Nallah/Primary Drain for a length of 57.88 km
2. Secondary and Tertiary drains for flood hot spots – 16.01 km;
3. Rejuvenation of 16 waterbodies
4. Development of 3 Sponge parks with park development
5. Developent of Spoge parks in 20 OSR sites.

2.3 MAJOR NALLAH / PRIMARY DRAIN

Major nallah / primary drains sizes are ranging from 1.2mx1m to 28mx2.1m and total designed length is 57.88km. Proposal for major nallah and primary drain of HCMC area includes the following

- Desilting the existing drains, clearing of weeds, bund strengthening using earth/random rubble masonry/ RCC retaining walls, chain link fencing and connecting the missing links.
- Major nallah / primary drain is proposed as open drains with both side cover in MS frame with wire mesh to avoid dumping of solid waste
- L Shaped RCC retaining walls with natural bed trimming is proposed in prime and thickly habitation areas
- Random Rubble masonry retaining walls with natural bed trimming is proposed in scattered development areas
- RCC open and closed drains as per site requirements
- Bund strengthening with natural bed trimming wherever space available and in scattered development areas

Table 2-3 Integrated Storm Drain Summary

SI No	Description	Earthen Bund Strengthening (km)	Random Rubble Masonry Retaining Wall (km)	L Shaped RCC Retaining Wall (km)	RCC Open Drain (km)	RCC Closed Drain (km)	Total (km)
1	Major Nallah / Primary drain	47.43	2.92	4.69	2.70	0.14	57.88
2	Secondary and Tertiary drains					16.01	16.01

2.4 WATERBODY REJUVENATION

Major nallah / primary drains are integrated with all the waterbodies of entire HCMC area. Proposed rejuvenation works for 16 WBs are as follows.

- Desilting the WB and removal of weeds to enhance storage capacity

- Stone pitching and turfing works for bund slopes with toe wall (the bottom 1m of the bund alone considered for stone pitching, the area above will be strengthened using green measures)
- Permeable paver blocks for pathway
- Bund strengthening and bund formation works
- Inlet and outlet weir improvements
- Recharge pit for ground water recharge
- Seating arrangements and Street lighting
- Shrubs and Saplings plantation in and around waterbodies
- Chain link fencing

Table 2-4 Waterbody Rejuvenation

Sl. No	Name of water body	Rejuvenation Status
1	Kesavakuttai Eri	Proposed
2	Krishnarav Eri (Look India Opp)	Proposed
3	Venkatesan Eri	Proposed
4	Santhapuram Eri	Proposed
5	Seetharaman Eri	Proposed
6	Sri Chandra Sudeshwar Kovil - Theppakulam	Proposed
7	Jalagandeshwar Swamy Koil (Ramanaikan Eri)	Proposed
8	Dharga Chandrambigai Lake	Proposed
9	Dhadhav Rao Lake Ashok Leyland Unit-1	Proposed
10	Varatharayan Eri	Proposed
11	Pattalamman Eri	Proposed
12	Devan Eri (Therpettai Eri)	Proposed
13	Venkatappan Eri (Bedrapalli)	Proposed
14	Lakshmanarav Eri (Motta eri)	Proposed
15	Thottan Eri (Alasanatham Eri)	Proposed
16	Alasanatham Eri	Proposed

Table 2-5 Waterbody Rejuvenation Proposal Summary

S No	Water Body	Desilting	Weed Removal	Bund Forming	Recharge Pit	Pathway & Fencing	Weir	Inlet channel / Hume pipe	Benches
1	Chennathur - Kesavakuttai Eri	✓	✓	✓	✓	✓		✓	✓
2	Chennathur - Krishnarav Eri (Look India Opp)	✓	✓	✓	✓	✓	✓	✓	✓
3	Zuzuwadi - Venkatesan Eri near Upkar layout (Anumepalli)	✓	✓	✓	✓	✓		✓	✓
4	Zuzuwadi - Santhapuram	✓	✓	✓	✓	✓	✓	✓	✓
5	Mookandapalli - Seetharaman Eri	✓	✓	✓	✓	✓		✓	✓
6	Sri Chandra Sudeshwar Kovil	✓							
7	Jalagandeshwar Swamy Koil	✓							
8	Dharga Chandrambigai Lake	✓	✓	✓	✓	✓		✓	✓
9	Dhadhav Rao Lake Ashok Leyland	✓	✓	✓	✓	✓		✓	✓
10	Chennathur - Varatharayan Eri	✓	✓	✓	✓	✓	✓	✓	✓
11	Chennathur - Pattalamman Eri	✓	✓	✓	✓	✓		✓	✓
12	Chennathur - Devan Eri (Therpettai Eri)	✓	✓						
13	Zuzuwadi - Venkatappan Eri Bedrapalli	✓	✓	✓	✓	✓		✓	✓
14	Mookandapalli - Lakshmanarav Eri	✓	✓	✓	✓	✓		✓	✓
15	Hosur Municipality - Thottan Eri (Alasanatham Eri)	✓	✓	✓	✓	✓		✓	✓
16	Alasanatham ERI (Near Micro Labs compay)	✓	✓	✓	✓	✓	✓	✓	✓

2.5 SPONGE PARK DEVELOPMENT

Sponge Park development is proposed for 3 parks. Proposal for sponge parks includes Children Play Area with Equipment, Volley Ball Court, Basketball court, Plantation, Flag pole and Name Board, Rain Water Harvesting, Security Building, Water Supply, Lighting Facility, Paver Block, Concrete and Stone pathway, Gym with equipment, Toilet, Septic Tank & Fountain.

In addition, artificial recharge facility by using Eco Block is proposed in Mahalakshmi Nagar park, Samanathapuram park.

Table 2-6 Park Typology

Sl No	Name of Park	Categorization of Park	Artificial Recharge
1	Mahalakshmi Nagar	Medium Sponge Park	Yes
2	Samathanapuram Park	Medium Sponge Park	Yes
3	Devi Nagar Park	Small Sponge Park	

Table 2-7 Small Sponge Park – Proposal

Sl No	Parks	Civil			Hydrology		Vegetation			Amenities		
	Name of Parks	Pathway (m)	Lighting (Nos)	Boundary wall with Gate (m)	SWD (m)	RWPH (Nos)	Tree (Nos)	Hedge (m)	Shrub (Nos)	Bench (Nos)	Dustbin (Nos)	Compost pit (Nos)
1	Devi Nagar Park	90	6	107	7	1	3	76	10	3	2	2

Table 2-8 Medium Sponge Park – Proposal

Sl No	Parks	Civil			Hydrology		Vegetation			Amenities				
	Name of Parks	Pathway (m)	Lighting (Nos)	Boundary wall with Gate (m)	SWD (m)	RWPH (Nos)	Tree (Nos)	Hedge (m)	Shrub (Nos)	Bench (Nos)	Dustbin (Nos)	Gazebo (Nos)	Amphitheater (Nos)	Compost pit (Nos)
1	Mahalakshmi Nagar	246	13	235	55	1	5	198	20	8	3	1	0	2
2	Samathanapuram	144	10	238	12	1	8	134	20	6	2	1	0	2

Table 2-9 Eco Bloc Rain Water Harvesting Parks

Sl No	Name of Park	Park Area (Acres)	Categorization of Park	Eco Block Area (Sqm)	No of Eco Block
1	Mahalakshmi Nagar	0.6	Medium Sponge Park	144	100
2	Samathanapuram Park	0.7	Medium Sponge Park	144	100
Total				**288**	**200**

2.6 OSR SITES - SPONGE PROPOSAL

There are 20 OSR sites considered for sponge proposal. Out of 20 OSR sites, 15 OSR sites are categorized as parks and 5 OSR sites are categorized as open space based on land records.

Development proposal for OSR sites categorized as Parks includes Children Play Area with Equipment, Volley Ball Court, Basketball court, Plantation, Flag pole and Name Board, Rain Water Harvesting, Security Building, Water Supply, Lighting Facility, Paver Block, Concrete and Stone pathway, Gym with equipment, toilet, septic tank & fountain.

Development Proposal for OSR sites categorized as Open Space includes recharge pit, recharge well, percolation pond and retention pond. This project is expected to cause minor impacts temporarily during construction and operation & maintenance.

Table 2-10 OSR sites Proposal Summary

S No	Survey No (TS ward)	OSR Categorization	Area (Acre)	Perimeter (m)	OSR Proposal
1	18. Ward - A/22/1/0	Park	2.442	399	Large
2	22. Ward - A/18//17/0	Park	1.768	336	Large
3	43. Ward - A/11/19/7, 20/3	Park	0.260	224	Small
4	20. Ward - A/25/6/0	Park	0.113	86	Small
5	119- 121. Ward - A/14/46/7, 8, 9	Park	1.282	323	Large
6	142, 143. Ward - A/12/2/19, 20	Park	0.065	66	Very Small
7	44. Ward - A Sr No 749	Park	0.406	165	Small
8	77. Ward - B/4/54/0	Park	0.341	151	Small
9	78. Ward - B/17/147/0	Park	0.314	143	Small
10	79. Ward - B/6/78/0	Park	0.218	120	Small
11	01. Ward - D/3/57/0	Park	0.076	71	Very Small
12	331. Mookandapalli Sr No 352/7,8	Park	0.217	142	Small
13	376. Avalapalli Sr No 794/13A	Park	0.342	160	Small
14	362. Avalapalli Sr No 711/1B	Park	0.177	110	Small
15	362. Avalapalli Sr No 711/1C	Park	0.347	173	Small
16	21. Ward - A/23//37/0	Medium Open Space	0.895	245	Percolation Pond
17	60. Ward - A/26/123/0	Small Open Space	0.100	108	Recharge Well
18	35. Ward - A/26/120/3	Small Open Space	0.139	111	Recharge Well
19	59. Ward - A/27/139	Large Open Space	1.460	313	Retention Pond
20	472, 473. Ward - A/10/162/3, 2	Small Open Space	0.259	152	Recharge Well

2.7 OSR LAND OWNERSHIP

All the OSR sites are belongs to ULB involuntary resettlement.

2.8 PROJECT COMPONENTS PLANTATION PROPOSAL

For drains 9239 trees are proposed. 38,610 shrubs and hedges are proposed for planation around water bodies. 461 plantations of which 13 trees, 408 hedges and 40 shurbs are proposed in 3 parks. Total trees proposed to planted are 9252 (9239+13 =9252).

Table 2-11 Park Plantation Proposal

Sl. No	Plantation - Park	Unit	Mahalakshmi Nagar	Samathanapuram	Devi Nagar	Total
1	Planting of **trees** by the road side (Avenue trees) in 0.60 m dia holes, deep dug in the ground, mixing the soil with decayed farmyard / sludge manure, planting the saplings, backfilling the trench, watering, fixing the tree guard 1.5m above Ground level, 0.3m below the ground level with MS wire mesh of 1"x1" opening size with 4 Nos of 12mm diameter rods of 1.8m length in which 0.3m below the ground level and maintaining the plant for one year - **Tree Plantation**	Nos	5	5	3	**13**
2	Replanting the **sapling** of 2m height for replacing the dead sapling in place with available tree guard at site. - **Hedge Plantation**	Nos	198	134	76	408
3	Tree Plantation including pit excavation, Cost and supply of plants, fertiliser, fencing guard all labour charges watering for one year Period - **Shrub Plantation**	Nos	20	10	10	40
					Total	**461**

3 LEGAL AND REGULATORY FRAMEWORK

In this regulatory framework section, the prevailing key of National, State level laws, rules, policies, Acts, notifications pertaining to environmental, climate change and social aspects have been reviewed for their applicability to the proposed projects are as follows. The policy objective is that all the environmental, social and climate change issues and impacts potential from the project are mitigated and effectively addressed in the project components and be in conformity to the applicable legislations and regulations.

3.1 REGULATORY FRAMEWORK RELATED TO ENVIORNMENT, SOCIAL AND CLIMATE CHANGE

The environmental, climate change and social laws, rules, policies, Acts, notifications applicable to this Project are listed in the following Table.

Table 3-1 National Regulations on Environmental, Climate Change and Social Aspects

Sl. No.	Acts/ Rules/ Regulations	Description	Relevance to this project
1.	Wildlife Protection Act, 1972, Amendment 2022	This Act seeks to protect wildlife, by creating protected areas and controlling trade in wildlife products.	Not Applicable
2.	Water (Prevention and Control of Pollution) Act, 1974 and Tamil Nadu Water (Prevention and Control of Pollution) Rules, 1974	These laws seek to control pollution of water and enhance the quality of water. Under this law, it is mandatory to obtain consent for discharge of effluents and pay consent fees to Tamil Nadu State Pollution Control Board (TNPCB) for any municipal projects causing water pollution.	Applicable
3	The Water (Prevention and Control of Pollution) Cess Act, 1977	This Act provides for levy and collection of access by local authorities on water consumed by persons or industries to augment resources for Pollution Control Boards.	Applicable
4	Air (Prevention and Control of Pollution) Act 1981 and Tamil Nadu Air (Prevention of Control of Pollution) Rules 1983	These laws address the prevention and control of air pollution. Under section 21 of this act, it is mandatory to obtain consent from Pollution Control Board.	Applicable
5	Forest (Conservation) Act, 1980	Forest (Conservation) Act, 1980 was enacted to halt rapid deforestation and governments cannot de-reserve forest land or direct that it can be used for non- forest purposes.	Not Applicable
6	Environment (Protection) Act, 1986	Popularly known as EP Act, it is an umbrella legislation that supplements existing environmental regulations. This law essentially links pollution and natural resource issues.	Applicable

Sl. No.	Acts/ Rules/ Regulations	Description	Relevance to this project
7	Wetlands (Conservation and Management) Rules, 2017	The rules list the wetlands that needs to be protected like those covered under Ramsar Convention, those in UNESCO heritage site, those which are ecologically sensitive etc.	Not Applicable
8	Prohibition of Employment as Manual Scavengers 'and their Rehabilitation Act 2013 (PEMSR)	This act prohibits construction of insanitary latrines and employment or engaging of manual scavenger for the purpose of manual scavenging. No person, local authority or any agency shall, from such date as notified by the State Government (which shall not be later than one year from the date of commencement of this Act), engage or employ, either directly or indirectly, any person for hazardous cleaning of a sewer or a septic tank.	Applicable
9	The Right to Fair Compensation and transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR). The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Rules, 2017, Government of Tamil Nadu. (Gazette Notification Sep 21, 2017)	The Act provides for enhanced compensation and assistances measures and adopts a more consultative and participatory approach in dealing with the Project Affected Persons. This act came into effect on 1 January 2014 and the Land Acquisition Act, 1894 stands revised. The Act lays down procedures for estimating fair compensation of the affected families (and not just the title holders) due to land acquisition, rehabilitation and resettlement. The Act is notified by the GoTN on 21 September 2017 (G.O. Ms. No. 298, Revenue & Disaster Management (LA-I (1), 20th September 2017)	Not Applicable
9	The Child Labour (Prohibition and Regulation) Amendment Act, 2016. The Child Labour (Prohibition and Regulation) Act,1986	No child below 14 years of age will be employed or permitted to work in any of the occupations set forth in the Act's Part A of the Schedule or in any workshop wherein any of the processes set forth in Part B of the Schedule. Child can help his family or family enterprise, which is other than any hazardous occupations or processes set forth in the Schedule, after his school hours or during vacations.	Applicable
10	National Policy on safety, health and environment at workplace	This code consolidates and amends the laws regulating the Occupational safety and health and working conditions of the persons employed in an establishment. The Act replaces 13 old central labour laws like The Factories Act, 1948, The Building and other Construction Workers Act, 1996, The Mines Act, 1952 etc.,	Applicable
11	The Occupational Safety, Health and Working Conditions Code, 2020	This code consolidates and amends the laws regulating the Occupational safety and health and working conditions of the persons employed in an establishment. The Act replaces 13 old central labour laws like The Factories Act,	Applicable

Sl. No.	Acts/ Rules/ Regulations	Description	Relevance to this project
		1948, The Building and other Construction Workers Act, 1996, The Mines Act, 1952, The Inter-State Migrant Workmen Act, 1979, etc.,	
12	Code on Wages, 2022	The Code on Wages seeks to regulate wages & bonus payments in all employments. The code subsumes four existing acts namely, The Equal Remuneration Act, 1976, The Minimum Wages Act, 1948, The Payment of Bonus Act, 2015, The Payment of Wages Act, 2015.	Applicable
13	Workmen Compensation Act, 1923.	The Act provides for compensation by the employer to their workmen in case of injury by accident arising out of and during employment.	Applicable

Table 3-2 State Regulations on Environmental, Climate Change and Social Aspects

Sl. No.	Acts/ Rules/ Regulations	Description	Relevance to this Project
1	Ground water (Regulation) Amendment Act, 2002	This amendment to the original act was made to impose provision of rainwater harvesting in every building either private or government to augment ground water storage in such manner as may be prescribed. The act also mentions that water bodies, including ponds, lakes, tanks and the like, whether public or private should be used only for the purpose of storage of water and not for any other purposes. These provisions are also included in the Panchayats Act and the Municipal Act.	Applicable
2	The Tamil Nadu Preservation of Private Forest Act, 1949	Guidelines for extraction of trees from non-forest area stipulates that permission for tree cutting shall be taken from State Forest department	Not Applicable

Sl. No.	Acts/ Rules/ Regulations	Description	Relevance to this Project
3	The Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014 and Rules 2015 notified by GOTN.	Street vendors, defines the rights and duties of street vendors and requires definition of designated vending zones, issue of certificates of vending and identity cards to street vendors, and proposes vending fees and maintenance charges. Under the Act, each state government is required to define the public purpose for which a street vendor may be evicted and the manner of relocation, manner of giving notice, and provides for a dispute resolution mechanism. As per the Act, the planning and regulation of street vending is to be undertaken at town level by the Town Vending Committee. The Act also provides for social audit of the activities of the Town Vending Committee. This act that specifically aims to protect the rights of urban street vendors and to regulate street vending activities. It provides for Survey of street vendors and protection from eviction or relocation; issuance of certificate for vending; provides for rights and obligations of street vendors; development of street vending plans; organizing of capacity building programmes to enable the street vendors to exercise the rights contemplated under this Act; undertake research, education and training programmes to advance knowledge and understanding of the role of the informal sector in the economy, in general and the street vendors, in particular and to raise awareness.	Not Applicable
4	Occupational, Safety, Health and Working Conditions (Tamil Nadu) Rules 2022	These draft rules notified on 11.04.2022	Applicable

Table 3-3 Climate Change

Sl. No.	Acts/ Rules/ Regulations	Description	Relevance to SMIF TN Projects
1	National Action Plan on Climate Change (30.06.2008) TNSAPCC, 31.03.2015	India is faced with the challenge of sustaining its rapid economic growth while dealing with the global threat of climate change. India, in 2008, has set up National Action plan on climate change (NAPCC) which outlined policies aimed at sustainable growth and dealing with climate change concerns effectively. NAPCC outlines eight national missions to address various adaptation and mitigation measures pertaining to Solar Energy, Enhanced Energy Efficiency, Sustainable Habitat, Water, Sustaining Himalayan Ecosystem, Green India, Sustaining Agriculture, Strategic Knowledge on Climate Change.	Applicable

3.2 SAFEGUARD POLICIES – EXTERNAL FUNDING AGENCIES:

The World Bank's ESF, 20184: The World Bank's Environmental and Social Framework (ESF) sets the World Bank's commitment to sustainable development through a Bank policy and a set of Environmental andSocial standards that are designed to support borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity. The ESF is the key E&S risk management tool which guides the borrowers to identify, assess, mitigate and report on project E&S risks, impacts and mitigation measures ant the effectiveness of their implementation.

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

KFW's Sustainability Guideline (SG) Assessment and Management of Environmental, Social and Climate Aspects: Principles and Procedures, February 20225: The SG of KfW describes principles and procedures to assess the environmental, social and climate impacts during the preparation of FC measures financed by KfW. Objective of the guidelines is to define a common binding framework to incorporate environmental, social and climate standards into the planning, appraisal, implementation, and monitoring of FC measures and to enhance transparency, predictability and accountability in the decision-making processes of the internal environmental and social due diligence (ESDD) and climate mainstreaming.

3.3 APPLICABLE ENVIRONMENTAL STANDARDS

This section outlines the applicable air quality, noise, water quality, and wastewater standards for this project.

Air Quality

The Indian National Ambient Air Quality Standards (NAAQS), as notified by the Central Pollution Control Board (CPCB) and adopted by the Tamil Nadu Pollution Control Board (TNPCB), have been applied for this project as they constitute the legally enforceable regulatory requirements in India under the Air (Prevention and Control of Pollution) Act, 1981. These standards are developed considering local environmental conditions, background air quality, and exposure scenarios, and are therefore appropriate for assessing project related impacts while ensuring consistency with TNPCB monitoring, reporting, and enforcement practices. World Bank/IFC and WHO guideline values, which are more stringent for certain parameters, and are therefore used only as reference benchmarks to promote good international environmental practice (GIIP), wherever technically and operationally feasible. Therefore, Tamil Nadu Pollution Control Board (TNPCB) standards are adapted for this project.

Table 3-4 Summary Comparison of Air Quality Standards

Pollutant	India (NAAQS)	Tamil Nadu (TNPCB)	World Bank (IFC/WHO)
PM_{10} (24-hour)	100 µg/m³	100 µg/m³	50 µg/m³
$PM_{2.5}$ (24-hour)	60 µg/m³	60 µg/m³	25 µg/m³
SO_2 (24-hour)	80 µg/m³	80 µg/m³	20 µg/m³
NO_2 (24-hour)	80 µg/m³	80 µg/m³	40 µg/m³
CO (8-hour)	4 mg/m³	4 mg/m³	9 mg/m³
Lead (Pb, annual)	1.0 µg/m³	1.0 µg/m³	0.5 µg/m³

Noise

Indian MoEFCC/TNPCB noise standards, which are largely comparable with World Bank IFC EHS guidelines, have been adopted as they are the legally enforceable requirements in India and are proportionate to the scale and nature of the project. Potential noise impacts are expected to be minor, localized, temporary, and fully reversible through standard ESMP mitigation measures, with residual impacts anticipated to be negligible to low. IFC EHS noise guidelines are referred to only as benchmark values to support Good International Industry Practice (GIIP) and for comparative assessment purposes. Therefore, Tamil Nadu Pollution Control Board (TNPCB) standards are adapted for this project.

Table 3-5 Summary Comparison – Noise Standards

Zone	India (MoEFCC)	Tamil Nadu (TNPCB)	World Bank (IFC EHS)
Residential (Day)	55 dB(A)	~55 dB(A)	55 dB(A)

Zone	India (MoEFCC)	Tamil Nadu (TNPCB)	World Bank (IFC EHS)
Residential (Night)	45 dB(A)	~45 dB(A)	45-50 dB(A)
Industrial (Day)	75 dB(A)	~75 dB(A)	70-75 dB(A)
Industrial (Night)	70 dB(A)	~70 dB(A)	70-75 dB(A)

Water quality

World Bank–referenced guidance places strong emphasis on safeguarding drinking water sources, particularly through a precautionary approach to microbial contamination and heavy metals. Accordingly, project-specific parameters including pH, BOD_5, Dissolved Oxygen (DO), fluoride, arsenic, lead, cadmium, hexavalent chromium (Cr^{6+}), and total coliform will be assessed against national CPCB norms for Drinking Water (Class A). Parameters such as COD, TDS, turbidity, total hardness, chloride, sulphate, nitrate, iron, and mercury will be evaluated in accordance with IS 10500:2012 drinking water standards. These Indian standards are legally enforceable, applicable to surface and drinking water quality. Therefore, Tamil Nadu Pollution Control Board (TNPCB), standards have been adapted for this project.

Table 3-6 Summary Comparison – Water Quality Standards

Parameter	India (CPCB) – Drinking water (Class A)	Tamil Nadu (TNPCB)	World Bank IFC Guidelines (Drinking Water)
pH	6.5 – 8.5	6.5 – 8.5	6.5 – 8.5
BOD	≤ 3 mg/L	≤ 3 mg/L	≤ 5 mg/L
COD	≤ 250 mg/L	≤ 250 mg/L	Not explicitly specified
Total Dissolved Solids	≤ 500 mg/L	≤ 500 mg/L	≤ 500 mg/L
Dissolved Oxygen (DO)	≥ 6 mg/L	≥ 6 mg/L	Not always specified; recommended to be high
Lead (Pb)	≤ 0.01 mg/L	≤ 0.01 mg/L	≤ 0.01 mg/L
Fecal Coliform	Not detectable	Not detectable	0 per 100 mL

Waste water

Indian Central Pollution Control Board (CPCB) and Tamil Nadu Pollution Control Board (TNPCB) effluent discharge standards are broadly comparable with World Bank IFC guidelines for most parameters, with identical limits for pH, BOD_5, oil & grease, and lead. For certain parameters such as COD, total suspended solids (TSS), and total residual chlorine, IFC guidelines prescribe more stringent values; however, Indian standards are formulated considering local receiving environment characteristics, regulatory frameworks, and cumulative pollution loads. Accordingly, CPCB/TNPCB standards have been adopted as they represent

the applicable national regulatory requirements and provide an appropriate and proportionate basis for assessing and managing project-related effluent discharges.

Table 3-7 Summary Comparison – Waste water Standards

Parameter	India (CPCB)	Tamil Nadu (TNPCB)	World Bank IFC Guidelines
pH	6.5 – 8.5	6.5 – 8.5	6 – 9
BOD5	≤ 30 mg/L	≤ 30 mg/L	≤ 30 mg/L
COD	≤ 250 mg/L	≤ 250 mg/L	≤ 125 mg/L
Total Suspended Solids	≤ 100 mg/L	≤ 100 mg/L	≤ 30 mg/L
Oil & Grease	≤ 10 mg/L	≤ 10 mg/L	≤ 10 mg/L
Total Residual Chlorine	≤ 1.0 mg/L	≤ 1.0 mg/L	≤ 0.5 mg/L
Lead (Pb)	≤ 0.1 mg/L	≤ 0.1 mg/L	≤ 0.1 mg/L

3.4 CLEARANCES / PERMISSIONS TO BE OBTAINED

The list of clearances/permissions required for project construction is listed below. This list is indicative and the contractor should ascertain the requirements prior to start of the construction and obtain all necessary clearances/permission prior to start of construction.

Table 3-8 Clearance to be obtained by ULB

Sl No	Proposed Activity	Statutory Authority	Applicable Legislation	Status	Responsibility
1	Highways crossings for storm water drains	NH, NHAI	National highways Rules 1957	To be applied	ULB
2	State Highways crossings for storm water drains	SH	The Tamil Nadu Highways Act, 2001 (Act 34 of 2002)	To be applied	ULB
3	Traffic diversion for construction of storm water drains	Traffic Police, Hosur City Municipal Corporation	MoRTH 112 SP 55 of IRC Codes	To be applied	ULB
4	Electricity connections and tariff	TNPDCL	Tamil Nadu Electricity Supply Code (as amended upto 31.12.2009)	To be applied	ULB
5	WRD NoC for Waterbodies (3 WBs) and Nallah (3.3 Km)	WRD, Hosur	As per GO 101 / WRD 30.09.2024	Applied and in process. Refer Annexure 11.	ULB

Sl No	Proposed Activity	Statutory Authority	Applicable Legislation	Status	Responsibility
6	HR&CE NoC for improvement to Waterbodies @ 2 locations	Hindu Religious and Charitable Endowments Department, Government of Tamil Nadu	The Tamil Nadu Hindu Religious and Charitable Endowments Act,1959.	To be applied	ULB

Table 3-9 Clearance to be obtained by Contractor

Sl No	Proposed Activity	Statutory Authority	Applicable Legislation	Status	Responsibility
1	Labour Licence and all other statutory work permits including contract Labour & Interstate Migrant Worker License (if any)	Tamil Nadu Labour Department. Directorate of Industrial Safety and Health (DISH-https://dish.tn.gov.in/)	The Contract Labour (Regulations & Abolition) Act, 1970 Building and other construction workers (Regulation of Employment and Conditions of Service) Act, 1996	To be obtained	Contractor
2	Workmen Compensation Insurance / Accident Insurance, EPF and ESIC (as applicable)	Tamil Nadu Labour Department	Tamil Nadu Labour Welfare Fund Act	To be obtained	Contractor
3	Crushers / Quarries and Batching Plants / Ready Mix Concrete Plants – as applicable	Tamil Nadu Pollution Contral Board (TNPCB)	Consent to establish and consent to operate under air act, 1981	To be obtained	Contractor
4	Discharges from construction activities – as applicable	Tamil Nadu Pollution Contral Board (TNPCB)	Consent to establish and consent to operate under water act, 1974	To be obtained	Contractor

Sl No	Proposed Activity	Statutory Authority	Applicable Legislation	Status	Responsibility
5	Ground Water Extraction – as applicable	WRD	Tamil Nadu Ground Water Development and Management Act 2000	To be obtained	Contractor
6	Temporary traffic diversion measures	Traffic Police Hosur	MoRTH 112 SP 55 of IRC codes	To be obtained	Contractor

4 ENVIRONMENTAL AND SOCIAL BASELINE

This chapter presents the baseline data required to understand the environmental, ecological attributes and socio-economic characteristics of the study area. The baseline includes climate, meteorology, topography, geology, hydrology, drainage, rainfall, and land usage based on secondary data. Water, air, noise, soil, flora, fauna and social baseline survey based on primary data/ Survey. The study was conducted for entire integrated storm drain includes major nallah / primary drains, secondary and tertiary drains, water bodies and parks, OSR sites (referred as study area). The objective is to comprehend the current environmental and social baseline conditions and to proposes mitigation measures in the ESMP.

4.1 METHODOLOGY

The Baseline has been collected from the primary and secondary sources and E&S screening of all the project sites. The desk review of the available documentation and reports of this project is carried out including DPR. The survey in the study area was conducted to identify the permanent and temporary social impacts.

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

Table 4-1 Sources of Environmental & Social data

S. No.	Attribute	Parameter	Source of Data
1	Land use /cover	Land use patterns	Hosur Master Plan 2046
2	Geology	Soil profile and soil classification	Geotechnical investigation (Primary)
3	Air, water, noise, soil	As per TNPCB guidelines	Environmental Baseline Assessment (Primary)
4	Meteorology	44 years Rainfall data (1980 to 2023)	State Groundwater and Surface Water Resources Data Centre-Taramani
5	Ecology, Biodiversity	Existing terrestrial flora and fauna	Various sources. /Flora fauna survey based on visual inspection & transect walk and enquiry with locals & published sources.

S. No.	Attribute	Parameter	Source of Data
6	Socio-economic aspects	Socio-economic demographic data	Census of India, 2011; District census Hand Book for Krishnagiri District
7	Social screening survey	To identify permanent / temporary social impacts in the project components	Primary Social baseline survey (from June 2024 to Oct 2024)

4.2 TOPOGRAPHY OF THE PROJECT AREA

Hosur town is located in the north western part of Krishnagiri district in Tamil Nadu. It stretches between Latitude 12°43' N and Longitude 77°49' E. Ground Elevation ranges from 818m to 940m. Digital Elevation model of Hosur CMC area is as given below.

Figure 4-1 Digital Elevation Model of the Project Area

4.3 GEOLOGY

The geological formations of Hosur, an industrial city in Tamil Nadu, India, are mainly Archaean and Proterozoic in age. The area is covered by hard metamorphic, metasedimentary, and igneous rocks. The geological formations consist of hard rocks of granite or gneiss formation. The aquifers in this region are unconfined. Hosur is considered as the oldest inhabited town in the state of Tamil Nadu as many Neolithic, Monolithic and Palaeolithic sites have been found.

Red soil is manifested in the planning area. It suits cultivation of agriculture crops and horticulture crops on a large scale. Wells are the major source of irrigation in Hosur area, supplemented by tanks and canals. The tube wells form an important source of irrigation in Hosur taluk.

4.4 CLIMATE

Hosur experiences a tropical savanna climate with distinct wet and dry seasons. Due to its high elevation, Hosur usually enjoys salubrious and moderate climate throughout the year, with occasional heat waves. The coolest month is January with an average low temperature of 17.1 °C and the hottest month is May with an average high temperature of 33.6 °C. Winter temperatures rarely drop below 12 °C with the lowest ever recorded temperature of 7.1 °C recorded on 1 February 2018 and summer temperatures seldom exceed 35 °C.

4.5 RAINFALL

Hosur receives rainfall from both the northeast and the southwest monsoons and the wettest months are October, September, and August. The summer heat is moderated by fairly frequent thunderstorms but no flooding. Hosur and its hinterland receives maximum rainfall during the north east monsoon is from October to November.

44 years of daily rainfall data was collected from State Groundwater and Surface Water Resources Data Centre-Taramani for Hosur Taluk Office rain gauge station, to arrive rainfall intensity for 5 years and 25 years return period to design secondary & tertiary drains and Major nallah / primary drain respectively.

Table 4-2 Annual Rainfall Analysis During the Year 1980 - 2023

Sl. No.	Year	Maximum Annual One Day Rainfall (mm)	Total Annual Rainfall (mm)
1	1980	26.00	374.70
2	1981	51.00	621.80
3	1982	46.00	342.89
4	1983	49.00	544.10
5	1984	59.20	613.70
6	1985	27.80	421.40
7	1986	72.00	584.70
8	1987	63.00	493.40
9	1988	40.40	530.00
10	1989	76.10	588.80
11	1990	50.00	364.16
12	1991	101.00	978.20
13	1992	46.40	471.20
14	1993	56.70	536.20
15	1994	42.00	456.60

Sl. No.	Year	Maximum Annual One Day Rainfall (mm)	Total Annual Rainfall (mm)
16	1995	53.20	535.43
17	1996	44.00	650.00
18	1997	66.00	673.60
19	1998	87.60	908.20
20	1999	110.00	1179.60
21	2000	70.00	1057.90
22	2001	97.20	791.40
23	2002	103.00	736.80
24	2003	56.00	522.70
25	2004	90.00	1146.00
26	2005	105.00	1170.00
27	2006	52.00	439.50
28	2007	57.00	829.00
29	2008	150.00	1139.50
30	2009	102.00	972.40
31	2010	64.20	721.80
32	2011	76.40	464.90
33	2012	88.80	628.20
34	2013	60.00	611.40
35	2014	69.00	500.10
36	2015	123.00	918.0
37	2016	141.00	597.00
38	2017	75.00	1360.20
39	2018	76.00	560.00
40	2019	69.00	790.75
41	2020	60.00	863.50
42	2021	94.60	1029.80
43	2022	97.00	1602.00
44	2023	53.10	532.20
Average		**72.70**	**723.90**

Source: State Groundwater and Surface Water Resources Data Centre-Taramani

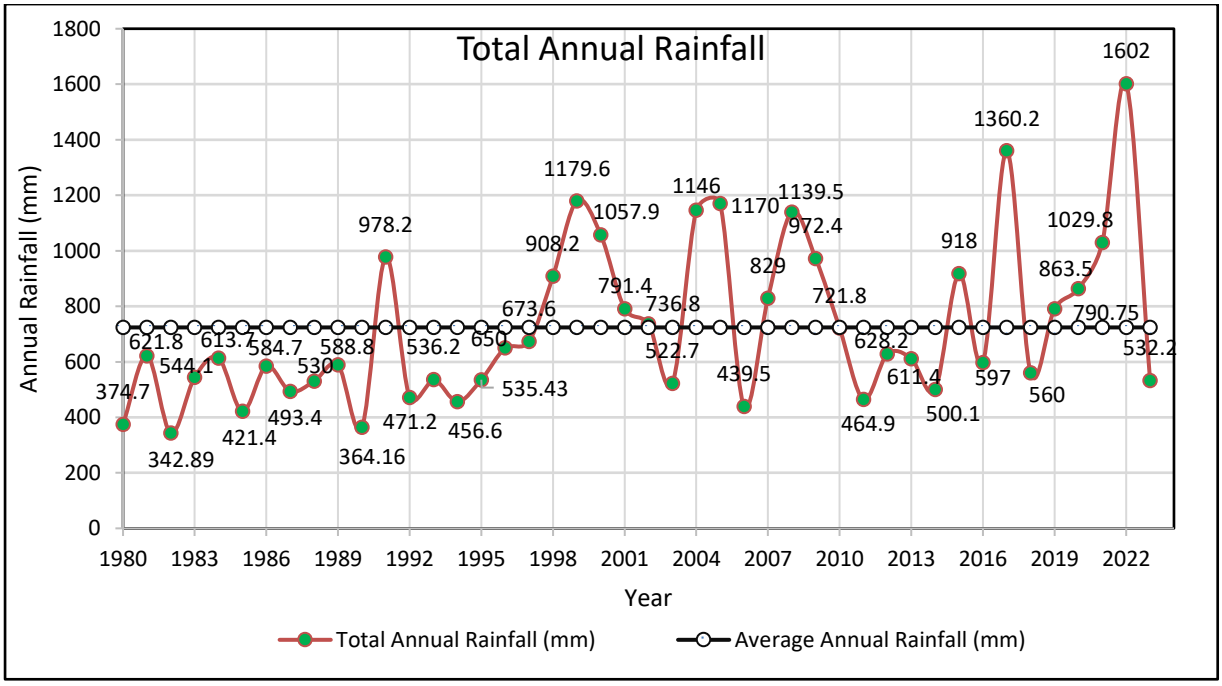
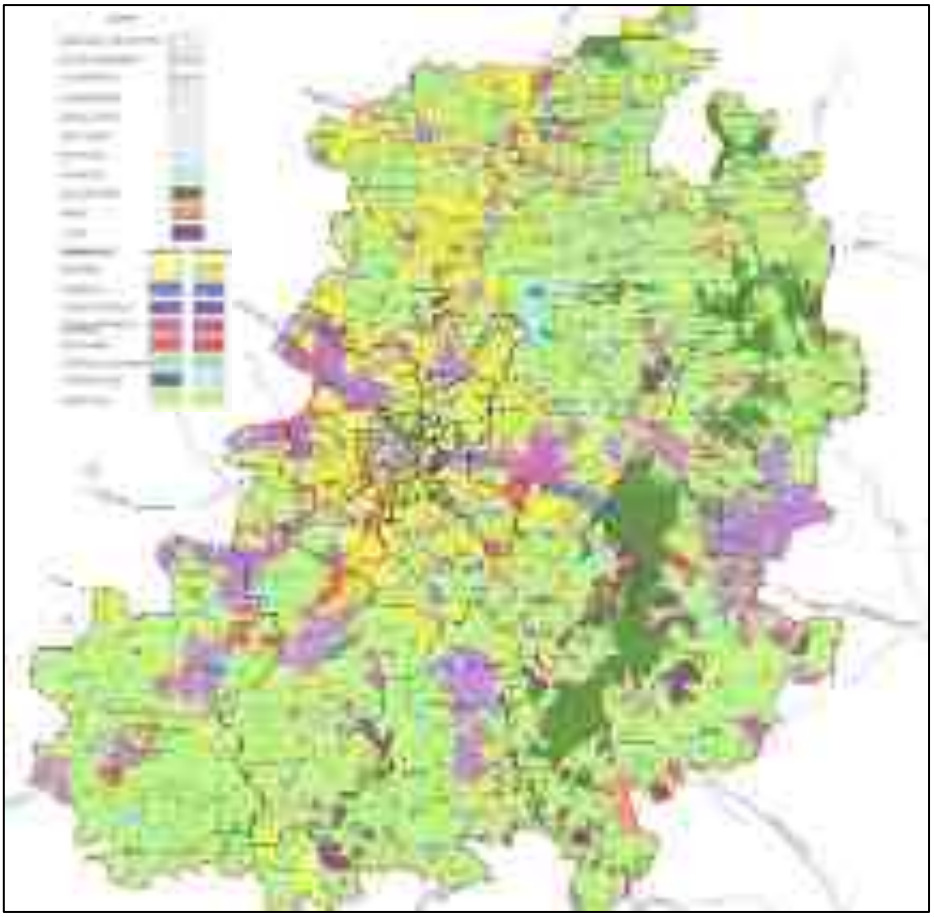


Figure 4-2 Annual Rainfall Analysis

From the above, we can understand that the maximum annual rainfall occurs on 2022 which records maximum as 1602 mm. During the year of 1980 to 1998, the rainfall is normal and records as on an average of below 700 mm. After that year, the rainfall is increased to the peak of above 1000 mm. Hence rainfall analysis is carried out from 1994-2023 using Least Square Exceedance Method. Considering climate factor of 20%, secondary and tertiary drains are designed for 1 in 5 years return period for 64.92 mm/hr and Major Nallah / Primary drains are designed for 1 in 25 years return period for 87.83 mm/hr.

4.6 LAND USE

The land use is analysed and expressed in terms of percentage which is categorically, as Residential, Commercial, Industrial, Institutional, Transportation, Recreational, Water bodies, Agricultural and Others. The others consist of Hills, Quarry and Forest.



Source: Hosur Master Plan 2046

Figure 4-3 – Land use Map – Hosur and Surrounding Areas (LPA)

4.7 GROUND WATER IN HOSUR

The ground water resources for the State have been assessed Block-wise (Taluka). The Firka (1202 Firka) resources were summed up to taluk level by Ground Water Resources Assessment (GWRA)-jointly carried out by Central Ground Water Board and State Nodal/Ground Water Department periodically as per the Ground Water Resource Estimation Committee (GEC) methodology. The 'Stage of Ground Water Extraction' is computed as the ratio of 'Annual Ground Water Extraction' with respect to 'Annual Extractable Ground Water Resource' and is usually expressed in percentage. Based on the stage of extraction, the assessment units are categorized as Safe (<= 70 %), Semi-Critical (>70 % and <=90 %), Critical (>90 % and <=100%) and Over-Exploited (>100 %).

Groundwater levels in the Hosur region (Krishnagiri District, TN) vary with depths ranging from shallow (a few meters) to deeper (10 to 20 meters), particularly impacted by extraction. Groundwater level of Hosur is in semi critical (>70 % and <=90 %) stage.

4.8 BASELINE ENVIRONMENTAL STATUS – PRIMARY DATA

Baseline environmental monitoring is required to be conducted for five environmental parameters i.e., ambient air quality, surface water quality, ground water quality, noise level monitoring and silt quality to assess baseline environmental status. The baseline monitoring locations representing the entire project area were selected.

Area of Influence: Hosur city municipal corporation spread over an area of 72.41 sq km. The actual study includes providing integrated storm drains for the entire administrative area. Hence the baseline environmental studies are carried out covering the entire corporation area.

Figure 4-4 Environmental Baseline Monitoring Locations

List of sample collection for Air, Noise, ground water, surface water and silt as follows.

Table 4-3 Air and Noise Monitoring Locations

Sl No	ID NO	Location	Identification of Location
1	A&N- A	SIPCOT	Commercial Area
2	A&N- B	Chinnaelsagiri	Commercial Area
3	A&N- C	ESI Ring Road Near Hyundai show room	Industrial Area
4	A&N- D	Mathigiri (Hosur corporation - primary school)	Silence Area
5	A&N- E	New Rayakottai (HUDCO 100 Feet Ring Road)	Residential Area
6	A&N- F	Chennathur - near Pattalamman Lake	Residential Area
7	A&N- G	Goldern Avenue - Thotagiri Road	Residential Area
8	A&N- H	Basthi Road, Near Sargar Lake	Commercial Area

Table 4-4 Ground Water, Surface Water and Silt Sampling Locations

Sl No	Base Line Assessment	Location	Total Samples
1	Ground Water	Near Waterbodies – 28 Nos, Near Nallah – 4 Nos	32 Nos
2	Surface Water	3 WBs are dry condition, Waterbodies – 25 Nos, Near Nallah – 4 Nos	29 Nos
3	Silt	Waterbodies – 28 Nos, Near Nallah – 4 Nos	32 Nos
4	Air	Sampling location as per above table	8 Nos
5	Noise	Sampling location as per above table	8 Nos

Table 4-5 Overall List of Ground Water, Surface Water and Sitl Sample Collection in WBs

Sl. No	Location of water body	Ground Water			Surface Water & Silt			
		Sample No	Latitude	Longitude	Surface Water Sample No	Silt Sample No	Latitude	Longitude
1	Avalapalli - Avalapalli Eri (Chinna Eri) basthi	GW-01	12.743354	77.84438	SW-01	SS-01	12.74299	77.842548
2	Avalapalli - Mayil Ravanan Eri (basthi)	GW-02	12.747177	77.841372	SW-02	SS-02	12.743589	77.838777
3	Avalapalli - Venkatagiri Eri (Basthi)	GW-03	12.740915	77.835352	SW-03	SS-03	12.740942	77.837264
4	Chennathur - Kesavakuttai Eri	GW-04	12.711896	77.859079	SW-04	SS-04	12.712738	77.860892
5	Chennathur - Krishnarav Eri (Look India Opp)	GW-05	12.716382	77.843084	SW-05	SS-05	12.715781	77.842556
6	Zuzuwadi - Venkatesan Eri near Upkar layout (Anumepalli)	GW-06	12.778103	77.790982	SW-06	SS-06	12.776338	77.792073
7	Zuzuwadi - Santhapuram Eri	GW-07	12.76096944	77.81784722	SW-07	SS-07	12.761042	77.818896
8	Mookandapalli - Seetharaman Eri	GW-08	12.755881	77.800271	SW-08	SS-08	12.753893	77.798873
9	Mookandapalli - Datha Eri (Near TVS company) (kottur eri)	GW-09	12.723896	77.783804	SW-09	SS-09	12.725035	77.78507
10	Kalegunda Pond	GW-10	12.730823	77.834857	SW-10	SS-10	12.730599	77.834853
11	Sri Chandra Sudeshwar Kovil (Therpettai Street) - Theppakulam	GW-11	12.723546	77.831459	SW-11	SS-11	12.725297	77.834611
12	Jalagandeshwar Swamy Koil (Ramanaikan Eri Karai - Rama Bai)	GW-12	12.730099	77.826098	SW-12	SS-12	12.732035	77.823667
13	Dharga Chandrambigai Lake	GW-13	12.741345	77.818735	SW-13	SS-13	12.739533	77.816897
14	Dhadhav Rao Lake Ashok Leyland Unit-1	GW-14	12.770346	77.784188	SW-14	SS-14	12.770934	77.784845
15	Avalapalli - Sargar Eri	GW-15	12.768892	77.860884	SW-15	SS-15	12.767268	77.861319
16	Chennathur - Varatharayan Eri	GW-16	12.704148	77.861044	-	SS-16	12.708464	77.85941
17	Chennathur - Pattalamman Eri	GW-17	12.707831	77.852132	SW-16	SS-17	12.707653	77.85063
18	Chennathur - Devan Eri (Therpettai Eri)	GW-18	12.729821	77.829465	SW-17	SS-18	12.728699	77.833055
19	Zuzuwadi - Venkatappan Eri Bedrapalli	GW-19	12.757989	77.808638	SW-18	SS-19	12.75806389	77.80676944
20	Mookandapalli - Lakshmanarav Eri (motta eri)	GW-20	12.728259	77.793681	SW-19	SS-20	12.72980278	77.79502778
21	Hosur Municipality - Ramanayakken	GW-21	12.727181	77.815076	SW-20	SS-21	12.730282	77.820389
22	Hosur Municipality - Thottan Eri (Alasanatham Eri)	GW-22	12.734169	77.838207	SW-21	SS-22	12.73301944	77.837625
23	Sipcot Lake - Chinna Elasagiri	GW-23	12.756712	77.812643	-	SS-23	12.753511	77.813056
24	Kalkeri Lake Thally Road	GW-24	12.698909	77.781747	-	SS-24	12.698664	77.784893
25	Anthiwadi Veeraragavan Lake	GW-25	12.715814	77.808397	SW-22	SS-25	12.716225	77.807701
26	Karnoor Eri	GW-26	12.700908	77.803849	SW-23	SS-26	12.70107	77.803127
27	Avalapalli - Venkatagiri Iyan Eri (Thottagiri)	GW-27	12.745048	77.849358	SW-24	SS-27	12.744246	77.850573
28	Alasanatham ERI (Near Micro Labs compay)	GW-28	12.736389	77.848627	SW-25	SS-28	12.737266	77.848569

Table 4-6 List of Ground Water, Surface Water and Sitl Sample Collection in Major Nallah

Sl . No	Description	Sample No	Location of Nallah	Co ordinates	
				Latitude	Longitude
1	Ground Water	GW-29	Devan Eri (Therpettai Eri) Nallah	12.761325	77.832057
2		GW-30	Venkatappan Eri Bedrapalli Nallah	12.754545	77.845746
3		GW-31	Lakshmanarav Eri (Motta eri) Nallah	12.74483	77.824615
4		GW-32	Ramanayakken Eri Nallah	12.717401	77.808649
5	Surface Water	SW-26	Chitthana palli, Nallur road Nallah	12.761469	77.832952
6		SW-27	Thillai nagar opp to HCMC Nallah	12.754157	77.84447
7		SW-28	Brindavan Nagar, Denkanikotta Road Nallah	12.74483	77.824615
8		SW-29	Anthiwadi - veeraragavan lake Nallah	12.717401	77.808649
9	Silt	SS-29	Seetharaman Eri Nallah	12.761469	77.832952
10		SS-30	Datha Eri (Near TVS company) (kottur eri) Nallah	12.754157	77.84447
11		SS-31	Kalegunda Pond Nallah	12.74483	77.824615
12		SS-32	Sri Chandra Sudeshwar Kovil (Therpettai Street) – Theppakulam Nallah	12.717401	77.808649

Table 4-7 List of Air Quality and Noise Monitoring Locations

Sl . No	Air and Noise Sample No	Location	Area	Co ordinates	
				Latitude	Longitude
1	A&N- 1	SIPCOT	Commercial Area	12.767775	77.79653
2	A&N- 2	Chinnaelsagiri	Commercial Area	12.756	77.81956
3	A&N- 3	ESI Ring Road Near Hyundai show room	Industrial Area	12.73965	77.79673

Sl . No	Air and Noise Sample No	Location	Area	Co ordinates	
				Latitude	Longitude
4	A&N- 4	Mathigiri (Hosur corporation - primary school)	Silence Area	12.6945	77.8069
5	A&N- 5	New Rayakottai (HUDCO Near, 100 Feet Ring Road)	Residential Area	12.72177	77.82968
6	A&N- 6	Chennathur - near pattalamman lake	Residential Area	12.70786	77.8523
7	A&N- 7	Goldern Avenue - Thotagiri Road	Residential Area	12.74335	77.84441
8	A&N- 8	Basthi Road, Near Sargar Lake	Commercial Area	12.76906	77.85788

Table 4-8 Testing Parameters

Sl No	Description	Parameter
1	Surface Water	pH @ 25°C, Suspended Solids, Turbidity, Total Dissolved Solids, Oil and grease, Biochemical Oxygen Demand (BOD) 3 days @ 27°C, Chemical Oxygen Demand (COD), Total Residual Chlorine, Ammoniacal Nitrogen as N, Total Kjeldahl Nitrogen as N, Free Ammonia as NH_3, Iron as Fe, Chloride as Cl, Fluoride as F, Nitrate as NO_3, Sulphate as SO_4, Salinity at 25^0C, Electrical conductivity at 25^0C, Dissolved Phosphate as P, Total phosphorus (P), Orthophosphate, Total nitrogen (N), Nitrogen in nitrate (NO_3^-), Chlorophyll
2	Ground Water	pH @ 25°C, Suspended Solids, Oil and grease, Biochemical Oxygen Demand (BOD) 3 days @ 27°C, Chemical Oxygen Demand (COD), Turbidity, Total Dissolved Solids, Total Residual Chlorine, Ammoniacal Nitrogen as N, Total Kjeldahl Nitrogen as N, Free Ammonia as NH_3, Iron as Fe, Chloride as Cl, Fluoride as F, Nitrate as NO_3, Sulphate as SO_4, Salinity at 25^0C, Electrical conductivity at 25^0C, Dissolved Phosphate as P
3	Silt	Colour, Texture, pH, Phosphate as PO_4, Sodium as Na, Nitrate (as nitrate-nitrogen), Iron as Fe, Chromium as Cr, Manganese as Mn, Lead as Pb, Zinc as Zn, Copper as Cu, Nickel as Ni, Cobalt as Co, Silica, Aluminium, Mercury, Arsenic, Cadmium
4	Air	PM2.5, PM10, SOX, NOX, CO, NH_3 etc
5	Noise (24 hours)	Noise levels at Day and Night

4.9 Surface Water Sampling Analysis

Surface water Samples are analysed in NABL accredited Lab for 23 nos of Parameters as mentioned in testing parameters table. The surface water sampling test results are compared with IS 2296 water quality standard.

Water Quality Standards (as per IS: 2296)

Class A – Drinking water without conventional treatment but after disinfection.

Class B – Water for outdoor bathing.

Class C – Drinking water with conventional treatment followed by disinfection.

Class D – Water for fish culture and wild life propagation.

Class E – Water for irrigation, industrial cooling and controlled waste disposal.

(Unobj = Unobjectionable).

Table 4-9 Water Quality Standards (as per IS: 2296)

Sl No	Parameter and Unit	A	B	C	D	E
1	Taste	None	--	--	--	--
2	Odour	Unobj	--	--	--	--
3	Colour (True) (Hazen unit)	10	300	300	--	--
4	pH (max) (min : 6.5)	8.5	8.5	8.5	8.5	8.5
5	Conductivity (25oC) uS/cm	--	--	--	1000	2250
6	DO (mg/L) (minimum)	6	5	4	4	--
7	BOD (3d, 27oC) (mg/L)	2	3	3	--	--
8	Total Coliforms (MPN/100 mL)	50	500	5000	--	--
9	TDS (mg/L)	500	--	1500	--	2100
10	Oil and Grease (mg/L)	--	--	0.1	0.1	--
11	Mineral oil (mg/L)	0.01	--	--	--	--
12	Total Hardness (mg/L as CaCO3)	300	--	--	--	--
13	Chlorides (mg/L as Cl)	250	--	600	--	600
14	Sulfates (mg/L as SO4)	400	--	400	--	1000
15	Nitrates (mg/L as NO3)	20	--	50	--	--
16	Free CO2 (mg/L)	--	--	--	6	--
17	Free NH3 (mg/L as N)	--	--	--	1.2	--
18	Fluorides (mg/L as F)	1.5	1.5	1.5	--	--
19	Calcium (mg/L)	80.10	--	--	--	--
20	Magnesium (mg/L)	24.28	--	--	--	--
21	Copper (mg/L)	1.5	--	1.5	--	--
22	Iron (mg/L)	0.3	--	50	--	--
23	Manganese (mg/L)	0.5	--	--	--	--
24	Zinc (mg/L)	15	--	15	--	--
25	Boron (mg/L as B)	--	--	--	--	2
26	Barium (mg/L)	1	--	--	--	--
27	Silver (mg/L)	0.05	--	--	--	--
28	Arsenic Total (mg/L)	0.05	0.2	0.2	--	--
29	Mercury (mg/L)	0.001	--	--	--	--
30	Lead (mg/L)	0.1	--	0.1	--	--
31	Cadmium (mg/L)	0.01	--	0.01	--	--
32	Chromium (VI) (mg/L)	0.05	0.05	0.05	--	--
33	Selenium (mg/L)	0.01	--	0.05	--	--
34	Cyanide (mg/L as CN)	0.05	0.05	0.05	--	--
35	Phenols (mg/L)	0.002	0.005	0.005	--	--
36	Anionic detergents (mg/L as MBAS)	0.2	1	1	--	--
37	PAH (mg/L)	0.2	--	--	--	--
38	Pesticides (ug/L)	0	--	--	--	--

Sl No	Parameter and Unit	A	B	C	D	E
39	Insecticides (ug/L)	--	--	0	--	--
40	Alpha emitters (10-6uC/mL)	0.001	0.001	0.001	0.001	0.001
41	Beta emitters (10-6uC/mL)	0.01	0.01	0.01	0.01	0.01
42	Percent Sodium (%)	--	--	--	--	60
43	Sodium Absorption Ratio	--	--	--	--	26

Inference: Among 28 samples, 1 sample falls under Class A, 19 samples fall under Class C, 5 samples fall under Class E. In 3 samples TDS is very high which requires UF and RO treatment.

Table 4-10 Surface Water Samples Classification as per IS 2296

Description	Class A	Class C	Class E	Unfit
No of samples	1	19	5	3

It is found that few parameters are exceed the limit such as

- Total Suspended solids exceed the permissible limit in Krishnarav Eri, Venkatesan Eri, Seetharaman Eri, Thottan Eri and Karnoor Eri due to sullage / sewage intrusion.
- Biological Oxygen demand exceeds the permissible limit in Krishnarav Eri, Venkatesan Eri, Sri Chandra Sudeshwar Kovil, Karnoor Eri and Venkatagiri Eri, Nalla C & D due to sullage / sewage intrusion.
- Chemical Oxygen demand exceeds the permissible limit in Krishnarav Eri, Venkatesan Eri and Venkatagiri Eri, Nalla C due to sullage / sewage intrusion.
- Total Kjeldahl Nitrogen as N exceeds the permissible limit in Krishnarav Eri due to sullage / sewage intrusion and septicity.

As implementation of UGSS scheme in phased manner is in progress which will prevent discharge of sullage / sewage in drains and water bodies.

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Table 4-11 Surface Water Monitoring Results for SW-1 to 10

Sl No	Test Parameters	Unit	IS 2296 Standard	Avalapalli Eri (SW-1)	Mayil Ravanan Eri (SW-2)	Venkatagiri Eri (SW-3)	Kesavakuttai Eri (SW-4)	Krishnarav Eri (SW-5)	Venkatesan Eri (SW-6)	Santhapuram Eri (SW-7)	Seetharaman Eri (SW-8)	Datha Eri (SW-9)	Kalegunda Pond (SW-10)
1	pH @ 25°C	-	8.5	7.22	7.36	7.84	7.35	7.3	7.31	7.48	7.39	7.12	7.76
2	Total Suspended Solids	mg/L	0	7	17	38.15	BLQ[LOQ-5.0]	128	132	14	146	26	12
3	Oil and grease	mg/L	0	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
4	BOD 3 days @27°C	mg/L	2	28.14	9.08	22.7	BLQ[LOQ-2.5]	81.72	72.64	7.26	27.24	9.98	7.26
5	COD	mg/L	0	130.2	40.67	79.84	BLQ[LOQ-4.0]	299.4	270.43	36.7	129.74	47.38	24.29
6	Turbidity	NTU	5	1.08	0.6	1.38	1.12	4.77	46.2	BLQ[LOQ-0.5]	14.57	3.82	2.27
7	Total Dissolved Solids	mg/L	500	1360	1382	1414	320	1126	2630	2059	1738	538	1525
8	Total Residual Chlorine	mg/L	0	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	mg/L	0	0.86	0.74	1.16	BLQ[LOQ-0.25]	1.13	0.92	0.65	0.93	0.86	3.82
10	Total Kjeldahl Nitrogen as N	mg/L	0	13.64	9.66	46.04	BLQ[LOQ-1.0]	110.84	88.1	9.14	47.18	16.48	12.5
11	Free Ammonia as NH_3	mg/L	0	1.05	0.91	1.42	BLQ[LOQ-0.25]	1.39	1.12	0.8	1.13	1.05	4.66
12	Iron as Fe	mg/L	0.3	0.15	0.21	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	1.04	1.15	0.16	0.19	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
13	Chloride as Cl	mg/L	250	340	374.49	340	113.33	261.16	827.83	512.47	497.68	142.9	482.9
14	Fluoride as F	mg/L	1.5	0.44	0.34	0.42	0.08	0.38	0.86	0.78	0.46	0.16	1.86
15	Nitrate as NO_3	mg/L	20	1.86	2.26	1.72	BLQ[LOQ-1.0]	1.61	2.32	2.76	2.39	1.38	2.16
16	Sulphate as SO_4	mg/L	400	145.24	104.62	162.54	32.5	136.07	309.85	214.06	178.52	49.13	178.3
17	Salinity at 250° C	ppt	0	<1.0	<1.0	1.1	<1.0	<1.0	1.9	1.4	1.2	<1.0	1.2
18	Dissolved Phosphate as P	mg/L	0	0.88	0.94	1.33	0.08	1.24	1.08	0.21	0.87	0.17	0.62
19	Total phosphorus (P)	mg/L	0	1.2	1.24	1.92	0.12	1.58	1.36	0.29	1.15	0.24	0.81
20	Orthophosphate	mg/L	0	0.74	0.85	0.98	0.06	0.88	0.82	0.17	0.72	BLQ[LOQ-0.01]	0.54
21	Total nitrogen (N)	mg/L	0	16.48	12.68	51.95	5.81	113.11	91.66	12.57	50.52	BLQ[LOQ-0.5]	18.5
22	Nitrite (as NO_2)	mg/L	0.3	BLQ[LOQ-0.01]	BLQ [LOQ-0.01	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
23	Chlorophylla	mg/L	0	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
	Class			**Class C**	**Class C**	**Class C**	**Class A**	**Class C**	**-**	**Class E**	**Class E**	**Class C**	**Class E**

Table 4-12 Surface Water Monitoring Results SW 11 to 20

Sl No	Test Parameters	Unit	IS 2296 Standard	Sri Chandra Sudeshwar Kovil (SW-11)	Jalagandeshwar (SW-12)	Dharga Chandrambigai Lake (SW-13)	Dhadhav Rao Lake (SW-14)	Sargar Eri (SW-15)	Pattalamman Eri (SW-16)	Devan Eri (SW -17)	Venkatappan Eri (SW -18)	Lakshmanarav Eri (SW-19)	Ramnarayan Eri (SW-20)
1	pH @ 25°C	-	8.5	7.5	7.51	7.47	7.51	6.94	7.24	7.42	7.33	7.45	7.84
2	Total Suspended Solids	mg/L	0	24	BLQ[LOQ-5.0]	6	19	56	31	12	64	6	8
3	Oil and grease	mg/L	0	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
4	BOD 3 days @27°C	mg/L	2	45.4	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	9.08	13.62	BLQ[LOQ-0.25]	20.8	14.52	9.08	BLQ[LOQ-2.5]
5	COD	mg/L	0	99.8	BLQ[LOQ-4.0]	10.91	45.63	60.29	8.1	69.86	49.9	60.1	12.05
6	Turbidity	NTU	5	13.04	BLQ[LOQ-0.5]	1.98	1.1	18.6	1.12	2.57	0.73	17.05	BLQ[LOQ-0.5]
7	Total Dissolved Solids	mg/L	500	3053	807	1540	1362	504	908	1317	1455	623	1243
8	Total Residual Chlorine	mg/L	0	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	mg/L	0	0.74	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	0.78	0.87	1.56	3.32	0.36	0.86	0.34
10	Total Kjeldahl Nitrogen as N	mg/L	0	18.47	5.14	7.96	10.23	11.94	21.86	14.78	24.44	17.62	6.82
11	Free Ammonia as NH_3	mg/L	0	0.9	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	0.95	1.06	BLQ[LOQ-0.25]	4.05	0.44	1.05	0.41
12	Iron as Fe	mg/L	0.3	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	0.12	0.57	0.08	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	0.38	0.14	BLQ[LOQ-0.05]

SI No	Test Parameters	Unit	IS 2296 Standard	Sri Chandra Sudeshwar Kovil (SW-11)	Jalagandeshwar (SW-12)	Dharga Chandrambigai Lake (SW-13)	Dhadhav Rao Lake (SW-14)	Sargar Eri (SW-15)	Pattalamman Eri (SW-16)	Devan Eri (SW -17)	Venkatappan Eri (SW -18)	Lakshmanarav Eri (SW-19)	Ramnarayan Eri (SW-20)
13	Chloride as Cl	mg/L	250	1143.19	189.71	458.26	394.2	147.83	285.8	364.64	463.19	163.41	487.83
14	Fluoride as F	mg/L	1.5	1.12	0.21	0.52	0.39	0.19	0.22	1.54	0.47	0.22	0.32
15	Nitrate as NO_3	mg/L	20	2.74	1.62	1.94	2.35	1.47	1.56	2.04	1.84	1.38	1.86
16	Sulphate as SO_4	mg/L	400	346.12	72.04	164.2	138.22	54.12	95.21	110.24	162.09	76.22	112.41
17	Salinity at 250° C	ppt	0	2.3	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	1.1	<1.0	<1.0
18	Dissolved Phosphate as P	mg/L	0	0.93	BLQ[LOQ-0.05]	1.18	0.98	0.21	1.25	0.92	0.08	0.12	0.09
19	Total phosphorus (P)	mg/L	0	1.18	BLQ[LOQ-0.05]	1.42	1.46	0.28	1.82	1.13	0.18	0.17	0.13
20	Orthophosphate	mg/L	0	0.64	BLQ[LOQ-0.05]	0.94	0.76	BLQ[LOQ-0.05]	0.89	0.71	0.06	0.08	0.06
21	Total nitrogen (N)	mg/L	0	21.99	6.97	10.13	13.38	14.31	7.74	21.29	26.67	20.1	8.28
22	Nitrite (as NO_2)	mg/L	0.3	BLQ[LOQ-0.01]		BLQ[LOQ-0.01]	BLQ[LOQ-0.01]		1.56	1.14	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	1.22
23	Chlorophylla	mg/L	0	BLQ[LOQ-0.5]		1.5	BLQ[LOQ-0.5]		BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
	Class			-	**Class C**	**Class E**	**Class C**	**Class C**	**Class C**	**Class C**	**Class C**	**Class C**	**Class C**

Table 4-13 Surface Water Monitoring Results SW 21 to 29

SI No	Parameters	Unit	IS 2296 Standard	Thottan Eri (SW-21)	Anthiwadi Veeraragavan Lake (SW-22)	Karnoor Eri (SW-23)	Venkatagiri Iyan Eri (SW-24)	Alasanatham Eri (SW-25)	A (Nallah) (SW-26)	B (Nallah) (SW-27)	C (Nallah) (SW-28)	D (Nallah) (SW-29)
1	pH @ 25°C	-	8.5	7.41	7.11	6.93	6.65	7.32	7.5	7.34	7.38	7.27
2	Total Suspended Solids	mg/L	0	134	BLQ[LOQ-5.0]	176	BLQ[LOQ-5.0]	7	6	29	46	24
3	Oil and grease	mg/L	0	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
4	BOD 3 days @27°C	mg/L	2	29.05	BLQ[LOQ-2.5]	40.86	72.64	8.17	6.14	10.24	143.36	66.56
5	COD	mg/L	0	149.7	9.98	179.64	261.66	40.06	25.3	48.8	450.72	241.92
6	Turbidity	NTU	5	4.41	2.26	18.1	21.8	1.41	1.84	1.52	7.82	5.13
7	Total Dissolved Solids	mg/L	500	1542	507	953	2499	1160	1128	1258	1690	1280
8	Total Residual Chlorine	mg/L	0	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
9	Ammoniacal Nitrogen as N	mg/L	0	0.88	BLQ[LOQ-0.25]	0.96	0.92	0.72	BLQ[LOQ-0.25]	0.74	0.87	0.94
10	Total Kjeldahl Nitrogen as N	mg/L	0	49.45	4.26	69.34	17.05	6.54	7.1	8.81	32.4	68.21
11	Free Ammonia as NH_3	mg/L	0	1.08	BLQ[LOQ-0.25]	1.17	1.12	0.88	BLQ[LOQ-0.25]	0.91	1.06	1.15
12	Iron as Fe	mg/L	0.3	0.14	BLQ[LOQ-0.05]	0.75	BLQ[LOQ-0.05]	0.16	BLQ[LOQ-0.05]	0.16	BLQ[LOQ-0.05]	0.42
13	Chloride as Cl	mg/L	250	463.19	128.12	246.38	1113.63	128.12	387.61	332.24	493.32	362.44
14	Fluoride as F	mg/L	1.5	0.54	0.13	0.27	0.78	0.38	0.32	0.35	0.6	0.57
15	Nitrate as NO_3	mg/L	20	2.46	1.12	2.14	2.62	1.52	1.62	2.26	1.87	2.63
16	Sulphate as SO_4	mg/L	400	148.42	62.4	96.25	253.64	115	118.1	125.08	152.43	136.84
17	Salinity at 250° C	ppt	0	1.1	<1.0	<1.0	1.87	<1.0	<1.0	<1.0	1.28	<1.0
18	Dissolved Phosphate as P	mg/L	0	1.09	0.08	1.06	0.09	0.11	0.11	1.41	0.9	1.46
19	Total phosphorus (P)	mg/L	0	1.92	0.11	1.57	0.09	0.14	0.14	1.76	1.12	1.73
20	Orthophosphate	mg/L	0	1.24	0.06	0.92	0	0.08	0.08	0.96	0.38	0.98
21	Total nitrogen (N)	mg/L	0	52.81	5.53	72.42	20.41	9.04	8.64	11.93	34.89	71.8
22	Nitrite (as NO_2)	mg/L	0.3	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]		BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]	BLQ[LOQ-0.01]
23	Chlorophylla	mg/L	0	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]		BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
	Class			**Class E**	**Class C**	**Class C**	-	**Class C**	**Class C**	**Class C**	**Class E**	**Class C**

4.10 GROUND WATER SAMPLING ANALYSIS

The ground water sampling results are compared with Drinking Water standard IS: 10500 - 2012.

Inference: It is found that TDS exceeds the permissible limit all waterbodies except Venkatagiri Eri due to more extraction of ground water. As per IS 10500-2012,

- TDS < 500mg/l – can be used for drinking
- TDS > 500mg/l and <= 2000 mg/l – may be tolerated, although it is not ideal for long term consumption.
- TDS > 2000 mg/l – cannot be used

Table 4-14 Ground Water Monitoring Results for GW – 1 to 10

SI No	Parameter	Unit	Limit – IS 10500	Avalapalli Eri (GW-1)	Mayil Ravanan Eri (GW-2)	Venkatagiri Eri (GW-3)	Kesavakuttai Eri (GW-4)	Krishnarav Eri (GW-5)	Venkatesan Eri (GW-6)	Santhapuram Eri (GW-7)	Seetharaman Eri (GW-8)	Datha Eri (GW-9)	Kalegunda Pond (GW-10)
1	pH @ 25°C	-	6.5-8.5	7.54	7.4	7.21	7.38	7.84	7.08	7.53	7.62	7.59	7.29
2	Total Suspended Solids	mg/L	100	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]
3	Oil and grease	mg/L	10	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
4	BOD 3 days @27°C	mg/L	30	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]
5	COD	mg/L	250	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]
6	Turbidity	NTU	1	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-5.0]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	0.66
7	Total Dissolved Solids	mg/L	500	830.0	1622.0	1138	1128.0	1340.0	2340.0	2639.0	1447.0	685.0	1510.0
8	Total Residual Chlorine	mg/L	1	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	mg/L	0.5	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	mg/L	100	5.4	6.54	6.04	5.97	8.53	6.54	6.25	8.24	5.4	8.24
11	Free Ammonia as NH_3	mg/L	5	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
12	Iron as Fe	mg/L	1	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
13	Chloride as Cl	mg/L	250	246	240	198	210	241	233	246	189	211.88	191
14	Fluoride as F	mg/L	1	0.28	0.51	0.37	0.32	0.44	0.89	0.74	0.71	0.18	0.49
15	Nitrate as NO_3	mg/L	45	1.32	2.94	1.57	2.17	1.82	2.46	2.75	2.11	1.54	1.98
16	Sulphate as SO_4	mg/L	200	82.5	181.24	116.58	104.62	132.46	195	184.22	141.24	66.33	146.54
17	Salinity at 250° C	ppt	0.5	<1.0	<1.0	<1.0	<.1.0	<1.0	1.80	1.94	1.40	<1.0	<1.0
18	EC at 25^0 C	mS/cm	2.25	1197	2.3	1639	1659.80	1938.0	3.35	3.68	2.05	980.0	2.16
19	Dissolved Phosphate as P	mg/L	5	0.12	0.12	0.13	0.08	0.13	0.07	0.08	0.16	0.13	0.14

Table 4-15 Ground Water Monitoring Results for GW – 11 to 20

SI No	Parameter	Unit	Limit – IS 10500	Sri Chandra Sudeshwar Kovil (GW-11)	Jalagandeshwar (GW-12)	Dharga Chandrambigai Lake (GW-13)	Dhadhav Rao Lake (GW-14)	Sargar Eri (GW-15)	Varatharayan Eri (GW-16)	Pattalamman Eri (GW-17)	Devan Eri (GW-18)	Venkatappan Eri (GW-19)	Lakshmanarar Eri (GW-20)
1	pH @ 25°C	-	6.5-8.5	6.85	7.68	7.41	7.34	7.36	6.85	7.43	7.05	7.45	7.42
2	Total Suspended Solids	mg/L	100	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]
3	Oil and grease	mg/L	10	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
4	BOD 3 days @27°C	mg/L	30	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]
5	COD	mg/L	250	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]
6	Turbidity	NTU	1	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
7	Total Dissolved Solids	mg/L	500	628.0	1589.0	1236.0	1408.0	904.0	1010.60	965.0	914.0	2082.0	1156.0
8	Total Residual Chlorine	mg/L	1	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	mg/L	0.5	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	mg/L	100	6.82	6.25	8.24	7.96	5.68	7.39	5.12	6.39	5.68	7.96
11	Free Ammonia as NH_3	mg/L	5	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
12	Iron as Fe	mg/L	1	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
13	Chloride as Cl	mg/L	250	197.1	214	170	198	206	197	215	220	241	168
14	Fluoride as F	mg/L	1	0.24	0.47	0.32	0.42	0.30	0.34	0.29	0.28	0.39	0.32
15	Nitrate as NO_3	mg/L	45	1.38	2.15	1.76	1.86	1.58	1.62	1.96	1.82	2.42	1.61
16	Sulphate as SO_4	mg/L	200	62.31	152.65	96.12	136.07	85.46	98.32	92.39	94.21	116.82	118.42
17	Salinity at 250° C	ppt	0.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.60	<1.0
18	EC at 25^0 C	mS/cm	2.25	898.0	2.28	1757.0	2.01	1241.6	1566.0	1403.60	1307.0	3.05	1652.0

SI No	Parameter	Unit	Limit – IS 10500	Sri Chandra Sudeshwar Kovil (GW-11)	Jalagandeshwar (GW-12)	Dharga Chandrambigai Lake (GW-13)	Dhadhav Rao Lake (GW-14)	Sargar Eri (GW-15)	Varatharayan Eri (GW-16)	Pattalamman Eri (GW-17)	Devan Eri (GW-18)	Venkatappan Eri (GW-19)	Lakshmanarar Eri (GW-20)
19	Dissolved Phosphate as P	mg/L	5	0.11	0.23	0.13	0.14	0.14	0.11	0.08	0.09	0.14	0.13

Table 4-16 Ground Water Monitoring Results for GW – 21 to 28

Sl.No	Test Parameters	Unit	Limit – IS 10500	Ramanarayan Eri (GW-21)	Thottan Eri (GW-22)	Sipcot Lake (GW-23)	Kalkeri Thally Eri (GW-24)	Anthiwadi Veeraragavan Lake (GW-25)	Karnoor Eri (GW-26)	Venkatagiri Iyan Eri (GW-27)	Alasanatham Eri (GW-28)
1	pH @ 25°C	-	6.5-8.5	7.26	7.20	7.29	7.02	7.68	7.62	6.82	7.24
2	Total Suspended Solids	mg/L	100	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	0	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]
3	Oil and grease	mg/L	10	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-1.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
4	BOD 3 days @27°C	mg/L	30	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-0.25]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]
5	COD	mg/L	250	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]
6	Turbidity	NTU	1	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
7	Total Dissolved Solids	mg/L	500	1027.0	1275.0	1754.0	653.0	794.0	841.0	53.0	908.0
8	Total Residual Chlorine	mg/L	1	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	mg/L	0.5	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	mg/L	100	7.39	5.12	6.25	7.39	7.96	5.97	5.68	7.96
11	Free Ammonia as NH_3	mg/L	5	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
12	Iron as Fe	mg/L	1	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
13	Chloride as Cl	mg/L	250	199	104	201.43	192.17	202.03	202.03	16.26	184.78
14	Fluoride as F	mg/L	1	0.33	0.34	0.36	0.18	0.22	0.28	0.04	0.38
15	Nitrate as NO_3	mg/L	45	1.86	2.14	2.37	1.48	1.52	1.31	BLQ[LOQ-1.0]	1.72
16	Sulphate as SO_4	mg/L	200	96.37	126.48	182.46	58.12	69.21	72.43	BLQ[LOQ-5.0]	115.21
17	Salinity at 250° C	ppt	0.5	<1.0	<1.0	1.36	<1.0	<1.0	<1.0	<1.0	<1.0
18	EC at 25^0 C	mS/cm	2.25	1451	1886.40	2.55	925.0	1135.0	1169.0	79.8	1641.0
19	Dissolved Phosphate as P	mg/L	5	0.12	0.08	0.12	0.09	0.12	0.11	BLQ[LOQ-0.05]	0.12

Table 4-17 Ground water Monitoring Results for GW – 29 to 32

Sl No	Test Parameters	Unit	Limit – IS 10500	A (Nallah) (GW-29)	B (Nallah) (GW-30)	C (Nallah) (GW-31)	D (Nallah) (GW-32)
1	pH @ 25°C	-	6.5-8.5	6.85	7.19	7.56	7.33
2	Total Suspended Solids	mg/L	100	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]	BLQ[LOQ-5.0]
3	Oil and grease	mg/L	10	BLQ[LOQ-1.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]	BLQ[LOQ-2.0]
4	BOD 3 days @27°C	mg/L	30	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]	BLQ[LOQ-2.5]
5	COD	mg/L	250	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	BLQ[LOQ-4.0]	8.10
6	Turbidity	NTU	1	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]	BLQ[LOQ-0.5]
7	Total Dissolved Solids	mg/L	500	1136.0	742.0	1802.0	974.0
8	Total Residual Chlorine	mg/L	1	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	mg/L	0.5	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	mg/L	100	6.25	5.97	6.82	5.68
11	Free Ammonia as NH_3	mg/L	5	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]	BLQ[LOQ-0.25]
12	Iron as Fe	mg/L	1	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]	BLQ[LOQ-0.05]
13	Chloride as Cl	mg/L	250	199.44	216.46	232.86	211.83
14	Fluoride as F	mg/L	1	0.36	0.26	0.56	0.28
15	Nitrate as NO_3	mg/L	45	1.62	1.13	1.96	1.74
16	Sulphate as SO_4	mg/L	200	116.21	67.42	182.11	98.21
17	Salinity at 250° C	ppt	0.5	<1.0	<1.0	1.4	<1.0
18	EC at 25^0 C	mS/cm	2.25	1603.0	1044.0	2.57	1346.0
19	Dissolved Phosphate as P	mg/L	5	0.12	0.07	0.13	BLQ[LOQ-0.05]

4.11 SILT SAMPLING ANALYSIS

Monitoring of Silt sampling was carried out as per CPCB guidelines and Hazardous and other Wastes (Management & Transboundary Movement) Rules, 2016.

Inference:

The silt sampling test result is compared with CPCB guidelines and Hazardous and other Wastes (Management & Transboundary Movement) Rules, 2016 and all the parameters are within the permissible limit. Hence the removed silt can be used for bund strengthening, creating mud flats within the water body and to dump in low lying areas.

Table 4-18 Silt Monitoring Results for S 1 to 10

SI No	Test Parameters	Unit	HWM 2016 – Standard	Avalapalli Eri (S-1)	Mayil Ravanan Eri (S-2)	Venkatagiri Eri (S-3)	Kesavakuttai Eri (S-4)	Krishnarav Eri (S-5)	Venkatesan Eri (S-6)	Santhapuram Eri (S-7)	Seetharaman Eri (S-8)	Datha Eri (S-9)	Kalegunda Pond (S-10)
1	Colour	-		Blackish Brown	Blackish Brown	Light Brown	Light Brown	Light Brown	Gray	Blackish Brown	Light Brown	Light Brown	Light Brown
2	Texture	%		Sand-18.0, Silt-30.0, Clay-52.0	Sand-21.0, Silt-34.0, Clay-45.0.	Sand-48.0, Silt-34.0, Clay-18.0	Sand-8.0, Silt-32.0, Clay-61.0	Sand-1.0, Silt-12.0, Clay-87.0	Sand-8.0, Silt-19.0, Clay-73.0.	Sand-1.0, Silt-16.0, Clay-83.0	Sand-7.0, Silt-24.0, Clay-69.0.	Sand-11.0, Silt-32.0, Clay-57.0.	Sand-7.0, Silt-38.0, Clay-55.0
3	Phosphate as PO_4	Kg/ha	5	61.56	58.82	44.78	72.26	64.23	76.55	71.37	65.04	67.35	53.97
4	Sodium as Na	Kg/ha	100-300	442.09	443.88	160.02	194.25	750.40	1649.12	3265.40	348.15	209.3	387.45
5	Nitrate	mg/kg	1000.0	177.55	225.63	24.79	248.94	250.02	387.50	354.22	242.07	473.97	229.01
6	Iron as Fe	%	1-5	0.69	0.26	0.08	1.95	2.20	1.47	1.59	1.70	1.49	0.94
7	Chromium as Cr	mg/kg	5.0	3.74	3.56	2.19	3.61	2.18	1.25	2.11	1.75	2.07	1.63
8	Manganese as Mn	mg/kg	10.0	8.63	6.93	BLQ[LOQ-1.0]	5.46	8.94	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	3.91	1.36	5.91
9	Lead as Pb	mg/kg	5.0	4.48	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	2.62	3.89	1.71	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	1.88
10	Zinc as Zn	mg/kg	250.0	30.02	35.27	8.15	44.69	69.20	0.46	82.05	69.04	46.02	47.0
11	Copper as Cu	mg/kg	25.0	7.96	16.88	6.99	22.4	6.68	0.25	9.14	3.09	14	9.91
12	Nickel as Ni	mg/kg	20.0	2.5	2.76	BLQ[LOQ-1.0]	8.7	15.93	14.37	8.39	18.43	4.62	6.42
13	Cobalt as Co	mg/kg	80.0	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
14	Silica	%	50-70	57.62	71.67	92.68	58.01	1.03	25.57	1.0	46.18	78.91	58.57
15	Aluminium	mg/kg	20,000-80,000	2639.71	1098.17	798.98	10384.08	7879.50	1.41	8557.06	0.73	5825.58	10922.27
16	Mercury	mg/kg	0.2	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ [LOQ-1.0	BLQ[LOQ-1.0]
17	Arsenic	mg/kg	5.0	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]

Table 4-19 Silt Monitoring Results for S 11 to 20

SI No	Parameters	Unit	HWM 2016 Standard	Sri Chandra Sudeshwar Kovil (S-11)	Jalagandeshwar (S-12)	Dharga Chandrambigai Lake (S-13)	Dhadhav Rao Lake (S-14)	Sargar Eri (S-15)	Varatharayan Eri (S-16)	Pattalamman Eri (S-17)	Devan Eri (S-18)	Venkatappan Eri (S-19)	Lakshmanarar Eri (S-20)
1	Colour	-	-	Light Brown	Light Brown	Light Brown	Blackish Brown	Light Brown	Brown	Light Brown	Light Brown	Light Brown	Light Brown
2	Texture	%	-	Sand-9.0, Silt-27.0, Clay-64.0.	Sand-7.0, Silt-28.0, Clay-65.0	Sand-1.0, Silt-28.0, Clay-71.0	Sand-5.0, Silt-25.0, Clay-70.0.	Sand-9.0, Silt-18.0, Clay-73.0	Sand-21.0, Silt-27.0, Clay-52.0	Sand-7.0, Silt-25.0, Clay-68.0	Sand-17.0, Silt-31.0, Clay-52.0	Sand-6.0, Silt-25.0, Clay-69.0.	Sand-5.0, Silt-30.0, Clay-65.0
3	Phosphate as PO_4	Kg/ha	5	72.57	63.34	62.09	68.30	60.7312	58.44	96.41	51.30	68.72	69.14
4	Sodium as Na	Kg/ha	100-300	1298.05	635.71	1128.40	587.99	411.96	423.93	921.41	182.76	743.64	256.34
5	Nitrate	mg/kg	1000.0	324.42	356.10	203.13	267.80	303.22	63.45	289.56	136.41	308.56	223.44
6	Iron as Fe	%	1-5	1.47	1.85	1.68	1.29	2.88	3.98	3.41	0.82	2.54	1.06
7	Chromium as Cr	mg/kg	5.0	3.63	4.4	2.15	3.9	3.17	2.13	1.23	4.67	4.5	1.14
8	Manganese as Mn	mg/kg	10.0	BLQ[LOQ-1.0]	2.36	4.02	BLQ[LOQ-1.0]	1.29	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	2.96	2.81	1.26
9	Lead as Pb	mg/kg	5.0	1.53	1.33	1.43	1.12	BLQ[LOQ-1.0]	2.41	1.56	4.43	BLQ[LOQ-1.0]	2.13
10	Zinc as Zn	mg/kg	250.0	55.75	63.86	79.04	66.58	65.53	66.25	80.96	25.59	73.65	27.09
11	Copper as Cu	mg/kg	25.0	8.52	5.85	3.72	21.64	2.37	5.48	3.47	20.11	4.55	17.45
12	Nickel as Ni	mg/kg	20.0	12.61	12.51	12.11	8.41	16.64	10.88	11.52	1.19	12.13	15.87
13	Cobalt as Co	mg/kg	80.0	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
14	Silica	%	50-70	43.50	49.43	0.95	44.33	42.08	45.23	39.63	72.54	42.40	37.69
15	Aluminium	mg/kg	20,000-80,000	0.46	4723.13	10486.43	4984.0	1.11	1.55	14499.32	1971.12	0.75	3626.16
16	Mercury	mg/kg	0.2	BLQ[LOQ-1.0]	BLQ[LOQ-1.0	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]

Sl No	Parameters	Unit	HWM 2016 Standard	Sri Chandra Sudeshwar Kovil (S-11)	Jalagandeshwar (S-12)	Dharga Chandrambigai Lake (S-13)	Dhadhav Rao Lake (S-14)	Sargar Eri (S-15)	Varatharayan Eri (S-16)	Pattalamman Eri (S-17)	Devan Eri (S-18)	Venkatappan Eri (S-19)	Lakshmanarar Eri (S-20)
17	Arsenic	mg/kg	5.0	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]

Table 4-20 Silt Monitoring Results for S 21 to 28

Sl No	Parameters	Unit	HWM 2016 – Standard	Ramanarayan Eri (S-21)	Thottan Eri (S-22)	Sipcot Lake (S-23)	Kalkeri Thally Eri (S-24)	Antherwadi Veeraragavan Lake (S-25)	Karnoor Eri (S-26)	Venkatagiri Eri (S-27)	Alasanatham Eri (S-28)
1	Colour	-		Light Brown	Light Brown	Brown	Brown	Light Brown	Light Brown	Light grey	Blackish Brown
2	Texture	%		Sand-9.0, Silt-29.0, Clay-62.0	Sand-3.0, Silt-33.0, Clay-61.0.	Sand-11.0, Silt-33.0, Clay-56.0	Sand-18.0, Silt-27.0, Clay-55.0	Sand-5.0, Silt-29.0, Clay-66.0.	Sand-4.0, Silt-32.0, Clay-64.0	Sand-12.0, Silt-21.0, Clay-67.0.	Sand-17.0, Silt-32.0, Clay-51.0.
3	Phosphate as PO_4	Kg/ha	5	60.22	74.33	62.45	69.03	62.83	62.89	67.84	59.12
4	Sodium as Na	Kg/ha	100-300	512.33	1880.90	383.43	578.60	329.85	654.16	746.54	979.99
5	Nitrate	mg/kg	1000.0	394.31	362.89	221.57	29.48	186.25	317.36	391.90	264.69
6	Iron as Fe	%	1-5	1.59	1.28	1.86	10.82	1.57	1.92	1.25	0.81
7	Chromium as Cr	mg/kg	5.0	2.01	2.2	2.34	3.05	2.79	1.34	1.04	1.22
8	Manganese as Mn	mg/kg	10.0	1.99	2.73	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	1.66	3.19	1.31
9	Lead as Pb	mg/kg	5.0	1.95	3.17	BLQ[LOQ-1.0]	1.42	BLQ[LOQ-1.0]	2.61	2.43	BLQ[LOQ-1.0]
10	Zinc as Zn	mg/kg	250.0	29.11	95.70	48.11	62.23	57.24	103.44	72.85	47.32
11	Copper as Cu	mg/kg	25.0	20.84	9.95	23.56	4.6	7.92	5.34	27.3	24.38
12	Nickel as Ni	mg/kg	20.0	8.11	11.4	7.95	31.31	58.76	23.35	12.91	7.31
13	Cobalt as Co	mg/kg	80.0	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
14	Silica	%	50-70	62.75	26.63	52.44	57.80	36.80	23.19	53.17	55.41
15	Aluminium	mg/kg	20,000-80,000	6198.9	0.63	7327.27	1.47	4405.28	15407.75	1.2	0.62
16	Mercury	mg/kg	0.2	BLQ [LOQ-1.0	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0	BLQ[LOQ-1.0]
17	Arsenic	mg/kg	5.0	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]

Table 4-21 Silt Monitoring Results for S 29 to 32

Sl No	Parameters	Unit	HWM 2016 – Standard	A (NALLA) (SS-29)	B (NALLA) (SS-30)	C (NALLA) (SS-31)	D (NALLA) (SS-32)
1	Colour	-		Light Brown	Light Brown	Brownish grey	Light Brown
2	Texture	%		Sand-38.0, Silt-45.0, Clay-17.0	Sand-7.0, Silt-28.0, Clay-65.0.	Sand-9.0, Silt-34.0, Clay-57.0.	Sand-3.0, Silt-22.0, Clay-75.0
3	Phosphate as PO_4	Kg/ha	5	50.85	76.94	82.07	69.14
4	Sodium as Na	Kg/ha	100-300	120.23	616.68	996.58	575.77
5	Nitrate	mg/kg	1000.0	22.33	230.99	251.31	248.92
6	Iron as Fe	%	1-5	0.97	1.46	1.13	2.67
7	Chromium as Cr	mg/kg	5.0	3.99	3.25	2.79	2.94
8	Manganese as Mn	mg/kg	10.0	1.91	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
9	Lead as Pb	mg/kg	5.0	BLQ[LOQ-1.0]	1.19	2.69	1.42
10	Zinc as Zn	mg/kg	250.0	34.14	106.67	75.54	83.81
11	Copper as Cu	mg/kg	25.0	22.59	20.57	3.2	4.72
12	Nickel as Ni	mg/kg	20.0	5.03	17.08	11.4	17.16
13	Cobalt as Co	mg/kg	80.0	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
14	Silica	%	50-70	80.85	49.26	13.39	3.80
15	Aluminium	mg/kg	20,000-80,000	719.36	0.69	2974.88	0.74
16	Mercury	mg/kg	0.2	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]
17	Arsenic	mg/kg	5.0	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]	BLQ[LOQ-1.0]

4.12 AMBIENT AIR SAMPLING ANALYSIS

Ambient Air Sampling is conducted at 8 locations to predict the long-term assessment of pollutant levels in the outdoor air. The Air sampling is conducted for 24 hours at different locations in the entire HCMC area.

The National Ambient Air Quality Standards (NAAQS) in India are set by the Central Pollution Control Board (CPCB). These standards apply nationwide and are governed by the Air (Prevention and Control of Pollution) Act, 1981. They define permissible levels of various pollutants in ambient air to safeguard public health and the environment.

Table 4-22 National Ambient Air Monitoring Standard (CPCB)

Sl No	Parameter	Unit	Time Weighted Average	Concentration in Ambient Air	
				Industrial, Residential, Rural and other area	Ecologically sensitive area (notified by Central Government)
1	Particulate matter (size less than 2.5µm) or PM2.5	µg/cum	Annual	40	40
			24 hours	60	60
2	Particulate matter (size less than 10µm) or PM10	µg/cum	Annual	60	60
			24 hours	100	100
3	Sulphur Dioxide (So_2)	µg/cum	Annual	50	20
			24 hours	80	80
4	Nitrogen Dioxide (No_2)	µg/cum	Annual	40	30
			24 hours	80	80
5	Carbon Monoxide (CO)	µg/cum	8 hours	2	2
			1 hours	4	4
6	Ammonia (NH_3)	µg/cum	Annual	100	100
			24 hours	400	400

The samples collected from different location in our project area is analysed for the Suspended Particulate Matter, gaseous pollutants such as Sulphur di oxide (SO_2) and Nitrogen di Oxides (NO_2), Primary pollutants such as Carbon Monoxide, ammonia and compared with National Ambient Air quality standard (NAAQS). The results of Ambient Air Quality Standards in Hosur project area as follows.

Table 4-23 Ambient Air Quality Monitoring Results for A to H

Sl No	Name	Unit	A&N-1	A&N-2	A&N-3	A&N-4	A&N-5	A&N-6	A&N-7	A&N-8	NAAQ NORMS
1	PM2.5	µg/m^3	63.0	48.0	118.0	91.0	7.0	40.0	31.0	56.0	60.0
2	PM10	µg/m^3	138.0	97.0	227.0	175.0	153.0	89.0	70.0	113.0	100.0
3	SO_2	µg/m^3	12.5	8.4	19	15.3	11.8	7.6	5.8	9.3	80.0
4	NO_2	µg/m^3	26.0	23.0	38.0	32.0	29.0	20.0	17.0	25.0	80.0
5	CO	µg/m^3	BLQ (LOQ-0.115)	BLQ (LOQ-0.115)	0.152	0.138	0.123	BLQ (LOQ-0.115)	BLQ (LOQ-0.115)	BLQ (LOQ-0.115)	2.0
6	NH_3	µg/m^3	BLQ (LOQ-20.0)	BLQ (LOQ-20.0)	BLQ (LOQ-20.0)	BLQ (LOQ-20.0)	BLQ (LOQ-20.0)	BLQ (LOQ-20.0)	BLQ (LOQ-20.0)	BLQ (LOQ-20.0)	400.0

From above table, we found the few observations as follows

- Particulate matter (size less than 2.5 µm) or PM 2.5 is higher than standard NAAQ in A&N-1 (SIPCOT), A&N-3 (ESI Ring Road Near Hyundai show room), & A&N-4 (Mathigiri - Hosur corporation - primary school))
- Particulate matter (size less than 10 µm) or PM 10 is higher than standard NAAQ in A&N-1 (SIPCOT), A&N-3 (ESI Ring Road Near Hyundai show room), A&N-4 (Mathigiri -Hosur corporation - primary school), A&N-5 (New Rayakottai- HUDCO 100 Feet Ring Road) & A&N-8 (Basthi Road, Near Sargar Lake)
- Gaseous pollutants such as Sulphur di oxide (SO_2) and Nitrogen di Oxides (NO_2) is in order with respect to standard NAAQ
- Primary pollutants such as Carbon Monoxide, ammonia is in order with respect to standard NAAQ

4.13 Noise Level Monitoring

The ambient noise levels were monitored at the selected location within the study area during day and night time. Equivalent noise level is a scale for measurement of long-term noise exposure and has been accepted by CPCB.

Table 4-24 Noise Test Results

Sl No	ID No	Location	Leq dB(A) as per CPCB		Day Time dB(A)			Night time dB(A)		
			Day	Night	Min	Max	Avg	Min	Max	Avg
1	A&N- 1	SIPCOT	75	70	47.3	79.5	65.7	40.5	76.4	57
2	A&N- 2	Chinnaelsagiri	75	70	33.5	74.6	55.4	30.4	57.3	38.9
3	A&N- 3	ESI Ring Road Near Hyundai show room	75	70	32.4	78.2	67.5	31.9	59.1	43.9
4	A&N- 4	Mathigiri (Hosur corporation primary school)	50	40	50.4	83.4	73.6	42.6	85.6	60.5
5	A&N- 5	New Rayakottai (HUDCO 100 Feet Ring Road)	55	45	30.6	76.3	55.8	30.4	67.4	37
6	A&N- 6	Chennathur - near Pattalamman Lake	55	45	30.9	54.5	48.4	30.9	54.7	45.9
7	A&N- 7	Goldern Avenue - Thotagiri Road	55	45	30.4	54.6	43.7	30.7	54.5	47.2
8	A&N- 8	Basthi Road, Near Sargar Lake	75	70	34.8	52.3	46	41.5	62.9	51.4

The above test results are compared with permissible limits, the following are the observations.

- During day time, noise pollution is found in location A&N- 4 (Mathigiri - Hosur corporation primary school) & A&N- 5 (New Rayakottai - HUDCO 100 Feet Ring Road) due to vehicle movements while comparing Permissible Noise level as per CPCB-2000.
- During night time, noise pollution is found in location A&N- 4 (Mathigiri - Hosur corporation primary school), A&N- 6 (Chennathur - near Pattalamman Lake) & A&N- 7 (Goldern Avenue - Thotagiri Road) due to vehicle movements while comparing Permissible Noise level as per CPCB-2000

The Noise pollution is noted due to vehicular actions like engines, horns, and brake sounds especially during stop & start and traffic locations.

4.14 Biological Environment

To assess the floral and faunal biodiversity of the region, a comprehensive walk-through survey was conducted across all project components.

4.15 Biodiversity Assessment

The biodiversity assessment covered in project components such as nallahs (primary drains), water bodies, and parks within and around the Hosur City Municipal Corporation (HCMC) area. The biological environment was evaluated through visual surveys, recording the presence of Macrophytes, Herbs/Weeds/Climbers, Shrubs, and Trees. The IUCN Red List status for the recorded flora and fauna is provided in Annexure 10.

4.16 Major Nallah / Primary drains

Waterways are generally lined with plants to prevent soil erosion, enrich the soil with nutrients to support various life forms, and strengthen the banks. In this regard, floral diversity was studied along the major nallah/primary drains of Hosur. The survey found that grasses were the dominant vegetation, with *Typha angustifolia* being particularly prevalent. The water surfaces were largely covered by floating aquatic plants, including *Eichhornia crassipes* (Water Hyacinth), *Pistia stratiotes*, and *Salvinia molesta*. Additionally, *Ricinus communis* (Castor) was frequently observed along the drain margins. Tree cover in these areas was sparse, with individuals distributed unevenly along the drains.

A total of 78 plant species were recorded along the Major nallah / primary drain and its adjoining areas. Herbs were represented by herbs (28 species), trees (25 species), shrubs (10 species), climbers (7 species), grass (5 species), Floating ferns. (2 species) and Vine (1 species). Refer Annexure 10 Table 1 List of plant species.

Figure 4-5 Biodiversity Assessment – Plant Diversity

A total of 23 tree species were recorded on the streets of Hosur. *Samanea saman, Pongamia pinnata,* and *Delonix regia* were the most common tree species found in the area. Refer Annexure 10 Table 1 List of plant species.

Figure 4-6 Biodiversity Assessment – Trees

4.17 WATERBODIES

The lakes of Hosur, feature a diverse range of vegetation that plays a crucial role in maintaining their ecological balance. Aquatic plants such as Hydrilla and Najas thrive submerged in the water, while floating species like Water Hyacinth (*Eichhornia crassipes*) and Duckweed cover the surface, contributing to nutrient cycling and habitat provision.

4.18 PLANT DIVERSITY

A total of 247 flora species were recorded: 63 tree species, 65 shrubs, 81 herbs, 33 climbers, 2 twiners, 1 grass, 1 vine and 1 bulb. Interpretation: High herbaceous/shrub diversity (65%) reflects wetland dynamics, but invasive floaters signal eutrophication from domestic waste.

4.19 BUTTERFLY DIVERSITY

A total of 114 butterfly species from six families and 18 subfamilies were recorded across twenty-eight lakes around Hosur city.

4.20 BIRD DIVERSITY

Hosur's freshwater lakes support a rich diversity of bird species, playing a crucial role in the ecological health of the region. Common water birds such as the Grey Heron, Indian Pond Heron, and Spot-billed Duck thrive in these habitats, while waders like the Black-winged Stilt and Common Sandpiper frequent the shorelines.

4.21 FISH DIVERSITY

Hosur's lakes, including notable ones like Ramanayakkan, Zuzuvadi, and Avalapalli Lake, are home to a diverse range of freshwater fish species. Prominent species include major carp such as Rohu (*Labeo rohita*), Catla (*Catla catla*), and Mrigal (*Cirrhinus mrigala*), as well as catfish like *Sperata seenghala*. The lakes also support Tilapia species (*Nile and Mozambique Tilapia*), minor carps, and predatory species like Snakeheads.

4.22 Waterbodies Biodiversity Assessment Summary

- The 28 lakes were studied on their biodiversity, both flora and fauna and the other developmental impacts. A total of 247 species of flora were recorded during the survey, of which 63 tree species, 65 shrubs, 81 herbs, 33 climbers, 2 twiners, 1 grass, 1 vine and 1 bulb.
- Most of the lake surface was covered by Aquatic plants such as Hydrilla and Najas, which thrive submerged in the water, while floating species like Water Hyacinth (Eichhornia crassipes) and Duckweed. The ecological/ecosystem balance has been highly impacted, and it is also an indication of the influence of domestic waste on the lakes.
- 114 butterfly species were recorded and classified as Least Concern (LC) according to IUCN conservation status. Three species in this list are legally protected in India under the Wildlife (Protection) Amendment Act, 2022 and fall under the Schedule II Species, which includes high-value species. Species such as the Crimson Rose (*Atrophaneura hector*), Danaid Eggfly (*Hypolimnas misippus*), and Common Pierrot (*Castalius rosimon*) fall in the category. Consequently, no Schedule I species were identified during this assessment. The high diversity of butterflies remains an encouraging sign despite habitat disturbance.
- 80 species of Birds and 12 species of fish were identified. 80 bird species, comprising of resident and migratory birds, were spotted within the lakes from Hosur

4.23 Biodiversity Assessment - Parks

Urban parks are essential for cities and residents' well-being, offering many environmental, health, economic, social, and recreational benefits. Environmentally, they improve air quality by absorbing pollutants and releasing oxygen, help regulate urban temperatures, manage stormwater, and support biodiversity.

4.24 Parks - Vegetation

Hosur's urban parks are home to a diverse range of plant species, with a total of 70 different types, including trees, shrubs, and understory species (refer Annexure 10 Table 1 List of plant species). Among these, trees are the predominant life form, providing the structural backbone and canopy coverage for the parks.

Hosur's urban parks feature a variety of common trees that contribute to their lush and diverse greenery. Among these, *Acacia chundra* is known for its hard wood and beautiful blossoms. *Dalbergia lanceolaria* is another valued tree, often appreciated for its fine timber. *Gmelina arborea* is widely planted for its fast growth and useful wood. *Lagerstroemia speciosa*, also known as the Queen's Crape Myrtle, is celebrated for its stunning flowers and smooth, attractive bark. *Mimusops elengi,* or the Spanish Cherry, is prized for its fragrant flowers and medicinal properties. *Pongamia pinnata*, commonly known as the Indian Beech, is noted for its resilience and oil-producing seeds. *Terminalia catappa*, often called the Indian Almond, provides large, spreading branches and a significant canopy, while *Simarouba glauca*, known as the Paradise Tree, is valued for its drought resistance and oil-rich seeds. These species not only enhance the parks' visual appeal but also play essential roles in providing shade, improving air quality, and supporting local biodiversity.

		
Annona reticulata L	*Bauhinia purpurea L*	*Cassia tora L*
		
Cordia dichotoma	*Dalbergia lanceolaria (Roxb.) Thoth*	*Euphorbia hirta L*

Figure 4-7 Biodiversity Parks – Vegetation

4.25 PARKS - BUTTERFLY

A total of 114 butterfly species from six families and 18 subfamilies were recorded across twenty parks around Hosur. Among these, the family Lycaenidae was the most diverse, comprising 33 species (30.17%). This was followed by the family Nymphalidae with 34 species (29.31%), Pieridae with 19 species (16.38%), Hesperiidae with 17 species (14.66%), and Papilionidae with 10 species (8.62%). The family Riodinidae was the least represented, with only 1 species (0.86%). Based on IUCN Status, all 114

species listed in the table are classified as Least Concern (LC). Globally, these populations are stable and not currently facing extinction. Three species in this list are legally protected in India under the Wildlife (Protection) Amendment Act, 2022 and fall under the Schedule II Species, includes high-value species. Species such as the Crimson Rose (*Atrophaneura hector*), Danaid Eggfly (*Hypolimnas misippus*), and Common Pierrot (*Castalius rosimon*) fall in the category. The presence of Schedule II species legally mandates that their habitats (host plants) be preserved.

		
Indian Grizzled Skipper	*Common Branded Redeye*	*Common Gull*
		
Common Hedge Blue	*Dark Blue Tiger*	*Bamboo Tree brown*
		
Gaudy Baron	*Danaid Eggfly*	*Common Pierrot*

		
Common albatross	*Crimson Rose*	*Spot Swordtail*

Figure 4-8 Parks Biodiversity - Butterfly

4.26 PARKS BIODIVERSITY ASSESSMENT SUMMARY - INFERENCE

The summary of the biodiversity assessment in parks is as follows

- The parks in Hosur are home to a diverse range of plant species, with a total of 70 different types, including trees, shrubs, and understory species. Among these, trees are the predominant life form, providing the structural backbone and canopy coverage for the parks. These trees not only contribute significantly to the park's aesthetic and ecological value but also play a crucial role in offering shade, improving air quality, and creating habitats for various wildlife species.
- The better maintenance and management of the parks, the diversity of flora and fauna can increase.
- The result of the biodiversity survey conducted for the parks in the project area recorded various species of flora and fauna; however, no Schedule I species as defined under the Wildlife (Protection) Amendment Act, 2022, were identified in the flora and butterflies. Refer biodiversity management plan in Annexure 10a.

4.27 DEMOGRAPHICS

According to the 2011 census, Hosur had a population of 116,821 with a sex ratio of 968 females for every 1,000 males, much above the national average of 929. A total of 14,307 were under the age of six, constituting 7,274 males and 7,033 females. Scheduled Castes and Scheduled Tribes accounted for 8.08% and 0.17% of the population, respectively. The average literacy of the city was 76.69%, compared to the national average of 72.99%. The city had a total of 29,255 households. There was a total of 43,959 workers, comprising 212 cultivators, 308 main agricultural labourers, 747 in household industries, 38,463 other workers, 4,229 marginal workers, 57 marginal cultivators, 62 marginal agricultural laborers, 189 marginal workers in household industries and 3,921 other marginal workers.

As per the religious census of 2011, Hosur had 83.66% Hindus, 11.37% Muslims, 4.5% Christians, 0.05% Sikhs, 0.02% Buddhists, 0.11% Jains, 0.27% following other religions and 0.02% following no religion or did not indicate any religious preference.

Table 4-25 Religion in Hosur City

S.No	Religion	Percentage (%)
1	Hindu	83.66%
2	Muslim	11.37%
3	Christian	4.50%
4	Other	0.47%

Tamil is the official language and is spoken by the majority of the people. Telugu and Kannada are also widely spoken, since the town was part of Mysore Kingdom prior to linguistic reorganization of states in 1956. With industrialization lot of people migrated from various parts of the state, so there are a significant number of Tamil speakers now in the town.

Table 4-26 Languages in Hosur City (2011)

S.No	Language	Percentage
1	Tamil	52.0
2	Telugu	25.1
3	Urdu	10.7
4	Kannada	8.13
5	Hindi	1.67
6	Malayalam	1.19
7	Others	1.21

4.28 ECONOMY

Hosur is an industrial hub and houses several automobile and manufacturing industries. Major companies include TVS Motors, Ashok Leyland, Titan, Sundaram Clayton, Harita Seatings, Harita Fehrer, General Electric, Kansai Nerolac Paints, Mylan, GRB Foods, Kamaz Vectra Motors, Alstom, Faiveley Transport, Caterpillar Inc., Carborundum Universal, Exide Industries Ltd, Hindustan Motors, Ion Exchange (India) Limited, Hindustan Unilever, Schaeffler, TTK Prestige, Tab India Granites Pvt Ltd, Bata Shoes, Del Monte Foods, Nippon Electricals, Wendt, Toyota Boshoku, Nilkamal Plastics and Reckitt Benckiser. There are plans for the development of an Information Technology Special Economic Zone near Hosur. ELCOT has called for applications for the allotment of land in the IT Park of Hosur in the month of June 2010. Proximity to Bangalore is seen as an advantage. Many start-up IT companies prefer Hosur for their initial operations. In December 2019, electric vehicle manufacturer Ather Energy signed an MoU with Government of Tamil Nadu to set up a 400,000 sq ft (37,000 m^2) manufacturing plant.

A variety of fruits and vegetables are cultivated around Hosur. The land is very fertile and there is significant access to fresh water as well as labour. Crops consist of tomatoes, cabbages, onions, mangoes, capsicum, carrot, cucumber, beans, coriander leaves, turnips and radishes. Roses are also grown in large numbers. District Livestock Farm was started in 1824. Central Sericultural Germplasm Resources Centre (CSGRC) was established in 1991 to protect and conserve mulberry and silkworm germ plasm resources. In July 2019, the government announced the construction of an international flower auction centre with quality control laboratory, cold storage facility, administrative building and an electronic auction hall at a cost of ₹202 million. It will deal with flowers cultivated on 3,702 hectares in the district, which are also exported to Australia, Singapore, and Malaysia.

4.29 Social Impact Assesment

The Social Impact Assessment has been carried out by following step by step approach. First social screening has been carried out on all the proposed project sites and alignments. Social Baseline conditions are established, followed by social risk classification will be arrived. The specific measures are included in the ESMP.

4.30 Social Screening

Social screening was carried out between June to October 2024 to identify potential impacts associated with the proposed project components. The screening for nallah /Drain was conducted in October 2024. The screening of water bodies was conducted in July 2024. The screening of park sites was conducted in August 2024. The screening was done in proposed project components. The components are;

- Improvements to Major Nallah/Primary Drain – 57.88km
- Secondary and Tertiary drains for flood hot spots – 16.01km
- Rejuvenation of 16 waterbodies
- Sponge Park development proposal for 3 nos (Devi Nagar, Mahalakshmi Nagar and Samathanapuram)

4.31 Social Screening – ISWD and Nallah

Social screening was carried out on October 2024 for the proposed nallah components and along the nallah alignment and ISWD. These consultations involved both residents and street vendors to address their concerns and gather input. During the screening, it was observed that the ramps of residential houses are fouling upon the proposed storm water drain alignment on Urban Local Body (ULB) land. During the implementation, proper access will be provided for the residents as per ESMP. However, as the proposed design involves the construction of a closed storm water drain, there will be no impact on the residents.

The findings of the screening process indicate that there are no livelihood impacts for street vendors and alternate vending space (nearby to their existing vending space) will be provided by the ULB during implementation phase. Hence, there are no permanent/temporary / economical and social impacts for the street vendors.

Each street's vendor count has been meticulously tabulated and is presented below.

Table 4-27 Details of Vendor Engagement

S.NO	NAME OF THE LAKE	Count of Vendors
1.	Kamaraj colony 2nd street	76
2.	Railway station road	22
3.	Nethaji road	26
4.	Taluk office road	49
5.	ESI ring road	34
6.	ASTC road	37
7.	Shanthi road (denkani kottai)	16
8.	Rayakottai road	125
9.	Bagalur road	157
10.	Chennai Bangalore high road	329

4.32 Social Screening– Waterbodies

The social screening was carried out on July 2024 to identify the potential temporary economic impacts in the project area. During the assessment, the consultants did not identify any impacts within the proposed site. However, the community expressed willingness to accept the lake development, while also highlighting the need for recreational facilities. All the proposed sites belong to the Urban Local Bodies (ULBs)/ the Water Resources Department. the observation of each site was explained in the site-specific feature given in below table.

Table 4-28 Findings - Waterbodies

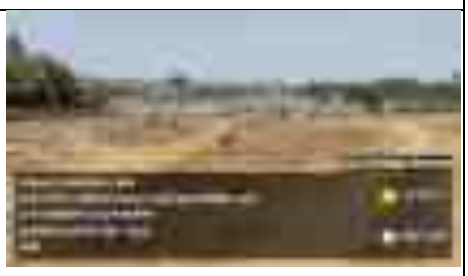
S. No	Site name	Ownership	Key Observation/ Recommendations	WB Photos
1	Avalapalli Eri (Basthi)	HCMC	• Unwanted small plants which are found in the lake need to be cleaned up as a part of this process. • There is no proper bund for the lake. • Water pollution is noted. • Additionally, there is a dump yard and a grave yard near the lake. • No impacts were found within the boundary	
2	Mayil Ravanan Eri (Basthi)	HCMC	• Lake water is found to be polluted. • Additionally, there is a dump yard and a grave yard near the lake. • People are living near the lake. • No impacts were found within the boundary.	
3	Venkatagiri Eri (Basthi)	HCMC	• The lake is surrounded by vacant lands on the north, east, and south sides, with people residing on the west side facing the lake. • This area was developed seven years ago. • A small temple is present near the lake, which will not affect the lake restoration works. • No impacts were found within the boundary.	

S. No	Site name	Ownership	Key Observation/ Recommendations	WB Photos
4	Kesavakuttai Eri	HCMC	• The lake is in dry condition. It is surrounded by agricultural land. • Rainwater is the only source of water for the lake. • No impacts were found within the boundary	
5	Krishnarav Eri	HCMC	• It is a very small lake located near the road. • One motor room was found within the area. • Construction waste has been dumped near the bunds of the lake. • No impacts were found within the boundary	
6	Venkatesan Eri	HCMC	• The lake water is found to be polluted • Unwanted small plants need to be cleaned up as a part of the rejuvenation proposal • No impacts were found within the boundary	
7	Santhapuram Eri	HCMC	• Unwanted plants that are found in the lake need to be cleaned up as part of the rejuvenation proposal. • The bunds of the lake are not maintained, and there are no impacts. • There are a few grave yards found inside the lake. • No impacts were found within the boundary.	
8	Seetharaman Eri	HCMC	• This lake is found in between the residential areas.	

S. No	Site name	Ownership	Key Observation/ Recommendations	WB Photos
			• Unwanted plants that are found in the lake need to be cleaned up as part of the rejuvenation proposal. • The lake water is found to be polluted. • No impacts were found within the boundary.	
9	Datha Eri (Kottur Eri)	HCMC	• Lake restoration work is under progress. • Garbage waste has been dumped near the bunds of the lake. • Temporary sheds were found on the bunds of the lake. • No proper bunds were found or maintained.	
10	Kalegunda Pond	HCMC	• The presence of this small pond in that area helps to recharge the ground water table due to which local people are benefitted for ground water supply. • There are three temporary temples present near the pond • There is one public toilet located nearby the pond, which will not affect the restoration work. • No impacts were found within the boundary.	
11	Sri Chandra Sudeshwar Kovil - Theppakulam	HR & CE	• It is a small temple pond. • The small temple pond is not clean and requires maintenance to improve its condition. • This pond is situated in a residential area.	

S. No	Site name	Ownership	Key Observation/ Recommendations	WB Photos
			• Rainwater is the only source of water for this pond. • No impacts were found within the boundary	
12	Jalagandeshwar Swamy Koil (Ramanaiken Eri)	HR & CE	• This pond is found to be polluted and requires cleaning and deepening of pond to improve its condition. • Ramanayaram lake is found opposite to this pond. • No impacts were found within the boundary	
13	Dharga Chandrambigai Lake	WRD	• This site is situated near the highway. • The lake has unwanted plants growing in it and needs to be cleaned as part of the rejuvenation proposal. • No impacts were found within the boundary	
14	Dhadhav Rao Lake Ashok Leyland Unit-1	WRD	• The lake is situated near the highway. • A forest check post office is found on the bunds of the lake. • Unwanted plants are found in this lake which needs to be cleaned. • No impacts were found within the boundary	
15	Sargar Eri	HCMC	• Bund strengthening work is in process for this lake. • The lake is found to be very dry, and there is an EB pole near the lake. • Rainwater is the only source for this lake, and the excess rainwater will be distributed to the	

S. No	Site name	Ownership	Key Observation/ Recommendations	WB Photos
			nearby agricultural lands. • weir was found to be damaged. • The water is found to be clean, and there is no pollution in the lake. • Dumping of waste is occurring near the bunds of the lake. • No impacts were found within the boundary	
16	Varatharayan Eri	HCMC	• One well is found on the boundary of the lake, along with two weirs nearby. • The lake is found to be dry and farmers in this area depends on this lake water for agricultural activities. • The lake was surrounded by agricultural land. • The farmers want the lake to be restored so that they can have adequate water for their agricultural activities. • No impacts were found within the boundary	
17	Pattalamman Eri	HCMC	• The lake is very dry and farmers in this area depend on lake water for their agricultural activities. • All the sides of the lake are surrounded by vacant land. • The farmers want the lake to be restored so that they can have adequate water for their farming activities. • No impacts were found within the boundary	

S. No	Site name	Ownership	Key Observation/ Recommendations	WB Photos
18	Devan Eri	HCMC	• Proper fencing has been installed around the lake for security and safety purposes. • Lake water is very clean and it is situated in a residential area • A small water tank is present near the lake which serves as one of the sources of water. • No impacts were found within the boundary	
19	Venkatappan Eri (Bedrapalli)	HCMC	• A small play area is found in the water body • Garbage has been continuously dumped in the lake which makes it even more polluted • The lake boundary fencing was installed by the HCMC officials and one weir was found in the lake • The lake water was very polluted • Unwanted plants that are found in the lake need to be cleaned up as part of the rejuvenation proposal • No impacts were found within the boundary.	
20	Lakshmanara v Eri (Motta Eri)	HCMC	• The lake water is found to be polluted and there is a boundary installed around the lake. • Two sides of the lake are surrounded by residential areas. • The water source for the lake is from two inlets of Raja Kalvai, ensuring a steady flow in water levels.	

S. No	Site name	Ownership	Key Observation/ Recommendations	WB Photos
			• No impacts were found within the boundary	
21	Ramanayakken Lake	HCMC	• The lake restoration is in process and it is restored using CSR funds. • Fishing activities are carried out by the people of that area. • A play area is developed for the children through the CSR initiative.	
22	Thottan Eri (Alasanatham Eri)	HCMC	• The Hosur Municipality created a boundary wall to protect the lake. • The lake is located in a prominent area, near both the main road and the bypass. • Street vendors are present in the bunds of the lake. • Lake water is found to be polluted. • No impacts were found within the boundary.	
23	Sipcot Lake-Chinna Elasagiri	HCMC	• Lake restoration work is in progress under the Titan CSR project. • No impacts were found within the boundary	
24	Kalkeri Lake Thally Road	Animal Husbandry	• Restoration work is underway, which is supported by the CSR initiative of TVS Motors near the bunds of the lake. • No impacts were found within the boundary	

S. No	Site name	Ownership	Key Observation/ Recommendations	WB Photos
25	Anthiwadi Veeraragavan	HCMC	• Construction waste has been dumped along the bunds of the lake. • One side of the lake is surrounded by residential areas, while another side a petrol bunk exists, and the opposite side is used for silk-producing activities. • There is an open SWD passing near the lake. • Lake restoration will be helpful in maintaining the ground water in that area. • No impacts were found within the boundary	
26	Karnoor Eri	WRD	• There is no proper boundary identified for the lake, and there is also one temporary shed found on the bunds of the lake. • Construction waste and garbage have been dumped on the bunds of the lake, which makes the lake very polluted. • Farmers depend on the lake water as a source for their agriculture. • No impacts were found within the boundary.	

S. No	Site name	Ownership	Key Observation/ Recommendations	WB Photos
27	Venkatagiri Iyan Eri (Thottagiri)	HCMC	• There is a compost yard present near the lake, which is posing a threat. • There is no proper boundary. • The lake was dry. • No impacts were found within the boundary	
28	Alasanatham Eri	HCMC	• There is no proper bund in this lake. • Cleaning of the inlet and outlet of the lake is necessary, and fishing activities are conducted by the residents on their own. • Lake water is very polluted. • Cultivation is being carried out near the lake. • A small temple is situated in the lake, and a structure is found inside the temple. • No impacts were found within the boundary	

4.33 LAND RECORDS OF WATERBODIES

Rejuvenation of waterbody is proposed for 16 nos and the land ownership were 12 water bodies belongs to ULB, 2 belongs to WRD and 2 belongs Hindu Religious & Charitable Endowments Department (HR & CE). The details of land ownership as follows.

Table 4-29 Land Records of Waterbodies

S.NO	Location	Survey No (TS ward)	Land Classification	Land Ownership	Remarks
1	Kesavakuttai Eri	592, 593, 591 & 594	Water Body	ULB	No involuntary resettlement
2	Krishnarav Eri (Look India Opp)	769	Water Body	ULB	No involuntary resettlement
3	Venkatesan Eri	15	Water Body	ULB	No involuntary resettlement

S.NO	Location	Survey No (TS ward)	Land Classification	Land Ownership	Remarks
4	Santhapuram	463	Water Body	ULB	No involuntary resettlement
5	Seetharaman Eri	122	Water Body	ULB	No involuntary resettlement
6	Sri Chandra Sudeshwar Kovil - Theppakulam	920	Water Body	Hindu Religious & Charitable Endowments Department (HR & CE)	No involuntary resettlement / NOC is in progress
7	Jalagandeshwar Swamy Koil (Ramanaikan Eri)	712	Water Body	Hindu Religious & Charitable Endowments Department (HR & CE)	No involuntary resettlement / NOC is in progress
8	Dharga Chandrambigai Lake	408	Water Body	WRD	No involuntary resettlement / NOC is in progress
9	Dhadhav Rao Lake Ashok Leyland Unit-1	79	Water Body	WRD	No involuntary resettlement / NOC is in progress
10	Varatharayan Eri	132, 599, 600, 162 & 163	Water Body	ULB	No involuntary resettlement
11	Pattalamman Eri	327, 466, 467 & 474	Water Body	ULB	No involuntary resettlement
12	Devan Eri (Therpettai Eri)	953	Water Body	ULB	No involuntary resettlement
13	Venkatappan Eri (Bedrapalli)	375	Water Body	ULB	No involuntary resettlement
14	Lakshmanarav Eri (Motta eri)	692	Water Body	ULB	No involuntary resettlement
15	Thottan Eri (Alasanatham Eri)	2,1170 & 1169	Water Body	ULB	No involuntary resettlement
16	Alasanatham Eri	1043, 1039 & 1041	Water Body	ULB	No involuntary resettlement

4.34 Social Screening– Park

The Social screening was carried in August 2024 to identify the potential temporary economic impacts in the project area. During the assessment, the consultants did not identify any impacts within the proposed site. However, the community expressed willingness to accept the park development, while also highlighting the need for recreational facilities. All the proposed park sites belong to the Urban

Local Bodies (ULBs). The observation of each site was explained in the site-specific feature given in below table.

Table 4-30 Findings – Park

S NO	Site Name	Observation	Site Photograph
1	TNHB Phase-III Bagalur Hudco	• The proposed site belongs to ULB • Park have been bordered by vacant land on north and south side, Residential building is occurred in east and west sides of park. • Residents will be benefitted by using for walking and other recreational activities.	
2	Hosur Phase 12 Old ASTC Hudco	• The proposed site belongs to ULB • A small volley ball court is present inside the park and it is in functional. • A bus stand is located near the boundary of the park. • Installation of playing area for the children will be effective.	
3	Mahalakshmi Nagar	• The proposed site belongs to ULB • Garbage's have been dumped on both sides of the park. • There is a lot of free space with possibilities of creating a walking area.	
4	Phase-8 New ASTC Hudco	• The proposed site belongs to ULB • Residential building is occurred in west and south sides of park.	

S NO	Site Name	Observation	Site Photograph
		• There is a temple located opposite to the park. • There is one transformer and four electricity board (EB) posts are located inside the park.	
5	Ward No 15 Samathanapuram	• The proposed site belongs to ULB • Two borewells and one overhead tank (OHT) are located within the park. Two open drains passing within the park. • Residential building is occurred in west, north and south sides of park, while Dhargah lake is on east side of the park. • A fixed boundary has been set for the park.	
6	TNHB phase XV Mullainagar	• The proposed site belongs to ULB • This park is located within the residential area. • There is a bore well and a water sump located inside the park, providing water supply for various purposes. These facilities ensure adequate water supply to local habitations. • An ICDS (Integrated Child Development Services) center and a nursery school are situated inside the	

S NO	Site Name	Observation	Site Photograph
		park, catering to the educational and developmental needs of children in the area. These facilities offer essential services for early childhood care and education within the site. • An EB (Electricity Board) post and High transmission tower are present within the park.	
7	Mathigiri – GKS nagar	• The proposed site belongs to ULB • There are many trees present within the park. • There are two naturally formed snake nest present inside the park.	
8	Mathigiri – VIP nagar	• The proposed site belongs to ULB • Park is found to be clean and well maintained. • The park was maintained by the resident welfare association of VIP Nagar. • Few trees were planted inside the park. Additionally, proper boundary is setup all around the park. • This small park is ideal for walking for the walkers, and it also has a stage and a flag post that is useful for celebrating events.	

S NO	Site Name	Observation	Site Photograph
9	Hosur – Rayakottai road luk India	• The proposed site belongs to ULB • There are many trees present within this park • Commercial things were dumped inside the park boundary • A snake nest was found inside the park. Pillars were erected to build temple around that snake nest.	
10	Mathigiri – Abirami Garden	• The proposed site belongs to ULB • Inside the lake area, there is one overhead tank (OHT), two EB post, one transformer, and two bore wells were present • A snake nest was found inside the park • Vacant space available that could be utilized for other purposes including play area.	
11	New ASTC Hudco	• The proposed site belongs to ULB • There is a temporary shed inside the park that is used as a stage by the RWA (Residents Welfare Association). • The park is maintained by the RWA and a proper boundary fencing is setup for the park, • There is a volleyball court in the park. • The park is located in a residential area, which is also used for animal husbandry purposes.	

S NO	Site Name	Observation	Site Photograph
		• There are 13 electricity board (EB) posts, 2 Sintex tanks, and 2 bore wells present inside the park.	
12	Avalapalli – RGM nagar	• The proposed site belongs to ULB • There is a small size overhead tank (OHT) inside the park. • The park is surrounded by residential areas on all four sides. • A park with a large walking area is recommended by the residents. • Bore wells are present, and some construction work is currently underway inside the park.	
13	Hosur – TNHB Phase VI Avalapalli Hudco	• The proposed site belongs to ULB • Residential building is occurred in west, north and south sides of park, while vacant land on east side of the park. • The area around the park has developed recently. • There is a small size overhead tank (OHT) inside the site.	

S NO	Site Name	Observation	Site Photograph
14	Balaji nagar	• The proposed site belongs to ULB • Residential building is occurred in west, east and south sides of park, while vacant land on north side of the park. • Bore well work is ongoing in this park. • Garbage is found to be dumped in the few areas of the park.	
15	Hosur-Devi Nagar	• The proposed site belongs to ULB • The park is situated near residential area. • There is a need for walking space within the park as suggested by the residents.	
16	Ward No 9 Upkar Layout, Alasanatham road	• The proposed site belongs to ULB • All the sides of the park are surrounded by residential areas. • The public would benefit from the construction of a park, as there are no nearby parks in that location.	
17	VGP layout, Alasanatham road	• The proposed site belongs to ULB • Residential building is occurred in west and south sides of park, while vacant land is in north and east side of the park. • There is no maintenance within the park.	
18	Muthukumaran Nagar Park	• The proposed site belongs to ULB • All the sides of the park are surrounded by residential areas.	

S NO	Site Name	Observation	Site Photograph
		• There is a need to develop a park in this area, with a strong emphasis on avoiding new building construction.	
19	Mathigiri – Ambalnagar	• The proposed site belongs to ULB • The park has already been developed, and there is exercise equipment available inside the park • Park is surrounded by residential area in all direction. • It is a small park primarily effective for walking, with available space for potential extension.	
20	Annamalai nagar	• The proposed site belongs to ULB • The park is very clean and well maintained • There is one overhead tank (OHT) and one electricity board (EB) post present inside the park. • The park is located in a residential area.	

4.35 LAND RECORDS OF PARKS

Sponge Park development is proposed for 17 parks and the land ownership details as follows.

Table 4-31 Land records of parks

S.NO	Location	Area (Acres)	Survey No (TS ward)	Land Classification	Land Ownership	Remarks
1	TNHB Phase III Bagalur HUDCO	1.39	S.F.No.544/1, 545/Pt, 544/1Pt	Park	ULB	No involuntary resettlement
2	Mahalakshmi Nagar	0.60	Ward B – Block No.08, SF No - 111	Park	ULB	No involuntary resettlement

S.NO	Location	Area (Acres)	Survey No (TS ward)	Land Classification	Land Ownership	Remarks
3	Phase -8 New ASTC HUDCO	0.54	337 Pt, 338 Pt & 339 Pt	Park	ULB	No involuntary resettlement
4	Samathanapuram	0.70	S.F.No. 335, 336 & 337	Park	ULB	No involuntary resettlement
5	TNHB phase XV Mullai Nagar	2.04	S.F.No.835/1A, 835/2Pt	Park	ULB	No involuntary resettlement
6	Mathigiri – VIP Nagar	0.67	S.F.No.706/2Pt, 708Pt, 709Pt	Park	ULB	No involuntary resettlement
7	Rayakottai Road Luk India Opp	0.64	S.F.No.3/1	Park	ULB	No involuntary resettlement
8	Mathigiri - Abirami Garden	0.70	S.F.No.182/2c1 183/1Pt, 189/1	Park	ULB	No involuntary resettlement
9	New ASTC Hudco	1.52	Ward35	Park	ULB	No involuntary resettlement
10	RGM Nagar	0.71	Survey No. 237/1, 2	Park	ULB	No involuntary resettlement
11	TNHB Phase VI Avalapalli Hudco	0.32	SF.No 749,750	Park	ULB	No involuntary resettlement
12	Balaji Nagar	0.47	Ward 35	Park	ULB	No involuntary resettlement
13	Devi Nagar	2.09	SF NO: 385/ 1 Pt	Park	ULB	No involuntary resettlement
14	Upkar Layout	0.18	SF NO: 398,399	Park	ULB	No involuntary resettlement
15	VGP Layout	0.37	SF NO: 406/ 1A, 402/2A	Park	ULB	No involuntary resettlement
16	Muthukumaran Nagar	0.47	1018/1	Park	ULB	No involuntary resettlement
17	Annamalai Nagar	0.40	Ward 27	Park	ULB	No involuntary resettlement

All the above sites are free from impacts and belongs to ULB. The land records and FMB Sketches are provided in the Annexure – Part B.

As Per the baseline social survey the outcomes for each of the components is summariesed below.

4.36 NALLAH AND ISWD

Social screening was carried out on October 2024 for the proposed nallah components and along the nallah alignment and ISWD. During the screening, there are no social impacts were observed near the alignment. There are no Permanent/Temporary/Economic/Social impacts. However, any impacts identified during implementation of the project will be mitigated as per ECSMF 2.0.

In case of unanticipated involuntary resettlement impacts arising during implementation, a social impact assessment must be conducted and compensation will be provided as per entitlement matrix of ECSMF 2.0.

4.37 WATER BODIES

Social screening was carried out on July 2024 for all 16 proposed water bodies. There are no Permanent/Temporary/Economic/Social impacts. However, any impacts identified during implementation of the project will be mitigated as per ECSMF 2.0.

In case of unanticipated involuntary resettlement impacts arising during implementation, a social impact assessment must be conducted and compensation will be provided as per entitlement matrix of ECSMF 2.0.

4.38 PARKS (SPONGE PARKS)

Social screening was carried out on August 2024 for all three proposed sponge parks. There are no Permanent/Temporary/Economic/Social impacts. However, any impacts identified during implementation of the project will be mitigated as per ECSMF 2.0. Incase of unanticipated involuntary resettlement impacts arising during implementation, a social impact assessment must be conducted and compensation will be provided as per entitlement matrix of ECSMF 2.0.

5 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

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

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

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

5.1 IDENTIFICATION OF LIKELY IMPACTS

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

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

Location impacts include impacts associated with site selection and include loss of on-site biophysical array and impacts either directly or indirectly on adjacent environments. It also includes impacts on people who will lose their livelihood or any other structures by the development of the site.

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

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

O&M impacts include impacts arising from the operation and maintenance activities of the infrastructure facility. These include routine management of operational waste streams, and occupational health and safety issues.

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

In case of this project most of the individual elements involve straight forward construction and operation, so impacts will be mainly localized and not greatly significant, negative impacts associated with stormwater drain facilities are already considered in the design. Most of the predicted impacts are associated with the construction process, and are produced because that process is involving excavation and earth movements; and being mostly located in an ULB area, will not cause direct impact on biodiversity values. The project will be in properties held by the ULB and access to the project location is through public rights-of-way and existing roads. Hence, land acquisition and impacts on private property will not occur.

5.2 Pre-Construction Impacts – Design and Location

5.3 Design of the Proposed Components

Technical design of the (i) major nallah and primary drains, and (ii) secondary and tertiary drains, follows the manual on storm water drainage systems published by CPHEEO focusing on providing a robust system which is easy to operate, sustainable, efficient and economically viable.

5.4 Prevention of Flooding

Rainfall data of 43 years are collected and based on that the stormwater drainage system of major nallah/ primary drains is designed to handle the maximum rainfall of 87.83 mm/hour for 25 years return period including 20% climate change factor. Similarly secondary & tertiary drains are designed to handle the maximum rainfall of 64.92 mm/hour for 5 years return period including 20% climate change factor.

5.5 GROUNDWATER RECHARGE

Groundwater level of Hosur is in semi critical stage. Major nallah/primary drains are proposed with natural bed for rainwater harvesting. Rainwater harvesting through constructing catch pits and rainwater harvesting structures are proposed in the stormwater drainage network. Catch pits at every 10m interval and Rainwater harvesting structure along with a silt catching pit is provided at every 30m interval in the proposed/rehabilitated drains. The provision includes FRP Grating Cover with frame and coarse sand for filter media inside the pit.

5.6 SEDIMENT CONTROL

For control of sediments, it is proposed to construct a sediment trap at the confluence point of the drain with the water body so that the sediments are deposited in the silt trap and settle over there which can be removed periodically. It is also possible to provide additional silt traps at the point where the cross-drainage confluence and the silt from these silt traps shall be periodically removed.

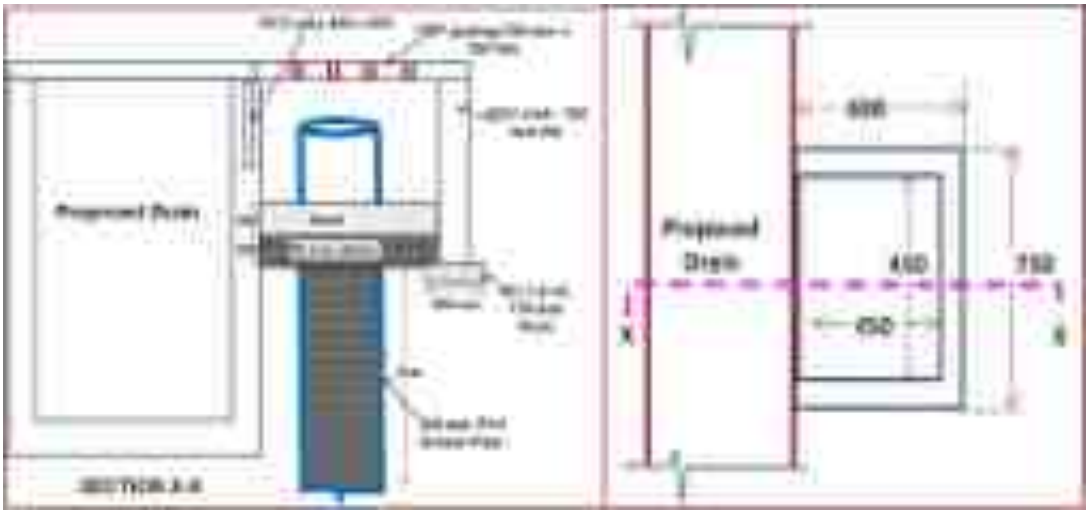


Figure 5-1 Catch pit section with RWH structure in Storm Water Drain

5.7 PREVENTION OF SOLID WASTE

At present HCMC is having an effective solid waste management system. However, people living nearer to Major drain and Storm drain are having tendency to throw solid waste into the Drains. Therefore, the following practices are proposed to prevent solid waste dumping.

i) Secondary and tertiary drains are designed as box type drain in RCC with cover on top which will prevent dumping of solid waste in drains.

ii) Major Nallah and primary drains where open drains exist with retailing wall, fencing on both sides of the canal is proposed to avoid solid waste disposal.

iii) Rain water will flow into drains through FRP gratings to screen the solid waste from entering into drains.

iv) Public awareness programs have been proposed to ensure public co-operation for

proper waste disposal.

5.8 Safety in Maintenance

Inspection doors are provided at an interval of 10m to facilitate maintenance activities by machinery.

5.9 Traffic Loads and People Access to Drains

Secondary and tertiary drains shall be constructed as box type drain in RCC with a cover on top which can also take traffic loads.

5.10 Utilities

Telephone lines, electric poles, and wires, water, and sewer lines, if exists within the proposed project locations may require to be shifted. To mitigate the adverse impacts due to relocation of the utilities, the contractor, in collaboration with the ULB will

(i) identify the locations and operators of these utilities to prevent unnecessary disruption of services during the construction phase; and

(ii) instruct construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services

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

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

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

5.12 Site Selection of Sources of Materials

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

5.13 Social and Cultural Resources – Chance Finds

Any work involving ground disturbance can uncover and damage archaeological and historical remains. This project includes minor excavation will occur in project sites for drains, waterbodies, parks and OSR sites. In the project site there are no archeologically or historically recognized sites or places close to project sites or within the project area. However, in case of such finds are recognized during excavation, all necessary measures are to be taken to ensure that they are protected and conserved.

Construction contractors to follow these measures in conducting any excavation work.

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

5.14 Construction Impacts

Civil Works include the construction of major nallah & stormwater drains along roadsides, rejuvenation of water bodies and sponge park development within HCMC area. These works will be confined to sites, and construction will include general activities like site clearance, excavation, construction of drains, disposal of surplus earth and creation of minor concrete structures, plantation etc., for WBs and Parks. Since these works are confined to the sites, there is no direct or significant interference of construction work with the surrounding land use. However, construction dust, noise, use of local roads for transportation of construction material, waste, labour camps, etc., will have negative impacts, which need to be avoided or mitigated properly. Drains will be constructed by the opencut method. Open cut trenching method of construction of drain involves trench excavation in the road, construction of drains, refilling with the excavated soil and disposal of surplus earth. Major nallah / primary drains size ranges from 1.2 x 1.2m to 35x 5.2m will be of earthen bund and random rubble masonry wall in scattered development areas. In Prime and congested areas, Major nallah / primary drains will be of L Shaped RCC retaining wall and Open RCC drains. All secondary and tertiary drains will be of RCC closed drains with size range from 0.60 x 0.60m to 3.0 x 3.0m.

Earthwork excavation will be undertaken by machine (backhoe excavator) and include danger lighting and using sight rails and barricades. The work will also be supplemented manually where there is no proper working area (eg, very narrow streets) for the backhoe excavators. Excavation and digging of trenches during construction had the potential to cause erosion and cave-ins thereby causing soil erosion, silt runoff and unsettling of street surfaces. Unorganized disposal of the excavated earth can

disturb the street surface and decrease the aesthetic and economic values of the area. The activity will be a discomfort to the road users and inhabitants.

During construction, precautionary measures will be taken; proper backfilling trenches will be done. Temporary access, diversions, and signboards for pedestrians will be provided. Surplus excavated earth will be disposed to designated dumping yard of HCMC.

5.15 Sources of Materials

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

(i) Obtain construction materials only from government-approved quarries with prior approval of PIU

(ii) PIU to review, and ensure that proposed quarry sources have all necessary clearances/ permissions in place prior to approval

(iii) Contractor to submit to PIU every month documentation on material obtained from each source (quarry/ borrow pit)

(iv) No new borrow areas, quarries, etc., shall be developed for the project. If required contractor need to get clearances from concern department.

5.16 Air Quality

Construction work, especially from earthwork activities, coupled with dry and windy working conditions, material and debris transport, and works along the public roads carrying significant traffic, have high potential to generate dust in the air. Significant quantities of earthwork will be conducted spreading all over the project area. Also, emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality. Anticipated impacts include dust and an increase in the concentration of vehicle-related pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons. Dust generation from construction work in individual and confined work sites of WBs and Parks etc., will be mainly during the initial construction phase of earthwork, as the site is confined, dust can be effectively controlled

with common measures. Dust generation will be significant during drain construction along the roads. An increase in dust/ particulate matter in ambient air is detrimental and may have adverse impacts on people and the environment. To mitigate the impacts, contractors will be required to ensure the following for all construction works:

(i) Provide a dust screen around the construction sites of WBs and Parks.

(ii) Damp down the soil and any stockpiled material on-site by water sprinkling; (water sprinkling 3-4 times a day – before the start of work, 1-2 times in between, and at the end of the day). When working in the roads there should be permanently one person responsible for directing when water sprinkling needs to take place to stop the dust moving. Reduce the need to sprinkle water by stabilizing surface soils where loaders, support equipment, and vehicles will operate by using water and maintain surface soils in a stabilized condition.

(iii) Apply water before levelling or any other earth-moving activity to keep the soil moist throughout the process.

(iv) Cover the soil stocked at the sites with tarpaulins and surround by dust screens.

(v) Control access to the work area, prevent unnecessary movement of the vehicle, public trespassing into work areas; limiting soil disturbance will minimize dust generation.

(vi) Use tarpaulins to cover the loose material (soil, sand, aggregate, etc.,) when transported by open trucks.

(vii) Control dust generation while unloading the loose material (particularly aggregate, sand, soil) at the site by sprinkling water and unloading inside the barricaded area. Minimise the drop height when moving the excavated soil.

(viii) Clean wheels and undercarriage of haul trucks before leaving the construction site.

(ix) Ensure that all the construction equipment, machinery is fitted with pollution control devices, which are operating correctly, and have valid pollution under control (PUC) certificate.

(x) No vehicles or plant to be left idling at site. Diesel generators to be placed at a maximum distance from the properties.

For Drain works

(i) Barricade the construction area using hard barricades (of 2 m height) on both sides

(ii) Initiate site clearance and excavation work only after barricading of the site is done

(iii) Confine all the material, excavated soil, debris, equipment, machinery (excavators, cranes, etc.,), to the barricaded area

(iv) Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated disposal area

(v) Undertake the work section wise, a 500m section should be demarcated and barricaded; open up several such sections at a time, but care shall be taken to locate such sections in different zones

(vi) Conduct work sequentially - excavation, drain construction, backfilling; testing section-wise (for a minimum length as possible) so that backfilling, stabilization of soil can be done.

(vii) Remove the excavated soil of first section to the disposal site as the work progresses sequentially, by the time second section is excavated, the first section will be ready for back filling, use the freshly excavated soil for back filling, this will avoid stocking of material, and minimize the dust.

(viii) Backfilled trench at any completed section after removal of barricading will be the main source of dust pollution. The traffic, pedestrian movement, and wind will generate dust from the backfilled section. Road restoration shall be undertaken immediately after successful testing of the section.

5.17 SURFACE WATER QUALITY

Run-off from stockpiled materials and chemicals from fuels and lubricants during construction works can contaminate the water quality of the receiving water bodies and streams/rivers. There are 28 waterbodies within the the project area. Surface runoff from the project area ultimately drains into Pennaiyar watershed and dispose into Chinnar river and Pennaiyar river. Runoff from the construction areas, which may contain silt and chemical traces that must not enter the river and the water bodies. Though the impact will be temporary but needs to be mitigated. Contractor will be required to:

(i) All earthworks are conducted during the dry season to prevent the problem of soil/silt run-off during rains

(ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets, do not stock earth/material close to water bodies (at least 100m)

(iii) Prioritize the re-use of excess spoils and materials in the construction works. If spoils will be disposed off, only designated disposal areas shall be used;

(iv) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;

(v) Place storage areas (with impermeable surface) for fuels and lubricants away from any drainage leading to water bodies, these should be at least 100m away from water bodies and ground water wells.

(vi) Store fuel, construction chemicals, etc., on an impervious floor, also avoid spillage by careful handling; provide spill collection sets for effective spill management

(vii) Dispose of any wastes generated by construction activities in designated sites; and conduct surface quality inspection according to the Environmental Management Plan (EMP).

(viii) Select a construction method which is less disruptive (e.g., precast / cast in-situ type)

(ix) Use spill traps / metal basins to avoid accidental spillage of construction chemicals, fuels lubricants in the water body.

(x) Clean up the site immediately after construction is complete; construction debris, materials, etc., shall be cleared and pre project condition shall be restored or improved.

5.18 Surface and Groundwater Quality

Another physical impact that is often associated with excavation is the effect on drainage and the local water table if groundwater and surface water collect in the voids. In the project area, the groundwater table is deeper than the anticipated excavation depth and therefore this impact is not envisaged. However, during the rains, water will be collected in open pits and trenches. The water collected in excavated pits will contain silt and disposal of this in drainage channels lead to silting. To avoid this the contractor needs to implement the following measures:

(i) As far as possible control the entry of runoff from upper areas into the excavated pits, and work area by creation of temporary drains or bunds around the periphery of the work area

(ii) Pump out the water collected in the pits/excavations to a temporary sedimentation pond; dispose off only clarified water into drainage channels/streams after sedimentation in the temporary ponds

(iii) Consider safety aspects related to pit collapse due to accumulation of water

5.19 Generation of Construction Wastes

Solid wastes generated from the construction activities are excess excavated earth (spoils), discarded construction materials, cement bags, wood, steel, oils, fuels, and other similar items. Domestic solid wastes may also be generated from the workers' camp. Improper waste management could cause

odour and vermin problems, pollution and flow obstruction of nearby watercourses and could negatively impact the landscape. The following mitigation measures to minimize impacts from waste generation shall be implemented by the contractor:

(i) Prepare and implement a Construction Waste (Spoils) Management Plan

(ii) As far as possible utilize the debris and excess soil in construction purpose, for example for raising the ground level or construction of access roads, etc.,

(iii) Avoid stockpiling any excess spoils at the site for a long time. Excess excavated soils should be disposed off to approved designated areas immediately

(iv) If the disposal is required, the site shall be selected preferably from barren, infertile lands; sites should locate away from residential areas, forests, water bodies and any other sensitive land uses

(v) Domestic solid wastes should be properly segregated in biodegradable and non-biodegradable for collection and disposal to the designated solid waste disposal site; create a compost pit (with impermeable bottom and sides) at workers camp sites for disposal of biodegradable waste; non-biodegradable / recyclable material shall be collected separately and sold in the local recycling material market.

(vi) Residual and hazardous wastes such as oils, fuels, and lubricants shall be disposed of via licensed (by TNPCB) third parties.

(vii) Prohibit burning of construction and/or domestic waste;

(viii) Ensure that wastes are not haphazardly thrown in and around the project site; provide proper collection bins, and create awareness to use the dust bins, recycle waste material wherever possible.

(ix) Conduct site clearance and restoration to original condition after the completion of construction work; PIU to ensure that the site is properly restored before issuing of construction completion certificate.

5.20 Noise and Vibration Levels

All the sites are located within habitations, where there are houses, schools and hospitals, religious places and businesses. The sensitive receptors are the general population in these areas. An increase in noise level may be caused by excavation, particularly breaking of cement concrete or bitumen roads for drain construction, operation of construction equipment, and the transportation of equipment, materials, and people. Vibration generated from construction activity, for instance from the use of pneumatic drills, will have an impact on nearby buildings. This impact is negative in the short-term, and reversible by mitigation measures. The construction contractor will be required to:

(i) Plan activities in consultation with PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in the least disturbance; especially near schools and other sensitive receptors.

(ii) Minimize the noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimise sound impact to surrounding sensitive receptor; and

(iii) Maintain maximum sound levels not exceeding 70 decibels (dBA) when measured at a distance of 10 m or more from the vehicles.

(iv) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity; if any building at risk, structural survey shall be completed prior to work, to provide baseline in case any issues from vibration, and if the building is structurally unsound, measures can be taken to avoid any further damage.

(v) Horns should not be used unless it is necessary to warn other road users or animals.

(vi) Consult local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as nights, religious and cultural festivals.

5.21 Accessibility and Traffic Disruptions

Excavation along the roads for drain construction, hauling of construction materials and operation of equipment on-site will cause traffic problems. There are four types of roads in the project area that provide regional connectivity viz National Highway (NH), State Highway (SH), Major District Roads (MDR) and Other District Roads (ODR). Drains are proposed along:

1. NH 44 Chennai – Bangalore Highway
2. NH 648 Bangalore – Hosur Highway
3. NH-948 Attibele - Anekal Road
4. SH 85 Kelamangalam Road Attibele – Rayakottai State Highways
5. SH-208 ESI Ring Road Mookandapalli – Avalapalli State Highways
6. SH-17 Papparapatti Somanahalli - Rayakottai State Highways
7. SH-17A Denkanikottai Road Hosur – Denkanikottai State Highways
8. SH-17B Thally Road Hosur - Thally State Highways

National Highway and State Highways carry considerable traffic, followed by other roads. Drains will also be constructed along the internal main roads that provide connectivity within the city. These roads also carry a considerable flow of traffic and are centres of commercial activities.

i. Internal roads in the project area are narrow, and in outer areas roads are comparatively wide. As the drains are proposed to be constructed within the road carriageway, it will disrupt traffic in one-lane.

ii. Works related to all the remaining components (WBs and Parks) will be confined to the selected sites, therefore there is no direct interference of these works with the traffic and accessibility.

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

Drain Construction

(i) Prepare a drain construction implementation plan in each zone separately and undertake the work accordingly; ensure that for each road where the work is being undertaken there is an alternative road for the traffic diversion; take up the work in a sequential way so that public inconvenience is minimal

(ii) Avoid construction work in all roads in a colony at one go; it will render all roads unusable due to excavations at the same time, creating large scale inconvenience

(iii) Undertake the work section wise, a 500 m section should be demarcated and barricaded; open up several such sections at a time, but care shall be taken to locate such sections in different zones

(iv) Confine work areas in the road carriageway to the minimum possible extent; all the activities, including material and waste/surplus soil stocking should be confined to this area. Proper barricading should be provided; avoid material/surplus soil stocking in congested areas – immediately removed from the site/ or brought to the as and when required

(v) Limit the width of trench excavation as much as possible by adopting best construction practices; adopt vertical cutting approach with proper shoring and bracing; this is especially to be practiced in narrow roads and deeper sewers; if they deep trenches are excavated with slopes, the roads may render completely unusable during the construction period

(vi) Leave spaces for access between mounds of soil to maintain access to the houses/properties; access to any house or property shall not be blocked completely;

alternative arrangements, at least to maintain pedestrian access at all times to be provided

(vii) Provide pedestrian access in all the locations; provide wooden/metal planks over the open trenches at each house to maintain the access.

(viii) Inform the local population in advance about the work schedule

(ix) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum.

(x) Keep the site free from all unnecessary obstructions;

(xi) Notify affected public by public information notices, providing signboards informing nature and duration of construction works and contact numbers for concerns/complaints. Provide information to the public through media – newspapers and local cable television (TV) services

(xii) At work site, public information/caution boards shall be provided including contact for public complaints

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

(i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except near delivery sites

(ii) Schedule transport and hauling activities during non-peak hours; (peak hours 7 to 10 AM and 4 to 7 PM).

(iii) Locate entry and exit points in areas where there is low potential for traffic congestion;

(iv) Drive vehicles in a considerate manner

(v) Notify affected public by public information notices, providing signboards informing nature and duration of construction works and contact numbers for concerns/complaints.

Control dust generation

Immediately consolidate the backfilled soil and restore the road surface, this will also avoid any business loss due to dust and access inconvenience of construction work. Employ best construction practices, speed up construction work with better equipment, increase workforce, etc., in the areas with predominantly commercial, and with sensitive features like hospitals, and schools. Consult businesses and institutions regarding operating hours and factoring this in work schedules. Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.

5.22 Flora Development on Both Side of Major Nallah and Storm Drains

Streets are important public spaces that are used every day for people to gather, walk, cycle, access public transport, or drive. Trees have always been an important part of streetscapes and are essential to sustainable and resilient urban street life, serving to:

1. connect us with nature in built-up areas
2. sustain cool urban temperatures for heat comfort
3. develop healthier communities and environments
4. support biodiversity
5. restore soil moisture levels to recharge and stabilize groundwater levels in catchments
6. improve urban air and restore soil quality
7. assist with vehicle calming
8. provide amenity and place character

Table 5-1 Native Trees suitable for planting along Avenue and Parks

Small Roads (Less than 7 m width road)			
1	*Putranjiva roxburghii*	Putranjeevi	Evergreen hardy tree with drooping branches; suitable for coastal and inland areas
2	*Bauhinia tomentosa*	Iruvatchi	Hardy species with yellow flower
3	*Bauhinia purpurea*	Mantharai	An elegant tree with pink f owers
4	*Ixora pavet a*	Koraan, Korivi	Hardy species with white fragrant f owers
Medium Roads (Less than 7 m – 12 m and more width)			
5	*Bauhinia purpurea*	Mantharai	An elegant tree with pink f owers.
6	*Crataeva adansonii*	Mavalingam	Handsome f owering tree with green-coloured f owers. Grows in arid condit ons. Medicine Fruits edible
7	*Lagerstroemia reginae*	Poo Maruthu	Green coloured f owers. Flowers twice a year. Grows in arid condit ons.
8	*Saraca asoca*	Asoka	Slow growing. Grows in semi-shaded areas
9	*Terminalia catappa*	Naattu Badaam	Suitable for coastal and inland areas
10	*Thespesia populnea*	Poovarasu	Evergreen foliage tree with yellow f owers good
11	*Pongamia pinnata*	Punga maram	Suitable for all regions; religious importance; oil source.
12	*Barringtonia acutangula*	Neer kadambu, Sengadambu	An elegant tree with pink f owers.
13	*Cassia f stula*	Sarkondrai	An elegant tree with yellow f owers.
14	*Jacaranda mimosifolia*	Vetankuruni	Tree with fragrant, violet-colored f owers
15	*Samanea saman*	Thoongumoonji maram	Big f owering tree

16	*Albizia saman*	Thoongumoonji maram	Rain tree is a tropical shade tree that can grow tall.
17	*Azadirachata indica*	Vepamaram	The sacred tree is commonly known as neem, Veepamaram
18	*Delonix regia*	Neruppu Kondrai	The tropical evergreen tall tree with an umbrella-shaped canopy.
19	*Ficus racemosa*	Atthi	A large, deciduous tree that can grow up to 30 meters tall
20	*Ficus religiosa*	Arasamaran	A large deciduous and Sacred tree, at ract birds
21	*Mangifera indica*	Maamaram	It is an evergreen tree with a broad, rounded canopy, common in the state
22	*Mimusops elengi*	Magzhimboo	It is a medium-sized evergreen tree, planted for its ornamental foliage and fragrant f owers.
23	*Peltophorum pterocarpum*	Vaagai	Medium-sized, deciduous tree with an umbrella-shaped canopy
24	*Senna auriculata*	Seenaavaram	Small tree or shrub with reddish-brown bark and bright yellow f owers
25	*Senna siamea*	Manjal Konrai	Medium-sized, evergreen tree with a dense, round crown with yellow f owers
26	*Swietenia macrophylla*	Thaenkani	It is a large tree with an umbrella-shaped crown
27	*Swietenia mahagoni*	Mahogany	It is a large, deciduous tree with spreading branches
28	*Syzygium cumini*	Naaval	It's an evergreen tropical tree common in the state
29	*Tamarindus indica*	Puliyamaram	large tree with a spreading crown
30	*Tecoma stands*	Manjarali	It’s an evergreen shrub or small tree with bright yellow f owers

For major nallah / primary drains and secondary and tertiary drains of 9239 trees are proposed. Trees, hedges and shrubs plantation in water bodies are proposed for 38,610 nos. Similarly in parks, trees, hedges and shrubs plantation are proposed for 461 nos.

5.23 Occupational Health and Safety

Workers need to be mindful of the occupational hazards which can arise from working in confined areas such as trenches, working at heights, near the heavy equipment operating areas, etc., Potential impacts are negative and short-term but reversible by adopting suitable mitigation measures. The Contractor will be required to:

(i) To provide all at site with personnel protective equipment such as boots, spectacles, hand gloves, helmets and to follow all national, state and local labour laws.

(ii) Develop and implement site-specific occupational health and safety (OHS) Plan which shall include measures such as: (a) safe and documented construction procedures to be followed for all site activities; (b) ensuring all workers are provided with and use personal protective equipment; (c) OHS Training for all site personnel, (d) excluding public from the work sites; and (e) documentation of work-related accidents; Follow International Standards such as the World Bank Group's Environment, Health, and Safety Guidelines.

(iii) Ensure that qualified first-aid personnel/specialist is available at all times in the project site. Equipped first-aid stations shall be easily accessible throughout the sites;

(iv) Secure all installations from unauthorized intrusion and accident risks

(v) Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;

(vi) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;

(vii) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;

(viii) Ensure moving equipment is outfitted with audible back-up alarms;

(ix) Mark and provide signboards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be following international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and

(x) Disallow worker exposure to noise level greater than 85 dBA for more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

(xi) Provide supplies of potable drinking water;

(xii) Provide clean eating areas where workers are not exposed to hazardous or noxious substances

5.24 COMMUNITY HEALTH AND SAFETY

Drain construction along the roads and narrow streets, and hauling of equipment and vehicles have the potential to create safety risks to the community. Excavations without any proper protection may endanger the close-by buildings. Hazards posed to the public, specifically in high-pedestrian areas may include traffic accidents and vehicle collisions with pedestrians. The potential impact is negative but short-term and reversible by mitigation measures. The contractor will be required to:

(i) Confine work areas; prevent public access to all areas where construction works are on-going through the use of barricading and security personnel

(ii) Attach warning signs, blinkers to the barricading to caution the public about the hazards associated with the works, and presence of deep excavation

(iii) Minimize the duration of time when the drain trench is left open through careful planning; plan the work properly from excavation to refilling and road relaying

(iv) Control dust pollution – implement dust control measures as suggested under air quality section

(v) Ensure appropriate and safe passage for pedestrians along with the work sites

(vi) Provide road signs and flag persons to warn of on-going trenching activities.

(vii) Restrict construction vehicle movements to defined access roads and demarcated working areas (unless in the event of an emergency)

(viii) Enforce strict speed limit (20 kmph) for plying on unpaved roads, construction tracks

(ix) Provide temporary traffic control (e.g. flagmen) and signs where necessary to improve safety and smooth traffic flow

(x) Where traffic is diverted around crossings, traffic control or careful selection of the exit from the working areas will be provided to ensure that vehicles join the road in a safe manner.

(xi) At sensitive locations particularly where there are schools and markets close to the road, awareness of safety issues will be raised through neighbourhood awareness meetings

(xii) All drivers and equipment operators will undergo safety training

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

5.25 CONSTRUCTION CAMPS

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

(i) Consult ULB before locating project offices, sheds, and construction plants;

(ii) Select a camp site away from residential areas (at least 100 m buffer shall be maintained) or locate the campsite within the existing facilities of ULB

(iii) Avoid tree cutting for setting up camp facilities

(iv) Provide a proper fencing/compound wall for campsites

(v) The campsite shall not be located near (100 m) water bodies, flood plains flood-prone/low lying areas, or any ecologically, socially, archeologically sensitive areas

(vi) Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit

(vii) Ensure conditions of liveability at work camps are maintained at the highest standards possible at all times; living quarters and construction camps shall be provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., shall not be used as accommodation for workers

(viii) Camps shall be provided with proper drainage, there shall not be any water accumulation

(ix) Provide drinking water, water for other uses, and sanitation facilities for employees

(x) Prohibit employees from cutting of trees for firewood; the contractor should provide cooking fuel (cooking gas); firewood is not allowed

(xi) Train employees in the storage and handling of materials which can potentially cause soil contamination

(xii) Wastewater from the camps shall be disposed of properly either into the sewer system; if the sewer system is not available, provide on-site sanitation with a septic tank and soak pit arrangements

(xiii) Recover used oil and lubricants and reuse or remove from the site;

(xiv) Manage solid waste according to the following preference hierarchy: reuse, recycling, and disposal to designated areas; provide a compost pit for biodegradable waste, and non-biodegradable / recyclable waste shall be collected and sold in the local market

(xv) Remove all wreckage, rubbish, or temporary structures which are no longer required; and

(xiv) On completion of works, the camp area shall be cleaned and restored to pre-project conditions, and submit a report to PIU; PIU to review and approve camp clearance and closure of worksite.

5.26 Operation and Maintenance Impacts

Operation and Maintenance (O&M) of the stormwater drainage system during defect liability period (DLP) and after DLP will be carried out by Contractor and HCMC respectively. Operation impacts of stormwater drains include

i) Contamination of stormwater due to the mixing of sewage or industrial wastewater

ii) Clogging of drains due to deposition of eroded soil, improper cleaning

5.27 Contamination of Storm Water due to Sewage Mixing

To enhance the drain water quality, it is necessary to divert/avoid the sewage water entering into the drains. Construction of the underground sewerage system is observed in many parts of the project area. Commissioning of the underground sewerage system with property connection is required to be implemented by HCMC.

The contractor and HCMC needs to check the water quality monitoring at regular intervals as prescribed in the Environmental Monitoring Program.

5.28 Regular Maintenance

To enhance the drain water quality, regular maintenance should be considered by de-silting the drain prior to monsoon, clearing of vegetation along the drain, immediate repairing of damaged structures and conducting awareness programs to the people residing next to project drains.

5.29 Clogging of Drains due to Deposition of eroded Soil, Improper Cleaning

Storm drains become clogged by deposition of silt and sand that form pools in which debris and other solid materials accumulate. Storm drains are sometimes misused as a receptacle for rubbish, waste building materials, ashes and other solid wastes deposited in them through inspection door or unauthorized openings. To avoid solid waste dumping into the storm water drain, the secondary and tertiary drains are designed as box type drain in RCC with a cover on top and inspection door at every 10m interval to remove the accumulated silt/debris. In closed drains, machines can be used to remove the accumulated silt/ debris. Major nallah / primary drain are open drains exist with bunds and retailing wall, machineries are used to remove the accumulated silt/debris/hyacinth.

Secondary and tertiary drains will be constructed as box type drain in RCC with a cover on top which will curtail dumping of solid waste in drains. Major nallah / primary drain will be constructed as open drains with both side cover in MS frame with wire mesh to avoid dumping of solid waste.

5.30 Solid Waste Management

At present, HCMC is having an effective solid waste management system. However, the people living nearer to water bodies and the commercial pockets that exist near eater bodies are tending to throw solid waste into the water bodies. Therefore, the following practices are proposed in the SWD.

i) Secondary and tertiary drains are designed as box type drain in RCC with a cover on top which will prevent dumping of solid waste in drains.

ii) Major nallah / primary drain are open drains with bunds and retailing wall, fencing on both sides of the drain is proposed to avoid solid waste disposal.

iii) Rainwater will flow into drains through FRP gratings to screen the solid waste from entering into drains.

iv) Public awareness programs have been proposed to ensure public co-operation for proper waste disposal

5.31 Environmental and Social Impacts

Environmental and Social impacts that could be expected from the proposed project as follows.

Table 5-2 Environmental and Social Impact Matrix

<table>
<tr><th>Area</th><th>Integrated Storm Water Drains</th><th>Réjuvénation of Waterbodies</th><th>Sponge Park Dévelopment</th></tr>
<tr><td>Hosur</td><td>It covers overall Hosur city municipal corporation</td><td></td><td></td></tr>
<tr><td>Description</td><td>1. Major Nallah / Primary drain – Total length about 66km exist both inside and outside HCMC area. Components proposed for major nallah are L shaped retaining wall, RCC open drains, Random Rubble masonry wall, bed trimming, bund strengthening, chain link fencing etc.,
2. Secondary and Tertiary Drains – Secondary and Tertiary drains required for 14 nos of flood hot spots are proposed for a total length of 16.01km.</td><td>3. Rejuvenation of Water Bodies - 16 nos proposed with rejuvenation proposal.
<table><tr><th>Sl. No</th><th>Name of water body</th></tr><tr><td>1</td><td>Kesavakuttai Eri</td></tr><tr><td>2</td><td>Krishnarav Eri (Look India Opp)</td></tr><tr><td>3</td><td>Venkatesan Eri</td></tr><tr><td>4</td><td>Santhapuram Eri</td></tr><tr><td>5</td><td>Seetharaman Eri</td></tr><tr><td>6</td><td>Sri Chandra Sudeshwar Kovil - Theppakulam</td></tr><tr><td>7</td><td>Jalagandeshwar Swamy Koil (Ramanaikan Eri)</td></tr><tr><td>8</td><td>Dharga Chandrambigai Lake</td></tr><tr><td>9</td><td>Dhadhav Rao Lake Ashok Leyland Unit-1</td></tr><tr><td>10</td><td>Varatharayan Eri</td></tr><tr><td>11</td><td>Pattalamman Eri</td></tr><tr><td>12</td><td>Devan Eri (Therpettai Eri)</td></tr><tr><td>13</td><td>Venkatappan Eri (Bedrapalli)</td></tr><tr><td>14</td><td>Lakshmanarav Eri (motta eri)</td></tr><tr><td>15</td><td>Thottan Eri (Alasanatham Eri)</td></tr><tr><td>16</td><td>Alasanatham Eri</td></tr></table></td><td>4. Sponge Concept Parks –3 nos proposed with sponge park development. OSR sites spong proposal 20 nos
<table><tr><th>Sl No</th><th>Name of Park</th></tr><tr><td>1</td><td>Mahalakshmi Nagar</td></tr><tr><td>2</td><td>Samathanapuram Park</td></tr><tr><td>3</td><td>Devi Nagar Park</td></tr></table></td></tr>
<tr><td>Environmental Impacts</td><td>This project is expected to cause temporarily impacts during construction like traffic management, access issues etc.,</td><td>This project is expected to cause minor impacts temporarily during construction and operation & maintenance. These impacts are minimal and can be managed with the project management measures.</td><td>This project is expected to cause minor impacts temporarily during construction and operation & maintenance. These impacts are</td></tr>
</table>

Area	Integrated Storm Water Drains	Réjuvénation of Waterbodies	Sponge Park Dévelopment
	and during operation and maintenance, issues related to disposal of silt, flooding etc., These impacts are minimal and can be managed with the project management measures.		minimal and can be managed with the project management measures.
Social Impacts	The above components are proposed along the district road, NH and SH; there is no permanent / temporary impacts along major nallah / drain alignment	The land use of the proposed project is in the waterbodies; there is no permanent / temporary social impacts.	The land use of the proposed project is in the existing park; there is no permanent / temporary social impacts.
Risk Assessment	Moderate Risk	Low Risk	Low Risk

5.32 ENVIRONMENTAL AND SOCIAL IMPACTS OF HOSUR ISWD

Table 5-3 Environmental and Social Impacts

Project Components	Environmental and Social Impacts	Remarks
ISWD – Major Nallah / Primary drains, Secondary and Tertiary drains	No E&S Impacts	The component will enhance groundwater recharge, mitigate urban flooding and improve micro climate
Waterbody rejuvenation	No E&S Impacts	The component will enhance groundwater recharge, mitigate urban flooding, improve micro climate, and create multifunctional green-blue public spaces
Sponge Park development and OSR sites Sponge proposal	No E&S Impacts	The component will enhance groundwater recharge, mitigate urban flooding, improve micro climate, and create multifunctional green-blue public spaces

6 ANALYSIS OF ALTERNATIVES

6.1 PROJECT COMPONENTS

Hosur ISWD project comprises of three main components includes

1. Integrated Storm Drains
    - Major Nallah / primary drain 57.88km inside HCMC area
    - Secondary and Tertiary drain 16km for 14 nos of flood Hot Spots
2. Waterbody rejuvenation 16 nos
3. Sponge Park development 3 nos and OSR sites sponge proposal 20 nos

6.2 DESIGN OPTIONS – SOCIAL IMPACTS

As per the original design, there are 10 compound walls / ramps are affected as shown in below figure.

Figure 6-1 Locations of Compound Walls /Ramps in Drain Alignment

However as per revised design all the impacts are avoided. The design was revised in the Jeeva Nagar, Hosur Bus Stand and KCC Nagar and the details are given below;

1. Redesign of drains where compound walls foul in locations of 1 to 5 in Jeeva Nagar
2. Redesign of drains where compound wall fouls in locations of No 6 at Hosur Bus Stand
3. Redesign of drains where compound walls foul in locations of No 7 and 8 in Jeeva Nagar
4. Redesign of drains where ramp fouls in locations of No 9 and 10 in KCC Nagar

Figure 6-2 Redesign of Drains where compound walls foul in locations of 1 to 5 in Jeeva Nagar

Figure 6-3 Redesign of drains where compound wall fouls in locations of No 6 at Hosur Bus Stand

Figure 6-4 Redesign of drains where compound walls foul in locations of No 7 and 8 in Jeeva Nagar

Figure 6-5 Redesign of drains where ramp fouls in locations of No 9 and 10 in KCC Nagar

6.3 TECHNOLOGY ALTERNATIVES

The project components are proposed with nature-based solutions instead of general practice as given below.

Table 6-1 Project Components – Nature Based Proposals

SI No	Project Components	General Practice	NbS Soltuions Proposed in this Project
1	Improvements to Major Nallah / Primary Drains	RCC retaining Wall with bed concrete	Bund strengthening with natural bed trimming is proposed wherever space available and in scattered development areas
			Random Rubble masonry retaining walls with natural bed trimming is proposed in scattered development areas
2	Waterbody Rejuvenation	Waterbody side slopes either with concrete/ stone masonry	Stone pitching and turfing works for bund slopes with toe wall (the bottom 1m of the bund alone considered for stone pitching, the area above will be strengthened using green measures)
		Paver Blocks for pathway	Permeable paver blocks for pathway are proposed
3	Devlopment of Sponge Parks	Parks components for recreation only shall be proposed	Sponge concept of Bioswale, water retention pond and artificial recharge facility using ECO block to improve the ground water recharge is proposed
4	Devlopment of OSR sites	Vaccant Land	OSR sites are proposed with recharge concepts to reduce instantaneous peak runoff and to improve the ground water recharge

6.4 CONCLUSION

On analysing the technology alternatives as stated above, nature-based material and proposal are included for all the three components of ISWD, rejuvenation of WBs and sponge park development. Groundwater level of Hosur is in semi critical stage. Hence Major nallah / primary drain with natural bed is proposed to enhance rain water harvesting. 16 nos of WBs are proposed with desilting to enhance water storage capacity and plantation to mitigate the urban heat effects. Sponge Park developments include bio swale, water retention pond and artificial recharge facility using ECO block to improve the ground water recharge. OSR sites are proposed with recharge concepts to reduce instantaneous peak runoff and to improve the ground water recharge.

7 ENVIRONMENTAL AND SOCIAL STANDARDS AND RISK CLASSIFICATION

7.1 APPLICABLE ENVIRONMENTAL AND SOCIAL STANDARDS

This chapter outlines the Environmental and Social Standards (ESS) applicable to the proposed project, drawing upon the KfW Sustainability Guidelines (February 2022) on the Assessment and Management of Environmental, Social, and Climate Aspects: Principles and Procedures. These guidelines provide a unified and binding framework for integrating environmental, social and climate considerations across the planning, appraisal, implementation, and monitoring stages of Financial Cooperation (FC) measures. This emphasizes transparency, predictability, and accountability in environmental and social due diligence (ESDD) and climate mainstreaming.

In line with these guidelines, the Project has adopted the World Bank Environmental and Social Framework (ESF), which sets out ten Environmental and Social Standards (ESS1–10) as the benchmark for international best practices in sustainability, resilience, and community well-being. For this Project, ESS7 (Indigenous Peoples) and ESS8 (Cultural Heritage) are not applicable and have therefore been excluded from the analysis. The applicable standards, together with relevant national laws and legal requirements, provide the framework for assessing potential impacts and ensuring effective risk management.

Specifically, this chapter describes:

- The World Bank ESS applicable to this proposed project,
- The corresponding potential impacts and mitigation measures (aligned with the Environmental and Social Impact Assessment – ESIA),
- The environmental, social, and overall risk classification of the Project, and
- The organization of responsibilities, documentation and Environmental, Social, Health & Safety (ESHS) topic areas.

This integrated approach ensures consistency between the ESIA and the Environmental and Social Management Plan (ESMP), thereby confirming that all identified impacts are addressed, mitigation measures are aligned and ESHS issues are systematically structured under the ESS framework.

Table 7-1 Applicability of the World Bank's Environmental and Social Standards to Hosur

Environmental and Social Standards	Relevance to this Project
ESS1 Assessment and Management of Environmental and Social Risks and Impacts	This project involves integrated storm drain management, water bodies rejuvenation, sponge park development. There are no sensitive or protected environmental features within the project area. ESS1 is relevant for this sub-project. Hence ESIA and ESMP are prepared as per ECSMF.
ESS2 Labour and Working Conditions	Labours including migrant labour, local labours according to the skill sets will be expected to be engaged. ESS2 is relevant for this project. As per ESS2, LMP is to be prepared by the contractor. The LMP will describe the findings of the ESIA, national labour policies and practices, the types of project workers that are likely to be involved, worker influx, the procedures to apply ESS2, and a grievance mechanism. ESS2 is relevant for this sub-project.
ESS3 Resource Efficiency and Pollution Prevention and Management	There will be Air, Noise, Water pollution during the implementation and which will be managed through the ESMP. ESS3 is relevant for this sub-project.
ESS4 Community Health and Safety	Risk to community health and safety is considered as minor and manageable through ESMP. During implementation pedestrian, vehicles, labour working in the trench excavation works and laying of feeder lines and appropriate safety measures included in the ESMP. ESS4 is relevant for this sub-project.
ESS5 Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	There is no land acquisition, restrictions on land use and involuntary resettlement requirements. will be constructed on identified government owned vacant lands. There may be potential temporary economic impacts to hawkers, vendors, while implementation GRM to be in place prior to starting of the works as per updated ECSMF. Based on the above, ESS5 is not triggered for this sub-project.

Environmental and Social Standards	Relevance to this Project
ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources	ESS6 is not relevant to this sub-project.
ESS7 Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	ESS7 is not relevant to this sub-project.
ESS8 Cultural Heritage	The project area does not have any protected site or monuments of cultural importance. However, chance find procedures have been included as part of the ESMP for compliance during project implementation. Hence ESS8 is not relevant to this sub-project.
ESS9 Financial Intermediaries	ESS9 is not relevant to this sub-project.
ESS10 Stakeholder Engagement and Information Disclosure	This ESS10 is applicable to the sub-project. Accordingly, Stakeholder Engagement Plan is prepared and included in the ESIA.

7.2 Risk Classification and Categorisation

The environmental and social risk screening process reveals that the project categorized B (Moderate risk category) as there is no involuntary resettlement, loss of assets, livelihoods, common property resources or any significant impact.

Table 7-2 Project Risk Classification and Categorisation

Dimension	Justification	Risk Classification
Environmental Risk	This project involves integrated storm drain management, water bodies rejuvenation, sponge park development. The project will result in temporary impacts, including short-term turbidity increase, limited disturbance to aquatic habitats, temporary noise and vibration, dust generation, waste generation, and risk of accidental spillage etc., These impacts will be mitigated through ESMP measures such as controlled construction, sediment control, dust suppression, proper waste management, spill prevention, restricted working hours, and site restoration All impacts are reversible, and residual impacts are expected to be negligible to low.	**Moderate**
Social Risk	This Project involves desilting, cleaning of jungles and bushes, bund strengthening, recharge pit for drains, rejuvenation of	**Low**

Dimension	Justification	Risk Classification
Environmental Risk	This project involves integrated storm drain management, water bodies rejuvenation, sponge park development. The project will result in temporary impacts, including short-term turbidity increase, limited disturbance to aquatic habitats, temporary noise and vibration, dust generation, waste generation, and risk of accidental spillage etc., These impacts will be mitigated through ESMP measures such as controlled construction, sediment control, dust suppression, proper waste management, spill prevention, restricted working hours, and site restoration All impacts are reversible, and residual impacts are expected to be negligible to low.	**Moderate**
	waterbody by desiliting, weeds removal, stone pitching and turffing for bunds, pathway, tree planting, development of sponge park and OSR sites. As per the Social Impact Assessment this project doesn't envisage land acquisiton, R&R impacts (Permanent /Temporary /Economic). However, if social impacts identified during the implementation of the project will be assessed and mitigated as per ECSMF Ver 2.0. Unforseeen impacts procedures are included.	
Dimension	**Justification**	**Risk Category**
Risk Category	Based on the environmental and social conditions, necessary mitigations are proposed in the ESMP. The World Bank ESHS is included in the bid documents to handle EHS, OHS risks arising during the implementation of the project.	**B**

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Based on the environmental and social conditions, project area specific ESMP is prepared. The ESMP measures are given Pre-construction, Construction, Decommissioning and Operation & Maintenance phases. The Contractor supervised by the PIU is mainly responsible for the implementation of plans during the project life cycle. There are 3 projects specific ESMP is provided. 1. ESMP for Storm Water Drain, 2. ESMP for Rejuvenation of Waterbody, 3. ESMP for Sponge city / Parks concept and provided below.

8.1 ESMP FOR STORM WATER DRAINS

Table 8-1 Environmental and Social Management Plan for Storm Drains

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1	**PRE-CONSTRUCTION PHASE**						
1.1	Engineering design and alternative analysis	Ensure that the investigation and analysis of alternative engineering design and technologies and the route selection of the proposed storm drain network (the project) cause minimum environmental and social risk and impact during the project cycle; Ensure the activities like trenching, excavation and drain construction are executed without causing loss or disturbance to the terrestrial ecosystem; and Alternatives in terms of cost effectiveness, low maintenance, minimum area and storm drain route selected along the existing road corridors for the project will cause minimum E&S impact.	HCMC	Design/Pre-construction	Review the performance of design and technology and route decided for the project; and Consultant the experts and learn from the experiences gained from such projects elsewhere	Minimum E&S risk and impact; Minimum or no impact on local ecology, water bodies and forest; Minimum impact on land and livelihood of local communities; and cost effective and O&M efficient.	Periodically
1.2	Prevention of flooding	The Secondary/ Tertiary drain shall be constructed to handle the maximum rainfall of 64.92mm/hr.	HCMC	Pre construction phase			During monsoon

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1.3	Ground water recharge	i) Catchpits at every 10m interval and rain water harvesting structure along with silt catching pit at every 30m interval shall be constructed along the drains as per the standards prescribed by the Hosur City Municipal Corporation Storm Water Schedule of rates is provided in each cost estimate of drains separately.	HCMC	Pre construction phase			Periodically
1.4	Sediment Control	For control of sediments, it is proposed to construct sediment trap at the confluence point of drain with the water body so that the sediments are deposited in the silt trap and settle over there which can be removed periodically.	HCMC	Pre construction phase			Periodically
1.5	Prevention of solid waste into drains	Secondary/ Tertiary drain shall be constructed as box type drain in RCC with cover on top which will curtail dumping of solid waste in drains. Major Nallah/Primary drains belonging to Hosur City Municipal Corporation will be provided with both side cover in MS frame with wire mesh to avoid dumping of solid waste.	HCMC	Pre construction phase			Periodically

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1.6	Drain cleaning before start of project activities	Desilting activity shall be scheduled before start of construction work wherever required. In case of demolition and reconstruction of existing drain, diversion of drainage arrangements to be made, to avoid spillage in nearby areas.	Contractor / HCMC	Beginning of construction	Site inspection	Natural drainage maintained, Minimum excavation for drainage and levelling	One time
1.7	Barricading site	The construction area should be barricaded at all time in a day with adequate marking, flags, reflectors etc. for safety of general traffic movement and pedestrians.	Contractor	Prior to start of construction	Site inspection	Proper barricading in place and Accident or casualty reported	One time
1.8	Safety in maintenance	Inspection doors shall be provided at an interval of 10m to facilitate maintenance activities only by machineries.	HCMC	Pre construction phase			
1.9	Traffic Loads and People access in Secondary/ Tertiary drain	Secondary/ Tertiary drain shall be constructed as box type drain in RCC with cover on top which can also take traffic loads due to vehicular movements.	HCMC	Pre construction phase			
1.10	Utility Relocation	i. Identify the common utilities that would be affected such as: telephone cables, electric cables, electric poles, water pipelines, public water taps, etc.	HCMC /Contractor	Pre construction phase	Review detailed layout plan and site inspection	Utilities shifted in time whenever necessary	Continuous

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		ii. Affected utilities shall be relocated with prior approval of the concerned agencies before construction starts. Wherever the entry and exit to houses/ establishments are affected due to construction activities, alternate temporary arrangement for crossing over shall be provided.					
1.11	Labour accommodation & other facilities to labourers	Setting up of labour camps needs to be done as per the procedures. Adequate potable water facilities, sanitation and drainage etc., in conformity with the Indian labour laws shall be ensured. The contractor shall also guarantee the following: i. Select a camp site away from residential areas (at least 100m buffer shall be maintained) or locate the camp site within the existing facilities of City Corporation ii. The location, layout and basic facility provision of each labour camp will be submitted to Engineer	HCMC/ Contractor	During Pre-construction	Visual inspection; Consultations with labour, and local communities nearby; Site inspection; Facilities made available; Type of illness and its causes; and	All the facilities available as per law and standards; Assess the satisfaction level of labourers; Cordial relation between labour and local communities; Ensure easy access to a first-aid box with all required medicines and	Everyday

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		prior to their construction. iii. Select a camp site away from residential areas (at least 100m buffer shall be maintained) or locate the camp site within the existing facilities of City Corporation iv. The location, layout and basic facility provision of each labour camp will be submitted to Engineer prior to their construction. v. The construction will commence only upon the written approval of the Engineer. vi. Avoid tree cutting for setting up camp facilities vii. Provide a proper fencing/compound wall for camp sites viii. Camp site shall not be located near (100 m) water bodies, flood plains, flood prone/low lying areas or any ecologically, socially,			Discussions about the level of health awareness and safety precautions taken by the workers while working on the work site.	accessories at each worksite, labour accommodation, and office at all times. Also,make arrangements with doctors at the nearest government health centre or private clinic for immediate medical support.	

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		archeologically sensitive areas ix. Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit x. Ensure conditions of liveability at work camps are maintained at the highest standards possible at all times; living quarters and construction camps shall be provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts and facilities constructed with materials like AC sheets, tarpaulins, etc., shall not be used as accommodation for workers xi. Camp shall be provided with proper drainage; there shall not be any water accumulation					

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		xii. Provide drinking water, water for other uses, separate toilets for men and women; drinking water should be regularly tested to confirm that drinking water standards are met xiii. Prohibit employees from cutting of trees for firewood; contractor should provide cooking fuel (cooking gas); fire wood not allowed xiv. Train employees in the storage and handling of materials which can potentially cause soil contamination xv. Wastewater from the camps shall be disposed properly into on-site sanitation with septic tank and soak pit arrangements (100 m away from surface water body or groundwater well) xvi. To prevent open defecation & preventive measure to					

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		neighbourhood, if Labours work away from labour camp, resting shed, separate mobile toilet for men and women with water supply and septic tanks arrangement to be provided by the contractor. xvii. Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; provide a compost pit for bio degradable waste, and non-biodegradable / recyclable waste shall be collected and sold in local market. xviii. Remove all wreckage, rubbish, or temporary structures which are no longer required; and xix. At the completion of work, camp area shall be cleaned and restored to pre project conditions, and submit report to HCMC; HCMC to review					

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		and approve camp clearance and closure of work site xx. Labour accommodation and temporary shade near work sites shall provide protection from heat, rain, flooding, insects, snakes and mosquitoes. It should have adequate provisions for emergency such as fire safety, security, etc; xxi. Adequate healthcare is to be provided for the workforce; xxii. Ensure adequate water supply in all toilets and urinals; Provide separate toilets/ bathrooms for women laborers and shall be screened from those for men (marked in vernacular language. xxiii. Provide first aid medical kit at labour accommodation, temporary labour shed and working site; train the labour for usage of items in injury, emergency, coordinate with nearest					

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		government and private medical centers for the medical services, display the contact number of medical doctor(s) and keep a vehicle for emergency travel all the time; xxiv. As per provisions of WHO and MOHFW guidelines of Covid-19, sanitizer, soap, mask, etc. should be made available in sufficient quantity and its use by the workers mandatorily and maintain social distancing all the time; xxv. The contractor will provide garbage bins in the camps and ensure that these are regularly emptied and disposed off in co-ordination with the ULB. xxvi. Ensure medical tests and treatment of Covid-19 positive cases immediately; and general medical checkup for 3 month once.					

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1.12	Source of Materials	i) Obtain construction materials only from government approved quarries with prior approval of PIU. ii) The contractor has to obtain approvals for all construction materials. iii) PIU to review and ensure that proposed quarry sources have all necessary clearances/ permissions in place prior to approval. iv) Contractor to submit to PIU on a monthly basis documentation on material obtained from each source (quarry/ borrow pit) v) No new borrow areas, quarries etc., shall be developed for the project.	HCMC/ Contractor	Pre-Construction Phase	Records, approvals	Approvals documents	Periodically
1.13	Chance - Found Archaeological Property	Create awareness among the workers, supervisors and engineers about the chance finds during excavation work	Contractor/HCMC	Construction phases	Site inspection; and Actions	Discovery of archaeological/ paleontological material; Level of	When occurrence of chance finding

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation. The contractor shall take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. Stop work immediately to allow further investigation if any finds are suspected Inform State Archaeological Department if a find is suspected and taking any action, they require to ensure its removal or protection in situ. vi) The Engineer shall seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to			taken by the workers, PIU.	awareness among workers and Protection and reporting of identified material when discovered.	

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		recommence the work in the site.					
1.14	Permits and approvals	i) Obtain all permits and approvals required for E&S aspects during pre-construction, construction, operation and decommissioning phases. ii) These shall be made available from the NHAI, State highways, WRD, Traffic Police, Telecom, Electricity and other departments and regulators of the State and Central governments as applicable. iii) Ensure that all necessary approvals for construction to be obtained by contractor like labour licence/labour insurance are obtained before start of construction.	HCMC	Before construction commences	Keep record of all permit, approvals and authorizations	Permits and approvals are available	One time/ Continuous
1.15	Storage of materials and portable office Cabin	i) No construction materials should be stored on the road, over or beside	Contractor / HCMC	Pre-construction	Site inspection	Location and its access and	Semi-annually

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		drains and footpaths, or on any other public area as this may restrict public access to these utilities. ii) The contractor shall identify the site for temporary use of land for construction sites /storage of construction materials, etc. iii) Site for storage of construction materials to be identified without affecting the traffic and other common utilities and the quality of the construction materials. iv) Construction materials should only be stored and prepared on the site if they do not obstruct the road or any surrounding public utility. v) Construction materials should only be transported to the worksite as and when required for construction. vi) Establish a suitable portable cabin for site staffs.				Basic facilities and civic amenities.	

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1.16	Sensitive Areas	The sensitive areas like Schools, hospitals to be provided with suitable noise barriers and safety measures, prior to the start of work in order to minimize the dust and noise impacts due to vehicle movement during construction and their effectiveness to be checked.	HCMC, Contractor	Pre-construction phase	Site inspection	Location and its access and Basic facilities and civic amenities.	Periodically
1.17	Appointment and Mobilization of Environment & Safety Officer	The contractor to appoint Environment, Safety, social safeguard officer as per the contract documents. The experts will be mobilized prior to work start. ESO will dedicatedly work and ensure implementation of Environmental Management Plan including Occupational, Health and Safety measures during the project implementation. vi)	Contractor / HCMC	Pre-Construction Phase	Review reports and records	No compliance at site	Mobilized and to be available throughout the contract period.
	CONSTRUCTION PHASE						
2.1	Contractor Reporting obligations	i) PA/ESMP Contract specific ESMP to be prepared.	HCMC/ Contractor	Construction Phase	Records, approvals	Approvals document	Periodically

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		ii) Contractor has to prepare LMP, WMP, TMP, BMP					
2.2	Source of Materials	i) Obtain construction materials only from government approved quarries with prior approval of PIU. ii) The contractor has to obtain approvals for all construction materials. iii) PIU to review and ensure that proposed quarry sources have all necessary clearances/ permissions in place prior to approval. iv) Contractor to submit to PIU on a monthly basis documentation on material obtained from each source (quarry/ borrow pit) v) No new borrow areas, quarries etc., shall be developed for the project.	HCMC/ Contractor	Construction Phase	Records, approvals	Approvals documents	Periodically

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
2.3	Site Clearance and Protection	Site to be cleared prior to initiating works. If necessary, the top soil to be carved out and stored in a separate place. Avoid tree cutting and loss of vegetation, shrubs, grasses, etc. to the maximum extent possible. Provide adequate protection to the trees to be retained with tree guards (e.g. Masonry tree guards, Low level RCC tree guards, Circular Iron Tree Guard with Bars) as required. Take adequate care to determine to root protection zone and minimise root loss. Trees shall be removed from the construction sites before commencement of construction. Undertake afforestation in nearby areas. Tree plantation is proposed all around boundary of waterbodies and parks wherever possible.	HCMC	Construction phase	Review site management and labour plan; and site inspection	No tree cutting should occur, and vegetation loss should be minimized. The number and species of any trees cut and replanted must be recorded, along with the survival rate of the replanted trees.	Monthly

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
2.4	Planning of temporary Traffic arrangements	i) Temporary diversion will be provided with the approval of the HCMC Engineer. Detailed traffic control plans will be prepared and submitted to the HCMC Engineers for approval prior to commencement of works. ii) The traffic control plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, SIGNAGES, safety measures for transport of hazardous materials and arrangement of flagmen. iii) The contractor has to prepare Traffic Management Plan (TMP).	Contractor / HCMC	Construction phases	Review traffic management plan and Site inspection	Implementation of traffic management plan adequately; Number of complaints received; and Incidence of accidents	Continuous as required
2.5	Construction machinery	Modern machineries such as JCBs, poclain, road roller, etc.; shall be used to increase work efficiency and minimize the construction period;	Contractor, PIU	Construction phase	Review the vehicle details TPI	Noise level and working of heavy machiner.	Continuous as required

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		Ensure that material transported is properly covered with Tarpaulin, etc. Schedule material deliveries after daylight hours and Identify and repair minor leaks and prevent machineries/equipment failures. All the vehicle should have pollution control certificate					
2.6	Top soil protection	i) Topsoil removed prior to commencement of construction activities shall be stored (stockpile no higher than 2 meter) separately and reused for backfilling and landscape development with in the project area; ii) Keep topsoil stockpiles in an area protected from the wind and water; iii) Land disturbance shall be restricted to the footprint of the project components and remaining area will be kept undisturbed to the extent possible.	Contractor, HCMC	Construction phase	Site inspection; and Assessment of disturbed (project components construction area) and undisturbed area.	Incidence of erosion; Storage and uses of topsoil; and Topsoil erosion on adjacent land.	Regularly

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		iv) Ensure suitable control of run-off during the construction phase to prevent erosion of topsoil on adjacent land and undeveloped portions of the site; and v) All excavations should be closed at the earliest before the start of rainy season.					
2.7	Noise from vehicles, plants and equipment	i) Use of less noise generating equipment's, provide personal protective equipment's such as ear plugs/muffs and other safety measures to labourers. In addition, the concrete mixture to be used for construction works will be prepared in a location away from the locality to minimize the noise generated from the machinery. ii) Servicing of all construction vehicles and machinery will be done regularly and during routine servicing	Contractor	Construction phases	Review of monitoring records, random noise measurements	Level of noise generated and number of registered complaints	Regularly

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced. iii) Maintenance of vehicles, equipment and machinery shall be done at regular interval and upto the satisfaction of the HCMC Engineer to keep noise levels at the minimum.					
2.8	Dust Pollution near settlements	i) All earth work will be protected in manner acceptable to the a HCMC Engineer to minimize generation of dust. Area under construction shall be covered & equipped with dust collector. ii) Construction material shall be covered or stored in such a manner so as to avoid being affected by wind direction. iii) Unpaved haul roads near / passing through residential and	Contractor	Construction phase	Site inspection; Incidence of dust plumes; and Review of dust emission control measures.	Emission from construction site; Incidence of dust plumes observed; Dust mitigation measures followed; and Number of complaints received.	Regularly

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		commercial areas to be watered thrice a day. iv) Trucks carrying construction material to be adequately covered to avoid the dust pollution and to avoid the material spillage. v) Sprinkling of water to be done at regular intervals at places of work to protect the nearby inhabitants and road users.					
2.9	Baseline parameters	i) Base line parameters shall be recorded and ensured conformance till the completion of the project. ii) The contractor shall undertake periodical monitoring of air, water, noise and soil quality through an approved monitoring agency. The parameter to be monitored, frequency and duration of monitoring plan shall be as per Environmental Monitoring Plan.	Contractor / HCMC	Construction phases	Site inspection	Emission from construction site, Incidence of dust plumes observed, dust mitigation measures followed and number of complaints received.	Regularly

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		iii) Adequate measures shall be taken and checked to control any pollution and report shall be sent to the HCMC Engineer.					
2.10	Air quality	i) Maintain all vehicles, DG sets/generators and other equipment in good working condition to minimise GHG emission, exhaust fumes, etc.; Wherever possible to use energy efficienct equipment. ii) Avoid excavation, handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present; iii) Water sprinkling, cover dumping and stockpiles of lose material with plastic sheets or nets, particularly in windy conditions should be used to reduce airborne dust at construction sites and	Contractor	Construction phases	Site inspection, Incidence of dust plumes; and review of dust emission control measures.	Emission from construction site, Incidence of dust plumes observed, dust mitigation measures followed and number of complaints received.	Regularly

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		iv) Prevent burning, fire, use of wood for cooking in the project sites to avoid air contamination.					
2.11	Ground water	Contractor shall ensure that all vehicle / machinery and equipment operation, maintenance and refueling will be carried out in such a manner that spillage of fuels and lubricants will not contaminate the ground water. Workforce will be trained in the environmental pollution aspect and activities should stop immediately and resume only when problem is resolved; and Faulty equipment, vehicles and other source of possible oil and lubricant contamination should be repaired on priority and must be kept in good condition all the time.	Contractor	Construction &operation phases	Site inspection; and Review of spillage control measures.	Fuel or lubricant spillage; and Underground water pollution mitigation measures followed.	Regularly
2.12	Protection of lakes/ water bodies/ Surface water	Contractor shall ensure that all vehicle / machinery and equipment operation, maintenance and refuelling will be carried out in such a manner that spillage of fuels and lubricants will not contaminate the water bodies.	Contractor	Construction phases	Site inspection and review of spillage control measures	Fuel or lubricant spillage and water pollution mitigation measures followed.	Regularly

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		Water bodies need to be cordoned off by using protective barriers such as green cloth and subsequently plantation. Increase in turibidity to be managed during the constructin Phase.					
2.13	Chance - Found Archaeological Property	Create awareness among the workers, supervisors and engineers about the chance finds during excavation work All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation. The contractor shall take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. Stop work immediately to allow further investigation if any finds are suspected Inform State Archaeological Department if a find is suspected	Contractor/HCMC	Construction phases	Site inspection; and Actions taken by the workers, PIU.	Discovery of archaeological/ paleontological material; Level of awareness among workers and Protection and reporting of identified material when discovered.	When occurrence of chance finding

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		and taking any action, they require to ensure its removal or protection in situ. The Engineer shall seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work in the site.					
2.14	Safety Aspects	i) Adequate precautions shall be taken to prevent the accidents and from the machineries. All machines used shall confirm to the relevant Indian standards Code and shall be regularly inspected by the HCMC. ii) Where loose soil is met with, shoring and strutting shall be provided to avoid collapse of soil. iii) Protective footwear and protective goggles shall be provided to all workers employed on mixing of materials like cement, concrete etc. iv) Welder's protective eye-shields shall be provided to workers who are	Contractor	Construction phases	Site inspection; and Observation of workers with PPE and safety measures while working on work site.	Quantity and timely supply of PPEs; Awareness level about the use of PPEs; and Incidence of injury, accident, infirmity.	Everyday

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		engaged in welding works. v) Earplugs shall be provided to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation. vi) The contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc to workers and staff. vii) The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labour Organization (ILO) Convention No. 62 as far as those are applicable to this contract. viii) The contractor will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and					

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		the Building and other Construction Workers (regulation of Employment and Conditions of Services) Act, 1996 are adhered to. ix) The contractor shall not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with products containing lead in any form.					
2.15	Work-zone safety Management	Temporary barricades shall be provided to delineate construction zone as well material stacking areas. The construction site and the labour facility shall be appropriately barricaded to prevent entry and accidental tress-passing of workers, staff and others into the construction sites. All operational areas shall be access controlled. Watch and ward facilities at all times shall be provided by the contractor.	Contractor, PIU	Construction phase	Site inspection	Availability of safety measures Absence of Safety Incidents	Everyday

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		Proper retro reflective warning signage will be installed on the access road next to the construction site about movement of construction machinery and vehicles. In excavations for longitudinal surface road drains, culverts etc., a high visibility warning and retro reflective signage shall be displayed in vermicular language and English. Entry of unauthorized persons should be prevented. Excavations will be adequately barricaded and well lit – with signages /info boards. There shall be adequate lighting arrangement at night and adequate barricading to prevent mishaps after construction activity ceases for the day. A readily available first aid unit with necessary supplies, drinking water, resting shed, sanitation					

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		etc shall be made available in every work zone.					
2.16	Risk from Electrical Equipment(s)	The Contractor shall take all required precautions to prevent danger from electrical equipment and ensure that i) No material will be stacked or placed so as to cause danger or inconvenience to any person or the public. ii) All necessary fencing and lights will be provided to protect the public in construction zones. iii) All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Engineer. iv) Loto procedures to be followed.	Contractor	Construction phase	Site inspection; Observation of power supply system and Electricity safety precaution taken by workers while working on work site.	Incidence of current shock, injury, electrocution	Daily

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
2.17	Fire Safety	Ensure that no fires are permitted on or adjacent to site. Ensure that no smoking is permitted on the working site. Ensure that sufficient and certified firefighting equipment are placed and maintained on the site. Equip all fuel stores and waste storage areas with fire extinguishers. Ensure that all workforce and staff on site are aware of the location of firefighting equipment on the site andConduct training program on use of extinguishers, sand, etc for fire-fighting and ensure that they are trained in its operations.	Contractor	Project life cycle	Inspect Attendance registers for firefighting training conducted and Observation of fire extinguishers and certificate at the sites.	Number of Fire incidents; Certified extinguishers in appropriate locations and Worker's knowledge to operate the fire extinguisher	When required
2.18	Emergency response to manage cyclone and other disaster conditions	Contractor shall ensure efficient communication system in place which will be required during occurrence of any natural hazard; Evacuation plan shall be in place for the site;	Contractor, PIU	Project life cycle	Inspect attendance register for training program and Inspect fire extinguishers	DMP in place; Communication system in existence; Display of evacuation route;	When required

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		Evacuation plan or route is displayed clearly through signs or picture at prominent places within the sites. Ensure effective coordination within the workforce and concerned departments and display contact number of concerned persons at prominent places; and Conduct training program and mock drills to workers to deal with the disaster situations due to occurrence of cyclones and tsunami.			and certificate	Capacity of workers to manage and Disaster and emergency situations	
2.19	Submission of updated environmental & social management plan (ESMP) / site environmental plan (SEP); ESMP implementation and reporting	Supervisor to ensure ESMP implementation. Submission of updated ESMP/SEP Timely submission of monthly monitoring reports including documentary evidence on ESMP implementation such as photographs.	Contactor	Project cycle	Review of reports and records	Compliance at the site	One-time / As and when need arises
2.20	Clearances	i) Contractor has to submit revised EMP to address specific activities such as construction camp, layout, facilities, storage yard etc.,	Contractor HCMC HCMC				

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		ii) Environment, Health and Safety (EHS) specialist has to be appointed prior to start of work and to be continued till closure of the project. iii) Clearances required from other departments and Environmental aspects shall be ensured and made available before start of work. iv) Batch mixing plants for construction of drains, obtain prior permission from Tamil Nadu Pollution Control Board v) To Comply with all the provisions of government rules and regulations for labour welfare and safety (Guidance List of applicable labour act shall be adhered to vi) The permits obtained by the contractor shall be periodically examined and validity be ensured. This includes the Consent for Batching plants from where the contractor	HCMC Contractor Contractor HCMC				

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		sources the concrete, Labour License, insurances etc.					
2.21	Nuisance to neighbourhood community	To avoid access problem, construction works shall be intimated to neighbourhood community prior before start of work. Materials shall be transported through the temporary approach road formed without disturbing the neighbourhood community. Supervisors at the site shall guide the heavy vehicles carrying materials and machinery to the temporary access road and signages if required may be provided. Safety barricading shall be provided while construction of drains near the structures restricting entry to work place and signages shall be placed. Work site lighting during night where ever required shall be provided during implementation. Adequate slope gradient is required to be maintained while	Contractor Contractor / HCMC				

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		strengthening the bund. Storage of materials shall be done only within in earmarked areas of the project area, without disturbing the nearby community. GRC shall be formed to address any grievance of the community due to construction activities. Boards with details of the committee members and contact details shall be provided near the project area.					
2.22	Temporary flooding during construction activity.	Desilting activity shall be scheduled during non-flooding season. Proper drainage arrangements to be made, to avoid the overflowing of existing drains due to construction activity.	Contractor / HCMC				
2.23	Prevention of accidents	Prevention of accidents involving human beings, animal, vehicles or accidents during construction period. This needs to be ensured with proper barricading, signage boards and lighting etc. The project engineer of HCMC will plan and direct the contractor to execute the work progressively so that the length of the open	Contractor / HCMC				

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		excavated trench is minimised in order to reduce possible accidents.					
2.24	Drainage flow	Alternate arrangement like diversion of the drainage be ensured to allow the natural flow. It shall be ensured that none of the construction activities affect the natural flow of the drainage. During stacking or during work, falling of debris / materials that affect the natural flow of the drainage shall be prevented.	Contractor / HCMC				
2.25	Using of modern machineries	Using of modern machineries such as Excavators, backhoes etc, shall be used to minimize the construction period which will reduce the construction period impacts to the nearby residents.	Contractor				
2.26	Protection of residential / sensitive receptors.	Noisy construction operations in residential and sensitive areas should be done only between 7.30 am and 6.00 pm. Preventive maintenance of construction equipment and	Contractor				

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		vehicles to meet emission standards and to keep them with low noise. Provision of enclosing generators and concrete mixers at site. Sound barriers shall be installed during the construction phase to protect the inhabited areas from the noise from construction activities. Adequate barricading and safety measures to protect dust pollution and noise impacts on sensitive receptors like schools and hospital etc; due to vehicle movement to be ensured prior to the start of work and their effectiveness to be checked during construction and operation phase.					
2.27	Vehicular noise pollution at residential / sensitive receptors.	i) Idling of temporary trucks or other equipment should not be permitted during periods of loading / unloading or when they are not in active use. The practice must be ensured especially near	Contractor				

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		residential / commercial / sensitive areas. ii) Stationary construction equipment will be kept at least 500m away from sensitive receptors. iii) All possible and practical measures to control noise emissions during drilling shall be employed. The HCMC Engineer may direct to take adequate control measures depending on site conditions.					
2.28	Pollution from Construction Wastes	All waste arising from the project is to be disposed off in the manner that is acceptable by the HCMC Engineer. Solid and liquid waste arise in out of construction activities to be managed through Waste Management Plan (WMP). The WMP has t o be prepared by the contractor and approved by HCMC. The HCMC Engineer shall certify that all liquid wastes disposed off from the sites to meet the discharge standard.	Contractor		Project engineer/ Officilas designated by HCMC.		

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
2.29	Pollution from Fuel and Lubricants	i) The contractor shall ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites will be located at least 500 m from sensitive receptors. ii) All location and lay-out plans of such sites shall be submitted by the Contractor prior to their establishment and will be approved by the Engineer. iii) Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. iv) Contractor shall arrange for collection, storing and disposal of oily wastes to	Contractor				

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		the preidentified disposal sites (list to be submitted to HCMC Engineer) and approved by the HCMC Engineer. All spills and collected petroleum products will be disposed off in accordance with MoEF and state PCB guidelines. v) HCMC Engineer will certify that all arrangements comply with the guidelines of PCB/ MoEF or any other relevant laws.					
2.30	Disposal of oil and grease	A suitable site should be identified for safe disposal / without contaminating the source, in relatively low-lying areas, away from the water bodies etc., as approved by the HCMC Engineer & as per specific procedures.	Contractor/HCMC				
2.31	First Aid	The contractor shall arrange for: i) A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances	Contractor				

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		as per the Factories Rules in every work zone ii) Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital					
2.32	Informatory Signs and Hoardings	The contractor shall provide, erect and maintain informatory /safety signs, hoardings written in English and local language, wherever required or as suggested by the Engineer.	Contractor / HCMC				
2.33	Safety of Pedestrians	Provide safe access such as temporary bridges and crossings, planks/makeshift pathways, detours and walkways.	Contractor / HCMC				
2.34	Access to adjacent public properties	Contractor shall at all times during construction, make available at least pedestrian access to adjacent properties so as not to obstruct the ingress and egress from the neighbouring houses and commercial and other buildings.	Contractor / HCMC				
	Social Aspects						
2.35	Grievance Redressal	Establish the efficient grievance redressal mechanism and accordingly constitute the grievance redressal committee	HCMC	Project life cycle	Review the proceedings and minutes	GRC established. Number of Grievances	Monthly or as required

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		(GRC) as outlined in the ESIA, Project level representatives of all the stakeholders as members, including women and vulnerable groups of local communities; Ensure the wider publicity of procedure, functioning and availability of GRC since the inception of the project. All the grievances received shall be acknowledged and proper recording and tracking should be carried out. All the complaints will be resolved in 6-8 weeks depending upon the severity of case; Convenor will be the coordinator for organizing GRC meetings as required, writing the proceedings, minutes of meeting, informing the aggrieved party about the decision of GRC, etc.			of meetings; and Consultations with the members of GRC. Disclosure of GRM in the all the work sites.	received and number of grievances resolved. Number of GRC meetings held. Decision taken with in a timeframe. Time taken for resolving the grievances.	
2.36	Compensation and Assistance to potential temporary economic impacts	There are no any social impacts identified. However, if any impacts identified during implementation the unforeseen	Contractor, PIU	Construction Phase	Verify the disbursement of compensation and	Potential temporary economic impacts were compensated	One time

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		impacts and mitigation measures are proposed.			assistance; and Conduct consultation with local communities		
2.37	Loss of access	The contractor shall ensure that access to connecting roads; market, residence and other places should not be blocked. In case, it is unavoidable, then alternate route should be provided to people. The community should be made aware about the diversion plan along with expected deadline for the completion of work. After completion of the work, the access should be restored as per original condition. The contractor is required to provide notice to the shop owners of the need to shift kiosk/wares displayed on ROW as soon as the work plan is ready with minimum 7 working days.	Contractor	Construction	Visual inspection	Crossing/ access closed	Regularly

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		No works can be commenced unless 100% shifted in sections ready for implementation.					
2.38	Public disclosure & Stakeholders Consultation	Ensure timely and full project information dissemination through distribution of prior notice, pamphlet in local language, oral communication, meetings, websites, etc. Implement the Stakeholder Engagement Plan (SEP).	HCMC/Contractor	Pre-construction phase	Issue of Project information Pamphlets to the Public. Advance notice about Roadcut to the residents. Awareness about the project to the Beneficiaries. (FGD's with RWA, Awareness meeting with school students.etc. Consultation with local communities beneficiaries, temporary economic impacts	Methods used for public disclosure; and Project awareness. (Number of Participants with Male, Female details.) Awareness level of stake holders, particularly the local communities, beneficiaries of the proposed Drain netwrok.	Continuous

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
					and other stakeholders.		
	Decommissioning Phase						
3.1	Disposal of desilted / excavated material, construction and other waste.	The excavated /desilted material shall be disposed off without any accumulation. The soil excavated from the drains and lakes shall be tested for quality, adequately treated with methods like bioremediation and proper reuse option explored. The rest may be safely disposed. The disposal shall be done in the existing dump yards of Hosur city municipal Corporation at near KCC nagar / Dinnur Dumpsite. During construction if any suitable site found for disposal, the same shall be considered by obtaining prior consent from HCMC Engineers. The following shall be ensured during silt disposal i) The dumping does not impact natural drainage courses. ii) No endangered / rare flora is impacted by such dumping.	Contractor / HCMC	After completion of construction phase and operation phase	Site inspection and review of record of activities upon completion of construction phase and commissioning phase	Restoration of construction sites in original condition; and Sites are fully rehabilitated prior to commissioning of project	Weekly

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		iii) Settlement area located at least 1.0 km away from the site. iv) Should be located in non-residential areas located in the downwind side. v) located at least 100m from the designated forest land. vi) avoid disposal on productive land. vii) should be located with the consensus of the local community, in consultation with the HCMC Engineer. viii) All vehicles delivering material to the site shall be covered to avoid material spillage. All excavated material shall be stored within the site, dried and transported in trucks covered with tarpaulin. ix) Proper signages to be provided for heavy vehicle movement. x) Access roads to be made for material transport to site inside project area.				

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		xi) Dredged spoils shall be used for bund strengthening of water bodies inside the project area.					
3.2	Clearing of construction camps and restoration	i) Contractor to prepare site restoration plans, the plan is to be implemented by the contractor prior to demobilization. ii) On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expenses, to the entire satisfaction of the HCMC Engineer.	Contractor				
3.3	Project implementation	It shall be ensured that the Environmental, Health and Safety and Biodiversity guidelines of World Bank are adhered to as applicable for activities during construction.	Contractor / HCMC				

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
3.4	Occupational Health and Safety to workers Emergency Measures for drains	Workers exposed to dust, chemicals or pathogens and working in high humidity areas shall be allowed to take breaks away from these areas and be encouraged to wash frequently with sanitizer. Supervisors will be deployed at the site for work implementation with heavy vehicles. Keep a detailed log of all accidents and incidents that almost caused an accident. Elevated platforms should be equipped with handrails, toe boards and non-slip surfaces. Personal Floatation devices (life vests), First Aid Kits, Fire Extinguisher, Tow rope, etc. shall be provided on vehicles / floats which work near water filled portions of the drains.	Contractor				
	OPERATION AND MAINTENANCE PHASE						

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
4.1	Maintenance	i) It shall be ensured by the HCMC that drains are not clogged. The following practices should be adopted in maintaining storm water drains: ii) Drains shall be regularly inspected and cleaned especially prior to monsoons. iii) All damaged or missing drain covers should be replaced immediately. iv) Rubbish and silt that has been removed from the drainage system should not be left alongside the drain and shall be immediately disposed in pre-identified site with necessary precautions. v) It shall be ensured that the Environmental, Health and Safety guidelines of World Bank (Generic and Water & Sanitation) are adhered to relevant activities during operation.	HCMC	Operation and Maintenance phase			

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
4.2	Impairment of receiving water quality due to mixing of waste water	i) Avoid mixing of wastewater from household, commercial, industrial and other establishments. ii) Provision for connecting domestic liquid waste to sewerage system is to be made during drain construction to avoid mixing of wastewater. iii) Periodical monitoring shall be carried out and sources of wastes/ effluent etc; are to be identified by the HCMC. HCMC may initiate action to ensure proper linking of such connections to other waste disposal systems and it shall be ensured that the drains carry only the rainwater iv) In case of any industrial effluent discharge is identified, necessary action be taken in coordination with the TNPCB.	HCMC	Operation and Maintenance phase	Odour control measures, monitoring of H2S and ammonia; site inspection	No odour is experience around the working area	Periodical

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
4.3	Nuisance due to clogging of drains, formation of mosquito breeding grounds etc.,	i) Ensure timely desilting of drains. ii) Create awareness among the people not to throw garbage and other waste into the drains.	HCMC	Operation and Maintenance phase			
4.4	Disposal of storm water	i) Mixing of wastewater from households, commercial, industrial and other establishments will be avoided through improved sewerage system in the project area through periodical monitoring of water quality. ii) Possibility of reusing the storm water for secondary uses with minimum treatment shall be explored and implemented.	HCMC	Operation and Maintenance phase			
4.5	Tree Planting & Protection	i) Plantation of trees shall be carried out along the major drains or any other place possible like parks and waterbodies in the nearby areas. ii) Planation of trees around the secondary/Teritary	HCMC	Operation and Maintenance phase			

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		drain boundary, wherever possible. iii) Trees shall be transplanted to the possible extent. iv) Masonry tree guards, Low level RCC tree guards, Circular Iron Tree Guard with Bars, use of plate compactors near trees may also be considered where necessary. v) Growth and survival status shall be monitored for planted trees once in two years by Engineer in-charge.					
4.6	Flood & Disaster management	i) Flood management system may be developed with forecasting and warning to protect areas prone to flooding and action be taken as necessary, like bailing out of water, relocation of residents to other locations etc. ii) Boards with details of the committee members and contact details shall be	HCMC	Operation and Maintenance phase			

Sl No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		provided near the project area at distinct locations.					
4.7	Environmental parameters	Periodical monitoring of water and soil quality through an approved monitoring agency. The parameter to be monitored, frequency and duration of monitoring plan shall be as per Environmental Monitoring Plan. Adequate measures shall be taken and checked to control any pollution and report be sent to the concerned Engineer. During sampling, appropriate PPEs shall be used.	HCMC	Operation and Maintenance phase			

8.2 ESMP FOR REJUVENATION OF WATERBODY

Table 8-2 Environmental and Social Management Plan for Rejuvenation of Waterbodies

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1	**Pre-Construction and Construction Stage**						
1.1	Clearances	i. Contractor has to submit revised EMP to address specific activities such as Construction camp, layout, facilities, storage yard etc., ii. Environment, Health and Safety (EHS) specialist has to be	Contractor HCMC HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		appointed prior to start of work and to be continued till closure of the project. iii. Biodiversity specialist may be appointed prior for monitoring the plantation plan and implementation. iv. Clearances required from other departments and Environmental aspects shall be ensured and made available before start of work. For trees identified for cutting, obtain prior permission from the respective Regional Deputy / Joint Commissioner, HCMC prior to commencement of work. v. Batch mixing plants for construction of works, obtain prior permission from Tamil Nadu Pollution Control Board. vi. To comply with all the provisions of government rules and regulations for labour welfare and safety vii. The permits obtained by the contractor shall be periodically examined and validity be ensured. This includes the Consent for Batching plants from where the contractor sources the concrete, Labour License, insurances etc. viii. NH, SH and WRD clearances	HCMC HCMC Contractor Contractor HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1.2	Permits and approvals	i. Obtain all permits and approvals required for E&S aspects for waterbody rejuvenation work across all phases. ii. Ensure that all necessary approvals for rejuvenation to be obtained by contractor like labour licence/labour insurance are obtained before starting the work.	HCMC	Before rejuvenation commences	Keep record of all permit, approvals and authorizations	Permits and approvals are available	One time/ Continuous
1.3	Baseline parameters	Baseline parameters for water and soil shall be assessed prior to commencement of work.	Contractor / HCMC				
1.4	Air quality	i. Maintain all vehicles, DG sets/generators and other equipment in good working condition to minimise GHG emission, exhaust fumes, etc.; Wherever possible to use energy efficiency equipment. ii. Avoid excavation, handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present. iii. Water sprinkling, cover dumping and stockpiles of lose material with plastic sheets or nets, particularly in windy conditions should be used to reduce airborne dust at construction sites and	Contractor	Rejuvenation phases	Site inspection, Incidence of dust plumes; and review of dust emission control measures.	Emission from site, Incidence of dust plumes observed, dust mitigation measures followed and number of complaints received.	Regularly

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		iv. Prevent burning, fire, use of wood for cooking in the project sites to avoid air contamination.					
1.5	Ground water	Contractor shall ensure that all vehicle/ machinery and equipment operation, maintenance and refuelling will be carried out in such a manner that spillage of fuels and lubricants will not contaminate the ground water. Workforce will be trained in the environmental pollution aspect and activities should stop immediately and resume only when problem is resolved and Faulty equipment, vehicles and other source of possible oil and lubricant contamination should be repaired on priority and must be kept in good condition all the time.	Contractor	Rejuvenation & operation phases	Site inspection and Review of spillage control measures.	Fuel or lubricant spillage and Underground water pollution mitigation measures followed.	Regularly
1.6	Discharge of sewage & sullage into drain	Commissioning of underground sewerage system with property connection is required to be implemented by HCMC/ TWAD. HCMC should take necessary measures to avoid the sullage / sewage intrusion into the drain by implementing house service connection to all households within the project area.	HCMC/TWAD				
1.7	Protection of lakes/ water bodies/ Surface water	Contractor shall ensure that all vehicle / machinery and equipment operation, maintenance and refuelling will be carried out in such a manner that spillage of fuels	Contractor	Rejuvenation phases	Site inspection and review of spillage	Fuel or lubricant spillage and Undergroun	Regularly

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		and lubricants will not contaminate the water bodies. Water bodies need to be cordoned off by using protective barriers such as green cloth and subsequently plantation.			control measures	d water pollution mitigation measures followed.	
1.8	Site Clearance, Tree Plantation, and Protection	i. Site to be cleared prior to initiating works. If necessary, the top soil to be carved out and stored in a separate place. Avoid tree cutting and loss of vegetation, shrubs, grasses, etc. to the maximum extent possible. ii. Provide adequate protection to the trees to be retained with tree guards. iii. Take adequate care to determine to root protection zone and minimise root loss. iv. Trees shall be removed from the construction sites before commencement of construction. v. Tree plantation shall be proposed all around boundary of lakes wherever possible.	HCMC	Construction phase	Review site management and labour plan and site inspection	No tree cutting should occur and vegetation loss should be minimized. The number and species of any trees cut and replanted must be recorded, along with the survival rate of the replanted trees.	Monthly
1.9	Top soil protection	i. Topsoil removed prior to commencement of construction activities shall be stored (stockpile	Contractor, HCMC	Construction phase	Site inspection; and	Incidence of erosion; Topsoil	Regularly

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		no higher than 2 meter) separately and reused for backfilling and landscape development with in the project area; ii. Keep topsoil stockpiles in an area protected from the wind and water; iii. Land disturbance shall be restricted to the footprint of the project components and remaining area will be kept undisturbed to the extent possible; iv. Ensure suitable control of run-off during the construction phase to prevent erosion of topsoil on adjacent land and undeveloped portions of the site; and v. All excavations should be closed at the earliest before the start of rainy season.			Assessment of disturbed (project components construction area) and undisturbed area.	erosion on adjacent land.	
1.9a	Contractor Reporting obligations	iii) PA/ESMP Contract specific ESMP to be prepared. i. Contractor has to prepare LMP, WMP, TMP, BMP	HCMC/ Contractor	Construction Phase	Records, approvals	Approvals document	Periodically
1.10	Source of Materials	ii. Obtain construction materials only from government approved quarries with prior approval of PIU. iii. The contractor has to obtain approvals for all construction materials.	HCMC Contractor	Pre-Construction and Construction Phase	Records, approvals	Approval documents	Periodically

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		iv. PIU to review and ensure that proposed quarry sources have all necessary clearances/ permissions in place prior to approval. v. Contractor to submit to PIU on a monthly basis documentation on material obtained from each source (quarry/ borrow pit) vi. No new borrow areas, quarries etc., shall be developed for the project.					
1.11	Storage of materials and portable Office Cabin	i. No construction materials should be stored on the road, on top of or beside drains and footpaths, or on any other public area as this may restrict public access to these utilities. ii. The contractor shall identify the site for temporary use of land for construction sites /storage of construction materials, etc. iii. Site for storage of construction materials to be identified without affecting the traffic and other common utilities, and the quality of the construction materials. iv. Construction materials should only be stored and prepared on the site if they do not obstruct the road or any surrounding public utility.	Contractor / HCMC	Pre-construction	Site inspection	Location and its access and Basic facilities and civic amenities.	Semi-annually

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		v. Construction materials should only be transported to the worksite as and when required for construction. vi. vi)Establish a suitable portable cabin for site staffs.					
1.12	Transportation of building materials	i. Temporary approach road parallel to the bund and on the peripheral boundary of the water spread area shall be formed for trunks to convey silt and other construction materials. These temporary approach roads shall be removed after completion of construction activities. ii. Vehicles transporting construction materials prone to fugitive dust emissions shall be covered. iii. Trucks carrying sand shall be provided with tarpaulin sheets to cover the bed and sides of the trucks. iv. Idling of delivery trucks or other equipment shall be avoided during loading and unloading. v. Sprinkling of water (for materials such as blue metal, sand and brick) before unloading to suppress dust generation shall be done. vi. Adequate care shall be taken to prevent spillage of earth or	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		construction materials offsite and in haul routes. Any such spillage shall be removed immediately, and the area to be cleaned.					
1.13	Disposal of desilted / excavated material, construction and other waste.	Temporarily retained waste within the lake areas shall be earmarked and dry waste needs to be transported in covered trucks and register shall be maintained at the site. Surplus excavated earth shall be removed from the site every day preventing storage and transport to the existing dump yards of Hosur City Municipal Corporation at KCC Nagar/ Dinnur dumpsite daily. During construction if any suitable site found for disposal, the same shall be considered by obtaining prior consent from HCMC Engineers. Floating materials like plastics, weeds shall be sent to the KCC Nagar/ Dinnur Solid waste municipal (SWM) facility. Transportation of the materials shall be carried out in trucks covered by tarpaulin sheets. The excavated /desilted material shall be disposed off without any accumulation. The soil excavated from the lakes shall be tested for quality, adequately treated with methods like bioremediation and proper reuse option explored. The rest may be safely disposed. The disposal shall be done in the existing dump yards of Hosur City	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		Municipal Corporation at DInnur dumpsite / KCC Nagar dumpsite. The following shall be ensured during silt disposal a) The dumping does not impact natural drainage courses b) No endangered / rare flora is impacted by such dumping c) Settlement area located at least 1.0 km away from the site, dumping shall be away from the non-residential areas located in the downwind side. d) At least 100m from the designated forest land. e) avoid disposal on productive land. f) All vehicles delivering material to the site shall be covered to avoid material spillage. All excavated material shall be stored within the site, dried and transported in trucks covered with tarpaulin g) Proper signages to be provided for heavy vehicle movement. h) Access roads to be made for material transport to site inside project area (Waterbodies) i) Dredged spoils shall be used for bund strengthening of water bodies inside the project area.					

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1.14	De-silting of the Lake and Strengthening of Bunds.	i. The desilted earth shall be dried for one day and stored in bags for bund strengthening. ii. Wetting of soil shall be done before trench excavation, wetting of brick, metal and sand before handling. iii. Sprinkling of water on metal and sand shall be carried out before handling. iv. Construction residues such as metal cuttings/ shavings, wood, packing materials and containers shall be disposed following the applicable legal requirements. v. Biodiversity expert to be appointed to develop biodiversity management plan and to get it approved by the PMC/ULB, Environmental expert prior to the execution of the works.	Contractor				
1.15	Traffic Management	Traffic management shall be in place by the contractor with adequate placement of traffic signals and traffic control personnel, when the vehicles are passing through the local roads and near the project site. Transportation of the construction materials to project site and excavated silt/ wastes for disposal covered trucks shall be in non-peak hours.	Contractor / HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1.16	Planning of temporary Traffic arrangements	i. Temporary diversion will be provided with the approval of the HCMC Engineer. Detailed traffic control plans will be prepared and submitted to the HCMC Engineers for approval, one week prior to commencement of works. ii. The traffic control plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, SIGNAGES, safety measures for transport of hazardous materials and arrangement of flagmen. iii. The guidance for traffic management provided in Section 7.13 of the EA report shall be referred to for preparation of the traffic plan.	Contractor / HCMC	Construction phases	Review traffic management plan and Site inspection	Implementation of traffic management plan adequately; Number of complaints received; and Incidence of accidents	Continuous as required
1.17	Barricading site	The construction area should be barricaded at all time in a day with adequate marking, flags, reflectors etc. for safety of general traffic movement and pedestrians.	Contractor	Prior to start of construction	Site inspection	Proper barricading in place and Accident or casualty reported	One Time
1.18	Nuisance to neighbourhood community	Materials shall be transported through the temporary approach road formed without disturbing the neighbourhood community. Supervisors at the site shall guide the	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		heavy vehicles carrying materials and machinery to the temporary access road and signages if required may be provided. Safety barricading shall be provided while construction near the structures restricting entry to work place and signages shall be placed. Work site lighting during night wherever required shall be provided during implementation. Adequate slope gradient is required to be maintained while strengthening the bund. Storage of materials shall be done only within in earmarked areas of the project area, without disturbing the nearby community. GRC shall be formed to address any grievance of the community due to construction activities. Boards with details of the committee members and contact details shall be provided near the project area.	Contractor / HCMC				
1.19	Dust Pollution near settlements	i. All earth work will be protected in a manner acceptable to the HCMC Engineer to minimize generation of dust. Area under construction shall be covered & equipped with dust collector. Construction material shall be covered or stored in such a	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		manner so as to avoid being affected by wind direction. ii. Trucks carrying construction material to be adequately covered to avoid the dust pollution and to avoid the material spillage. iii. Sprinkling of water to be done at regular intervals at places of work to protect the nearby inhabitants and road users.					
1.20	Vehicular noise pollution at residential / sensitive receptors.	i. Idling of temporary trucks or other equipment should not be permitted during periods of loading / unloading or when they are not in active use. The practice must be ensured especially near residential / commercial / sensitive areas. ii. Stationary construction equipment will be kept at least 500m away from sensitive receptors. All possible and practical measures to control noise emissions during drilling shall be employed. The HCMC may direct to take adequate control measures depending on site conditions.	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1.21	Noise from vehicles, plants and equipment	i. Use of less noise generating equipment's, provide personal protective equipment's such as ear plugs/muffs and other safety measures to labourers. In addition, the concrete mixture to be used for construction works will be prepared in a location away from the locality to minimize the noise generated from the machinery. ii. Servicing of all construction vehicles and machinery will be done regularly and during routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced. Maintenance of vehicles, equipment and machinery shall be done at regular interval and up to the satisfaction of the Engineer to keep noise levels at the minimum.	Contractor				
1.22	Sensitive Areas	The sensitive areas like Schools, hospitals to be provided with suitable noise barriers and safety measures, prior to the start of work in order to minimize the dust and noise impacts due to vehicle movement during construction and their effectiveness to be checked.	HCMC, Contractor	Pre-construction phase	Site inspection	Location and its access and Basic facilities and civic amenities.	Periodically

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1.23	Pollution from Construction Wastes	All waste arising from the project is to be disposed off in the manner that is acceptable by the HCMC Engineer. The HCMC Engineer shall certify that all liquid wastes disposed off from the sites to meet the discharge standard.	Contractor				
1.24	Pollution from Fuel and Lubricants	i. The contractor shall ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites will be located at least 500 m from sensitive receptors. ii. All location and lay-out plans of such sites shall be submitted by the Contractor prior to their establishment and will be approved by the Engineer. Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. iii. Contractor shall arrange for collection, storing and disposal of oily wastes to the preidentified disposal sites (list to be submitted to HCMC Engineer) and approved	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		by the HCMC Engineer. All spills and collected petroleum products will be disposed off in accordance with MoEF and state PCB guidelines. iv. HCMC Engineer will certify that all arrangements comply with the guidelines of PCB/ MoEF or any other relevant laws.					
1.25	Disposal of oil and grease	A suitable site should be identified for safe disposal / without contaminating the source, in relatively low-lying areas, away from the water bodies etc., as approved by the HCMC Engineer & as per specific procedures.	Contractor/HCMC				
1.26	Operation of construction machinery	All construction vehicles shall comply with emission standards and shall be maintained properly. Wind shields shall be installed all along the site boundary to abate the dust carry-over to the neighbouring areas. Use of Ready-mix Concrete wherever possible shall be explored. In the case of use of Concrete Mixer, Concrete Mixer shall be mounted on shelter with top and sides closed. Sprinkling of water on metal & sand shall be carried out before handling.	Contractor				
1.27	Using of modern machineries	Using of modern machineries such as Excavators, backhoes etc, shall be used to minimize the construction period which	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		will reduce the construction period impacts to the nearby residents.					
1.28	Protection of residential / sensitive receptors.	i. Preventive maintenance of construction equipment and vehicles to meet emission standards and to keep them with low noise. ii. Provision of enclosing generators and concrete mixers at site shall be provided. iii. Sound barriers shall be installed during the construction phase to protect the inhabited areas from the noise from construction activities. iv. Adequate barricading and safety measures to protect dust pollution and noise impacts on sensitive receptors like schools and hospital etc due to vehicle movement to be ensured prior to the start of work and their effectiveness to be checked during construction and operation phase.	Contractor				
1.29	Labour camp, Labour accommodation, facilities & other facilities to labourers	Setting up of labour camps needs to be done as per the procedures. Adequate potable water facilities, sanitation and drainage etc., in conformity with the Indian labour laws shall be ensured. The contractor shall also guarantee the following:	Contractor	During Pre-construction	Visual inspection; Consultations with labour, and local communities	All the facilities available as per law and standards; Assess the satisfaction	Everyday

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		xxvii. Select a camp site away from residential areas (at least 100m buffer shall be maintained) or locate the camp site within the existing facilities of City Corporation xxviii. The location, layout and basic facility provision of each labour camp will be submitted to Engineer prior to their construction. xxix. Select a camp site away from residential areas (at least 100m buffer shall be maintained) or locate the camp site within the existing facilities of City Corporation xxx. The location, layout and basic facility provision of each labour camp will be submitted to Engineer prior to their construction. xxxi. The construction will commence only upon the written approval of the Engineer. xxxii. Avoid tree cutting for setting up camp facilities xxxiii. Provide a proper fencing/compound wall for camp sites xxxiv. Camp site shall not be located near (100 m) water bodies, flood plains, flood prone/low lying areas or any ecologically, socially, archeologically sensitive areas			nearby; Site inspection; Facilities made available; Type of illness and its causes; and Discussions about the level of health awareness and safety precautions taken by the workers while working on the work site.	level of labourers; Cordial relation between labour and local communities ; Ensure easy access to a first-aid box with all required medicines and accessories at each worksite, labour accommodation, and office at all times. Also, make arrangements with doctors at the nearest government health centre or	

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		xxxv. Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit xxxvi. Ensure conditions of liveability at work camps are maintained at the highest standards possible at all times; living quarters and construction camps shall be provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts and facilities constructed with materials like AC sheets, tarpaulins, etc., shall not be used as accommodation for workers xxvii. Camp shall be provided with proper drainage; there shall not be any water accumulation xxviii. Provide drinking water, water for other uses, separate toilets for men and women; drinking water should be regularly tested to confirm that drinking water standards are met xxxix. Prohibit employees from cutting of trees for firewood; contractor should provide cooking fuel (cooking gas); fire wood not allowed				private clinic for immediate medical support.	

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		xl. Train employees in the storage and handling of materials which can potentially cause soil contamination xli. Wastewater from the camps shall be disposed properly into on-site sanitation with septic tank and soak pit arrangements (100 m away from surface water body or groundwater well) xlii. To prevent open defecation & preventive measure to neighbourhood, if Labours work away from labour camp, resting shed, separate mobile toilet for men and women with water supply and septic tanks arrangement to be provided by the contractor. xliii. Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; provide a compost pit for bio degradable waste, and non-biodegradable / recyclable waste shall be collected and sold in local market. xliv. Remove all wreckage, rubbish, or temporary structures which are no longer required; and xlv. At the completion of work, camp area shall be cleaned and restored					

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		to pre project conditions, and submit report to HCMC; HCMC to review and approve camp clearance and closure of work site xlvi. Labour accommodation and temporary shade near work sites shall provide protection from heat, rain, flooding, insects, snakes and mosquitoes. It should have adequate provisions for emergency such as fire safety, security, etc; xlvii. Adequate healthcare is to be provided for the workforce; xlviii. Ensure adequate water supply in all toilets and urinals; Provide separate toilets/ bathrooms for women laborers and shall be screened from those for men (marked in vernacular language. xlix. Provide first aid medical kit at labour accommodation, temporary labour shed and working site; train the labour for usage of items in injury, emergency, coordinate with nearest government and private medical centers for the medical services, display the contact number of medical doctor(s) and keep a vehicle for emergency travel all the time;					

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		l. As per provisions of WHO and MOHFW guidelines of Covid-19, sanitizer, soap, mask, etc. should be made available in sufficient quantity and its use by the workers mandatorily and maintain social distancing all the time; li. The contractor will provide garbage bins in the camps and ensure that these are regularly emptied and disposed off in co-ordination with the ULB. Ensure medical tests and treatment of Covid-19 positive cases immediately; and general medical checkup for 3 month once.					
1.30	Appointment and Mobilization of Environment & Safety Officer	The contractor has to appoint Environment, Safety, social safeguard officer as per the ESHS in the contract documents. The experts will be mobilized prior to work start. ESO will dedicatedly work and ensure implementation of Environmental Management Plan including Occupational, Health and Safety measures during the project implementation.	Contractor / HCMC	Pre-Construction Phase	Review reports and records	No compliance at site	Mobilized and to be available throughout the contract period.
1.31	Flora and Chance found Fauna	i. Prosopis Juliflora shall be removed within the project area to improve the native bio-diversity.	Contractor/HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		ii. Planting of indigenous species shall be planned wherever possible to enhance effective use of site micro-climates and soil conditions. iii. Shrubs shall be planted to attract butterflies and birds. iv. As far as possible neem trees can be retained. Palm trees and other fast-growing shrubs can be planted wherever possible. (List of suggested species in Table 7.1 shall be referred.) v. The contractor will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal. vi. If any wild animal is found near the construction site at any point of time, the contractor will immediately upon discovery thereof acquaint the Engineer and carry out the Engineer's instructions for dealing with the same. vii. The Engineer will report to the nearby forest office (range office or	HCMC HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials. viii. Biodiversity specialist of HCMC shall monitor implementation of plantation activities and to conduct awareness program for the local about the importance of flora and fauna.					
1.32	Chance Found Archaeological Property	i. Create awareness among the workers, supervisors and engineers about the chance finds during excavation work ii. All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation. iii. The contractor shall take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. Stop work immediately to allow further investigation if any finds are suspected;	Contractor/HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		iv. Inform State Archaeological Department if a find is suspected and taking any action, they require to ensure its removal or protection in situ. The Engineer shall seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work in the site.					
1.33	Safety Aspects	i. Follow all national, state and local labour laws. ii. Adequate precautions shall be taken to prevent the accidents and from the machineries. All machines used shall confirm to the relevant Indian standards Code and shall be regularly inspected by the HCMC. Where loose soil is met with, shoring and strutting shall be provided to avoid collapse of soil. Protective footwear and protective goggles shall be provided to all workers employed on mixing of materials like cement, concrete etc. iii. Welder's protective eye-shields shall be provided to workers who are engaged in welding works. v) Earplugs shall be provided to workers exposed to loud noise, and workers working in crushing,	Contractor	Construction phases	Site inspection; and Observation of workers with PPE and safety measures while working on work site.	Quantity and timely supply of PPEs; Awareness level about the use of PPEs; and Incidence of injury, accident, infirmity.	Everyday

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		compaction, or concrete mixing operation. iv. The contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc to workers and staffs. v. The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labour Organization (ILO) Convention No. 62 as far as those are applicable to this contract. vi. The contractor will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and the Building and other Construction Workers (regulation of Employment and Conditions of Services) Act, 1996 are adhered to. vii. The contractor shall not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with products containing lead in any form.					
1.34	Prevention of accidents	Prevention of accidents involving human beings, animals, vehicles falling or accidents during construction period. This	Contractor / HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		needs to be ensured with proper barricading, signage boards and lighting etc.					
1.35	Emergency response to manage cyclone and other disaster conditions	i. Contractor shall ensure efficient communication system in place which will be required during occurrence of any natural hazard. ii. Evacuation plan shall be in place for the site. iii. Evacuation plan or route is displayed clearly through signs or picture at prominent places within the sites. iv. Ensure effective coordination within the workforce and concerned departments and display contact number of concerned persons at prominent places; and v. Conduct training program and mock drills to workers to deal with the disaster situations due to occurrence of cyclones.	Contractor, PIU	Project life cycle	Inspect attendance register for training program and Inspect fire extinguishers and certificate	DMP in place; Communication system in existence; Display of evacuation route; Capacity of workers to manage and Disaster and emergency situations.	When required
1.36	Fire Safety	i. Ensure that no fires are permitted on or adjacent to site. ii. Ensure that no smoking is permitted on the working site. iii. Ensure that sufficient and certified firefighting equipment are placed and maintained on the site.	Contractor	Project life cycle	Inspect, Attendance registers for firefighting training conducted and Observation	Number of Fire incidents; Certified extinguishers in appropriate locations	When required

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		iv. Equip all fuel stores and waste storage areas with fire extinguishers. v. Ensure that all workforce and staff on site are aware of the location of firefighting equipment on the site and Conduct training program on use of extinguishers, sand, etc for fire-fighting and ensure that they are trained in its operations.			of fire extinguishers and certificate at the sites.	and Worker's knowledge to operate the fire extinguisher	
1.37	Risk from Electrical Equipment(s)	The Contractor shall take all required precautions to prevent danger from electrical equipment and ensure that – i. No material will be stacked or placed so as to cause danger or inconvenience to any person or the public. ii. All necessary fencing and lights will be provided to protect the public in construction zones. iii. All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in good working order, will be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Engineer.	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1.38	First Aid	The contractor shall arrange for: i. A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zon ii. Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital	Contractor				
1.39	Informatory Signs and Hoardings	The contractor shall provide, erect and maintain informatory /safety signs, hoardings written in English and local language, wherever required or as suggested by the Engineer.	Contractor / HCMC				
1.40	Safety of Pedestrians	Provide safe access such as temporary bridges and crossings, planks/makeshift pathways, detours and walkways.	Contractor / HCMC				
1.41	Access to adjacent public properties	Contractor shall at all times during construction, make available at least pedestrian access to adjacent properties so as not to obstruct the ingress and egress from the neighbouring houses and commercial and other buildings.	Contractor / HCMC				
1.42	Submission of updated environmental & social management plan (ESMP) / site, environmental plan (SEP); ESMP	Supervisor to ensure ESMP implementation. Submission of updated ESMP/SEP Timely submission of monthly monitoring reports including documentary evidence on ESMP implementation such as photographs.	Contactor	Project cycle	Review of reports and records	Compliance at the site	One-time or as and when required.

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
	implementation and reporting						
	Social Aspects						
1.43	Compensation and Assistance to potential temporary economic impacts	There are no any social impacts identified. However, if any impacts identified during implementation the unforeseen impacts and mitigation measures are proposed.	Contractor, PIU	Construction Phase	Verify the disbursement of compensation and assistance; and Conduct consultation with local communities	Potential temporary economic impacts were compensated	One time
1.44	Compensation and Assistance to potential temporary economic impacts	i) Provide compensation and assistance to potential temporary economic impacts; ii) Employ people of local communities for project works with a priority to potential temporary economic impacts based on their skills; iii) Employ the potential temporary economic impacts, particularly willing women on priority in project related unskilled, semi-skilled and skilled works as applicable.	Contractor, PIU	Construction Phase	Verify the disbursement of compensation and assistance; and Conduct consultation with local communities	Potential temporary economic impacts were compensated at replacement cost against the income loss	One time

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
1.45	Loss of access	i) The contractor shall ensure that access to connecting roads; market, residence and other places should not be blocked. In case, it is unavoidable, then alternate route should be provided to people. The community should be made aware about the diversion plan along with expected deadline for the completion of work. After completion of the work, the access should be restored as per original condition. ii) The contractor is required to provide notice to the shop owners of the need to shift kiosk/wares displayed on ROW as soon as the work plan is ready with minimum 7 working days. iii) No works can be commenced unless 100% shifted in sections ready for implementation.	Contractor	Construction	Visual inspection	Crossing/ access closed	Regularly
1.46	Public disclosure & Stakeholders Consultation	i) Ensure timely and fully project information dissemination through distribution of prior notice, pamphlet in local language, oral communication, meetings, websites, etc.	HCMC/Contractor	Pre-construction phase	Issue of Project information Pamphlets to the Public.	Methods used for public disclosure; and Project awareness.	Continuous

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		ii) Under take detailed mapping and analysis of key stakeholders. Based on the stakeholder analysis, stakeholder engagement plan is prepared that will be updated as required; iii) Ensure that stakeholder including impacted persons are consulted and made aware about the project's purpose, risks/ impacts, mitigation measures and time- frame; and iv) Maintain the records and documentation of the procedure followed and the output of stakeholder engagement.			Advance notice about Roadcut to the residents. Awareness about the project to the Beneficiaries. (FGD's with RWA, Awareness meeting with school students etc.,) Consultations with local communities, beneficiaries, temporary economic impacts and other stakeholders.	(Number of Participants with Male, Female details.) Awareness level of stake holders, particularly the local communities, beneficiaries of the proposed Drain netwrok.	
	Decommissioning Phase						

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
2.1	Clearing of construction camps and restoration	i. Contractor to prepare site restoration plans, the plan is to be implemented by the contractor prior to demobilization. ii. On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expenses, to the entire satisfaction of the HCMC Engineer.	Contractor				
2.2	Project implementation	It shall be ensured that the Environmental, Health and Safety and Biodiversity guidelines of World Bank are adhered to as applicable for activities during construction.	Contractor / HCMC				
2.3	Occupational Health and Safety to workers Emergency Measures for Lakes	i. Workers are provided with necessary occupational health and safety equipment such as protective face mask, head gear, eye shields protective goggles and safety gloves etc. ii. Emergency contact numbers including Ambulance will be displayed at the project site and labour accommodation. First aid will be made available at site. iii. Onsite Emergency plan will be finalized and implemented for	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		community and work men to act when in emergency. Emergency procedures will be displayed in the site. iv. Health check-up for the contract labours shall be carried out periodically due to exposure to slushy soil. Periodical HIV awareness camp shall be conducted. v. Workers exposed to dust, chemicals or pathogens and working in high humidity areas shall be allowed to take breaks away from these areas and be encouraged to wash frequently with sanitizer vi. Supervisors will be deployed at the site for work implementation with heavy vehicles. vii. Maintain records on accidents, near misses. viii. Elevated platforms should be equipped with handrails, toe boards and non-slip surfaces. ix. Personal Floatation devices (life vests), First Aid Kits, Fire Extinguisher, Tow rope, etc. shall be provided on vehicles / floats which work near water filled portions of the drains.					

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
2.5	Unforeseen impacts	Unforeseen impacts encountered during implementation shall be addressed in accordance with the principles of ESMF.	Contractor & HCMC				
2.6	Informatory Signs and Hoardings	The contractor shall provide, erect and maintain informatory / safety signs, hoardings written in English and local language, wherever required or as suggested by the Engineer.	Contractor / HCMC				
2.7	Safety of Pedestrians	Provide safe access such as temporary bridges and crossings, planks/makeshift pathways, detours and walkways.	Contractor / HCMC				
	OPERATION AND MAINTENANCE PHASE						
3.1	Tree Planting & Protection.	i) Planation of trees around the lake boundary, wherever possible ii) Growth and Survival status shall be monitored for planted trees once in two years.	HCMC				
3.2	Solid waste Management in lakes	i) Provide additional bins in critical locations ii) Ensure frequent collection and disposal of waste iii) Carryout periodical awareness programmes to educate the public / stakeholders iv) Prevention of dumping of wastes inside the waterbody through continuous monitoring.	HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring Method	Monitoring Indicator	Frequency
		v) Provide required number of bins at strategic locations around the lakes and the solid wastes generated shall be regularly collected through existing arrangement & manpower available with the HCMC. vi) Provide Signages to create awareness. Display boards carrying the messages of DO's and Dont's.					
3.3	Environmental parameters	i) Periodical monitoring of water and soil quality through an approved monitoring agency. The parameter to be monitored, frequency and duration of monitoring plan shall be as per Environmental Monitoring Plan. ii) Adequate measures shall be taken and checked to control any pollution and report be sent to the concerned Engineer. iii) During sampling, appropriate PPEs shall be used.	HCMC				

8.3 ESMP FOR SPONGE CITY / PARK CONCEPT

Table 8-3 Environmental and Social Management Plan for Sponge City / Park Concept

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
1	**Pre-Construction and Construction Stage**						
1.1	Clearances	i) Contractor has to submit revised EMP to address specific activities such as Construction camp, layout, facilities, storage yard etc., ii) Environment, Health and Safety (EHS) specialist has to be appointed prior to start of work and to be continued till closure of the project. iii) Biodiversity specialist may be appointed prior for monitoring the plantation plan and implementation. iv) Clearances required from other departments and Environmental aspects shall be ensured and made available before start of work. For trees identified for cutting, obtain prior permission from the respective Regional Deputy / Joint Commissioner, HCMC prior to commencement of work. v) Batch mixing plants for construction of works, obtain prior permission from Tamil Nadu Pollution Control Board. vi) To comply with all the provisions of government rules and regulations for labour welfare and safety. vii) The permits obtained by the contractor shall be periodically examined and validity be ensured. This includes the Consent for Batching plants from where	Contractor HCMC HCMC HCMC HCMC Contractor Contractor HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		the contractor sources the concrete, Labour License, insurances etc.					
1.2	Permits and approvals	i. Obtain all permits and approvals required for E&S aspects for waterbody rejuvenation work across all phases. ii. Ensure that all necessary approvals for rejuvenation to be obtained by contractor like labour licence/labour insurance are obtained before starting the work.	HCMC	Before rejuvenation commences	Keep record of all permit, approvals and authorizations	Permits and approvals are available	One time/ Continuous
1.3	Baseline parameters	Baseline parameters for water and soil shall be assessed prior to commencement of work.	Contractor / HCMC				
1.4	Air quality	i. Maintain all vehicles, DG sets/generators and other equipment in good working condition to minimise GHG emission, exhaust fumes, etc.; Wherever possible to use energy efficiency equipment. ii. Avoid excavation, handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present. iii. Water sprinkling, cover dumping and stockpiles of lose material with plastic sheets or nets, particularly in windy conditions should be used	Contractor	Construction phases	Site inspection, Incidence of dust plumes; and review of dust emission control measures.	Emission from construction site, Incidence of dust plumes observed, dust mitigation measures followed and number of complaints received.	Regularly

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		to reduce airborne dust at construction sites and iv. Prevent burning, fire, use of wood for cooking in the project sites to avoid air contamination.					
1.5	Ground water	i. Contractor shall ensure that all vehicle / machinery and equipment operation, maintenance and refuelling will be carried out in such a manner that spillage of fuels and lubricants will not contaminate the ground water. ii. Workforce will be trained in the environmental pollution aspect and activities should stop immediately and resume only when problem is resolved; and iii. Faulty equipment, vehicles and other source of possible oil and lubricant contamination should be repaired on priority and must be kept in good condition all the time.	Contractor	Construction &operation phases	Site inspection; and Review of spillage control measures.	Fuel or lubricant spillage and Underground water pollution mitigation measures followed.	Regularly
1.6	Protection of lakes/ water bodies/ Surface water	i. Contractor shall ensure that all vehicle / machinery and equipment operation, maintenance and refuelling will be carried out in such a manner that spillage of fuels and lubricants will not contaminate the water bodies. ii. Water bodies need to be cordoned off by using protective barriers	Contractor	Construction phases	Site inspection and review of spillage control measures	Fuel or lubricant spillage and water pollution mitigation measures followed.	Regularly

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		such as green cloth and subsequently plantation and iii. In case of water logging, water will be pumped out during the construction of storm drains					
1.7	Site Clearance, tree plantation and Protection	i) Site to be cleared prior to initiating works. If necessary, the top soil to be carved out and stored in a separate place. Avoid tree cutting and loss of vegetation, shrubs, grasses, etc. to the maximum extent possible. ii) Provide adequate protection to the trees to be retained with tree guards. iii) Take adequate care to determine to root protection zone and minimise root loss. iv) Trees shall be removed from the construction sites before commencement of construct. v) Tree plantation shall be proposed all around boundary of lakes wherever possible.	HCMC	Construction phase	Review site management, labour plan and site inspection	No tree cutting should occur and vegetation loss should be minimized. The number and species of any trees cut and replanted must be recorded, along with the survival rate of the replanted trees.	Monthly
1.7a	Contractor Reporting obligations	iv) PA/ESMP Contract specific ESMP to be prepared. i. Contractor has to prepare LMP, WMP, TMP, BMP	HCMC/ Contractor	Construction Phase	Records, approvals	Approvals document	Periodically

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
1.8	Source of Materials	ii. Obtain construction materials only from government approved quarries with prior approval of PIU. ii. The contractor has to obtain approvals for all construction materials. iii. PIU to review and ensure that proposed quarry sources have all necessary clearances/ permissions in place prior to approval. iv. Contractor to submit to PIU on a monthly basis documentation on material obtained from each source (quarry/ borrow pit) v. No new borrow areas, quarries etc., shall be developed for the project.	HCMC contractor	Pre-Construction and Construction Phase	Records, approvals	Approval documents	Periodically
1.9	Storage of materials and portable office Cabin	i. No construction materials should be stored on the road, on top of or beside drains and footpaths, or on any other public area as this may restrict public access to these utilities. ii. The contractor shall identify the site for temporary use of land for construction sites /storage of construction materials, etc. iii. Site for storage of construction materials to be identified without affecting the traffic and other common utilities, and the quality of the construction materials.	Contractor / HCMC	Pre-construction	Site inspection	Location and its access and Basic facilities and civic amenities.	Semi-annually

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		iv. Construction materials should only be stored and prepared on the site if they do not obstruct the road or any surrounding public utility. v. Construction materials should only be transported to the worksite as and when required for construction. vi. Establish a suitable portable cabin for site staffs.					
1.10	Transportation of building materials	i) Temporary approach road parallel to the bund and on the peripheral boundary of the water spread area shall be formed for trunks to convey silt and other construction materials. These temporary approach roads shall be removed after completion of construction activities. ii) Vehicles transporting construction materials prone to fugitive dust emissions shall be covered. iii) Trucks carrying sand shall be provided with tarpaulin sheets to cover the bed and sides of the trucks. iv) Idling of delivery trucks or other equipment shall be avoided during loading and unloading. Sprinkling of water (for materials such as blue metal, sand and brick) before unloading to suppress dust	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		generation shall be done. v) Adequate care shall be taken to prevent spillage of earth or construction materials offsite and in haul routes. Any such spillage shall be removed immediately, and the area to be cleaned.					
1.11	Disposal of excavated materials, construction and other waste	i. Temporarily retained waste within the lake areas shall be earmarked and dry waste needs to be transported in covered trucks and register shall be maintained at the site. ii. Surplus excavated earth shall be removed from the site every day preventing storage and transport to the existing dump yards of Hosur City Municipal Corporation at KCC Nagar/ Dinnur dumpsite daily. During construction if any suitable site found for disposal, the same shall be considered by obtaining prior consent from HCMC Engineers. iii. Floating materials like plastics, weeds shall be sent to the KCC Nagar/ Dinnur Solid waste municipal (SWM) facility. iv. Transportation of the materials shall be carried out in trucks covered by tarpaulin sheets.	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		v. Biodiversity expert to be appointed to develop biodiversity management plan and to get it approved by the PMC/ULB Environmental Expert prior to the execution of the works.					
1.12	Traffic Management	Traffic management shall be in place by the contractor with adequate placement of traffic signals and traffic control personnel, when the vehicles are passing through the local roads and near the project site. Transportation of the construction materials to project site and excavated silt/ wastes for disposal covered trucks shall be in non-peak hours.	Contractor / HCMC				
1.13	Planning of temporary Traffic arrangements	i. Temporary diversion will be provided with the approval of the HCMC Engineer. Detailed traffic control plans will be prepared and submitted to the HCMC Engineers for approval, one week prior to commencement of works. ii. The traffic control plans shall contain details of temporary diversion, details of arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, SIGNAGES, safety measures for transport of hazardous materials and arrangement of flagmen.	Contractor / HCMC	Construction phases	Review traffic management plan and Site inspection	Implementation of traffic management plan adequately; Number of complaints received; and Incidence of accidents	Continuous as required

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
1.14	Barricading site	The construction area should be barricaded at all time in a day with adequate marking, flags, reflectors etc. for safety of general traffic movement and pedestrians.	Contractor	Prior to start of construction	Site inspection	Proper barricading in place and Accident or casualty reported	One Time
1.15	Nuisance to neighbourhood community	i. Materials shall be transported through the temporary approach road formed without disturbing the neighbourhood community. Supervisors at the site shall guide the heavy vehicles carrying materials and machinery to the temporary access road and signages if required may be provided. ii. Safety barricading shall be provided while construction near the structures restricting entry to work place and signages shall be placed. Work site lighting during night wherever required shall be provided during implementation. Adequate slope gradient is required to be maintained while strengthening the bund, iii. Storage of materials shall be done only within in earmarked areas of the project area, without disturbing the nearby community.	Contractor Contractor / HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		iv. GRC shall be formed to address any grievance of the community due to construction activities. Boards with details of the committee members and contact details shall be provided near the project area.					
1.16	Dust Pollution near settlements	i) All earth work will be protected in a manner acceptable to the HCMC Engineer to minimize generation of dust. Area under construction shall be covered & equipped with dust collector. ii) Construction material shall be covered or stored in such a manner so as to avoid being affected by wind direction. iii) Trucks carrying construction material to be adequately covered to avoid the dust pollution and to avoid the material spillage. iv) Sprinkling of water to be done at regular intervals at places of work to protect the nearby inhabitants and road users.	Contractor				
1.17	Vehicular noise pollution at residential /	i) Idling of temporary trucks or other equipment should not be permitted during periods of	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
	sensitive receptors.	loading / unloading or when they are not in active use. The practice must be ensured especially near residential / commercial / sensitive areas. ii) Stationary construction equipment will be kept at least 500m away from sensitive receptors. iii) All possible and practical measures to control noise emissions during drilling shall be employed. The HCMC may direct to take adequate control measures depending on site conditions.					
1.18	Noise from vehicles, plants and equipment	i) Use of less noise generating equipment's, provide personal protective equipment's such as ear plugs/muffs and other safety measures to labourers. In addition the concrete mixture to be used for construction works will be prepared in a location away from the locality to minimize the noise generated from the machinery. ii) Servicing of all construction vehicles and machinery will be done regularly and during	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		routine servicing operations, the effectiveness of exhaust silencers will be checked and if found defective will be replaced. iii) Maintenance of vehicles, equipment and machinery shall be done at regular interval and upto the satisfaction of the Engineer to keep noise levels at the minimum.					
1.19	Sensitive Areas	The sensitive areas like Schools, hospitals to be provided with suitable noise barriers and safety measures, prior to the start of work in order to minimize the dust and noise impacts due to vehicle movement during construction and their effectiveness to be checked.	HCMC, Contractor	Pre-construction phase	Site inspection	Location and its access and Basic facilities and civic amenities.	Periodically
1.20	Operation of construction machinery	i. All construction vehicles shall comply with emission standards and shall be maintained properly. Wind shields shall be installed all along the site boundary to abate the dust carry-over to the neighbouring areas. ii. Use of Ready-mix Concrete wherever possible shall be explored. In the case of use of Concrete Mixer, Concrete Mixer	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		shall be mounted on shelter with top and sides closed. Sprinkling of water on metal & sand shall be carried out before handling.					
1.21	Using of modern machineries	Using of modern machineries such as Excavators, backhoes etc, shall be used to minimize the construction period which will reduce the construction period impacts to the nearby residents.	Contractor				
1.22	Protection of residential / sensitive receptors.	i. Preventive maintenance of construction equipment and vehicles to meet emission standards and to keep them with low noise. ii. Provision of enclosing generators and concrete mixers at site shall be provided. iii. Sound barriers shall be installed during the construction phase to protect the inhabited areas from the noise from construction activities. iv. Adequate barricading and safety measures to protect dust pollution and noise impacts on sensitive receptors like schools and hospital etc due to vehicle movement to be ensured prior to the start of work and their effectiveness to be checked during construction and operation phase.	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
1.23	Pollution from Construction Wastes	All waste arising from the project is to be disposed off in the manner that is acceptable by the HCMC Engineer. The HCMC Engineer shall certify that all liquid wastes disposed off from the sites to meet the discharge standard.	Contractor				
1.24	Pollution from Fuel and Lubricants	i. The contractor shall ensure that all construction vehicle parking location, fuel/lubricants storage sites, vehicle, machinery and equipment maintenance and refuelling sites will be located at least 500 m from sensitive receptors. ii. All location and lay-out plans of such sites shall be submitted by the Contractor prior to their establishment and will be approved by the Engineer. iii. Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refuelling will be carried out in such a fashion that spillage of fuels and lubricants does not contaminate the ground. Contractor shall arrange for collection, storing and disposal of oily wastes to the preidentified disposal sites (list to be submitted to HCMC Engineer) and approved	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		by the HCMC Engineer. All spills and collected petroleum products will be disposed off in accordance with MoEF and state PCB guidelines. iv. HCMC Engineer will certify that all arrangements comply with the guidelines of PCB/ MoEF or any other relevant laws.					
1.25	Disposal of oil and grease	A suitable site should be identified for safe disposal / without contaminating the source, in relatively low-lying areas, away from the water bodies etc., as approved by the HCMC Engineer & as per specific procedures.	Contractor/HCMC				
1.26	Labour camp & other facilities to labourers	Setting up of labour camps needs to be done as per the procedures. Adequate potable water facilities, sanitation and drainage etc., in conformity with the Indian labour laws shall be ensured. The contractor shall also guarantee the following: lii. Select a camp site away from residential areas (at least 100m buffer shall be maintained) or locate the camp site within the existing facilities of City Corporation liii. The location, layout and basic facility provision of each labour camp will be submitted to Engineer prior to their construction.	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		liv. Select a camp site away from residential areas (at least 100m buffer shall be maintained) or locate the camp site within the existing facilities of City Corporation lv. The location, layout and basic facility provision of each labour camp will be submitted to Engineer prior to their construction. lvi. The construction will commence only upon the written approval of the Engineer. lvii. Avoid tree cutting for setting up camp facilities lviii. Provide a proper fencing/compound wall for camp sites lix. Camp site shall not be located near (100 m) water bodies, flood plains, flood prone/low lying areas or any ecologically, socially, archeologically sensitive areas lx. Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit lxi. Ensure conditions of liveability at work camps are maintained at the highest standards possible at all times; living quarters and construction camps shall be					

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts and facilities constructed with materials like AC sheets, tarpaulins, etc., shall not be used as accommodation for workers lxii. Camp shall be provided with proper drainage; there shall not be any water accumulation lxiii. Provide drinking water, water for other uses, separate toilets for men and women; drinking water should be regularly tested to confirm that drinking water standards are met lxiv. Prohibit employees from cutting of trees for firewood; contractor should provide cooking fuel (cooking gas); fire wood not allowed lxv. Train employees in the storage and handling of materials which can potentially cause soil contamination lxvi. Wastewater from the camps shall be disposed properly into on-site sanitation with septic tank and soak pit arrangements (100 m away from surface water body or groundwater well)					

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		lxvii. To prevent open defecation & preventive measure to neighbourhood, if Labours work away from labour camp, resting shed, separate mobile toilet for men and women with water supply and septic tanks arrangement to be provided by the contractor. lxviii. Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; provide a compost pit for bio degradable waste, and non-biodegradable / recyclable waste shall be collected and sold in local market. lxix. Remove all wreckage, rubbish, or temporary structures which are no longer required; and lxx. At the completion of work, camp area shall be cleaned and restored to pre project conditions, and submit report to HCMC; HCMC to review and approve camp clearance and closure of work site lxxi. Labour accommodation and temporary shade near work sites shall provide protection from heat, rain, flooding, insects, snakes and mosquitoes. It should have adequate provisions for emergency such as fire safety, security, etc;					

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		lxxii. Adequate healthcare is to be provided for the workforce; lxxiii. Ensure adequate water supply in all toilets and urinals; Provide separate toilets/ bathrooms for women laborers and shall be screened from those for men (marked in vernacular language. lxxiv. Provide first aid medical kit at labour accommodation, temporary labour shed and working site; train the labour for usage of items in injury, emergency, coordinate with nearest government and private medical centers for the medical services, display the contact number of medical doctor(s) and keep a vehicle for emergency travel all the time; lxxv. As per provisions of WHO and MOHFW guidelines of Covid-19, sanitizer, soap, mask, etc. should be made available in sufficient quantity and its use by the workers mandatorily and maintain social distancing all the time; lxxvi. The contractor will provide garbage bins in the camps and ensure that these are regularly emptied and					

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		disposed off in co-ordination with the ULB. i) Ensure medical tests and treatment of Covid-19 positive cases immediately; and general medical checkup for 3 month once.					
1.27	Flora and Chance found Fauna	i. Prosopis Juliflora shall be removed within the project area to improve the native bio-diversity. ii. Planting of indigenous species shall be planned wherever possible to enhance effective use of site micro-climates and soil conditions. iii. Shrubs shall be planted to attract butterflies and birds. iv. As far as possible neem trees can be retained. Palm trees and other fast-growing shrubs can be planted wherever possible. (List of suggested species in Table 7.1 shall be referred.) v. The contractor will take reasonable precaution to prevent his workmen or any other persons from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body and hunting of any animal.	Contractor/HCMC HCMC HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		vi. If any wild animal is found near the construction site at any point of time, the contractor will immediately upon discovery thereof acquaint the Engineer and carry out the Engineer's instructions for dealing with the same. vii. The Engineer will report to the nearby forest office (range office or divisional office) and will take appropriate steps/ measures, if required in consultation with the forest officials. viii. Biodiversity specialist of HCMC shall monitor implementation of plantation activities and to conduct awareness program for the local about the importance of flora and fauna.					
1.28	Chance Found Archaeological Property	i. Create awareness among the workers, supervisors and engineers about the chance finds during excavation work ii. All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on the site shall be the property of the Government and shall be dealt	Contractor/HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		with as per provisions of the relevant legislation. iii. The contractor shall take reasonable precautions to prevent his workmen or any other persons from removing and damaging any such article or thing. Stop work immediately to allow further investigation if any finds are suspected; iv. Inform State Archaeological Department if a find is suspected and taking any action, they require to ensure its removal or protection in situ. The Engineer shall seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work in the site.					
1.29	Safety Aspects	i) Follow all national, state and local labour laws (indicated in Section 4.2) ii) Adequate precautions shall be taken to prevent the accidents and from the machineries. All machines used shall confirm to the relevant Indian standards Code and shall be regularly inspected by the HCMC. iii) Where loose soil is met with, shoring and strutting shall be	Contractor	Construction phases	Site inspection; and Observation of workers with PPE and safety measures while working on work site.	Quantity and timely supply of PPEs; Awareness level about the use of PPEs; and Incidence of injury, accident, infirmity.	Everyday

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		provided to avoid collapse of soil. iii) Protective footwear and protective goggles shall be provided to all workers employed on mixing of materials like cement, concrete etc. iv) Welder's protective eye-shields shall be provided to workers who are engaged in welding works. v) Earplugs shall be provided to workers exposed to loud noise, and workers working in crushing, compaction, or concrete mixing operation. vi) The contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, ear plugs, mask etc to workers and staffs. vii) The contractor will comply with all the precautions as required for ensuring the safety of the workmen as per the International Labour Organization (ILO) Convention No. 62 as far as those are applicable to this contract.					

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		viii) The contractor will make sure that during the construction work all relevant provisions of the Factories Act, 1948 and the Building and other Construction Workers (regulation of Employment and Conditions of Services) Act, 1996 are adhered to. ix) The contractor shall not employ any person below the age of 14 years for any work and no woman will be employed on the work of painting with products containing lead in any form.					
1.30	Risk from Electrical Equipment(s)	The Contractor shall take all required precautions to prevent danger from electrical equipment and ensure that – i) No material will be stacked or placed so as to cause danger or inconvenience to any person or the public. ii) All necessary fencing and lights will be provided to protect the public in construction zones. iii) All machines to be used in the construction will conform to the relevant Indian Standards (IS) codes, will be free from patent defect, will be kept in	Contractor	Construction phase	Site inspection, Observation of power supply system; and Electricity safety precaution taken by workers while working on work site.	Incidence of current shock, injury, electrocution	Daily

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		good working order, will be regularly inspected and properly maintained as per IS provision and to the satisfaction of the Engineer.					
1.31	Prevention of accidents	Prevention of accidents involving human beings, animals or vehicles falling or accidents during construction period. This needs to be ensured with proper barricading, signage boards and lighting etc.	Contractor / HCMC				
1.32	Emergency response to manage cyclone and other disaster conditions	i. Contractor shall ensure efficient communication system in place which will be required during occurrence of any natural hazard. ii. Evacuation plan shall be in place for the site. iii. Evacuation plan or route is displayed clearly through signs or picture at prominent places within the sites. iv. Ensure effective coordination within the workforce and concerned departments and display contact number of	Contractor, PIU	Project life cycle	Inspect attendance register for training program and Inspect fire extinguishers and certificate	DMP in place; Communication system in existence; Display of evacuation route; Capacity of workers to manage and Disaster and emergency situations.	When required

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		concerned persons at prominent places and v. Conduct training program and mock drills to workers to deal with the disaster situations due to occurrence of cyclones.					
1.33	Fire Safety	i. Ensure that no fires are permitted on or adjacent to site. ii. Ensure that no smoking is permitted on the working site. iii. Ensure that sufficient and certified firefighting equipment are placed and maintained on the site. iv. Equip all fuel stores and waste storage areas with fire extinguishers. v. Ensure that all workforce and staff on site are aware of the location of firefighting equipment on the site and Conduct training program on use of extinguishers, sand, etc for fire-fighting and ensure that they are trained in its operations.	Contractor	Project Life cycle	Inspect, Attendance registers for firefighting training conducted and Observation of fire extinguishers and certificate at the sites.	Number of Fire incidents; Certified extinguishers in appropriate locations and Worker's knowledge to operate the fire extinguisher	When required
1.34	First Aid	The contractor shall arrange for: i) A readily available first aid unit including an adequate supply of sterilized dressing materials and appliances as per the Factories Rules in every work zone	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		ii) Availability of suitable transport at all times to take injured or sick person(s) to the nearest hospital					
1.35	Informatory Signs and Hoardings	The contractor shall provide, erect and maintain informatory /safety signs, hoardings written in English and local language, wherever required or as suggested by the Engineer.	Contractor / HCMC				
1.36	Safety of Pedestrians	Provide safe access such as temporary bridges and crossings, planks/makeshift pathways, detours and walkways.	Contractor / HCMC				
1.37	Access to adjacent public properties	Contractor shall at all times during construction, make available at least pedestrian access to adjacent properties so as not to obstruct the ingress and egress from the neighbouring houses and commercial and other buildings.	Contractor / HCMC				
	Social Aspects						
1.38	Grievance Redressal	Grievance arising during implementation of the project shall be redressed by HCMC through Grievance Redressal Mechanism (GRM) established for the project. All the grievances received shall be acknowledged and proper recording and tracking should be carried out. GRC will adjudicate the complaints in 6-8 weeks depending upon the severity of case.	HCMC	Project life cycle	Review the proceedings and minutes of meetings; and Consultations with the members of GRC. Disclosure of	GRC established. Number of Grievances received and number of grievances resolved. Number of GRC meetings	Monthly or as required

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		Convenor will be the coordinator for organizing GRC meetings as required, writing the proceedings, minutes of meeting, informing the aggrieved party about the decision of GRC, etc.			GRM in the all the work sites.	held. Decision taken with in a timeframe. Time taken for resolving the grievances.	
1.39	Compensation and Assistance to potential temporary economic impacts	Provide compensation and assistance to potential temporary economic impacts; Employ people of local communities for project works with a priority to potential temporary economic impacts based on their skills; Employ the potential temporary economic impacts, particularly willing women on priority in project related unskilled, semi-skilled and skilled works as applicable;	Contractor, PIU	Construction Phase	Verify the disbursement of compensation and assistance; and Conduct consultation with local communities	Potential temporary economic impacts were compensated at replacement cost against the income loss	One time
1.40	Loss of access	i. The contractor shall ensure that access to park pathways; market, residence and other places should not be blocked. In case, it is unavoidable, then alternate route should be provided to people. The community should be made aware about the diversion plan along with expected deadline for the completion of work. After completion of the work, the access should be restored as per original condition.	Contractor	Construction	Visual inspection	Crossing/ access closed	Regularly

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		ii. The contractor is required to provide notice to the shop owners (around park) of the need to shift kiosk/wares displayed on ROW as soon as the work plan is ready with minimum 7 working days. iii. No works can be commenced unless 100% shifted in sections ready for implementation.					
1.41	Public disclosure & Stakeholders Consultation	i. Ensure timely and fully project information dissemination through distribution of prior notice, pamphlet in local language, oral communication, meetings, websites, etc. ii. Under take detailed mapping and analysis of key stakeholders. Based on the stakeholder analysis, stakeholder engagement plan is prepared that will be updated as required. iii. Ensure that stakeholder including impacted persons are consulted and made aware about the project's purpose, risks/ impacts, mitigation measures and time-frame; and iv. Maintain the records and documentation of the procedure followed and the output of stakeholder engagement.	HCMC/Contractor	Pre-construction phase	Issue of Project information Pamphlets to the Public. Advance notice about Roadcut to the residents. Awareness about the project to the Beneficiaries. (FGD's with RWA, Awareness meeting with school students.etc.,) Consultations with local communities,	Methods used for public disclosure; and Project awareness. (Number of Participants with Male, Female details.) Awareness level of stake holders, particularly the local communities , beneficiaries of the proposed	Continuous

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
					beneficiaries, temporary economic impacts and other stakeholders.	Drain netwrok.	
	Decommissioning Phase						
2.1	Clearing of construction camps and restoration	i) Contractor to prepare site restoration plans, the plan is to be implemented by the contractor prior to demobilization. ii) On completion of the works, all temporary structures will be cleared away, all rubbish cleared, excreta or other disposal pits or trenches filled in and effectively sealed off and the site left clean and tidy, at the contractor's expenses, to the entire satisfaction of the HCMC Engineer.	Contractor				
2.2	Project implementation	It shall be ensured that the Environmental, Health and Safety and Bioiversity guidelines of World Bank are adhered to as applicable for activities during construction.	Contractor / HCMC				
2.3	Occupational Health and Safety to workers, Emergency Measures for Lakes	i. Workers are provided with necessary occupational health and safety equipment such as protective face mask, head gear, eye shields protective goggles and safety gloves etc.	Contractor				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		ii. Emergency contact numbers including Ambulance will be displayed at the project site and labour accommodation. First aid will be made available at site. iii. Onsite Emergency plan will be finalized and implemented for community and work men to act when in emergency. Emergency procedures will be displayed in the site. iv. Health check-up for the contract labours shall be carried out periodically due to exposure to slushy soil. Periodical HIV awareness camp shall be conducted. v. Workers exposed to dust, chemicals or pathogens and working in high humidity areas shall be allowed to take breaks away from these areas and be encouraged to wash frequently with sanitizer vi. Supervisors will be deployed at the site for work implementation with heavy vehicles. vii. Maintain records on accidents, near misses. viii. Elevated platforms should be equipped with handrails, toe					

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		boards and non-slip surfaces. ix. Personal Floatation devices (life vests), First Aid Kits, Fire Extinguisher, Tow rope, etc. shall be provided on vehicles / floats which work near water filled portions of the drains.					
2.4	Unforeseen impacts	Unforeseen impacts encountered during implementation shall be addressed in accordance with the principles of ESMF.	Contractor & HCMC				
2.5	Informatory Signs and Hoardings	The contractor shall provide, erect and maintain informatory / safety signs, hoardings written in English and local language, wherever required or as suggested by the Engineer.	Contractor / HCMC				
2.6	Safety of Pedestrians	Provide safe access such as temporary bridges and crossings, planks/makeshift pathways, detours and walkways.	Contractor / HCMC				
	OPERATION AND MAINTENANCE PHASE						
3.1	Tree Planting & Protection.	i) Planation of trees around the lake boundary, wherever possible ii) Growth and Survival status shall be monitored for planted trees once in two years.	HCMC				
3.2	Solid waste Management in park	i) Provide additional bins in critical locations ii) Ensure frequent collection and disposal of waste	HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		iii) Carryout periodical awareness programmes to educate the public / stakeholders iv) Prevention of dumping of wastes inside the waterbody through continuous monitoring. v) Provide required number of bins at strategic locations around the lakes and the solid wastes generated shall be regularly collected through existing arrangement & manpower available with the HCMC. vi) Provide Signages to create awareness. Display boards carrying the messages of DO's and Don'ts.					
3.3	Environmental parameters	i) Periodical monitoring of water and soil quality through an approved monitoring agency. The parameter to be monitored, frequency and duration of monitoring plan shall be as per Environmental Monitoring Plan. ii) Adequate measures shall be taken and checked to control any pollution and report be	HCMC				

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		sent to the concerned Engineer. iii) During sampling, appropriate PPEs shall be used.					
3.4	Maintenance	i. HCMC shall ensure that all park areas, pathways, and facilities remain clean, safe, and free from obstruction. ii. Park pathways, green areas, play zones, and public facilities shall be inspected and cleaned regularly, with additional attention before monsoon and festive seasons. iii. Any damaged or missing infrastructure—such as benches, pathway tiles, fencing, lights, or signboards—shall be repaired or replaced immediately to ensure visitor safety. iv. Garden waste, litter, and debris collected during maintenance activities shall not be left scattered within the park. All waste shall be transported and disposed of at pre-identified locations following proper environmental practices. v. All maintenance activities within the park during the operation phase shall comply with the Environmental, Health, and Safety (EHS) Guidelines of the World					

Sl.No	Potential Impact	Mitigation Measures	Responsible Agencies	Implementation Phase	Monitoring method	Monitoring Indicator	Frequency
		Bank, including the Generic and Water & Sanitation guidelines wherever applicable.					

8.4 MONITORING AND EVALUATION

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

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

Contractor will prepare the internal monitoring report and submit to the PIU every month, and PIU will submit monthly report to TNUIFSL. Accordingly, the required budget for monitoring will be made available during the construction and the budget for operation phase will be updated and allocated later. Details of schedule of activities are given in below Table.

Table 8-4 Schedule of activities

S.No.	Schedule of activities	Responsibility	Time line
1	Obtain required permits and licenses	PIU/Contractor	Prior to Pre-construction
2	Designate the Convenor	PIU	Pre- construction
3	Constitute the GRC & disclose in all the project work sites	PIU	Pre- construction
4	Mobilization of EHS officer	Contractor	Prior to construction
5	Mobilization of environment expert	PMC	During construction
6	Mobilization of one social expert	PMC	During construction

8.5 ENVIRONMENT MONITORING PLAN

To monitor the extent of environmental impact of the proposed project, the contractor has to periodically monitor the ambient environmental quality along the proposed project area. The monitoring requirement for the different environmental components is presented in table below:

Table 8-5 Stage Wise Environmental Monitoring Plan

Project Stage: Construction Air Quality Monitoring

A	Parameter	PM10, PM2.5, SO_2, NO_x, CO and NH_3
B	Sampling Method	Use method specified by CPCB for analysis
C	Standards	National Ambient Air Quality Standards 2009, Air (Prevention and Control of Pollution) Act,1981 Or relevant CPCB standards/guidelines
D	Frequency	Three seasons except monsoon during construction period
E	Duration	As per CPCB guidelines for monitoring
F	Location	Sensitive locations, especially in the downwind direction along the network alignment.
G	Measures	Wherever air pollution parameters increase above specified standards, additional measures as decided by the engineer shall be adopted
H	Implementation	Contractor through approved monitoring agencies
I	Supervision	HCMC

Project Stage: Construction & Operation and Maintenance - Water Quality Monitoring

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

Project Stage: Construction & Operation - Noise Level Monitoring

A	Parameter	Noise Levels on dB (A) scale

B	Sampling Method	Free field at 1 m from the equipment whose noise level are being measured Equivalent noise levels using an integrated noise level meter kept at a distance of 15m from edge of pavement
C	Standards	National Ambient Air Quality Standards in respect of Noise, Noise Pollution (Regulation and Control) Rules, 2000
D	Frequency	Seasonal during construction period
E	Duration	Reading to be taken at 15 seconds interval for 15 minutes every hour and then average out for analysis
F	Location	Wherever the contractor decides to locate the equipment yard. At sensitive locations such as schools, hospitals etc., along the alignment
G	Measures	In case of noise levels causing disturbance to the sensitive receptors, management measures as suggested in the ESMP shall be carried out.
H	Implementation	Contractor through approved monitoring agencies
I	Supervision	HCMC

Project Stage: Construction & Operation - Soil Monitoring

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

8.6 Implementation of the Proposed Project, Institutional Arrangements at ULB and Monitoring

The proposed project involves integrated storm water drains for Hosur City Municipal Corporation under PDGF managed by TNUIFSL. This project will be implemented by ULB under the scheme of Tamil Nadu sustainable urban development project (TNSUDP). At Present this project is being looked after ULB Engineers at Hosur and comprises of 1 Assistant Executive Engineer and 1 Assistant Engineer under the control of Executive Engineer, Urban Division, and Hosur. This project is proposed to be implemented as seven Packages.

8.7 Monitoring

The management measures identified for contractor will be included in the bid document for ensuring implementation of the environmental safeguards. Implementation of the management measures by the contractor shall be ensured by ULB and report on ESMF compliance shall be submitted to TNUIFSL periodically. The management measures identified for operation phase will be taken up by the ULB Board & contractor upon completion of construction activities for the Contractor's Maintenance period of one year and by the Hosur City Municipal Corporation for Subsequent period. Any social impacts identified during the implementation of the project the Contractor to intimate the same to ULB shall communicate the same to ULB, TNUIFSL for mitigation.

8.8 Environmental Monitoring Program

The Environmental Monitoring Programme is an essential part of managing any development project. Its purpose is to identify possible environmental problems at an early stage, so that timely corrective measures can be taken. This ensures that the project is carried out in an environmentally safe and sustainable manner.

The main objectives of the programme are:

- To check and understand any changes in environmental conditions caused by the project.
- To monitor whether the suggested mitigation (control) measures are being implemented properly.
- To track changes in environmental quality and take preventive actions where required.

Details of the monitoring programme, including parameters, frequency and locations, are provided in Tables below. The programme will also be updated periodically as per the rules and guidelines of the Ministry of Environment, Forest and Climate Change (MoEFCC) and the State Pollution Control Board. To ensure smooth implementation, the Environmental and Safety team will carry out regular inspections. Any compliance or non-compliance with the programme will be documented, and a quarterly report will be submitted to the Client.

8.9 Environmental and Social Monitoring Action Plan (ESMAP)

An Environmental and Social Monitoring Action Plan (ESMAP) must be formulated for construction and operation phases to monitor the major environmental and social parameters along with the frequency of monitoring, methods of monitoring, parameters to be measured and responsibility of monitoring.

8.10 Reporting System of Environmental and Social Monitoring

The reporting system of environmental and social monitoring will be based on a feedback mechanism from project sites to the project proponent level in the implementation framework of the project. The Contractor will prepare report on environmental and social safeguards implementation, making it a part of the monthly progress report. The E&S Safeguard Expert at the PIU level level will review the reports and prepare the action taken report on monthly basis and appraise to the ULB. The ULB, based on the review of the environment and social safeguard measures taken at the project level, should discuss with the PIU on critical issues for decision making. After review of the report, ULB may seek further clarifications from PIU on critical aspects, whichever is felt appropriate. The E&S Safeguard Experts at the PIU will compile the quarterly reports and submit half-yearly progress reports. The PMU will submit the quarterly /half yearly /annually report to the Kfw to maintain the transparency and project compliance.

The monitoring requirement to be carried out once in three months for the different environmental components in the baseline location is presented in table below:

Table 8-6 Stage wise Environmental Monitoring Plan

1. Project Phase: Construction - Air Quality Monitoring		
A	**Parameter**	$PM_{2.5}$, PM_{10}, SO_2, NO_x, CO
B	**Sampling Method**	Use method specified by CPCB for analysis
C	**Standards**	National Ambient Air Quality Standards 2009, Air (Prevention and Control of Pollution) Act,1981 Or relevant CPCB standards/guidelines
D	**Frequency**	quaterly (once in 3 months) for each year
E	**Duration**	As per CPCB guidelines for monitoring
F	**Location**	Suitable location within project area
G	**Measures**	Wherever air pollution parameters increase above specified standards, additional measures as decided by the engineer shall be adopted
H	**Implementation**	Contractor through NABL approved labs/agencies
I	**Supervision**	PIU / PMU
2. Project Phase: Construction - Noise Level Monitoring		
A	**Parameter**	**Noise Levels on dB (A) scale**

B	**Sampling Method**	Free field at 1 m from the equipment whose noise level are being measured Equivalent noise levels using an integrated noise level meter
C	**Standards**	National Ambient Air Quality Standards in respect of Noise, Noise Pollution (Regulation and Control) Rules, 2000
D	**Frequency**	quaterly (once in 3 months) for each year
E	**Duration**	Readings every 15 sec for 15 minutes
F	**Location**	Wherever the contractor decides to locate the equipment yard at sensitive locations.
G	**Measures**	In case of noise levels causing disturbance to the sensitive receptors, management measures as suggested in the ESMP shall be carried out.
H	**Implementation**	Contractor through approved monitoring agencies
I	**Supervision**	PIU / PMU
3. Project phase: Construction and Operation & Maintenance - Surface Water Quality Monitoring		
A	**Parameter**	**Parameters for Surface water quality standards (IS; 2296) Water pH, TDS, Total hardness, Sulphate, Fluorides, Chloride, Fe, Pb for groundwater.**
B	**Sampling Method**	Grab sample to be collected and analysis as per Standard Methods for Examination of water and Wastewater.
C	**Standards**	Indian standards for Inland Surface Water (IS; 2296, 1982) and for Drinking water (IS; 10500,2012) Or relevant CPCB standards / guidelines
D	**Frequency**	Construction: quaterly (once in 3 months) for each year; O&M: quaterly (once in 3 months) for each year
E	**Duration**	-
F	**Location**	Suitable location within project area
G	**Measures**	At locations of variation in water quality/increased pollution, remedial measures to be adopted
H	**Implementation**	Contractor / O&M team through approved monitoring agencies
I	**Supervision**	PIU / PMU
4. Project phase: Construction and Operation & Maintenance - Ground Water Quality Monitoring		
A	**Parameter**	**pH, EC, Hardness, NO_3, SO_4, F, Fe, Cl**
B	**Sampling Method**	APHA methods
C	**Standards**	Indian standards for Drinking water (IS; 10500,2012) Or relevant CPCB standards / guidelines
D	**Frequency**	Construction: quaterly (once in 3 months) for each year; O&M: quaterly (once in 3 months) for each year
E	**Duration**	-
F	**Location**	Suitable location within project area
G	**Measures**	At locations of variation in water quality/increased pollution, remedial measures to be adopted
H	**Implementation**	Contractor / O&M team through approved monitoring agencies

I	**Supervision**	PIU / PMU
5. Project phase: Construction and Operation & Maintenance – Soil Quality Monitoring		
A	**Parameter**	**pH, EC, OC, NPK, CEC, Metals, Oil & Grease**
B	**Sampling Method**	Grab sampling;
C	**Standards**	Threshold for each contaminated set by IRIS database of USEPA until national standards are promulgated
D	**Frequency**	Once in a year for the entire construction phase
E	**Duration**	-
F	Location	Suitable location within project area
G	**Measures**	At location of increased in pollution levels, source shall be identified and measures adopted.
H	**Implementation**	Contractor / O&M through approved monitoring agencies
I	**Supervision**	PIU / PMU

8.11 Implementation Mechanism for Proposed Mitigation Measures

To ensure effective execution of the mitigation strategies identified during the social impact assessment, the following implementation mechanism is proposed for this project.

8.12 Institutional Responsibility

- **Project Implementation Unit (PIU):** Overall coordination and monitoring of mitigation activities.
- **Social Safeguard Officer (SSO):** Responsible for executing social mitigation measures, including stakeholder engagement and grievance redress.
- **Contractor:** Required to comply with social safeguard provisions during construction, including minimizing disruption and ensuring safety.
- **Local Government Bodies:** Support in community mobilization, relocation assistance, and monitoring of vulnerable groups.

8.13 Mitigation Measures Execution

I. **Pre-construction Phase:**

a) Dissemination of project information to affected communities
b) Coordination with local authorities for land and asset verification

II. **Construction Phase:**

a) Implementation of safety protocols and traffic management plans
b) Provision of temporary access routes and sanitation facilities
c) Monitoring of labour practices and prevention of child labour

III. **Post-construction Phase:**

a) Restoration of public spaces and utilities

b) Continued support to relocated households
c) Final social audit and feedback collection

8.14 Resource Requirements

I. **Budget Allocation:** Dedicated funds for compensation, relocation, community engagement, and grievance redress.

II. **Human Resources:** Deployment of trained social specialists, community mobilizers, and monitoring staff.

III. **Monitoring Tools:** Use of MIS systems, field reports, and third-party audits to track progress and compliance.

8.15 Budget for Environmental and Social Management Plan

8.16 Quantity for Environmental and Social Management Plan – As per DPR

Quantity for environmental and social management plan is proposed based on DPR items**.**

Table 8-7 Quantity for Environmental and Social Management Plan – As per DPR

Sl No	Management Activities	Qty	Unit	Cost (Rs.)
A	**ISWD - During Construction Phase**			Contractor has to quote as per Schedule A of Volume 3 BOQ
1	Sprinkling of water on the exposed site and dust suppression barriers to minimize the generation of dust and respirable suspended particulate matters	47,267	Cum	
2	Provision of temporary barricading with the help of portable fencing along the running track where the work in progress in streets	25,392	Rm	
3	Provision of temporary barriers of Iron Barricading of size 2m width and 1 m height with 40mm dia MS Tubular pipe for vertical supports on sides in roads	4804	Rm	
4	Provision for temporary arrangements approach platforms to the residences to cross drains during execution	181	Sq.m	
5	Provision for rain water harvesting along the alignment of drains	357	Nos	
6	Fencing of Open Drains on both sides to prevent solid waste disposal	50,355	Rm	
B	**Waterbodies - During Construction Phase**			
1	Species Plants for Waterbodies	38,610	Nos	
C	**Parks - During Construction Phase**			
1	Trees	13	Nos	
2	Hedges Plantation	408	Nos	
3	Shrub Plantation	40	Nos	

Table 8-8 Package wise Species Plants for Waterbodies and Parks – As per DPR

Sl. No	Plantation	Unit	Package 1 - 18 Months	Package 2 -18 Months	Package 3 - 24 Months	Package 4 - 18 Months	Package 5 - 24 Months	Package 6 - 18 Months	Package 7 - 18 Months	Total
A	**Water Body**									
1	Planting of the following Plants including Loading and unloading Charges, Transportaion, stacking of saplings at site earth work excavation of required size, planting of sapling, refilling of excvated earth etc., as direted as per the site in charge including cost and conveyance of all materials to site etc., complete as per standard specifications.									
a	Crotons (30-45 cm)	Nos	200	300	200	0	0	200	400	**1300**
b	Cyprus Plant (30-45 Cm)	Nos	200	300	200	0	0	200	400	**1300**
c	Hibiscus Hawai Foliage Shrub (30-45 Cm)	Nos	400	600	400	0	0	400	800	**2600**
d	Ixora (30-45 Cm)	Nos	300	450	300	0	0	300	600	**1950**
e	Jasmine (30-45 Cm)	Nos	500	750	500	0	0	500	1000	**3250**
f	Lavender (30-45 Cm)	Nos	200	300	200	0	0	200	400	**1300**
g	Lilly Foliage Shurb (30-45 Cm)	Nos	100	150	100	0	0	100	200	**650**
h	Lotus (30-45 Cm)	Nos	100	150	100	0	0	100	200	**650**
i	Rose (30-45 Cm)	Nos	600	900	600	0	0	600	1200	**3900**
j	Blue Bell (30-45 Cm)	Nos	200	300	200	0	0	200	400	**1300**
k	Jasmin Grandiflorum (15-20 Cm)	Nos	500	750	500	0	0	500	1000	**3250**
l	Cautus (105-120 Cm)	Nos	200	300	200	0	0	200	400	**1300**
m	Cycus (105-120 Cm)	Nos	20	30	20	0	0	20	40	**130**
n	Travellers Palm (105-120 Cm)	Nos	20	30	20	0	0	20	40	**130**
o	Aloe Vera (20-25 Cm)	Nos	400	600	400	0	0	400	800	**2600**
p	Mint Thulasi (20-25 Cm)	Nos	400	600	400	0	0	400	800	**2600**
q	Avaram herbal Plant (20-25 Cm)	Nos	400	600	400	0	0	400	800	**2600**
r	Karpuravalli (20-25 Cm)	Nos	400	600	400	0	0	400	800	**2600**
s	Vallarai (20-25 Cm)	Nos	400	600	400	0	0	400	800	**2600**
t	Thotta Sinungi (20-25 Cm)	Nos	400	600	400	0	0	400	800	**2600**
	Total A		**5940**	**8910**	**5940**	**0**	**0**	**5940**	**11880**	**38610**
B	**Parks**									
a	Trees	Nos	0	0	13	0	0	0	0	**13**
b	Hedges Plantation	Nos	0	0	408	0	0	0	0	**408**
c	Shrub Plantation	Nos	0	0	40	0	0	0	0	**40**

8.17 QUANTITY FOR ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN – AS PER ESIAR

Quantity proposed towards implementation of Environmental and Social Management plan for the project during construction and operational phase**.** Table gives below a detailed outline of the provisions for the implementation of environmental and social management plan.

Table 8-9 Quantity for Environmental and Social Management Plan – As per ESIAR

Sl. No	Management Activities	Qty	Unit	Cost (Rs.)
A	**During Construction Phase**			Contractor has to quote as per Schedule B of Volume 3 BOQ
	Environmental Monitoring Cost			
1	Plantation (trees and landscaping works) after the completion of the construction activity including maintenance during O&M	9239	Nos	
2	Air Quality Monitoring at 7 locations for quarterly (once in 3 months) per year for 18 to 24 Months	46	Nos	
3	Noise Monitoring at 7 locations for quarterly (once in 3 months) per year for 18 to 24 Months	46	Nos	
4	Surface Water Quality Monitoring at 23 locations for quarterly (once in 3 months) per year for 18 to 24 Months	152	Nos	
5	Sub-Surface Water Quality Monitoring at 23 locations for quarterly (once in 3 months) per year for 18 to 24 Months	152	Nos	
6	Soil / Silt quality Monitoring at 23 locations once per year for 18 to 24 Months	46	Nos	
7	Revision/ updation of safeguard documents	-	-	
8	Leaflet/ pamphlet printing (project dissemmination)	56,000	Nos	
9	Training programs for the labourers	LS		
10	PPEs for the labourers	LS		
11	Stakeholder meeting with line departments (yearly twice for two years)	4	Nos	
B	**During Operational Phase**			
	Environmental Monitoring Cost			
12	Water quality monitoring at 23 locations for quarterly (once in 3 months) for 1 year	92	Nos	

Sl. No	Management Activities	Qty	Unit	Cost (Rs.)
13	Soil quality monitoring at 23 locations for 1 time per year	23	Nos	
14	Awareness Training for community member of waterbodies for maintenance (yearly twice for two years) – 16 WBs x 2 x 2 = 64	64	Nos	
15	Awareness Training for community member of Parks for maintenance (yearly twice for two years) – 3 parks x 2 x 2 = 12	12	Nos	

Packagewise quantity for Environmental and Social Management Plan - As per ESIAR is given below:

Table 8-10 Packagewise Quantity for Environmental and Social Management Plan – As per ESIAR

SI No.	Monitoring field	Package 1 -18 Months	Package 2 -18 Months	Package 3 - 24 Months	Package 4 -18 Months	Package 5 - 24 Months	Package 6 -18 Months	Package 7 -18 Months	Total Qty
		Total Nos	Total Nos	Total Nos	Total Nos	Total Nos	Total Nos	Total Nos	
A	**During Construction Phase**								
1	Plantation (trees and landscaping works) after the completion of the construction activity	469	1068	1695	875	2604	1133	1395	**9239**
2	Air Quality Monitoring at 7 locations for quarterly (once in 3 months) per year for 18 to 24 Months	**6**	**6**	**8**	**6**	**8**	**6**	**6**	**46**
3	Noise Monitoring at 7 locations for quarterly (once in 3 months) per year for 18 to 24 Months	**6**	**6**	**8**	**6**	**8**	**6**	**6**	**46**
4	Surface Water Quality Monitoring at 23 locations for quarterly (once in 3 months) per year for 18 to 24 Months	18	24	24	6	32	18	30	152
5	Sub-Surface Water Quality Monitoring at 23 locations for quarterly (once in 3 months) per year for 18 to 24 Months	18	24	24	6	32	18	30	152
6	Soil / Silt quality Monitoring at 23 locations once per year for 18 to 24 Months	6	8	6	2	8	6	10	46
7	Revision/ updation of safeguard documents	LS	LS	LS	LS	LS	LS	LS	LS
8	Leaflet/ pamphlet printing (project dissemmination)	8000	8000	8000	8000	8000	8000	8000	56,000
9	Training programs for the labourers	LS	LS	LS	LS	LS	LS	LS	LS
10	PPEs for the labourers	LS	LS	LS	LS	LS	LS	LS	LS
11	Stakeholder meeting with line departments (yearly twice for two years)	LS							
II	**During Operational Phase**								
	Environmental Monitoring Cost								
12	Water quality monitoring at 23 locations for quaterly (once in 3 months) per year for 1 year	12	16	12	4	16	12	20	92
13	Soil quality monitoring at 23 locations for quaterly (once in 3 months) per year for 1 year by SPCB approved lab as per EMAP	3	4	3	1	4	3	5	23
14	Awareness Training for community member of waterbodies for maintenance (yearly twice for two years) – 16 WBs x 2 x 2 = 64	8	12	8		12	8	16	64
15	Awareness Training for community member of Parks for maintenance (yearly twice for two years) – 3 parks x 2 x 2 = 12			12					12

Table 8-11 ESMP Budget

Sl. No	Management Activities	Cost (Rs)
1	Environmental and Social Management Plan – As per DPR	Contractor has to quote as per Schedule A of Volume 3 BOQ
2	Environmental and Social Management Plan – As per ESIAR	Contractor has to quote as per Schedule B of Volume 3 BOQ
	Total	

9 STAKEHOLDER ENGAGEMENT AND GRIEVANCE REDRESSAL MECHANISM

9.1 STAKEHOLDER ENGAGEMENT AND CONSULTATION

The stakeholder engagement during the preparation stage were conducted across all the proposed site in Hosur. These consultations involved leader of resident welfare association, members of association, elected representatives and other community members. Stakeholder Consultations with line agencies, HCMC officials and Mayor was held before submission of final report.

Consultation was held during the DPR preparation stage. Consultation was carried out from June to October 2024 to identify the Permanent/Temporary/Economic/Social impacts related to the proposed project components – ISWD, Nallah, lake rejuvenation and development of sponge park and the details are presented below.

9.2 ISWD - FINDINGS

Table 9-1Details of Consultation

S.NO	Name of the Area	Date	No of Respondants
1	Kalegunta – Auto Drivers, Near Hosur Railway Station	8/10/2024	6
2	KCC Nagar/Balaji nagar	9/10/2024	16
3	Mathigiri/Jawahar nagar	8/10/2024	8
4	Ram Nagar/street vendors/kottai mariamman kovil	8/10/2024	7
5	Shanthi Nagar – Near Hosur Bus Stand	8/10/2024	6

The Major Findings for drains:

- Lack of improper drainage from the road network and improper disposal of storm water
- Lack of interconnectivity between the drains
- Drains that are carriers of sewage envisaged as potential pollutants of classified waterbodies and poses health hazard
- Deposition of solid wastes, silt and weed growth
- Improper structural condition of drain/culvert
- Lack of utilising Storm Waters for Ground Water Recharge
- Lack of Rain Water Harvesting Methods for Open Catchments

It is estimated that there are over 300 street vendors located within the proposed project locations. Their livelihoods will not be affected during project implementation, as the Urban Local Body (ULB) will provide alternative vending spaces in close proximity to their existing vending locations. Hence,

there will be no permanent, temporary, or economic social impacts on the street vendors. The participants have expressed the following suggestions during the consultation process.

- The discussion with the different stakeholders reveals the need for adopting a comprehensive and holistic approach to water management that includes restoration of water bodies, ensuring water flow without obstruction to prevent flooding and ensuring adequate clean water facilities for residential and agriculture purpose.
- The Nallah must be restored as part of the holistic water management.
- People are not aware of the importance of Storm Water Drains and they are confusing it with the Open Drain System which is prevalent in Hosur.
- People are using the open drain system as a sewer outlet, to address this there is a need for generating awareness on the pitfalls of this practice and to provide Under Ground Sewerage System in Hosur.

9.3 WATERBODY - FINDINGS

The Consultation were conducted across 28 waterbodies. These consultations involved with resident welfare association, self-group members and counsellor to address their concerns and gather input. Each participant details and date has been meticulously tabulated and is presented below:

Table 9-2 Details of Consultation conducted for waterbodies

S.NO	NAME OF THE LAKE	DATE	NUMBER OF RESPONDENTS
1	Avalapalli Eri (Basthi)	08/08/2024	8
2	Mayil Ravanan Eri (Basthi)	08/08/2024	10
3	Venkatagiri Eri (Basthi)	08/08/2024	8
4	Kesavakuttai Eri	08/08/2024	8
5	Krishnarav Eri	10/08/2024	7
6	Venkatesan Eri	09/08/2024	8
7	Santhapuram Eri	08/08/2024	8
8	Seetharaman Eri	09/08/2024	11
9	Datha Eri (Kottur Eri)	09/08/2024	7
10	Kalegunda Pond	09/08/2024	9
11	Sri Chandra Sudeshwar Kovil - Theppakulam	09/08/2024	9
12	Jalagandeshwar Swamy Koil (Ramanaiken Eri)	09/08/2024	10
13	Dharga Chandrambigai Lake	10/08/2024	7
14	Dhadhav Rao Lake Ashok Leyland Unit-1	09/08/2024	10
15	Sargar Eri	10/08/2024	8
16	Varatharayan Eri	10/08/2024	8
17	Pattalamman Eri	10/08/2024	7
18	Devan Eri	09/08/2024	9
19	Venkatappan Eri (Bedrapalli)	08/08/2024	10
20	Lakshmanarav Eri (Motta Eri)	09/08/2024	7
21	Ramanayakken Lake	09/08/2024	9
22	Thottan Eri (Alasanatham Eri)	08/08/2024	7
23	Sipcot Lake-Chinna Elasagiri	08/08/2024	7

S.NO	NAME OF THE LAKE	DATE	NUMBER OF RESPONDENTS
24	Kalkeri Lake Thally Road	09/08/2024	8
25	Anthiwadi Veeraragavan	09/08/2024	10
26	Karnoor Eri	09/08/2024	10
27	Venkatagiri Iyan Eri (Thottagiri)	10/08/2024	8
28	Alasanatham Eri	10/08/2024	10

The participants have expressed the following suggestions during the consultation process.

i) Construction of new weir

ii) Repair and maintenance of existing weir and shutter

iii) Desilting of lakes

iv) Strengthening of bunds

v) Fence around the lake, as there were instances of demise of children because of accidents in the lake

vi) Clearing unwanted plants

vii) Clearing inlets and outlets

viii) Creating designated spaces for birds near the lake would support and enhance the ecological value of the area

ix) To ensure that untreated waste is not released in the lake

x) To ensure that garbage is not dumped in the lakes

xi) Development of a children's play area, which would make the lake a more family-friendly destination

xii) A boating area, water fountain, and yoga space are also desired to enhance the lake's functionality as a community resource

xiii) The addition of CCTV cameras will improve security, while restrooms and shelters for benches will provide essential facilities for visitors

xiv) Installation of stone benches around the lake would provide comfortable seating for visitors, while the addition of lights would improve safety and usability during evening hours

xv) Planting trees around the lake is also recommended to enhance the environmental quality and aesthetic appeal of the area.

9.4 PARK - FINDINGS

The consultation was conducted across 20 parks. These consultations involved leader of resident welfare association, members of association and other community members. All the public welcomed

the proposed sponge park development. Each Participants count has been meticulously tabulated and is presented below:

Table 9-3 Details of Consultation conducted for Sponge Park

S.NO	Name of the Park	Date	No of Respondants
1.	TNHB Phase III Bagalur Hudco	11/07/2024	Total No – 10 Male – 8 Female – 2
2.	Hosur Phase XII Old ASTC Hudco	11/07/2024	Total No – 8 Male – 8 Female – 0
3.	Mahalakshmi Nagar	11/07/2024	Total No – 7 Male – 7 Female – 0
4.	Phase VIII New Astc Hudco	11/07/2024	Total No – 21 Male – 11 Female – 10
5.	Hosur Ward 15 Samathanapuram	11/07/2024	Total No – 7 Male – 3 Female – 4
6.	Tnhb Phase XV Mullai Nagar	11/07/2024	Total No – 10 Male – 8 Female – 2
7.	Mathigiri GKS Nagar	12/07/2024	Total No – 10 Male – 2 Female – 8
8.	Mathigiri VIP Nagar	12/07/2024	Total No – 8 Male – 5 Female – 3
9.	Hosur Rayakottai Road Luk India Opp	11/07/2024	Total No – 7 Male – 7 Female - 0
10.	Mathigiri Abirami Garden	12/07/2024	Total No – 7 Male – 7 Female – 0
11.	New ASTC Hudco	11/07/2024	Total No – 14 Male – 5 Female – 9
12.	Avalapalli RGM Nagar	12/07/2024	Total No – 8 Male – 8 Female – 0
13.	Hosur TNHB Phase VI Avalapalli Hudco	12/07/2024	Total No – 10 Male – 9 Female – 1
14.	Balaji Nagar	12/07/2024	Total No – 28 Male – 17 Female - 11
15.	Devi Nagar	11/07/2024	Total No – 10 Male – 7 Female – 3
16.	Ward No:9 Upkar Layout, Alasanatham Road	11/07/2024	Total No – 7 Male – 7 Female – 0
17.	VGP Layout, Alasanatham Road	11/07/2024	Total No – 6 Male – 3 Female – 3
18.	Muthukumaran Nagar	11/07/2024	Total No – 8 Male – 8 Female – 0
19.	Mathigiri Ambal Nagar	12/07/2024	Total No – 5 Male – 5 Female – 0
20.	Annamalai Nagar	12/07/2024	Total No – 7 Male – 2 Female – 5

The participants have expressed the following suggestions during the consultation process

i) Dedicated walking space to encourage daily physical activity and promote overall well-being. The park area should be designed to accommodate individuals of all ages and mobility

levels, ensuring that everyone can benefit from a safe and accessible environment for exercise and leisure. To also ensure wheel chair accessibility and skid proof flooring for the walking areas.

ii) Safety features for women, children and elderly.

iii) Play materials for children.

iv) Greening techniques including community gardens, flower gardens etc.,

v) Rainwater harvesting facilitates.

vi) To address fitness needs, the park to include fitness equipment that caters to various exercise routines. This equipment will be strategically placed to create an outdoor gym environment, allowing residents to maintain their physical health and fitness goals.

vii) Sports grounds.

viii) Restrooms with adequate water supply.

ix) Drinking water facilities.

x) Stone benches for sitting and relaxing.

xi) Community spaces such as yoga hall, stages for performance, flag posts etc.,

xii) Preserve palaces of cultural importance (snake pits, temples).

9.5 STAKEHOLDERS CONSULTATION

The Stakeholder Consultations were held on 26.09.2025 at 3.00 pm in the Meeting Hall at Hosur City Municipal Corporation Office, Bagalur Road, opposite to Thillai Nagar, Hosur. But due to unavailability of officials the Stakeholder Consultation is Postponed to 30.09.2025 at 11.00 am.

9.6 PROCEEDING OF THE CONSULTATION

There are about 9 participants attended the consultation process. The meeting started at 11.00 am with brief introduction about the purpose of the stakeholder consultation and its objective. The welcome addressed by Hon'ble Mayor Thiru S.A. Sathya, Hosur Corporation.

Figure 9-1 Welcome Address

The Consultant M/s. Voyants Solutions made a power point presentation and explained the following.

- Project Objectives of the Study Area
- Salient Features of the Study Area
- Existing Drain Inventory
- Digital Elevation Model, Basin Map, External Catchment, Major Drainage Catchment
- Rainfall Analysis
- Climate Change Analysis
- Design Criteria Summary
- Major Nallah – Concept Plan of Proposal
- Zone wise Drain Summary
- Flood Hot Spots, existing drainage scenario and remedial measures
- List of Water Bodies and rejuvenation proposal
- List of Parks, OSR sites and sponge concept proposal
- Overall cost summary
- Social Impact Assessment
- Benefits of the project

Figure 9-2 Presentation by Voyants Solutions Pvt. Ltd.,

Figure 9-3 Stakeholder Sharing his Views

Figure 9-4 Queries Explanation to Stakeholder

After presentation, the session is opened for discussion in which the stakeholders have effectively participated and shared their views. Further, feedback forms to elicit views from the participant's stakeholder were also issued and collected.

Table 9-4 Summary of the Discussion and Response given to the points raised

Sl. No.	Participants	Point Raised	Reponses
1.	Thiru S.A. Sathya, Mayor, Hosur City Municipal Corporation.	a) The surplus outlet channel of Zuzuwadi lake has been filled with soil up to the existing ground / road level, and advised consultant to visit and include it in our proposals.	The consultant explained that the surplus outlet channel of Zuzuwadi lake is proposed with desilting and bund strengthening works as required in the DPR.
2.		b) Consultants have mentioned 58% of road lengths within Hosur Corporation limit are left out as drains are not constructed. But, in the past 3 to 4 months, drains are constructed in most of the areas by Hosur Corporation and advised to update the existing drain length (both single side drain and double side drain).	Noted. The consultant explained that the recently constructed drain details will be collected from HCMC officials and will be updated in the Final DPR.
3.		c) The ongoing UGSS work will be complete within 2 to 3 years and	The consultant explained that only rain fall intensity for

Sl. No.	Participants	Point Raised	Reponses
		informed do not to consider the waste water(domestic) quantity while designing the SWD.	various return period is considered for design of major nallah, primary and secondary drains.
4.		d) How many years of rainfall data considered for SWD design.	The consultant explained that historical rain fall data for 42 years were collected from State Ground and Surface Water Resources Data Centre and rainfall analysis was carried out.
5.		e) Climate analysis is considered in this design.	The consultant conveyed that climate factor of 20% additional rain fall intensity is considered for storm design.
6.		f) The two waterbodies nearly outside to Hosur Corporation area have to be considered for nallahs rehabilitation works as they are supply source to some waterbodies. (Chinna Bedrapalli lake and lake near to cattle farm)	The consultant explained that as per RFP, 28 nos of water bodies within the HCMC area is considered for rejuvenation proposals. However, in discussion with HCMC officials and confirmation of water bodies ownership, it can be considered for rejuvenation proposals.
7.		g) Asked About the nallah proposals from Devan Eri to Thottan Eri	The consultant explained the nallah proposal from Devan Eri to Thottan Eri.
8.		h) Informed that, if existing rajakalvai is within the patta land or encroached, it has to be mentioned in our proposals and informed the consultant that the possibility of recovering the land as per High Court order and Hosur Corporation will carry out the work. (Mr.Nagaraj, IAS, Land Acquisition)	Noted. It will be considered in the final DPR.
9.		i) Informed the consultant that if adequate width is not available in the nallahs/surplus channel,	The consultant explained that the actual width of the nallah as per the land record is considered for the proposal.

Sl. No.	Participants	Point Raised	Reponses
		and also existing narrow downed drain also to be retained.	L Shape retaining wall is proposed for major nallah falls under developed areas. In addition, existing narrow downed drain also retained.
10.		j) Informed the consultant that the existing Strom Water Drain blockage near to left side of GRT Jewelry (West)	The consultant explained that nallah cleaning work has to be carried out by Hosur Corporation during Pre and Post monsoon period as per standard operating procedure.
11.		k) Informed the consultant to confirm the drain alignment from Devan Eri to Thottan Eri on the left side parallel to State Highway to avoid flooding at kalegunda pond area.	Noted. The consultant explained that alternate route of nallah from Devan Eri to Thottan Eri will be discussed with HCMC officials and will be incorporated in the Final DPR.
12.		l) Asked the consultants about the number and name of parks considered for development/proposals within the Hosur Corporation area phase wise.	The consultant explained that 20 Nos of Park are considered for proposal. Out of 20 parks, 17 parks are proposed with sponge concept development and remaining 3 parks are already developed by HCMC.
13.		m) Informed the consultants to remove Annamalai Nagar Park and Samathanapuram Park proposals. Since both are in under Progress.	Noted and Annamalai Nagar Park and Samathanapuram Park will be removed from the Proposal.
14.	Thiru Md. Shabbir Alam, Commissioner, Hosur City Municipal Corporation.	a) DPR Presentation was well prepared and Comprehensive covering Technical, Financial and Implementation aspects. The efforts taken to compile and present data is appreciated.	Noted.
15.		b) Some channels/nallahs may be buried or blocked or encroached in current condition and advised us to include the current condition of the	Noted. The consultant explained that the blocked and buried nallah were identified and proposal is

Sl. No.	Participants	Point Raised	Reponses
		channels/nallahs as survey was carried out throughout the Hosur Corporation area.	given for actual width of the nallah as per the land records.
16.	Thiru C. Anandaiah, Deputy Mayor, Hosur City Municipal Corporation.	Suggested the consultant to check the possibility of space and requirements in Ward 8 and 9 – Bharathi Nagar and Samundi Nagar for Development of Parks.	Noted. The consultant explained that the same will be considered in discussion with Hosur Corporation officials.
17.	Thiru M. Victor Gnanaraj, City Engineer, Hosur City Municipal Corporation.	Consultant appointed has made a good survey of Hosur Corporation and Provided useful good suggestion for Flood mitigation. Suggestion given by Hosur Corporation and Ward members are well taken and incorporated in DPR.	Consultant explained that mitigation measures for flood Hot Spots are included in Phase 1 proposal.
18.	Thiru P. Murugan, Assistant Divisional Engineer, State Highways C&M.	Informed the consultants that, in some areas existing road width is not sufficient for additional space for drains. In that areas, proposals has to be given as motorized drains and its locations, length and cost will be finalized in discussion with State Highways.	The consultant explained that the road side drains are proposed as closed drains with 175mm thickness top slab considering vehicle load. However, discussion with State Highway officials will be carried out to include their suggestions in the final DPR.
19.	Thiru M. Ilaiya, Urban Planner, TNUIFSL.	a) As per site visit – Sponge Park involves tree cuttings. Recheck whether alternative has been proposed in the DPR.	The consultant explained that no tree cutting is proposed in Park developments. Clearing of light jungle such as removal of shrubs and herbs are proposed in the DPR.
20.		b) As per Mayor Suggestion make necessary changes and explore other alternatives for alignment of Strom Water Drain (SWD).	Noted and the consultant explained that the Mayor suggestion will be considered in Final DPR in discussion with HCMC officials.
21.	Thiru Umar Khan, Climate Change Expert, TNUIFSL.	Stakeholder option from NHAI/WRD need to be incorporated.	Noted.

9.7 DURING THE IMPLEMENTATION PHASE

Table 9-5: Stakeholder Engagement During Implementation phase

S.No	Information	Mode	Responsibility	Duration
1	PID	Phamplets	PIU / Contractor	Continuous
2	Road Cut Intimation	Hand bills / Notice / Phamplet	PIU / Contractor	Continuous
3	Awareness Campaigns (waterbody maintenance etc)	Outreach to the school student in the project area, SHG, RWA etc	PIU/ Contractor and E&S Experts	Continuous
4	Awareness Campaigns (ISWD maintenance)	Street Theater / Hand bills / Notice / Phamplet	PIU / Contractor	While effecting Proposed project
5	Awareness Campaigns (ISWD maintenance)	Street Theater / Hand bills / Notice / Phamplet	PIU / Contractor	While effecting Proposed project
6	Stakeholder Meeting	Focus Group Discussion in the project area, SHG, RWA etc	PIU / Contractor and E&S Experts	Continuous

9.8 GRIEVANCE REDRESS MECHANISM

A common GRM will be in place to redress social, environmental or any other project related grievances. Two tier GRM shall be constituted. The Municipal Engineer at project level, the Convenor for the project, who will coordinate with all the members, convene meetings and perform other activities required to ensure the efficient grievance redressal system. Such meetings will be held as per requirements.

GRIEVANCE REDRESS COMMITTEE (GRC)

1st level grievance redress: Comprises of

1. PIU/ULB supervision personnel
2. Contractors site engineer & ESO. To resolve issues on-site in consultation with each other.

2nd Level grievance redress: The Project level GRC shall be constituted with three persons with (preferably one of them as woman).

1. Commissioner of the ULB
2. Executive Engineer of the Implementing Agency
3. Representatives (TL, E&S Safeguards specialists)
4. Others may be nominated, as required.

The GRC to meet as and when required and frequently to address the grievances of the affected and record the proceedings, decision to resolve the grievances, intimating the aggrieved of the decision /mitigation measures adopted. The same should be reported in the Monthly/Quarterly/Semi Annual and Annual progress report to PMU. The report should contain type of grievances, resolution etc.

10 INSTITUTIONAL AND IMPLEMENTATION MECHANISM

10.1 STRUCTURE FOR IMPLEMENTATION

The details of PMU, PIU and the contractor's roles and responsibilities are provided below

10.1.1 PMU

TNUIFSL is the PMU/PEA will monitor the overall implementation of ESMP/ESHS through compliance reports and field visits.

10.1.2 PIU

PIU will depute officials as Environmental/Safeguard officer(s) to monitor the ESMP implementation and verification of the reports submitted by the Contractors.

10.1.3 PMC

Project Management consultant will have Environmental, Social Safeguards and ESHS experts to monitor the implementation of ESMP.

10.1.4 CONTRACTOR

Contractor has to appoint Environmental & Social Safeguards experts, ESHS expert and Safety/ Accident Prevention officer complying with ESIAR & ESHS.

- The Contractor has to prepare Project Area (PA)-ESMP.
- The Contractor has to implement ESMP and report to PMC/PIU.

Annexures

Part - A

Annexure 1

Environment, Climate Change and Social Screening Form

Project Details		
Sl.no	**Components**	**Details**
1	Project Objective and components	Preparation of Detailed Project Report (DPR) for Providing Integrated Storm Water Drains (ISWD) for Hosur City Municipal Corporation.
	Project Objective	1. To prepare a DPR for providing a climate resilient Storm Water Drainage System with all necessary integration of all existing water bodies/waterways/macro-drains for Hosur City Municipal Corporation 2. To prepare a DPR for rejuvenation of Water Bodies 3. To prepare a DPR for Sponge City / Parks concept by utilizing the identified vacant lands available in the corporation area
	Project Components	1. Major Nallah/ Primary Drain - 57.88 km 2. Secondary drain/ Tertiary Drain in flood prone area (ISWD) - Phase-1 = 16.01 km 3. Water Bodies Rejuvenation - 16 Nos 4. Sponge Park Development - 3 Nos 5. Sponge Proposal in OSR site - 20 Nos
	Major Nallah/ Primary Drain	Earthen Bund Strengthening – 47.43 km Random Rubble Masonry Retaining Wall - 2.92 km L Shaped RCC Retaining Wall - 4.69 km RCC Open Drain – 2.70 km RCC Closed Drain - 0.14 km Total Length of Nallah – 57.88 km
	Secondary drain/ Tertiary Drain in flood prone area (ISWD)	RCC Closed Drain – 16.01 km

<table>
<tr><td></td><td>Water Bodies Rejuvenation</td><td>Water Bodies Rejuvenation - 16 Nos
<table><tr><th>Sl. No</th><th>Name of water body</th></tr><tr><td>1</td><td>Kesavakuttai Eri</td></tr><tr><td>2</td><td>Krishnarav Eri (Look India Opp)</td></tr><tr><td>3</td><td>Venkatesan Eri</td></tr><tr><td>4</td><td>Santhapuram Eri</td></tr><tr><td>5</td><td>Seetharaman Eri</td></tr><tr><td>6</td><td>Sri Chandra Sudeshwar Kovil - Theppakular</td></tr><tr><td>7</td><td>Jalagandeshwar Swamy Koil (Ramanaika Eri)</td></tr><tr><td>8</td><td>Dharga Chandrambigai Lake</td></tr><tr><td>9</td><td>Dhadhav Rao Lake Ashok Leyland Unit-1</td></tr><tr><td>10</td><td>Varatharayan Eri</td></tr><tr><td>11</td><td>Pattalamman Eri</td></tr><tr><td>12</td><td>Devan Eri (Therpettai Eri)</td></tr><tr><td>13</td><td>Venkatappan Eri (Bedrapalli)</td></tr><tr><td>14</td><td>Lakshmanarav Eri (Motta eri)</td></tr><tr><td>15</td><td>Thottan Eri (Alasanatham Eri)</td></tr><tr><td>16</td><td>Alasanatham Eri</td></tr></table></td></tr>
<tr><td></td><td>Sponge Park Development</td><td>Sponge Park Development - 3 Nos
<table><tr><th>Sl. No</th><th>Name of Park</th></tr><tr><td>1</td><td>Mahalakshmi Nagar</td></tr><tr><td>2</td><td>Samathanapuram</td></tr><tr><td>3</td><td>Devi Nagar</td></tr></table></td></tr>
<tr><td></td><td>Sponge Proposal OSR Sites</td><td>Sponge Proposal in OSR site - 20 Nos
<table><tr><th>Sl. No</th><th>OSR Site</th></tr><tr><td>1</td><td>77. Ward - B/4/54/0</td></tr><tr><td>2</td><td>78. Ward - B/17/147/0</td></tr><tr><td>3</td><td>79. Ward - B/6/78/0</td></tr><tr><td>4</td><td>331. Mookandapalli Sr No 352/7,8</td></tr><tr><td>5</td><td>18. Ward - A/22/1/0</td></tr></table></td></tr>
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		6	22. Ward - A/18//17/0
		7	43. Ward - A/11/19/7, 20/3
		8	20. Ward - A/25/6/0
		9	142, 143. Ward - A/12/2/19, 20
		10	21. Ward - A/23//37/0
		11	60. Ward - A/26/123/0
		12	35. Ward - A/26/120/3
		13	59. Ward - A/27/139
		14	472, 473. Ward - A/10/162/3, 2
		15	119- 121. Ward - A/14/46/7, 8, 9
		16	44. Ward - A Sr No 749
		17	01. Ward - D/3/57/0
		18	376. Avalapalli Sr No 794/13A
		19	362. Avalapalli Sr No 711/1B
		20	362. Avalapalli Sr No 711/1C
2	Details of Alignment / Components (main components including construction activities)		**Major Nallah/ Primary Drain** – Construction activities is Earthen Bund Strengthening, Random Rubble Masonry Retaining Wall, L Shaped RCC Retaining Wall, RCC Open Drain, RCC Closed Drain **Secondary drain/ Tertiary Drain in flood prone area (ISWD)** – Construction of RCC closed drains **Water Bodies Rejuvenation** – Rejuvenation proposal includes Desilting, clearing of light / heavy jungle and bushes and weeds, Bund strengthening works including walkway, chain link fence, Stone Pitching and turfing works for bund slopes with toe wall, Gate, Street Light Arrangements along the pathway and stone bench, Recharge pit, Beautification of waterbody by planting trees at periphery, Inlet and outlet channel development **Sponge Park Development –** Children Play Area with Equipment, Volley Ball Court, Basketball

		court, Plantation, Flag pole and Name Board, Rain Water Harvesting, Security Building, Water Supply, Lighting Facility, Paver Block, Concrete and Stone pathway, Gym with equipment, toilet, septic tank & fountain, artificial recharge facility by using Eco Block • **Sponge Proposal OSR Sites –** OSR sites are developed sponge concept park development, percolation pond, Recharge Well, Retention Pond
3	Location of the Project Sites (all sites including alignment of networks, other structures like pumping stations; offices, locations where treated waste water, sludge & C&D wastes will be disposed/reused directly, any other) Current Land use (Provide information for all sites involved in the project), any historic land use (related to heritage, or contamination) Site Survey No:/s (with ownership), Geographical coordinates of the site	Major Nallah / Primary drains, Waterbody, Park and OSR sites Land records are enclosed in Annexure 14. Secondary drain/ Tertiary Drain are road side drains maintained by ULB.

Proposed Resource Use

Resource Use				
Sl.no	**Proposed Resources**	**Area/ Quantity**	**Unit**	**Details**
(i).	Land Area proposed to be used: Location wise (in sq km / sq m)	72.41	Sq.Km	Entire Hosur City Municipal Corporation
(ii).	Estimated energy consumption for the project activities – Source wise	Nil		
(iii).	Estimated usage of water quantity for the project: Ground Water and Surface water?	Nil		

Baseline Environmental Conditions

Sl.no	Environmental Aspects	Yes	No	Details (mention distance to these features in meters / kilometres, and quantities in g/kg/T as applicable. Also mention if any project components is excluded / regulated based on location/activities as per National / State regulations & need permits/follow guidance)
1	Is the project site located on or adjacent to any of the following (Provide information for all sites and alignment of the project components /sub components, associated activities; mention distance to these features in meters / kilometres)		No	
i)	Critically Vulnerable Coastal Areas, Eco sensitive Areas		No	There is no eco sensitive or critically vulnerable area present near the project area.
ii)	Cultural Heritage site, Protected monuments		No	There is no cultural heritage near the project area.
iii)	Natural Forests / Protected Areas Is the project in an eco- sensitive or adjoining an eco- sensitive area or its demarcated buffers? If yes, provide details.		No	There is no forest or protected area present near the project area.
iv)	Any other Wetlands/ Mangrove/ Estuarine Region?		No	There is no Wetlands/ Mangrove/ Estuarine Region is present near the project site.
v)	Any Natural Habitat areas, areas with natural features such as the Coasts, Lakes/ other water bodies?	Yes		There are 28 nos of WBs, 20 nos parks in HCMC area.
vi)	Any other Sensitive Environmental Components?		No	There are no other environmental sensitive components present in the project area.
vii)	Any Residences, schools, hospitals, sensitive receptors?	Yes		The proposed project components are 10m to 50m of radius to the residential area.
viii)	Any culturally – socially important paths, areas/religious occupancies, sacred groves, burial grounds, tourist or pilgrim congregation areas, borders, etc?		No	The proposed sites are not falling the area of cultural importance places.

ix)	Any Drinking water source, upstream and downstream uses of rivers, etc., which may be impacted by proposed discharge of treated sewage / sludge from water supply or sewage treatment plant?		No	This project is integrated storm drainage system.
x)	Any Low-lying areas prone to flooding/areas of Tidal Influence used as part of the Project or near the project components?	Yes		There are 14 nos flood hot spots in HCMC area.
xi)	Details of Surface water quality at intake point or Disposal point of treated sewage	Yes		There is sewage / sullage intrusion in major nallah and water bodies. By implementation of UGSS scheme, discharge of sewage / sullage can be prevented.
xii)	Any areas affected by other disasters?	Yes		Hosur recorded the maximum annual rainfall of 1602 mm in Oct 2022.
2	Groundwater: Is the site in Critical / Over Exploited condition?	Yes		The ground water is over exploited in Hosur City Municipal Corporation area.
3	Is the area disaster-prone? If yes; list all disaster zone categories applicable	Yes		The Hosur City Municipal Corporation area is listed as medium vulnerable category prone to flood of disaster zone. The cause of flood is by heavy rainfall.
4	Describe the soil and vegetation on site	Yes		The location is primarily comprising Charnockites and various Gneisses.
5	Is the site area and condition suitable for proposed development?	Yes		The project area and condition are suitable for the storm drainage system integrating all the waterbodies and parks.
6	Describe existing pollution/contamination or degradation in the site(s)	Yes		Based on the primary data of the assessment of the environmental parameters such as ambient air, noise, soil, surface and ground water, most of the parameters are within the permissible limit. However TDS is high in ground water due to more extraction of ground water. Air and noise level in area near the main road are above the permissible limit due to vehicular emission / movements.

7	Near Dams, Barrages	Yes		Kelavarapalli dam exist within the project area.
8	Any other remark on baseline condition?	Yes		Air quality and Noise level in few locations are above the permissible limit.

Anticipated Environmental Impacts: Impacts on Land, Geology and Soils

Sl.no	Impacts	Yes/ May create	No	Details (mention distance to these features in meters / kilometers, and quantities in g/kg/T as applicable. Also mention if any project components is excluded / regulated based on location/activities as per National / State regulations & need permits / follow guidance)
8.	Will the proposed project cause the following on Land / Soil?			
i)	Impact on Surrounding Environmental Conditions including Occupation on Low lying lands/flood plains		No	There is no impact on flood plains due to the project components.
ii)	Substantial removal of Top Soil (mention area in sqm)		No	Excavated silt shall be used for bund formation of waterbodies and major nallah / primary drains.
iii)	Any degradation of land / eco-systems expected due to the project?		No	There is no degradation of land or eco system involved in the project activity.
iv)	Loss or impacts on Cultural/heritage properties / precincts, features		No	There is no impact on cultural heritage due to the construction of the project components.
v)	Does the project activity involve cutting and filling/ blasting etc?		No	There is no blasting activity involved in the project activity.
vi)	Will the project cause physical changes in the project area (e.g., changes to the topography) due to earth filling, excavation, earthwork or any other activity?		No	There is no physical change in the project area due to the construction of the project components. Excavated earth / silt shall be used for bund formation

				of waterbodies and major nallah / primary drains which shall not affect any physical changes.
vii)	Will the project involve any quarrying/ mining etc?		No	There is no quarrying or mining activity involved in the project.
viii	Will the project / any of its component contaminate or pollute the Land? (for example sludge, disposal of untreated sewage/bypass)		No	The project components shall not pollute the land.
ix)	Pre-existing contamination on site/s		No	There is no pre-existing contamination on the project sites.

Impacts on Water Environment

Sl.no	Impacts	Yes/ May Create	No	Details (mention distance to these features in meters / kilometres, and quantities in g/kg/T as applicable. Also mention if any project components are excluded / regulated based on location / activities as per National / State regulations & need permits / follow guidance)
9	Will the subproject or its components cause any of the following impact on Water sources (Quantity or Quality):			
i)	Will the activities have proposed at the site(s) impact water quality (surface or underground) and water resource availability and use? Will this sub- project involve the dredging of water bodies, sea, canals, etc.,	Yes		The proposed integration of major nallah / primary drain with waterbodies and parks will enhance the water storage and quality. Silt removed from waterbodies will be used for bund formation of waterbodies and major nallah / primary drains.
ii)	Impacts on Water Resources		No	There is no impact on water resources.

iii)	Pollution of Water bodies/ground water nearby or downstream		No	There is no pollution of water bodies/ground water nearby or downstream.
iv)	Will the project affect the river /cannel flow pattern, stream pattern or any other irrigation canal?		No	The project shall not affect the flow pattern of any river or stream.
v)	Will the project result in stagnation of water flow or pondage or weed growth due to increased pollution/siltation		No	The project shall not result in stagnation of water flow.

Impacts on Biodiversity and Host Communities

Sl.no	Environmental Impacts	Yes/ May Create	No	Details (mention distance to these features in meters / kilometres, and quantities in g/kg/T as applicable. Also mention if any project components are excluded / regulated LS based on location / activities as per National / State regulations & need permits / follow guidance)
10	Will the subproject or its components cause any of the following impacts on Biodiversity or the neighbourhood			
i)	Will the project necessitates cutting of? Trees / Loss of Vegetation		No	There is no tree cutting activity involved.
ii)	Will the project result in Health & Safety Risks in the neighbourhood including the release of toxic gases, accident risks		No	There is no health and safety risk in the neighbourhood due to the construction of the project components.
iii)	Potential risk of habitat fragmentation due to the clearing activities? (e.g., Hindrance to the local biodiversity like disturbing the migratory path of animals/ birds etc.)		No	There is no potential risk of habitat fragmentation due to the project activity.

iv)	Potential Noise and Light Pollution or disturbance to surrounding habitats/communities	Yes		During excavation, construction activity generates noise pollution to the nearby residential area.
v)	Potential disruption to common property, accessibility, traffic disruptions, conflicts or disruption to the local community within the subproject area?	Yes		Utility cables, water pipe lines, TNEB lines, shall be disturbed during excavation of drains.

Impacts due to Storage and Wastes: Pollution and Hazards

Sl.no	Type	Yes	No	Details (mention distance to these features in meters /kilometres, and quantities in g/kg/T as applicable. Also mention if any project components are excluded / regulated based on location / activities as per National / State regulations & need permits / follow guidance)
11	Will the subproject or its components cause any impact due to storage of materials, wastes or pollution due to releases during various project activities			
i)	Will the project use or store dangerous substances (e.g., large quantities of hazardous chemicals/ materials like Chlorine, Diesel, Petroleum products; any other?		No	There is no storage of hazardous chemicals or materials involved in the project components.
ii)	Will the project produce solid or liquid wastes; including construction/demolition wastes (including dredging, de-weeding wastes, muck/silt, dust, sludge, C&D wastes, hazardous wastes (such as asbestos from existing network), e- wastes (from equipment)); polluted liquids?	Yes		There is no demolition and construction waste in this project. The solid waste or the liquid waste from the construction of drains shall be disposed in an

				appropriate method as per ESMP.
iii)	Will the project cause or increase air pollution or odour nuisance?		No	There is no air pollution or odour nuisance.
iv)	Will the project generate or increase noise levels which will impact surrounding biodiversity or communities?		No	There is no noise generating components involved in the project activity.
v)	Will the project generate or increase visual blight or light pollution?		No	There is no light pollution due to the project.
vi)	Will the project cause water pollution? (Of waterbodies/ groundwater)?		No	There is no water pollution due to the project.
vii)	Will the project involve dangerous construction activities which may be a safety concern to workers/ host communities		No	There is no dangerous construction involved in the project. Safety measures shall be followed at the deep excavation area.
viii)	Is there a potential for release of toxic gases or accident risks (e.g. potential fire outbreaks)		No	There is no potential release of toxic gases from the project.
12	Describe any other features of the project that could influence the ambient environment		No	There is no air quality disturbance due to the project activity.

Baseline Climate Data		
13. Project Area Baseline Note: Please provide details for ULB and also site. Please provide quantitative information where relevant.		
i)	Agro climatic zone	North Western Agro-Climatic Zone
ii)	No of Water Bodies in the ULB area	28
iii)	Name of the River(s) in the ULB	Chinnar River
iv)	Proximity to River (kms)	Chinnar River at about 1.70km from Hosur towards North West direction. Chinnear river flows within Hosur CMC area towards North East Direction.

		Pennaiyar River is touching in Kelavarapalli Dam near Hosur towards North East Direction. Pennaiyar River at about 2.50km from Hosur towards South East direction.
v)	Proximity to Sea (kms)	No
vi)	Proximity to hilly terrains (kms)	No
vii)	High Flood Level of the River	Varies from 843.6m to 836.2m
viii)	Flooding Events (Years) (Based on historic data of extreme flood events and future projections based on available analysis)	In the year July 2016, a major flash flood event occurred, with heavy rains. In October 2022, Hosur experienced heavy rainfall that led to widespread flash floods. Hosur recorded approximately 175.70 mm of rain throughout October 2022.
ix)	Flooding hotspots in the ULB	14 nos of flooding hotspots
x)	Available Water sources (Surface / ground)	Hogenakkal Water supply and bore wells
xii)	Groundwater Level and potential zone	2-5; mixed soil and partly hard rock terrain
xiii)	Normal Temperature & long-term average; trends in changes in temperature	Normal temperature and long-term average temperature is 24- degree c.
xiv)	Rainfall trends & long-term average	Long term average rainfall is 840mm.
xv)	Land Use	nil.
xvi)	% of Green Cover in the ULB area	7.2%
xvii)	% of Water Bodies/Rivers	7.27%
xviii)	Seismic Zone	2 and 3
xix)	Coverage rain water harvesting structures (in %)	
	a) Residential	90%
	b) Commercial & Institutional	100%
	c) Government/ULB	100%
xx)	RWH in buildings – Mandating byelaws	Yes

xxi)	Frequency of drought in study area. Does the area face water scarcity? Please provide details.		Number of drought year – nil Frequency - nil		
xxii)	Frequency and intensity of cyclones in study area.		No cyclones in Hosur City Municipal Corporation		
14	Climate Change Impacts in project area				
(i)	Climate signal Please select the relevant signals	Climate hazard Please select the relevant hazards	Yes	No	Details
	☐ Sea level rise ☐ Frequency of tropical storms ☐ Intensity of tropical storms ☐ Higher precipitation	☐ Salt water intrusion	Yes		The saline water intrusion in project area is being caused by over-extraction of the groundwater.
	amounts ☐ Shifting seasons ☐ Higher temperatures ☐ Less precipitation ☐ Lower temperatures ☐ Others				
		☐ Flooding of the coast		No	No coastal area in Hosur
		☐ River flood		No	Chinnar river in the Project area recorded the flooding in Oct 2022 rains.
		☐ Bank erosion (sea/river)		No	No bank erosion in Chinnar River
		☐ Flash flood (heavy rain)		No	The flash flood was recorded in Oct 2022 with extreme rainfall.
		☐Landslides		No	There is no landslide prone area in the project area.
		☐ Forest/Bush fires		No	There is no forest or bush near the project area.
		☐ Water shortage/drought	Yes		Urbanization of Hosur has contributed to the drop in water pressure and ground water level depletion.
		☐ Effects of heat		No	There is no heat effect at the project area.
		☐ Effects of cold		No	There is no cold effect at the project area.

		☐ Effects of winds		No	There is no wind effect at the project area.
		☐ Effects of air quality		No	There is no major deviations or trend in the air quality at the project area.
		☐ Effects of storm surge	Yes		All the project components are designed to withstand the maximum lift pressure and wind pressure.
		☐ Soil quality/land degradation		No	There is no impact or change in the silt quality. The excavated silt shall be reused for bund formation.
		☐ Others		No	
ii)	Energy consumption for the project? Will the project result in GHG emission?			No	
iii)	Will the project affect any other water or other user? (downstream intake points of Water Supply projects, downstream water use by people, animals; irrigation)			No	There no other affect due to the project.
iv)	Is the project located in exploited ground water block?		Yes		The project is located at the over exploited ground water block. This project will increase the ground water table by rainwater harvesting.
v)	Is the project area vulnerable to temperature fluctuations and drought?			No	The project area is not vulnerable to temperature fluctuations and drought.
vi)	Is the site vulnerable to hazards such as Earthquakes, Landslides, Flooding, Storm surge, Severe wind damage, Fire, Explosion, Other (specify)			No	The project area is not vulnerable to earthquakes, landslides, fire, and explosion. The project area is located near the shore and there shall be storm surge and flooding due to heavy rain.
vii)	Will the project result in generation of wastes / by-product?			No	No by product generation.

viii)	Will the project impact the water resource availability (surface/ ground water) and use (effluent/sewage disposal, bypasses from STPs/PS, leachate, runoff, wastes deposition, erosion)		No	The project will not impact the water source availability.
ix)	Will the project cause flooding of adjoining low-lying areas		No	The proposed project components will mitigate the flood hot spots.
(x)	Will the project impact water quality or quantity in natural/constructed Lakes, or ponds		No	The project will not impact the water source availability.

Project Environmental Enhancement Measures

Sl.No	Enhancement Measures	Yes	No	Details
15	Has the project design considered environmental enhancement measures?			
i)	Energy conservation measures/ energy recovery options incorporated in subproject design? Quantify the reduction in CO_2 emission from the sub-project.		No	
ii)	Has the project considered alternate / Renewable energy?		No	Does not arise
iii)	Has the project considered waste minimization (waste reuse/recycle options/circular economy)		No	Does not arise
iv)	Rainwater harvesting, water recycling and other water resource enhancement measures proposed in the project?	Yes		Recharge pits and rain water harvesting structures are proposed for all the project components.
v)	Does the project include measures for prevention of wastage of water resource?		No	Does not arise
vi)	What waterbody conservation/ drinking water source improvements/drought management options are being proposed?	Yes		Storage capacity of waterbodies are increased. Recharge pits and rain water harvesting structures are proposed for all the project components for effective ground water recharge.

vii)	Design Considerations for protection of project components from extreme events - flood, drought, other natural disasters	Yes		The project components are designed to mitigate the flood hot spots.
viii)	Greenbelt development proposed for the project?	Yes		Green belt development is proposed in ISWD, WBs, Parks and OSR sites.
ix)	Is the sub-project including design elements to strengthen infrastructure resilience? If so what?	Yes		The subproject shall mitigate the flood hot spots of the project area, improve in the health status of the people in the locality,, provide aesthetic appearance to the city.
x)	Has the project considered nature-based solutions and if so what?	Yes		Random rubble masonry retaining walls, earthen embankments are proposed for major nallah / primary drains. Nature based improvements are proposed for WBs, Spong Parks and OSR sites.
xi)	Is the sub-project combining infrastructure and nature-based solutions? If so how?	Yes		Random rubble masonry retaining walls, earthen embankments are proposed for major nallah / primary drains. Nature based improvements are proposed for WBs, Spong Parks and OSR sites.
xii)	What design considerations is the project including to mitigate heat island effect?	Yes		Tree plantations are proposed to mitigate heat island effect.
xiii)	What design considerations is the project including to preserve and expand green cover?	Yes		Tree plantations are proposed for Major Nallah / primary drain, Secondary drains. Trees along the periphery of WBs, Parks and OSR sites are proposed.

				Shurbs and herbs are proposed for ISWD, WB and Parks.

Land Use, Resettlement, and/or Land Acquisition

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

Loss of Crops, Fruit Trees, Household Infrastructure and livelihood

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

				help their life to improve economically.
14	Is the project being designed with sufficient local participation (including the participation of women) in the planning, design, and implementation process?		No	The project may involve the local people including women during the construction activity. But there is no local participation during the design and planning of the project.
Historical, Archaeological, or Cultural Heritage Sites				
15	Historical heritage site(s) require excavation near the same?		No	There is no heritage site required to excavate for this project.
16	Archaeological heritage site(s) require excavation near the same?		No	There is no archaeological site required to excavate for this project.
17	Cultural heritage site(s) require excavation near the same?		No	There is no cultural heritage site required to excavate for this project.
18	Graves or sacred locations require excavations near the same?		No	There is no graves or sacred site required to excavate for this project.
Tribal Population/Indigenous People				
19	Does this project involve acquisition / alienation of any land belonging to Tribal people?		No	There is no acquisition or alienation land for this project.
20	Will the project lead to displacement / other adverse impacts on tribal / indigenous peoples?		No	There is no displacement activity involved in the project.
Beneficiaries				
Sl.no	**Components**	**Yes**	**No**	**Details**
21	Population proposed to be benefitted by the proposed project	Approx. no.:		1,38,000
22	No. of Females proposed to be benefitted by the proposed project	Approx. no.:		69,500
23	Vulnerable households /population to be benefitted	Approx. no.:		18,500 (Households)
24	No. of Families to be benefitted	Approx. no.:		27,600

Date: _____

Signature and name of the Borrower

Authorised Signatory

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

Indicative Enclosures:

1. Provide maps with the geographical location of the project; Google maps with project sites and project alignment
2. An appropriately scaled map clearly showing the project area and project sites with land use, existing buildings, infrastructure, vegetation, adjacent land use, utility lines, access roads and any planned construction, and
3. Any other information to describe the project, locations and possible impact as required.
4. Provide relevant maps on flooding hotspots, LULC, etc.,
5. Land details for the project sites with (i) extent available and required, (ii) location, (iii) survey numbers, (iv) FMB extract, (v) current land use, land use classification

   (vi) land ownership, alienation/acquisition status, (vii) certificate giving availability of sites required for the project by the borrower, (viii) location photographs with Geo- co-ordinates of all project sites and alignment (start, end point).

ANNEXURE 2
Project Details and Components

Ward Map of Hosur City Municipal Corporation

Implementation of Waterbody, Park and Nallah

Implementation of OSR

ANNEXURE 3
Stakeholder Engagement details
1. Stormwater Drain

S.NO	NAME OF THE LAKE	DATE	NUMBER OF RESPONDENTS
1	Kalegunta – Auto Drivers, Near Hosur Railway Station	8/10/2024	6
2	KCC Nagar/Balaji nagar	9/10/2024	16
3	Mathigiri/Jawahar nagar	8/10/2024	8
4	Ram Nagar/street vendors/kottai mariamman kovil	8/10/2024	7
5	Shanthi Nagar – Near Hosur Bus Stand	8/10/2024	6

Consultation – Kalegunta

Consultation – KCC Nagar

Consultation – Mathigiri

Consultation – Ram Nagar

Consultation – Shanthi Nagar

Major Findings – Road and drain

- The Major Findings for roads and drains:
- Lack of improper drainage from the road network and improper disposal of storm water
- Lack of provisions for proper drainage path or such paths have been blocked by buildings or being used by encroachers.
- Lack of interconnectivity between the drains
- Drains that are carriers of sewage envisaged as potential pollutants of classified waterbodies and poses health hazard
- Deposition of solid wastes, silt and weed growth.
- Improper structural condition of drain/culvert.
- Lack of utilising Storm Waters for Ground Water Recharge
- Lack of Rain Water Harvesting Methods for Open Catchments

Major Findings in Road and Drain

2. Major Findings - Nalla

The Major Findings for Nallas:

- HCMC has nalla for a part of the town. The sullage and the sewage are let into the nalla and storm drains without any treatment causing environmental hazards.
- Also, the solid waste is thrown into the drains, causing blockage of the nalla and storm drains causing overflows.
- Flooding / inundation during heavy rains cause hindrances to the citizens of the town.
- Lack of proper drainage system causes unhygienic situation causing various water and vector borne diseases.
- Though the Municipality is implementing a solid waste management system, many Publics choose to dispose the solid waste into the drains. Due to this the drains are surcharged, polluted and not functioning properly.

Major Findings in Nalla

3. Major Findings – Waterbodies

S.NO	NAME OF THE LAKE	DATE	NUMBER OF RESPONDENTS
1	Chennathur - Kesavakuttai Eri	08/08/2024	8
2	Chennathur - Krishnarav Eri (Look India Opp)	10/08/2024	7
3	Zuzuwadi - Venkatesan Eri near Upkar layout (Anumepalli)	09/08/2024	8
4	Zuzuwadi - Santhapuram	08/08/2024	8
5	Mookandapalli - Seetharaman Eri	09/08/2024	11
6	Sri Chandra Sudeshwar Kovil (Therpettai Street) - Theppakulam	09/08/2024	9
7	Jalagandeshwar Swamy Koil (Ramanaikan Eri Karai - Rama Bai)	09/08/2024	10
8	Dharga Chandrambigai Lake	10/08/2024	7
9	Dhadhav Rao Lake Ashok Leyland Unit-1	09/08/2024	10
10	Chennathur - Varatharayan Eri	10/08/2024	8
11	Chennathur - Pattalamman Eri	10/08/2024	7
12	Chennathur - Devan Eri (Therpettai Eri)	09/08/2024	9
13	Zuzuwadi - Venkatappan Eri Bedrapalli	08/08/2024	10
14	Mookandapalli - Lakshmanarav Eri (motta eri)	09/08/2024	7
15	Hosur Municipality - Thottan Eri (Alasanatham Eri)	08/08/2024	7
16	Alasanatham ERI (Near Micro Labs compay)	10/08/2024	10

Chennathur Kesavakuttai lake

Chennathur Krishnarav lake

Zuzuwadi Venkatesan lake

Zuzuwadi Santhapuram lake

Mookandapalli Seetharaman lake

Sri Chandra Sudeshwar Kovil pond

Jalagandeshwar Kovil pond

Dharga Chandrambigai lake

Dhadhav Rao lake

Chennathur Varatharayan lake

Chennathur Pattalamman lake

Chennathur Devan lake

Zuzuwadi Venkatappan Bedrapalli lake

Mookandapalli Lakshmanarav lake

Hosur Municipality Alasantham lake

Alasanatham lake

Major finding of waterbodies are as follows.

S. No	Site name	Ownership	Key Observation/ Recommendations
1	Chennathur – Kesavakuttai Eri	ULB	• The lake is in dry condition. It is surrounded by agricultural land. • Rainwater is the only source of water for the lake.
2	Chennathur – Krishnarav Eri (Look India Opp)	ULB	• It is a very small lake located near the road. • One motor room was found within the area. • Construction waste has been dumped near the bunds of the lake.
3	Zuzuwadi – Venkatesan Eri near Upkar layout (Anumepalli)	ULB	• The lake water is found to be polluted • Unwanted small plants need to be cleaned up as a part of the rejuvenation proposal
4	Zuzuwadi – Sanathapuram Eri	ULB	• Unwanted plants that are found in the lake need to be cleaned up as part of the rejuvenation proposal. • The bunds of the lake are not maintained • There are a few grave yards found inside the lake.
5	Mookandapalli – Seetharaman Eri	ULB	• This lake is found in between the residential areas. • Unwanted plants that are found in the lake need to be cleaned up as part of the rejuvenation proposal. • The lake water is found to be polluted.
6	Sri Chandra SudeshwarKovil (Therpettai Street) - Theppakulam	HR & CE	• It is a small temple pond. • The small temple pond is not clean and requires maintenance to improve its condition. • This pond is situated in a residential area. • Rainwater is the only source of water for this pond.
7	Jalagandeshwar Swamy Koil (Ramanaikan Eri Karai- Rama Bai)	HR & CE	• This pond is found to be polluted and requires cleaning and deepening of pond to improve its condition. • Ramanayaram lake is found opposite to this pond.
8	DhargaChandrambigai Lake	WRD	• This site is situated near the highway. • The lake has unwanted plants growing in it and needs to be cleaned as part of the rejuvenation proposal.
9	Dhadhav Rao Lake Ashok Leyland Unit-1	WRD	• The lake is situated near the highway. • A forest check post office is found on the bunds of the lake. • Unwanted plants are found in this lake which needs to be cleaned.

S. No	Site name	Ownership	Key Observation/ Recommendations
10	Chennathur – Varatharayan Eri	ULB	• One well is found on the boundary of the lake, along with two weirs nearby. • The lake is found to be dry and farmers in this area depends on this lake water for agricultural activities. • The lake was surrounded by agricultural land. • The farmers want the lake to be restored so that they can have adequate water for their agricultural activities.
11	Chennathur – Pattalamman Eri	ULB	• The lake is very dry and farmers in this area depend on lake water for their agricultural activities. • All the sides of the lake are surrounded by vacant land. • The farmers want the lake to be restored so that they can have adequate water for their farming activities.
12	Chennathur – Devan Eri (Therpettai Eri)	ULB	• Proper fencing has been installed around the lake for security and safety purposes. • Lake water is very clean and it is situated in a residential area • A small water tank is present near the lake which serves as one of the sources of water.
13	Zuzuwadi – Venkatappan Eri Bedrapalli	ULB	• A small play area is found in the water body • Garbage has been continuously dumped in the lake which makes it even more polluted • The lake boundary fencing was installed by the HCMC officials and one weir was found in the lake • The lake water was very polluted • Unwanted plants that are found in the lake need to be cleaned up as part of the rejuvenation proposal
14	Mookandapalli – Lakshmanarav Eri (mottaeri)	ULB	• The lake water is found to be polluted and there is a boundary installed around the lake. • Two sides of the lake are surrounded by residential areas. • The water source for the lake is from two inlets of Raja Kalvai, ensuring a steady flow in water levels.
15	Hosur Municipality – Thottan Eri (Alasanatham Eri)	ULB	• The Hosur Municipality created a boundary wall to protect the lake. • The lake is located in a prominent area, near both the main road and the bypass. • Street vendors are present in the bunds of the lake. • Lake water is found to be polluted.

S. No	Site name	Ownership	Key Observation/ Recommendations
16	Alasanatham Eri (Near Micro Labs company)	ULB	• There is no proper bund in this lake. • Cleaning of the inlet and outlet of the lake is necessary, and fishing activities are conducted by the residents on their own. • Lake water is very polluted. • Cultivation is being carried out near the lake. • A small temple is situated in the lake, and a structure is found inside the temple.

4. Major Findings of Park

S.NO	NAME OF THE PARK	DATE	NUMBER OF RESPONDENTS
1.	MAHALAKSHMI NAGAR	11/07/2024	7
2.	HOSUR WARD 15 SAMATHANAPURAM	11/07/2024	7
3	DEVI NAGAR	11/07/2024	10

Mahalakshmi Nagar

Hosur Ward 15 Samathanapuram

Devi Nagar

Major findings of Parks are as follows.

S NO	Site Name	Land Use	Observation
1	Mahalakshmi Nagar	Barren Land	• Garbage's have been dumped on both sides of the park. • There is a lot of free space with possibilities of creating a walking area.
2	Ward No 15 Samathanapuram	Barren Land	• Two borewells and one overhead tank (OHT) are located within the park. Two open drains passing within the park. • Residential building is occurred in west, north and south sides of park, while Dhargah lake is on east side of the park. • A fixed boundary has been set for the park.
3	Hosur-Devi Nagar	Barren Land	• The park is situated near residential area. • There is a need for walking space within the park as suggested by the residents.

ANNEXURE 4

Stakeholder Engagement Plan

Pre-Construction

An overall consultation with the general public and other stakeholders has been planned by PIU prior to start of project construction for the Proposed Project.

During Construction

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

Stakeholder Engagement and Information Disclosure Strategy

Target stakeholders	Information to be disclosed	Proposed engagement & disclosure method	Timing of Engagement	Responsible Parties
Project Beneficiaries	• Project design details and their impacts • Provisions for compensating economic and physical displacement, timelines for completing rehabilitation Communication on final rehabilitation/ compensation approved by govt.	• FGDs and small group consultations • Print-Newspaper, Newsletter/leaflets/Pamphlet • Radio information capsules	• At least twice- before &after compensating • During alignment works	PIU/Contractor

Target stakeholders	Information to be disclosed	Proposed engagement & disclosure method	Timing of Engagement	Responsible Parties
	• Grievance mechanism in place			
Households / people residing along alignment of transmission lines or in proximity to sewer sites	• Project design details, planned alignments and their impacts • Design and site alternatives explored for impact minimization • Accidents and road safety/ traffic management issues and measures planned to be in place; • Information on likely disruptions to services and arrangement during construction including its duration and likely timings • Management of air and noise pollution; Disruption to services and	• Newsletters/ Pamphlets/ Hand bills • Focus group Discussions Digital based Information dissemination • Helpline/ Toll-free numbers displayed at project locations and prominently accessed areas • Suggestion boxes at site offices	• Continuous, as required in construction stage • One week prior to start of construction in the respective stretches	PIU/Contractor / PMC

Target stakeholders	Information to be disclosed	Proposed engagement & disclosure method	Timing of Engagement	Responsible Parties
	arrangement during construction • Community and Occupational Safety measures planned for; • Excavation works-sludge/ earth disposal plans • Labour management plans/proposed camp sites • Grievance mechanism process			
Other Interested Parties: • Resident Welfare Associations (RWAs) • Elected Reps of Municipal Corporation Civil Society Organizations • Print and Tele Media • Staff of Line departments	• Project design details, planned alignments and their impacts • Design and site alternatives explored for impact minimization • Accidents and road safety/ traffic management issues and measures	• One-on-one Meetings • Formal Small group meetings • Open forums and Town-hall meetings for RWAs and ERs • Formal presentations to closed groups like regulators, service providers and duty bearers	• Continuous, as and when required during construction	PIU/Contractor/PMC

Target stakeholders	Information to be disclosed	Proposed engagement & disclosure method	Timing of Engagement	Responsible Parties
• Service providers and duty bearers • Staff of Municipal Corporations • Community /Religious leaders • Regulatory agencies	planned to be in place; • Information on likely disruptions to services and arrangement during construction including its duration and likely timings • Community and Occupational Safety measures planned for WTP/OHSR constructions and transmissions; • Excavation works-sludge/ earth disposal plans • Labour management plans/ proposed camp sites • Grievance mechanism process			
Civil Works Contractor, staff & Sub-contractors	Project design details, alternatives, planned alignments and their impacts	Provisions in Bid/ contract documents	• Once, at the time of • contract signing and orientation	

Target stakeholders	Information to be disclosed	Proposed engagement & disclosure method	Timing of Engagement	Responsible Parties
	• Baseline information on environmental and social aspects • Project's induced environmental and social risk • Accidents & road safety/ traffic management measures planned • Orientation on EHS provisions • Sexual harassment provisions and requirements • Labor Management Procedures • Orientation on RAP implementation and requirements • ESIA requirements and measures proposed • Grievance mechanism proposed under the project, requirements	• One-on-One and formal small group meetings/ discussions • Formal presentations/ training to contractors project management team	during preconstruction phase • Periodic briefings and orientation at site • Feedback as and when required on site and monitoring reports	

Target stakeholders	Information to be disclosed	Proposed engagement & disclosure method	Timing of Engagement	Responsible Parties
	• Feedback on consultant/ contractor • implementation and supervision ports			

S.No	Aspect	Mitigation measures	Responsibility	Implementation stage	Monitoring method	Performance Indicator	Frequency
1	Public disclosure	placement of hoarding at public and prominent places indicating in English and Tamil language project details, name and contact number of Convenor and the Contractor.	Convenor/ Contractor	Pre-construction phase	No. of hoardings and locations chosen	Effectiveness of message communicated	Once
2	Conduct Consultations with the beneficiaries, local	Understand the perception of stakeholders, the positive and negative impact of the	PMC E&S experts, Contractor EHS - officer/ Project	Project life cycle beginning from the early stage of preconstruction	Review of available documents; Support or opposition of	Procedure followed for conducting consultation; No. of	Conduct consultations with the beneficiaries,

S.No	Aspect	Mitigation measures	Responsibility	Implementation stage	Monitoring method	Performance Indicator	Frequency
	communities and other stakeholders	project; Analyse the concerns and issues of potential temporary economic impacts, local communities and other stakeholders; Address the concerns raised as per ESMP provisions; and Implementation of project with a Gender responsive Approach.	Manager and Convenor of PIU		stakeholders in project activities; Project progress level; And Consultations conducted with stakeholders	meetings/ consultations held; No. of participants in each meeting; Profile of participants such as male and female; Type and severity of issues raised; Response and action taken; Awareness level about the project; Temporary loss of Potential temporary Economic impacts compensated Favorable Social atmosphere Towards project and support to participation in	local communities and other stakeholders

S.No	Aspect	Mitigation measures	Responsibility	Implementation stage	Monitoring method	Performance Indicator	Frequency
						project activities; and Increased engagement in terms of number and level of stakeholders and women in the project compensated activities	
3	Effective functioning of GRC	Resolve the E&S related complaints and disputes in a time bound manner amicably without any cost.	GRC members headed by the authority	Project life cycle beginning from the early stage of preconstruction.	Site inspections; Consultations held with potential temporary economic impacts, and other stakeholders; Project related E&S complaints received inwriting or verbally.	Adequacy of information & dissemination about the GRC and its objectives among the stakeholders; No. of GRC meetings held and timeframe; GRC members present in each meeting; No. of complaints/ grievances received and resolved; Time taken;	Whenever required

S.No	Aspect	Mitigation measures	Responsibility	Implementation stage	Monitoring method	Performance Indicator	Frequency
4	Organize meetings with line departments to seek project support as required	Coordination and meetings with the line departments, namely District Administration, WRD, Traffic Police/ ULBs/ and line agencies; Understand the role of line department and support envisaged for project implementation and operation; and Obtain an update related to potential temporary economic impacts, beneficiaries and other stakeholders.	PIU/Contractor	Project Planning stage onwards	Review the feedback of participants of the meeting; Date, time, and venue fixed as per suitability of other departments; Communicated information in advance (letter signed by the CE/SE of the CMWSSB); Presentation about the project (PPT), including objectives of the meeting expectations from the participants; and	No. of officials participated in the meetings and signed the attendance sheet; Relevant information shared; Comments/suggestions offered, Effectiveness of meeting in project implementation and operation; Improved communication, coordination helpful in project activities; Increased understanding about the project related tasks; and Other Facilitation roles.	Semi annually

S.No	Aspect	Mitigation measures	Responsibility	Implementation stage	Monitoring method	Performance Indicator	Frequency
					Q&A details.		
5	Public awareness about the project	Organize public events and engage all stakeholders like related government departments, local communities, beneficiaries of the project, women's group, NGOs in project areas.	PIU, PMC, Contractors	Pre-construction stage and onwards	Review the public awareness activities undertaken; Feedback of target groups to assess the effectiveness of such activities.	People understand importance of project and need for environmental and social sustainability;	Semi annually

Annexure 5

Public Information Notice Template

Public Announcement
Providing Integrated Storm Water Drains (ISWD) for Hosur City Municipal Corporation

Under this project, works are being conducted by xxxx Contractor to provide Integrated storm water drains (ISWD) for Hosur City Municipal Corporation.

As part of this, works for Construction of Strom Water Drain network will be taken up in -------- road----/ street/ lane ……. From to (provide dates).

We request you to kindly co-operate for smooth implementation of the works. We also request you to drive vehicles / pedestrians to walk carefully Inconvenience caused is regretted.

Annexure 6

Entitlement Matrix

S.NO	Impact Category	Entitlements	Explanations
I Impacts to Title holders (Loss of Private Properties)			
A	Loss of Land (agricultural, homestead, commercial or otherwise)	Compensation at replacement costs as per RTFCTLARR Act, 2013 criteria provided in Para 26 of the Act 1. One time grant not exceeding Rs.5,00,000/- for each affected household or annuity policy that shall pay Rs.2000/- per month for 20 years with appropriate indexation to Consumer Price indexation. 2. One time Resettlement Allowance Rs.50,000/- for the displaced household.	Higher of (i) market value as per India Stamp Act, 1899 for the registration of sale deed or agreements; or (ii) average sale price for similar land ascertained from the highest 50% of sale deeds of the preceding 3 years or (iii) consented amount paid for PPPs or private companies. Plus 100% solatium and 12% interest from date of notification to award. . The multiplied factor adopted by GoTN for distance from urban area to the affected area will be applied. In case of impacts to assigned lands, the compensation and other benefits will be provided to affected amenities will be as per the Third Schedule of RTFCTLARR Act 2013, wherever alternative resettlement sites are provided. The provision of purchase or lease as available under RTFCTLARR act, 2013, will be exercised whoever appropriate. The acquiring entity shall consider acquisition of residual land or asset, if it is not economically viable and shall compensate as per the provisions of the RTFCTLARR Act, 2013. All fees, stamp duties and registration charges are to be borne by the executing agency. owners at par with

S.NO	Impact Category	Entitlements	Explanations
			the land owners. The provision of infrastructural
B	Loss of residential structure	Cash compensation as per the replacement cost of the structure without depreciation and 100 % solatium. 2. Each affected family having cattle will be provided one time financial assistance of Rs.25,000 . 3. Provision of alternative house or Minimum of Rs,1,50,000 financial assistance in Urban Areas. Provision of House in case of rural area as per IAY specifications or equivalent cost of the house. 4. Each affected family which is displaced due to land acquisition shall be given a monthly subsistence allowance equivalent to Rs.3000/- per month for a period of one year from the date of award. 5. Transportation cost of Rs.50,000/- 6. Right to salvage affected materials	The value of houses, buildings and other immovable properties will be determined without depreciation and as per the provisions of RTFCTLARR Act 2013. Stamp duty and registration charges will be borne in case of new houses or sites Houses in urban areas may be provided in multi storied building complexes. Where the loss of structure is partial and the remaining structure is unviable, compensation will be based on the total structure and benefits will be given as mentioned in this section.
C	Loss of Commercial structure	Cash compensation as per replacement cost for the Structure without depreciation and 100 % solatium. 2. One time grant to artisan, small trader and certain others shall get a one time financial assistance of Rs.25,000/- 3. Each affected owner of commercial establishment which is	The value of commercial structures and other immovable properties will be determined without depreciation and as per Section 29 of RTFCTLARR Act 2013. Where the loss of structure is partial and the remaining structure is unviable, compensation will be based on the total structure and benefits will be

S.NO	Impact Category	Entitlements	Explanations
		displaced due to land acquisition shall be given a monthly subsistence allowance equivalent to Rs.3000/- per month for a period of one . 4.Transportation cost of Rs.50,000/- 5. Right to salvage affected materials year from the date of award.	given as mentioned in this section.
D	**Impacts to tenants, leaseholders and sharecroppers (residential / commercial/agricultural)**	Residential 1. Each affected family (not the owner) which is displaced due to land acquisition shall be given a monthly subsistence allowance equivalent to Rs.3000/- per month for a period of one year from the date of award. 2. One time financial assistance of Rs.50,000 as transportation cost for shifting of the family, building materials, belongings and cattle. 3. Right to salvage affected materials Commercial 1. Each affected commercial establishment (not the owner) which is displaced due to land acquisition shall be given a monthly subsistence allowance equivalent of Rs.3000/per month for a period of one year from the date of award. 2. One time financial assistance of Rs.50,000 as transportation cost for shifting of the family, building materials, belongings and cattle.	

S.NO	Impact Category	Entitlements	Explanations
		3. One time grant to artisan, small trader and certain others shall get a one time financial assistance of Rs.25,000 Agricultural Tenants In case of agricultural tenants advance notice to harvest crops or compensation for lost crop at market value of the yield determined by agricultural department	
E	**Impacts to trees, plants and standing crops,**	Compensation at market value. The Collector for the purpose of determining the value of trees, plants and standing crops 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.	The compensation for the affected trees, plants shall be determined as per Section 29 (2)& (3) of the RTFCTLARR Act 2013.
II. Impacts to non-title holders (Squatters, encroachers, tenants, leaseholders)			
NO	**Impact Category**	**Entitlements**	**Explanations**
a	Loss of House	Compensation as per replacement cost for the structure without depreciation 2. Alternative house with minimum area as per Government norms. The cost of alternative housing to be provided can be set off against all or part of the compensation payable for the structure lost. 3. One time Subsistence grant equivalent to 180 days of minimum wages which will be worked out as per the prevailing MNREGA12 rates.	Houses in urban areas may, if necessary, be provided in multi storied building complexes. The Titles for alternatives houses shall be provided in the joint name of the wife and husband. Loss of trees will be compensated.

S.NO	Impact Category	Entitlements	Explanations
b	Loss of shop	One time financial assistance of Rs. 13,400/- as transportation cost for shifting of the family, building materials, belongings and cattle. 5. Right to salvage the affected materials. 6. Compensation as per the replacement cost of the structure without depreciation. 7. One time subsistence grant equivalent to 180 days of minimum wages which will be worked out as per the prevailing MNREGA rates. One-time financial assistance of Rs. 13,400/- as transportation cost for shifting. 9. One time assistance of Rs. 20,000/- toward economic rehabilitation. Right to salvage the affected materials	
C	Encroached Structure	Cash compensation for the affected structure as per the replacement cost without depreciation. Right to salvage material.	The value of commercial structures and other immovable properties will be determined by the replacement Value of the encroached structure without depreciation. The relocation shall be done with concurrence of the Town Vending Committee, and will broadly involve relocation of permanently impacted vendors to a suitable area/vending zone without threat of eviction and issuance of vending licences to them to continue with

S.NO	Impact Category	Entitlements	Explanations
			their economic activities. This will be over and above any compensation for structure/asset loss, In accordance with the provisions of this EM.
III. Loss of Income /Livelihood			
	Loss of employment in non-agricultural activities or daily agricultural wage and other wage workers	Subsistence allowance equivalent to monthly minimum agricultural/industrial wages for 3 months	Only agricultural labourers, who are in fulltime / permanent employment of the land owner or those affected full time employees of the business will be eligible for this assistance.
	Loss of livelihood (other than wage income)	Assistance to link up with government skill or entrepreneurship development programs (including training, travel, conveyance and food costs).	Training will be provided through relevant training institutes. Suitable government skill /entrepreneurship development programs will be identified and assistance provided to APs to enroll and access the same.
IV. Impact to Vulnerable PAFs			
a	Vulnerable PAFs	Training for skill development. This assistance includes cost of training and financial assistance for travel/conveyance and food. One adult member of the affected household, whose livelihood is affected, will be entitled for skill development. Additional assistance to the vulnerable PAFs whose livelihood/loss of shelter is impacted by the project will be paid additional one time assistance of Rs. 6700. Wherever possible, the vulnerable people shall be	Training will be provided through relevant training institutions Suitable government skill /entrepreneurship development programs will be identified and assistance provided to PAFs to enroll and access the same. The one time assistance to the Vulnerable PAFs will be paid to only one type of impact for the multiple vulnerable impacts.

S.NO	Impact Category	Entitlements	Explanations
		assisted in enrolling the applicable government programmes.	
Section V Impacts to Community Assets			
		Wherever possible the community assets will be relocated in consultation with community. When the relocation of the community assets are not feasible, will be provided afresh.	
Section VI. Unforeseen Impacts			
		Unforeseen impacts encountered during implementation will be addressed in accordance with the principles of this resettlement policy framework. In case of unanticipated involuntary resettlement impacts during implementation, a social impact assessment must be conducted, and the resettlement plan updated, or a new resettlement plan must be prepared, in accordance with this ECSMF and KfWs SG.	
Section VII. Temporary Economic Impacts during implementation			
		Compensation for loss of income for the duration of impact based on net income worked out as per IT returns or based on notified minimum wage rates, whichever is higher.	Advance notice provided to temporarily affected persons once contractor's work plans are finalized, with minimum 7 working days.

Annexure 6
Sample Grievance Registration Form

(To be available in Tamil and English)

The _____Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

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

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

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

FOR OFFICIAL USE ONLY

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

Annexure 7

Waste management plan

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
1.	Upkeep of storage/ yard	Dispose-off the waste from the material storage to the designated site; and Ensureregular collection and removal of refuse and litter from the working site, office, labour accommodation, etc.	Contractor	Construction phase	Visual Inspection	Incidence of contamination	Daily
2.	Labour accommodation	Place sufficient number of garbage bins/containers at prominent locations of the project working sites and labour accommodations; Ensure emptying the garbage bins and dispose- off from the labour accommodation regularly in a hygienic manner;	Contractor	Construction phase	Visual inspections; and Records of waste disposal.	Incidence of staff not using facilities; and Incidence of pollution.	Daily

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
		Dispose-off domestic waste water into drainage;					
		Ensure sufficient number of bathing and ablution facilities in labour accommodations, sheds, and all the site staff;					
		Create awareness about the importance and safe disposal of waste at work sites, Labour accommodation and surroundings among the workers; and Impart training abouthandling the different types of wastes, waste management, including hazardous waste.					
3.	Waste management measures	Collect all waste bins, containers from all sites;	Contractor	Throughout project life cycle	Regular audits of the HCMCWMP implementation;	HCMCWMP in place; Extent to which HCMCWMP is complied with;	Daily/ weekly as applicable
		Collect recyclable wastes separately and arrange for its collection by the authorized vendor;			Visual inspection of waste collection and disposal; and		

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
		Prevent littering and pollution by construction staff at work sites by providing bins or waste bags in sufficient locations;			Construction areas for littering	Presence of litter; Extent of filling rubbish bins;	
		Provide separate bins/containers for hazardous materials and mark these clearly;				Total volume of general and hazardous waste storage capacity onsites; Extent of waste segregation; and Frequency of waste collection and disposal	
		Store hazardous / polluting materials on impermeable ground until disposed-off or collected by the authorized vendor; Do not allow any burning or burying of waste on site; and Dispose of rubble and other waste construction materials at the designated site.					

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
4.	Disposal of residual construction debris, excess oil and other materials	The contractor shall identify the site for debris and waste disposal that should be finalized prior to start of the earth works; Apply good practices and minimize the construction debris by the optimum use of material;	Contractor	Construction phase	Audit of excess and residual construction material disposal records and data; and Visual inspection.	Excavated soil and other wastes visible; and Cleanliness and maintenance of sites.	Daily and regularly.
		Reuse the excavated soil and other material lin backfilling, land scaping, filling low lying area and public places. Yet the unused residue of soil and sedimentation left will be disposed of;					
		Ensure that disposed waste do not cause soil and ground water pollution;					
		Contractor should ensure that designated landfill site should be located in non-residential area at least 1000 meter away so that					

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
		residents, flora and fauna are not impacted; Regularly clean up concretes pilled during construction; Sweep / rake / stack excess aggregate / stone chip / gravel / pavers into piles; Emptied cement and other material bags, containers and unusable bins sold to a licensed vendor; Dispose excess and residual waste to the designated site; The training should be imparted to all staff about the effects of waste and litter and follow the appropriate disposal procedures; and Construction waste at site should be handled as per Construction and					

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
		Demolition Waste Management Rules, 2016.					
5.	Hazardous waste disposal	Ensure that contaminants (including cement) are not placed directly on the ground to prevent runoff reaching the water resources; Ensure that the spillage of fuels, oil, lubricants collected does not contaminate the soil and water; Ensure the training of work forceab out environmental pollution and its management; Ensure disposal of hazardous waste at the designated site by the authorized vendor and prevention of pollution therein; Ensure hazardous materials such as solvent based paints, fuel, cleaning and polishing chemicals are handled with extreme precaution during their storing, transportation, and usage. Such material should be stored on impervious space/ floor; Ensure that only trained workers are involved in collection, storage, and disposal process; All precautions,	Contractor	Construction and operation phases	Audit of hazardous material disposal records and data; and Visual inspection of hazardous materials handling, storage areas and disposal practices.	Incidence of non-compliance with safety procedures concerning hazardous waste material; Availability of spillage kits; Incidence of spillage of hazardous materials on site; and Evidence of leaks and contamination of soil and water	Daily or as required

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
		safety and health measures are followed; Dispose of non- recyclable and recyclable metal objects through authorized vendor; and Regularly audit the records maintained for hazardous and other waste generated and disposal to designated site.					

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
6.	Closure and rehabilitation of construction and labour sites	Contractor to restore the original condition of the site prior to demobilization; Upon works completion, clear all structures, rubbish, fill- in and seal all the pits and trenches; Remove all construction equipment, vehicles, equipment, waste and surplus materials, temporary fencing and other items from the site; Clean up and remove any spills and contaminated soil in the appropriate manner; Do not burydiscarded materials on site or any other land not designated for this purpose; Hand over the completed construction site and the sites used for material storage and labour	Contractor	After completion of the civil works in construction phase	Physical verification of the site as well as items listed in the records of contractor; and Rehabilitation measures conducted after completion of construction and operation works.	Clean and clear site; Site rehabilitated; and Original condition of construct ion and other sites restored	Onetime

S. No.	Aspect	Mitigation measure/Procedure	Responsibility	Implementation	Monitoring methods	Performance indicators	Frequency
		accommodations and sheds will be handed over; and Handover the project site after completion of operation phase.					

Annexure 8

Labour Management Plan

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

Description	Mitigation Measures	Responsibility	
		Implementation	Supervision
Applicable Laws	The contractor should ensure the compliance of applicable Indian Labour Laws such as Factories Act 1948, Building and Other Construction Workers Act 1996, Inter State Migrant Workmen Act 1979, Contract Labour (Regulation & Abolition) Act 1970, Workmen Compensation Act 1923, Child Labour (Prohibition & Regulation) Act 1986, Minimum Wages Act 1948, Employee State Insurance Act 1948, Employees Provident Fund Act 1991, Payment of Wages Act 1936, Payment of Bonus Act 1965, Equal Remuneration Act 1976, Payment of Gratuity Act 1972 and other International Labour organization conventions as ratified by India.	Contractor	PIU/PMC

Description	Mitigation Measures	Responsibility	
		Implementation	Supervision
Applicable Licences	Labour Licence and all other statutory work permits including Contract Labour& Interstate Migrant Worker License. Workmen compensation Insurance / Accident Insurance, EPF and ESIC.	Contractor	PIU/PMC
Site layout	The location of the site, design and basic facility provision in the labour accommodation will be reviewed and approved by the PIU prior to the construction;	Contractor	PIU/PMC
Facilities	Maintain necessary living accommodation and ancillary facilities in functional and hygienic conditions; Provide adequate number of toilets separate for men	Contractor	PIU/PMC
	and women workers, bathing area, kitchen, safe fuel/LPG for cooking and uncontaminated water for drinking, cooking and washing; Ensure adequate water supply in all toilets and urinals; The labour camp should have protection from heat, rain, flooding, insects, snakes and mosquitoes. It should have adequate provisions for emergency such as fire safety, security, etc; Require the non-discrimination and harassment and should be socialized/basis for training, and covers potential ethnic discrimination.		

Description	Mitigation Measures	Responsibility	
		Implementation	Supervision
Health and Safety	Provide first aid medical kit at labour accommodation; train the labour for usage of items in injury, emergency, coordinate with nearest government and private medical centers for the medical services, display the contact number of medical doctor(s) and keep a vehicle for emergency travel all the time; necessary HIV/AIDS prevention measures will be taken at labour camp; HIV/AIDS awareness program will be organized by the contractor's Environment & Safety Officer; Where feasible, manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; ULB shall ensure proper segregated storage, collection, transport, treatment and	Contractor	PIU/PMC
	disposal of all wastes following the SWM / C&D waste Rules 2016; remove all wreckage, rubbish, or temporary structures which are no longer required;		
Labour use	The total number of workers to be employed on the project, and the different types of workers: direct workers,	Contractor	PIU/PMC

Description	Mitigation Measures	Responsibility	
		Implementation	Supervision
	contracted workers, temporary or seasonal workers and community workers. (Where numbers are not yet firm, an estimate should be provided) broad description and an indication of the likely characteristics of the project workers e.g. local workers, national or international migrants, female workers, workers between the minimum age and 18; details of the migrant workers, labour camp location should be shared with local Police station as per regulatory norms.		
Grievance	Establish a mechanism for grievance redressal for both direct and contract labourers, disclose contact details of officials concerned. Sign boards and GRC name boards should be written in local, multilingual languages and English at the labour camp.	Contractor	PIU/PMC

Description	Mitigation Measures	Responsibility	
		Implementation	Supervision
Policies and Procedures	Provide workers with contracts with fair terms and conditions Require the contractor to preferentially engage unskilled local workforce form the local communities Make all contracted workers to follow the rules for on-site behaviour (with colleagues) and conduct in the community. Conduct induction and toolbox talks outlining expected conduct and local community values. Introduce disciplinary measures for violations and misbehaviours. Set the minimum age of project workers eligible for any type for work. Train the labour for environmental protection, occupational and community health and safety and gender equality. Follow the equal wages policy without any discrepancies or gender partialities. Ensure minimum legal labour standards as per ILO regulations (child/forced labour, no discrimination, working hours, minimum wages) are met with. Contractors shall implement codes of conduct concerning employment and workforce behaviour (including but not limited to safety rules, zero tolerance for substance abuse,	Contractor	PIU/PMC

Description	Mitigation Measures	Responsibility	
		Implementation	Supervision
	environmental sensitivity of the area, dangers of sexually transmissible diseases and HIV/AIDS, gender equality and sexual harassment, respect for the beliefs and customs of the populations and community relations in general).		

Annexure 9

Immediate Incident Notification Form

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

Definition of Major Incident:

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

Guidance for Accidents and Incidents Reporting

1. Basic Information

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

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

2. Investigation

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

The investigation must follow the facts, witnesses and linked individuals/third parties and the timeline, and not be constrained by the incident/accident event in isolation.

In case publications on the event are available, these should be attached to the report (e.g. press articles, online articles, radio and TV- spots).

3. **Analysis**

- *using basic data, interview outcomes and reconstructed timeline, identification of:*
  - *immediate causes*
  - *underlying causes (actions in the past that have allowed or caused undetected unsafe conditions/acts)*
  - *root causes (generally organisational/management failings, sometimes not directly/ obviously in relation to accident/incident regarding location/time)*
  - *identification of absent/inadequate/failed/unused risk identification,- management- and control measures, reference/gap analysis against relevant national legislation and against the international standards as applicable and agreed upon for the Project*
- *conclusions and summary of root causes and underlying causes for the accident/incident.*

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

4. Way forward

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

Types of reportable injury

The death of any person

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

Specified injuries to workers

- fractures, other than to fingers, thumbs and toes
- amputations
- any injury likely to lead to permanent loss of sight or reduction in sight
- any crush injury to the head or torso causing damage to the brain or internal organs
- serious burns (including scalding) which:

- covers more than 10% of the body
- causes significant damage to the eyes, respiratory system or other vital organs

- any scalping requiring hospital treatment
- any loss of consciousness caused by head injury or asphyxia
- any other injury arising from working in an enclosed space which:
  - leads to hypothermia or heat-induced illness
  - requires resuscitation or admittance to hospital for more than 24

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

IMMEDIATE INCIDENT NOTIFICATION					
1. Incident Details					
Project Company		**Date of incident**			
		Time of Incident			
Location of incident		**Type of Incident**	**Environmental**	☐	
			Injury	*Workforce*	☐
				Public/Local community	☐
			Social incident (e.g. violent labor unrest)	☐	
2. WHAT HAPPENED					
Brief description of incident					
3. INJURED WORKERS					

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

4. INJURED MEMBERS OF PUBLIC						
Name	**Sex**	**Age**	**Community**	**Place of Residence**	**Cause**	**Injury Type (Major / Fatal)**

5. ENVIRONMENTAL INCIDENT			
Type (Spill / Gas Release)	**Total Loss (Litres / kG)**	**Cause**	**Damage**

6. WITNESSES TO INCIDENT			
Name	**Sex**	**Place of Residence**	**Description of incident**

7. OTHER RELEVANT INFORMATION				
Have the authorities been informed?	**Yes**	☐	**No**	☐
Please provide further information here				
Media attention?	**Yes**	☐	**No**	☐
Please provide further information here				
Any effects off-site?	**Yes**	☐	**No**	☐
Please provide further information here				

Photographs taken? *(please include them in this report)*	**Yes**	☐	**No**	☐

Date	

Which immediate corrective actions have been taken after the accident? By whom?

Please describe here if the accident lead to changes into the works organisation or process, if specific equipment has been acquired/mobilised, if protection measures were implemented, if works have stopped etc.

Person completing form:

Name and position:				
Contact details:	**Phone**		**Email**	

Annexure - 10

Biodiversity of Hosur - The IUCN Status and Interpretations

Table 1. List of plant species was recorded in Hosur

Sl. No.	Scientific Name	Family	Habit	IUCN Status
1	*Abrus precatorius* Linn	Fabaceae	Climber	NE
2	*Acacia chundra* (Rottler)Willd.	Fabaceae	Tree	NE
3	*Acacia ferruginea* DC	Fabaceae	Tree	VU
4	*Acacia latronum* (L.f.)Willd	Fabaceae	Shrub	NE
5	*Acacia leucophloea* (Roxb.)Willd.	Fabaceae	Tree	LC
6	*Acacia planifrons* Wight & Arn.	Fabaceae	Tree	NE
7	*Acacia sundra (Roxb) DC*	Fabaceae	Tree	NE
8	*Achyranthes aspera L.*	Amaranthaceae	Herb	NE
9	*Acorus calamus* L.	Acoraceae	Herb	LC
10	*Adenostemma lavenia* (L.) Kuntze	Asteraceae	Herb	NE
11	*Adina cordifolia* (Roxb) Hook.f.	Rubiaceae	Tree	NE
12	*Aegle marmelos* (L.) Corr Serr	Rutaceae	Tree	NT
13	*Aerva monsoniae* Martius.	Amaranthaceae	Herb	NE
14	*Ageratum conyzoides* L.	Asteraceae	Herb	NE
15	*Albizia Lebbeck* (L.) Wild	Fabaceae	Tree	LC
16	*Albizia odoratissima* (L.f.) Benth	Mimosaceae	Tree	LC
17	*Allophyllus serratus* (Roxb)	Sapindaceae	Shrub	LC
18	*Alternanthera sessilis* (L.)R.Br.ex DC	Amarathaceae	Herb	LC
19	*Alysicarpus monilifer* (L.) DC	Fabaceae	Herb	NE
20	*Alysicarpus rugosus* (Willd) DC	Fabaceae	Herb	NE
21	*Amaranthus spinosus L.*	Amaranthaceae	Herb	NE
22	*Andrographis affinis* Nees.	Acanthaceae	Herb	NE
23	*Andropogon pumilus* Roxb.	Graminae	Herb	NE
24	*Anisomeles malabarica* (L) R.Br	Labiatae (Lamiaceae)	Shrub	NE
25	*Annona muricata*	Annonaceae	Tree	NE
26	*Aristolochia indica* L.	Aristolochiaceae	Climber	NE
27	*Artocarpus integrifolius* L.f.	Moraceae	Tree	LC
28	*Asparagus racemosus* Willd.	Liliaceae	Climber	NE
29	*Azima tetracantha* Lam	Salvadoraceae	Shrub	LC
30	*Balanites roxburghii Planchon*	Balanitaceae	Tree	NE
31	*Barleria buxifolia* L.	Acanthaceae	Herb	NE
32	*Barleria nitida* Nees	Acanthaceae	Shrub	NE
33	*Barleria prionitis* L.	Acanthaceae	Herb	NE
34	*Bauhinia racemosa Lam*	Fabaceae	Tree	NE
35	*Benincasa cerifera* Savi	Cucurbitaceae	Climber	NE
36	*Bergia ammannioides* Roxb	Elatinaceae	Herb	LC
37	*Biophytum Nervifolium*	Oxalidaceae	Herb	NE

Sl. No.	Scientific Name	Family	Habit	IUCN Status
38	*Blepharis boerhaviifolia* Pers.	Acanthaceae	Herb	NE
39	*Blepharis maderaspatensis* (L.) Heyne ex Roth	Acanthaceae	Herb	NE
40	*Blumea lacera* (Burm.f.) DC.	Asteraceae	Herb	NE
41	*Blumea obliqua* (L.) Druce	Asteraceae	Herb	NE
42	*Boerhavia diffusa* L.	Nyctaginaceae	Herb	NE
43	*Boerhavia erecta*	Nyctaginaceae	Herb	NE
44	*Borreria hispida* (L.)	Rubiaceae	Herb	NE
45	*Breynia rhamnoides* (Retz) Muell. Arg	Euphorbiaceae	Shrub	LC
46	*Cadaba fruticosa (L.) Druce*	Capparaceae	Shrub	NE
47	*Calamus rotang* L.	Arecaceae	Shrub	NE
48	*Calotropis gigantea* (L) W.T.Aiton	Apocynaceae	Shrub	NE
49	*Calycopteris floribunda (Roxb)*	Combretaceae	Shrub	NE
50	*Canavalia ensiformis* DC	Fabaceae	Shrub	NE
51	*Canthium coromandelicum* (Burm.f.) Alston	Rubiaceae	Tree	NE
52	*Capparis brevispina* Auct. Non DC.	Capparaceae	Shrub	NE
53	*Capparis sepiaria* L	Capparaceae	Shrub	LC
54	*Capparis stylosa* DC	Capparaceae	Shrub	NE
55	*Capparis zeylanica* L	Capparaceae	Climber	NE
56	*Caralluma attenuata* Wight.	Asclepiadaceae	Herb	NE
57	*Cardiospermum canescens Wall*	Sapindaceae	Climber	NE
58	*Cardiospermum halicacabum L.*	Sapindaceae	Climber	LC
59	*Carissa spinarum* L.	Apocyanaceae	Shrub	LC
60	*Cassia auriculata* L.	Fabaceae	Shrub	NE
61	*Cassytha filiformis* L.	Lauraceae	Twiner	NE
62	*Cassia tora* L.	Fabaceae	Herb	NE
63	*Celtis wightii* planchon	Ulmaceae	Tree	LC
64	*Chloroxylon swietenia* DC	Rutaceae	Tree	VU
65	*Chomelia asiatica* (L.) kuntze	Rubiaceae	Shrub	NE
66	*Chromolaena odorata* (L.) R.M.King & H.Rob.	Asteraceae	Shrub	NE
67	*Cissus quadrangularis* L	Vitaceae	Shrub	NE
68	*Cissus setosa* Wallich	Vitaceae	Climber	NE
69	*Cissus vitiginea* L	Vitaceae	Climber	NE
70	*Citrullus vulgaris Schrader*	Cucurbitaceae	Herb	NE
71	*Clausena dentata* (Willd) M.Roem.	Rutaceaea	Tree	LC
72	*Cleistanthus collinus* (Roxb) Benth.	Euphorbiaceae	Shrub	VU
73	*Cleome aspera* J.Koeing	Cleomaceae	Herb	NE
74	*Clitoria ternatea* L.	Fabaceae	Climber	NE
75	*Coccinia grandis* (L.)Voigt	Cucurbitaceae	Climber	NE
76	*Coffea* wightiana W & A	Rubiaceae	Shrub	LC
77	*Combretum albidum* G.Don	Combretaceae	Climber	NE
78	*Conyza aegyptiaca* (L.) Aiton	Asteraceae	Herb	NE

Sl. No.	Scientific Name	Family	Habit	IUCN Status
79	*Corchorus acutangulus* Lam	Tiliaceae	Herb	NE
80	*Corchorus tridens* L.	Tiliaceae	Herb	NE
81	*Corchorus trilocularis* L.	Tiliaceae	Herb	NE
82	*Cordia dichotoma* G. Forster	Boraginaceae	Tree	LC
83	*Cordia monoica*	Boraginaceae	Tree	LC
84	*Crateva religiosa* Forster.F.	Capparaceae	Tree	LC
85	*Crotalaria biflora* (L.)	Fabaceae	Herb	NE
86	*Crotalaria evolvuloides*W&A	Fabaceae	Herb	NE
87	*Crotalaria mysorensis* Roth	Fabaceae	Herb	NE
88	*Cryptolepis buchananii* Roemer & Schultes	Asclepiadaceae	Climber	NE
89	*Cucumis dipsaceus* Ehrenb. ex Spach	Cucurbitaceae	Climber	NE
90	*Curcuma longa* L.	Zingiberaceae	Herb	DD
91	*Cyperas* sp	Cyperaceae	Grass	LC
92	*Dalbergia sissoo* Sensu Miq	Fabaceae	Tree	LC
93	*Delonix regia* (Hook.) Raf	Fabaceae	Tree	LC
94	*Derris scandens* (Roxb) Benth	Fabaceae	Climber	NE
95	*Dichrostachys cinerea* (L.) W &A	Mimosaceae	Tree	LC
96	*Dioscorea pentaphylla* L.	Dioscoreaceae	Climber	NE
97	*Dioscorea oppositifolia* L.	Dioscoreaceae	Climber	NE
98	*Diospyros ebenum J*.koenig	Ebenaceae	Tree	DD
99	*Diospyros Montana* Roxb	Ebenaceae	Tree	LC
100	*Dodonaea viscosa* Jacq.	Sapindaceae	Shrub	LC
101	*Dolichos falcatus* Klein ex Willd	Fabaceae	Twiner	NE
102	*Eichhornia crassipes (Mart.) Solms*	Pontederiaceae	Herb	NE
103	*Erythrina variegata* L.	Fabaceae	Tree	LC
104	*Euphorbia antiquorum* L.	Euphorbiaceae	Shrub	NE
105	*Euphorbia nivulia* Buch- Ham.	Euphorbiaceae	Tree	NE
106	*Euphorbia thymifolia* L.	Euphorbiaceae	Herb	NE
107	*Evolvulus alsinoides* (L.)	Convolvulaceae	Herb	NE
108	*Feronia elephantum* Corr Serr	Rutaceae	Tree	NE
109	*Ficus glomerata* Roxb.	Moraceae	Tree	LC
110	*Ficus infectoria* Roxb.	Moraceae	Tree	NE
111	*Ficus racemosa* L.	Moraceae	Tree	LC
112	*Ficus retusa* L. var. nitida Thumb.	Moraceae	Tree	NE
113	*Fluggea leucopyrus* Willd	Euphorbiaceae	Shrub	LC
114	*Glochidion ellipticum* Wight	Euphorbiaceae	Shrub	LC
115	*Gloriosa superba* L.	Liliaceae	Climber	LC
116	*Glossocardia bosvallia* (L.f.)DC	Asteraceae	Herb	NE
117	*Glycosmis cochinchinensis auct*	Rutaceae	Shrub	LC

Sl. No.	Scientific Name	Family	Habit	IUCN Status
118	*Gmelina asiatica* L	Verbinaceae	Shrub	LC
119	*Grangea maderaspatana* (L.) Poir.	Asteraceae	Herb	LC
120	*Grewia abutilifolia*	Tiliaceae	Shrub	LC
121	*Grewia emarginata* W & A	Tiliaceae	Shrub	NE
122	*Grewia obtusa* Wallich	Tiliaceae	Shrub	NE
123	*Gummifera lucida* Roxb.	Rubiaceae	Tree	NE
124	*Gymnema sylvestre* (Retz) R.Br.ex.Schultes.	Asclepiadaceae	Climber	NE
125	*Gymnosporia emarginata* (Willd)	Celastraceae	Shrub	NE
126	*Gymnosporia emarginata* (Willd.) Thw	Celastraceae	Tree	NE
127	*Helicteres isora* L.	Sterculiaceae	Tree	NE
128	*Heliotropium indicum L.*	Boraginaceae	Herb	NE
129	*Heliotropium subulatum* (Hochst. ex A.DC.)	Boraginaceae	Herb	NE
130	*Hemidesmus indicus* (L.) R.Br.	Asclepiadaceae	Climber	NE
131	*Hippocratea indica* Willd	Hipocrateaceae	Shrub	NE
132	*Hippocratea obtusifolia* Roxb	Hipocrateaceae	Shrub	NE
133	*Holoptelea integrifolia* Planch.	Ulmaceae	Tree	NE
134	*Hugonia mystax* L.	Linaceae	Climber	NE
135	*Hyptis Suaveolens* (L)Poit	Lamiaceae	Herb	NE
136	*Ichnocarpus frutescens* (L.) W. T. Aiton	Apocyanaceae	Climber	NE
137	*Indigofera cordifolia* Heyne ex Roth	Fabaceae	Herb	NE
138	*Indigofera linifolia* (L.f.) Retz	Fabaceae	Herb	LC
139	*Indigofera tinctoria L.*	Fabaceae	Herb	NE
140	*Ipomoea Carnea* Jacq	Convolvulacaeae	Shrub	NE
141	*Jasminum angustifolium*	Oleaceaea	Climber	NE
142	*Jasminum auriculatum* Vahl	Oleaceae	Climber	NE
143	*Jasminum trichotomum* Heyne	Oleaceae	Climber	NE
144	*Jatropha curcas* L.	Eurphorbiaceae	Tree	LC
145	*Justicia betonica* L.	Acanthaceae	Herb	NE
146	*Justicia glauca* Rottl.	Acanthaceae	Herb	NE
147	*Justicia tranquebariensis* L.f.	Acanthaceae	Shrub	NE
148	*Kigelia pinnata* DC.	Bignoniaceae	Tree	NE
149	*Lantana aculeata* L.	Verbinaceae	Shrub	NE
150	*Lantana camara*	Verbenaceae	Shrub	NE
151	*Lepidagathis cristata* Willd	Acanthaceae	Herb	NE
152	*Leptadenia reticulata* (Retz.) Wight	Apocynaceae	Climber	NE
153	*Leucaena leucocephala* (Lam.) de Wit	Fabaceae	Tree	NE
154	*Ligustrum walkeri* Decne	Oleaceae	Tree	NE
155	*Limonia alata* W & A	Rutaceae	Shrub	NE
156	*Linociera zeylanica* (L.) Gamble	Oleaceae	Tree	NE
157	*Lippia nodiflora* (L.) A.Rich	Verbinaceae	Herb	LC
158	*Ionidium suffruticosum* (L)	Violaceae	Herb	NE

Sl. No.	Scientific Name	Family	Habit	IUCN Status
159	*Ludwigia adscendens*	Onagraceae	Herb	LC
160	*Maba buxifolia* (Rottb)	Ebenaceae	Shrub	NE
161	*Maerua arenaria* DC	Capparaceae	Shrub	NE
162	*Marsilea quadrifolia* L.	Marsileaceae	Herb	LC
163	*Melhania incana* Heyne	Sterculiaceae	Shrub	NE
164	*Mimosa pudica L.*	Fabaceae	Herb	LC
165	*Mollugo nudicaulis* Lam	Aizoaceae	Herb	NE
166	*Mollugo pentaphylla* L.	Aizoaceae	Herb	NE
167	*Nerium odorum* Sol.	Apocyanaceae	Shrub	LC
168	*Ochna squarrosa* L	Ochnaceae	Shrub	NE
169	*Ocimum adscendens* Willd	Lamiaceae	Shrub	NE
170	*Olax scandens* Roxb	Olacaceae	Shrub	NE
171	*Oldenlandia herbacea* (L.) Roxb.	Rubiaceae	Herb	NE
172	*Oldenlandia umbellata* L.	Rubiaceae	Herb	NE
173	*Oldenlandia wightii* Hook.f	Rubiaceae	Herb	NE
174	*Orthosiphon diffumes* Benth.	Lamiaceae	Shrub	NE
175	*Pachygone ovata* (Poiret) J.D. Hook.& Thom	Menispermaceae	Climber	NE
176	*Parthenium hysterophorus* L.	Asteraceae	Herb	NE
177	*Passiflora foetida*	Passifloraceae	Climber	NE
178	*Pavonia odorata* Willd	Malvace	Shrub	NE
179	*Pedalium murex* L.	Pedaliaceae	Herb	NE
180	*Pergularia daemia*	Apocynaceae	Climber	LC
181	*Phaseolus aconitifolius*	Fabaceae	Shrub	DD
182	*Phaseolus trilobus*	Fabaceae	Shrub	NE
183	*Phoenix sylvestris* L.Roxb	Arecaceae	Tree	NE
184	*Phyla nodiflora* L	Verbenaceae	Herb	LC
185	*Phyllanthus polyphyllus willd*	Euphorbiaceae	Tree	NE
186	*Phyllanthus reticulatus* Poir	Phyllanthacaeae	Shrub	LC
187	*Phyllochlamys spinosa (Roxb) Bureau*	Moraceae	Shrub	NE
188	*Pithecellobium dulce* (Roxb)Benth	Fabaceae	Tree	LC
189	*Plecospermum spinosum* Trecul	Moraceae	Climber	NE
190	*Plectronia parviflora* (Lam) Beddome	Rubiaceae	Shrub	NE
191	*Polycarpaea corymbosa* (L)	Caryophyllaceae	Herb	NE
192	*Polygala erioptera* DC	Polygalaceae	Herb	NE
193	*Polygonum barbatum* L.	Polygonaceae	Herb	LC
194	*Polygonum glabrum* Willd.	Polygonaceae	Herb	LC
195	*Polygonum plebeium*	Polygonaceae	Herb	LC
196	*Pongamia pinnata* L.	Fabaceae	Tree	LC
197	*Portulaca quadrifida* L.	Portulacaceae	Herb	NE
198	*Premna latifolia* Roxb.	Lamiaceae	Tree	NE
199	*Prosopis juliflora*	Fabaceae	Tree	NE

Sl. No.	Scientific Name	Family	Habit	IUCN Status
200	*Pterolobium indicum* A.Rich	Fabaceae	Shrub	NE
201	*Randia candollerana* W&A	Rubiaceae	Tree	NE
202	*Randia dumetorum* (Retz)	Rubiaceae	Shrub	NE
203	*Randia malabarica* Lam	Rubiaceae	Tree	NE
204	*Rauvolfia tetraphylla* L.	Apocynaceae	Shrub	NE
205	*Rhinacanthus communis*Nees	Acanthaceae	Shrub	NE
206	*Rhus mysorensis* Don	Anacardiaceae	Climber	NE
207	*Rhynchosia rufescens* (Willd) DC	Fabaceae	Climber	NE
208	*Ricinus communis* L.	Eurphorbiaceae	Shrub	NE
209	*Rothia trifoliata* (Pers.)DC	Fabaceae	Herb	NE
210	*Ruellia prostrata* poiret	Acanthaceae	Herb	NE
211	*Sansevieria roxburghiana* Schultes & Schultes	Agavaceae	Herb	NE
212	*Santalum album* L.	Santalaceae	Tree	VU
213	*Sapindus emarginata* Vahl	Sapindaceae	Tree	NE
214	*Scilla indica* (Wight) Baker.	Liliaceae	Bulb.	NE
215	*Scolopia crenata* (W &A)	Flacourtiaceae	Tree	NE
216	*Sesamum laciniatum* Klein ex Willd.	Pedaliaceae	Herb	NE
217	*Solanum erianthum* D.Don	Solanaceae	Shrub	NE
218	*Solanum nigrum* L	Solanaceae	Herb	NE
219	*Streblus asper* Lour	Moraceae	Tree	LC
220	*Symphorema involucratum R*oxb	Verbinaceae	Shrub	NE
221	*Syzygium cumini*	Myrtaceae	Tree	LC
222	*Tephrosia purpurea* L.	Fabaceae	Shrub	NE
223	*Tephrosia tenuis* Wallich	Fabaceae	Herb	NE
224	*Tephrosia villosa* (L.)Pers.	Fabaceae	Herb	LC
225	*Terminalia catappa* L.	Combretaceae	Tree	NE
226	*Thespesia populnea* (L.) Soland.ex Correa	Malvaceae	Tree	LC
227	*Toddalia asiatica*(L) Lam	Rutaceaea	Shrub	NE
228	*Trema orientale* (L.) Blume	Ulmaceae	Tree	LC
229	*Tribulus terrestris* L.	Zygophyllaceae	Herb	LC
230	*Triumfetta rhomboidea* Jacq	Malvaceae	Herb	NE
231	*Tylophora indica* (Burm.f.) Merr.	Apocynaceae	Shrub	NE
232	*Typha angustifoli*a L.	Typhaceae	Herb	LC
233	*Urena lobata*	Malvaceae	Herb	LC
234	*Vanda tessellata* (Roxb) Hook.	Orchidaceae	Vine	LC
235	*Vicoa indica* (L.) DC	Asteraceae	Herb	NE
236	*Vitex negundo* L	Verbenaceae	Tree	LC
237	*Wahlenbergia erecta* (Roth ex Schult.) Tuyn	Companulaceae	Herb	NE
238	*Waltheria indica* L.	Sterculiaceae	Shrub	LC
239	*Wattakaka volubilis* (L.fil.) Stapf	Apocynaceae	Climber	NE
240	*Wrightia tinctoria* (Roxb) R.Br	Apocyanaceae	Tree	NE

Sl. No.	Scientific Name	Family	Habit	IUCN Status
241	*Wrightia tinctoria* (Roxb.) R. Br	Apocynaceae	Tree	NE
242	*Ximenia americana* L.	Olacaceae	Shrub	LC
243	*Ziziphus jujuba* (L.)	Rhamnaceae	Tree	LC
244	*Ziziphus oenoplia* (L.) Mill	Rhamnaceae	Shrub	LC
245	*Ziziphus trinervia* Roxb	Rhamnaceae	Tree	NE
246	*Ziziphus xylopyrus* (Retz) Willd	Rhamnaceae	Tree	NE
247	*Zornia diphylla* (L.) Pers.	Fabaceae	Herb	NE

IUCN Status - Flora of Hosur

Number of Species	IUCN Status	Remarks
175	**NE** (Not Evaluated)	The conservation status has not yet been assessed against the IUCN Red List criteria; these species can also be considered as common in the region or place
64	**LC** (Least Concern)	Widespread and abundant, these species are not currently at risk of extinction.
4	**VU** (Vulnerable)	**Threatened**—facing a high risk of extinction in the wild.
3	**DD** (Data Deficient)	Insufficient information to make a direct or indirect assessment of extinction risk.
1	**NT** (Near Threatened)	Close to qualifying for or likely to qualify for a threatened category in the near future.

Floral Conservation Analysis

The floral assessment in the table identifies 247 species. While the majority (175 species) have not been evaluated (NE) and 64 are of Least Concern (LC), four species are classified as Vulnerable, requiring management. And only one species *Santalum album* L.(Indian Sandalwood) falls in Schedule III of Wildlife (Protection) Amendment Act, 2022

1. **Vulnerable (VU) Species (Threatened)**

Four species in the checklist are classified as Vulnerable (VU), indicating that they are facing a high risk of extinction in the wild. These species are a priority for local conservation efforts: *Acacia ferruginea DC (Rusty Acacia), Chloroxylon swietenia DC (Satinwood), Cleistanthus collinus (Roxb) (Benth. Garari) and Santalum album L. (Indian Sandalwood)*. The presence of *Sandalwood* on this threatened list is a globally known species facing intense pressure from illegal harvesting and habitat loss. Very few trees are present along the lakes of Hosur, and its mostly cut illegally, in many private Industrial campuses within the corporation limit, they exist in good numbers.

2. Near Threatened (NT) Species

One species is classified as Near Threatened (NT): *Aegle marmelos (L.) Corr Serr (Bael Tree)*, this species requires close monitoring, as it is close to meeting the criteria for a threatened category and could

move into a higher-risk classification without intervention. This species is recommended for planting during plantation activity.

Table 2. Checklist of butterflies documented at different lakes of Hosur.

Sl. No	Common name	Scientific Name	Family	IUCN Status
1	Common Banded Awl	*Hasora chromus*	Hesperiidae	LC
2	Karwar Swift	*Caltoris canaraica*	Hesperiidae	LC
3	Giant Redeye	*Gangara thyrsis*	Hesperiidae	LC
4	Dark Palm Dart	*Telicota bambusae*	Hesperiidae	LC
5	Bush Hopper	*Ampittia dioscorides*	Hesperiidae	LC
6	Indian Grizzled Skipper	*Spialia galba*	Hesperiidae	LC
7	Grass Demon	*Udaspes folus*	Hesperiidae	LC
8	Oriental Grass Dart	*Taractrocera maevius*	Hesperiidae	LC
9	Indian Palm Bob	*Suastus gremius*	Hesperiidae	LC
10	Common Snow Flat	*Tagiades japetus*	Hesperiidae	LC
11	Brown Awl	*Badamia exclamationis*	Hesperiidae	LC
12	Common Branded Redeye	*Matapa aria*	Hesperiidae	LC
13	Rice Swift	*Borbo cinnara*	Hesperiidae	LC
14	Parnara Swift	*Parnara Spp*	Hesperiidae	LC
15	Dakhan Spotted Small Flat	*Sarangesa purendra hopkinsi*	Hesperiidae	LC
16	Narrow Banded Blue-bottle	*Graphium teredon*	Papilionidae	LC
17	Common Jay	*Graphium doson*	Papilionidae	LC
18	Tailed Jay	*Graphium agamemnon*	Papilionidae	LC
19	Common Cormon	*Papilio polytes*	Papilionidae	LC
20	Blue Mormon	*Papilio polymnestor*	Papilionidae	LC
21	Lime Butterfly	*Papilio demoleus*	Papilionidae	LC
22	Common Rose	*Atrophaneura aristolochiae*	Papilionidae	LC
23	Crimson Rose	*Atrophaneura hector*	Papilionidae	LC
24	Common Banded Peacock	*Papilio crino*	Papilionidae	LC
25	Spot Swordtail	*Graphium nomius*	Papilionidae	LC
26	Three Spot Grass yellow	*Eurema blanda*	Pieridae	LC
27	Common Grass yellow	*Eurema hecabe*	Pieridae	LC
28	Spotless Grass yellow	*Eurema laeta*	Pieridae	LC
29	Small Grass Yellow	*Eurema brigitta*	Pieridae	LC
30	Common Emigrant	*Catopsilia pomona*	Pieridae	LC
31	Mottled Emigrant	*Catopsilia pyranthe*	Pieridae	LC
32	Yellow Orange Tip	*Ixias pyrene*	Pieridae	LC
33	White Orange Tip	*Ixias marianne*	Pieridae	LC
34	Great Orange Tip	*Hebomoia glaucippe*	Pieridae	LC

Sl. No	Common name	Scientific Name	Family	IUCN Status
35	Little Orange Tip	*Colotis etrida*	Pieridae	LC
36	Crimson Tip	*Colotis danae*	Pieridae	LC
37	Plain Orange Tip	*Colotis aurora*	Pieridae	LC
38	Common Wanderer	*Pareronia valeria*	Pieridae	LC
39	Common Albatross	*Appias albina*	Pieridae	LC
40	Pioneer	*Belenois aurota*	Pieridae	LC
41	Indian Jezebel	*Delias eucharis*	Pieridae	LC
42	Psyche	*Leptosia nina*	Pieridae	LC
43	Common Gull	*Cepora nerissa phryne*	Pieridae	LC
44	Small Salmon Arab	*Colotis amata*	Pieridae	LC
45	Large Oakblue	*Arhopala amantes*	Lycaenidae	LC
46	Indian Sunbeam	*Curetis thetis*	Lycaenidae	LC
47	Common Guava Blue	*Virachola isocrates*	Lycaenidae	LC
48	Apefly	*Spalgis epeus*	Lycaenidae	LC
49	Monkey Puzzle	*Rathinda amor*	Lycaenidae	LC
50	Common Pierrot	*Castalius rosimon*	Lycaenidae	LC
51	Banded Blue Pierrot	*Discolampa ethion*	Lycaenidae	LC
52	Common Silverline	*Spindasis vulcanus*	Lycaenidae	LC
53	Slate Flash	*Rapala manea*	Lycaenidae	LC
54	Red Pierrot	*Telicada nyseus*	Lycaenidae	LC
55	Zebra Blue	*Leptotes plinius*	Lycaenidae	LC
56	Forget me Not	*Catochrysops strabo*	Lycaenidae	LC
57	Common Lineblue	*Prosotas nora*	Lycaenidae	LC
58	Tailess Lineblue	*Prosotas dubiosa*	Lycaenidae	LC
59	Dingy Lineblue	*Petrelaea dana*	Lycaenidae	LC
60	Common Cerulean	*Jamides celeno*	Lycaenidae	LC
61	Dark Cerulean	*Jamides bochus*	Lycaenidae	LC
62	Pea Blue	*Lampides boeticus*	Lycaenidae	LC
63	Lime Blue	*Chilades lajus*	Lycaenidae	LC
64	Gram Blue	*Euchrysops cnejus*	Lycaenidae	LC
65	Common Hedge Blue	*Acytolepis puspa*	Lycaenidae	LC
66	Pale Grass Blue	*Pseudozizeeria maha*	Lycaenidae	LC
67	Lesser Grass Blue	*Zizina otis*	Lycaenidae	LC
68	Tiny Grass Blue	*Zizula hylax*	Lycaenidae	LC
69	Dark Grass Blue	*Zizeeria karsandra*	Lycaenidae	LC
70	Grass Jewel	*Freyeria trochylus*	Lycaenidae	LC
71	Plains Cupid	*Chilades pandava*	Lycaenidae	LC
72	Small Cupid	*Chilades parrhasius*	Lycaenidae	LC
73	African Babul Blue	*Azanus jesous gamra*	Lycaenidae	LC

Sl. No	Common name	Scientific Name	Family	IUCN Status
74	Silverstreak Blue	*Iraota timoleon*	Lycaenidae	LC
75	Pointed Ciliate Blue	*Anthene lycaenina*	Lycaenidae	LC
76	Bright Babul Blue	*Azanus ubaldus*	Lycaenidae	LC
77	Redspot	*Zesius chrysomallus*	Lycaenidae	LC
78	Suffused Double Banded Judy	*Abisara bifasciata*	Riodinidae	LC
79	Blue Tiger	*Tirumala limniace*	Nymphalidae	LC
80	Dark Blue Tiger	*Tirumala septentrionis*	Nymphalidae	LC
81	Striped Tiger	*Danaus genutia*	Nymphalidae	LC
82	Plain Tiger	*Danaus chrysippus*	Nymphalidae	LC
83	Common Crow	*Euploea core*	Nymphalidae	LC
84	Double-branded Black Crow	*Euploea sylvester*	Nymphalidae	LC
85	Common Evening Brown	*Melanitis leda*	Nymphalidae	LC
86	Bamboo Treebrown	*Lethe europa*	Nymphalidae	LC
87	Common Bushbrown	*Mycalesis perseus*	Nymphalidae	LC
88	Common Four Ring	*Ypthima huebneri*	Nymphalidae	LC
89	Tailed Palmfly	*Elymnias caudata*	Nymphalidae	LC
90	Tawny Coster	*Acraea violae*	Nymphalidae	LC
91	Anomalous Nawab	*Charaxes agrarius*	Nymphalidae	LC
92	Baronet	*Symphaedra nais*	Nymphalidae	LC
93	Common Leopard	*Phalanta phalantha*	Nymphalidae	LC
94	Common Sailer	*Neptis hylas*	Nymphalidae	LC
95	Chestnut-streaked Sailer	*Neptis jumbah*	Nymphalidae	LC
96	Common Lascar	*Pantoporia hordonia*	Nymphalidae	LC
97	Angled Castor	*Ariadne ariadne*	Nymphalidae	LC
98	Common Castor	*Ariadne merione*	Nymphalidae	LC
99	Common Baron	*Euthalia aconthea*	Nymphalidae	LC
100	Chocolate Pansy	*Junonia iphita*	Nymphalidae	LC
101	Lemon Pansy	*Junonia lemonias*	Nymphalidae	LC
102	Peacock Pansy	*Junonia almana*	Nymphalidae	LC
103	Blue Pansy	*Junonia orithya*	Nymphalidae	LC
104	Yellow Pansy	*Junonia hierta*	Nymphalidae	LC
105	Great Eggfly	*Hypolimnas bolina*	Nymphalidae	LC
106	Danaid Eggfly	*Hypolimnas missipus*	Nymphalidae	LC
107	Common Three Ring	*Ypthima asterope mahratta*	Nymphalidae	LC
108	Joker	Byblia ilithyia	Nymphalidae	LC
109	Painted Lady	Vanessa cardui	Nymphalidae	LC
110	Black Rajah	Charaxes solon	Nymphalidae	LC
111	Commander	*Moduza procris*	Nymphalidae	LC

Sl. No	Common name	Scientific Name	Family	IUCN Status
112	Gaudy Baron	*Euthalia lubentina*	Nymphalidae	LC
113	Common Treebrown	*Lethe rohria*	Nymphalidae	LC
114	Lobed Beak	*Libythea laius*	Nymphalidae	LC

All 114 documented butterfly species are classified as Least Concern (LC) under the IUCN Red List, indicating that there are no documented significant declines in population numbers along the region, the butterfly species are common and have the Ability to thrive in diverse habitats, including grasslands, wetlands, and forest edges found along the lakes, parks and other natural habitats of Hosur.

A critical analysis of the table reveals a discrepancy between the global IUCN status and the local legal status (Indian Wildlife Protection Act). Based on IUCN Status, all 114 species listed in the table are classified as Least Concern (LC). This implies that globally, these populations are stable and not currently facing extinction. Despite being "Least Concern" globally, three species in this list are legally protected in India. Under the Wildlife (Protection) Amendment Act, 2022. The Schedule II Species in the list includes high-value species such as the Crimson Rose (*Atrophaneura hector*), Danaid Eggfly (*Hypolimnas misippus*), and Common Pierrot (*Castalius rosimon*). The presence of Schedule II species legally mandates that their habitats (host plants) be preserved. The management plan must ensure that "weed clearing" operations do not destroy the specific larval host plants of these protected species.

Table 3. List of bird species recorded in Hosur urban lakes

Sl. No.	Group	Common Name	Scientific Name	IUCN Status
	Kingfishers			
1		Common Kingfisher	*Alcedo atthis*	LC
2		White-throated Kingfisher	*Halcyon smyrnensis*	LC
3		Pied Kingfisher	*Ceryle rudis*	LC
	Bee-eaters, Rollers, and Allies			
4		Indian Roller	*Coracias benghalensis*	LC
	Barbets and Toucans			
5		Coppersmith Barbet	*Psilopogon haemacephalus*	LC
6		White-cheeked Barbet	*Psilopogon viridis*	LC
	Parrots, Parakeets, and Allies			
7		Rose-ringed Parakeet	*Psittacula krameri*	LC
	Old World Orioles			
8		Indian Golden Oriole	*Oriolus kundoo*	LC
	Woodswallows			

Sl. No.	Group	Common Name	Scientific Name	IUCN Status
9		Ashy Woodswallow	*Artamus fuscus*	LC
	Drongos			
10		Black Drongo	*Dicrurus macrocercus*	LC
	Jays, Magpies, Crows, and Ravens			
11		Rufous Treepie	*Dendrocitta vagabunda*	LC
12		House Crow	*Corvus splendens*	LC
13		Large-billed Crow	*Corvus macrorhynchos*	LC
	Cisticolas and Allies			
14		Common Tailorbird	*Orthotomus sutorius*	LC
15		Ashy Prinia	*Prinia socialis*	LC
16		*Prinia socialis*	*Prinia inornata*	LC
	Reed Warblers and Allies			
17		Booted Warbler	*Iduna caligata*	LC
18		Booted/Sykes's Warbler	*Booted/Sykes's Warbler*	LC
19		Blyth's Reed Warbler	*Acrocephalus dumetorum*	LC
20		Clamorous Reed Warbler	*Acrocephalus stentoreus*	LC
	Waterfowl			
21		Lesser Whistling-Duck	*Dendrocygna javanica*	LC
22		Indian Spot-billed Duck	*Anas poecilorhyncha*	LC
	Grebes			
23		Little Grebe	*Tachybaptus ruficollis*	LC
	Pigeons and Doves			
24		Rock Pigeon	*Columba livia*	LC
25		Spotted Dove	*Spilopelia chinensis*	LC
26		Laughing Dove	*Spilopelia senegalensis*	LC
	Cuckoos			
27		Greater Coucal	*Centropus sinensis*	LC
28		Asian Koel	*Eudynamys scolopaceus*	LC
29		Common Hawk-Cuckoo	*Hierococcyx varius*	LC
	Swifts			
30		Little Swift	*Apus affinis*	LC
	Rails, Gallinules, and Allies			
31		Eurasian Coot	*Fulica atra*	LC
32		Gray-headed Swamphen	*Porphyrio poliocephalus*	LC
33		White-breasted Waterhen	*Amaurornis phoenicurus*	LC
	Shorebirds			
34		Red-wattled Lapwing	*Vanellus indicus*	LC
35		Pheasant-tailed Jacana	*Hydrophasianus chirurgus*	LC

Sl. No.	Group	Common Name	Scientific Name	IUCN Status
36		Bronze-winged Jacana	*Metopidius indicus*	LC
37		Common Snipe	*Gallinago gallinago*	LC
	Martins and Swallows			
38		Barn Swallow	*Hirundo rustica*	LC
39		Wire-tailed Swallow	*Hirundo smithii*	LC
40		Red-rumped Swallow	*Cecropis daurica*	LC
41		swallow sp.	*Hirundinidae sp.*	NE
	Bulbuls			
42		White-browed Bulbul	*Pycnonotus luteolus*	LC
43		Red-whiskered Bulbul	*Pycnonotus jocosus*	LC
44		Red-vented Bulbul	*Pycnonotus cafer*	LC
	Leaf Warblers			
45		Green Warbler	*Phylloscopus nitidus*	LC
46		Greenish Warbler	*Phylloscopus trochiloides*	LC
	Starlings and Mynas			
47		Common Myna	*Acridotheres tristis*	LC
48		Jungle Myna	*Acridotheres fuscus*	LC
	Old World Flycatchers			
49		Indian Robin	*Copsychus fulicatus*	LC
50		Oriental Magpie-Robin	*Copsychus saularis*	LC
51		Pied Bushchat	*Saxicola caprata*	LC
	Flowerpeckers			
52		Pale-billed Flowerpecker	*Dicaeum erythrorhynchos*	LC
	Sunbirds and Spiderhunters			
53		Purple-rumped Sunbird	*Leptocoma zeylonica*	LC
54		Purple Sunbird	*Cinnyris asiaticus*	LC
	Old World Sparrows			
55		House Sparrow	*Passer domesticus*	LC
	Wagtails and Pipits			
56		Gray Wagtail	*Motacilla cinerea*	LC
57		White-browed Wagtail	*Motacilla maderaspatensis*	LC
58		Wood Sandpiper	*Tringa glareola*	LC
59		Tringa sp.	*Tringa sp.*	NE
	Gulls, Terns, and Skimmers			
60		River Tern	*Sterna aurantia*	LC
	Storks			
61		Painted Stork	*Mycteria leucocephala*	LC
	Cormorants and Anhingas			
62		Oriental Darter	*Anhinga melanogaster*	NT
63		Little Cormorant	*Microcarbo niger*	LC
64		Great Cormorant	*Phalacrocorax carbo*	LC

Sl. No.	Group	Common Name	Scientific Name	IUCN Status
65		Indian Cormorant	*Phalacrocorax fuscicollis*	LC
	Herons, Ibis, and Allies			
66		Little Egret	*Egretta garzetta*	LC
67		Indian Pond-Heron	*Ardeola grayii*	LC
68		Eastern Cattle Egret	*Bubulcus coromandus*	LC
69		Great Egret	*Ardea alba*	LC
70		Medium Egret	*Ardea intermedia*	LC
71		Gray Heron	*Ardea cinerea*	LC
72		Purple Heron	*Ardea purpurea*	LC
73		white egret sp.	*Egretta/Bubulcus/Ardea sp.*	LC
74		Glossy Ibis	*Plegadis falcinellus*	NE
75		Black-headed Ibis	*Threskiornis melanocephalus*	LC
	Vultures, Hawks, and Allies			
76		Black-winged Kite	*Elanus caeruleus*	LC
77		Shikra	*Accipiter badius*	LC
78		Black Kite	*Milvus migrans*	LC
79		Brahminy Kite	*Haliastur indus*	LC
	Hornbills			
80		Indian Gray Hornbill	*Ocyceros birostris*	LC

Conservation Significance: The urban lakes of Hosur are crucial for sustaining these waterbirds. The confirmed Near Threatened status of the Oriental Darter highlights the need for the ecological integrity of these wetlands to be maintained, as habitat degradation is the main threat to this species.

None of the 80 bird species listed are currently classified in a formal IUCN Threatened category (Vulnerable (VU), Endangered (EN), or Critically Endangered (CR)), The Oriental Darter (*Anhinga melanogaster*) is classified as NT, this species is close to qualifying for a threatened category due to threats such as habitat loss (draining bodies of water), human activities near breeding sites, and pollution. Change in status of Painted Stork and Black-headed Ibis in the IUCN Red List status for the other two major waterbirds has seen recent updates: The Black-headed Ibis (*Threskiornis melanocephalus*), previously listed as Near Threatened (NT), the current recommended categorisation is Least Concern (LC) due to increasing populations in India and South Asia and the Painted Stork (*Mycteria leucocephala*), this species is also currently classified as Least Concern (LC).

Table 4. List of the common freshwater fish species recorded in the lakes of Hosur

Sl. No	Scientific Name	Family	Common Name	IUCN Status
1	*Catla catla*	Cyprinidae	Catla	LC

Sl. No	Scientific Name	Family	Common Name	IUCN Status
2	*Cirrhinus mrigala*	Cyprinidae	Mrigal	LC
3	*Clarias batrachus*	Clariidae	Magur	LC
4	*Clarias gariepinus*	Clariidae	African catfish	LC
5	*Ctenopharyngodon idella*	Cyprinidae	Grass carp	LC
6	*Cyprinus carpio communis*	Cyprinidae	Common carp	VU
7	*Gambusia affinis*	Poeciliidae	Mosquito fish	LC
8	*Labeo fimbriata*	Cyprinidae	Fimbriatus	LC
9	*Labeo rohita*	Cyprinidae	Rohu	LC
10	*Oreochromis mossambicus*	Cichlidae	Tilapia	LC
11	*Oreochromis niloticus*	Cichlidae	Tilapia	LC
12	*Parambassis ranga*	Ambassidae	Indian glassy fish	LC

In the fish list, the conservation status in the context of both native and introduced populations was assessed. One species in the Hosur lakes is globally classified as Vulnerable (VU), a formal IUCN threatened category, the Common Carp (*Cyprinus carpio communis*): The native wild populations of this species are genuinely declining and are classified as Vulnerable. However, the carp found in the Hosur lakes is typically a domesticated variety introduced for aquaculture, which is globally abundant. Mozambique Tilapia (*Oreochromis mossambicus*), this species is classified as least common in these regions, but it is an invasive threat. In the Hosur urban lakes, the presence of these species poses an ecological risk, as many are highly invasive when introduced. The African Catfish (*Clarias gariepinus*) is a large, highly adaptable, and omnivorous predator that is widely introduced globally and can compete with and prey upon native fish. The Mosquito Fish (Gambusia affinis) is listed among the world's 100 worst invasive alien species by the IUCN Invasive Species Specialist Group. It was introduced for mosquito control, but is known to attack and prey on the eggs and juveniles of native fish and amphibians and it’s a major threat to the lakes in Hosur.

Tilapias (*O. mossambicus and O. niloticus*). Both species of Tilapia are widespread non-native fish introduced for food. They are known to displace native fish species through competition and over-colonisation. The most critical result for the Hosur lakes ecosystem is not the global "Threatened" status of the introduced species, but their local status as invasive species that compete with and potentially endanger the genuinely native Indian major carps like Catla, Mrigal and Rohu.

Annexure – 10a

Biodiversity Management Plan

The urban lakes of Hosur, located in the Krishnagiri district of Tamil Nadu, represent critical ecological assets that support remarkable biodiversity while serving multiple ecological functions. A comprehensive biodiversity assessment was conducted, and documented an impressive diversity of flora and fauna across these lake ecosystems. The biodiversity assessment has recorded:

- 247 plant species across water bodies (63 trees, 65 shrubs, 81 herbs, 33 climbers, 2 twiners, 1 grass, 1 vine and 1 bulb)
- 114 butterfly species from 6 families
- 80 bird species, including resident and migratory species
- 12 fish species in urban lakes
- 70 plant species in urban parks

Scheduled Species Management Plan

Legal Framework and Conservation Significance

The Wildlife Protection Act, 1972 (WPA), represents India's primary legislation for conservation of wild animals and plants. The Act categorizes species into different schedules based on their conservation status and protection needs, with Schedule I species receiving the highest level of protection equivalent to Schedule II of CITES (Convention on International Trade in Endangered Species). The IUCN Red List categorizes species into nine levels based on extinction risk, ranging from Not Evaluated (NE) to Extinct (EX). Key categories include Data Deficient (DD), Least Concern (LC), Near Threatened (NT), Vulnerable (VU), Endangered (EN), Critically Endangered (CR), Extinct in the Wild (EW), and Extinct (EX). Species listed as VU, EN, or CR are considered threatened. This status changes with geographical region and places.

Floral Conservation Analysis

The floral assessment identifies 247 species. While the majority (175 species) have not been evaluated (NE) and 64 are of Least Concern (LC), there are critical species requiring management.

Vulnerable (VU) Species: Four species are classified as Vulnerable, facing a high risk of extinction in the wild. These are *Acacia ferruginea DC (Rusty Acacia), Chloroxylon swietenia DC (Satinwood), Cleistanthus collinus (Roxb) (Benth. Garari) and Santalum album L. (Indian Sandalwood)*. *Santalum album* is under intense pressure from illegal harvesting. While rare along lake bunds due to theft, good populations exist within secured private industrial campuses in Hosur.

Near Threatened (NT) Species: *Aegle marmelos (L.) Corr Serr (Bael Tree)* is recorded as Near Threatened. Immediate intervention is required to prevent it from moving into a threatened category;

it is strongly recommended for inclusion in future plantation drives. Requires close monitoring and is recommended for plantation activities.

Scientific Name	Common Name	IUCN Status	Legal Status
Acacia ferruginea DC	Rusty Acacia	Vulnerable (VU)	-
Chloroxylon swietenia DC	Satinwood	Vulnerable (VU)	-
Cleistanthus collinus (Roxb)	Garari	Vulnerable (VU)	-
Santalum album L.	Indian Sandalwood	Vulnerable (VU)	-
Aegle marmelos	Bael Tree	Near Threatened	-

Butterfly Conservation Analysis

All documented species are classified as Least Concern (LC) by the IUCN, indicating stable global populations and the ability to thrive in diverse habitats. Local Legal Status (WPA 1972): There is a distinction between global IUCN status and Indian legal protection. Several species, such as the Crimson Rose (*Atrophaneura hector*), Danaid Eggfly (*Hypolimnas misippus*), and Common Pierrot (*Castalius rosimon*), were previously Schedule I but are now protected under Schedule II following the 2022 Amendment. These species receive high legal protection against hunting and trading, underscoring the need for a Biodiversity Management Plan even in the absence of Schedule I species.

While all 114 butterfly species are classified as Least Concern (LC) globally, three species are legally protected under Schedule II of the Wildlife (Protection) Amendment Act, 2022:

Species	Common Name	IUCN Status	Legal Protection
Atrophaneura hector	Crimson Rose	Least Concern	Schedule II
Hypolimnas misippus	Danaid Eggfly	Least Concern	Schedule II
Castalius rosimon	Common Pierrot	Least Concern	Schedule II

Schedule II protection requires mandatory preservation of butterfly habitats, specifically their larval host plants. Management activities, particularly vegetation clearing operations, must ensure these critical host plants are not destroyed.

Conservation of Crimson Rose requires protecting and enhancing populations of Aristolochia plants in lake sites. This climbing vine thrives along forest edges and in partially shaded areas. Current populations should be mapped and protected from disturbance. Seed collection from vigorous plants

should establish nursery stock for augmenting natural populations. Plantings should focus on forest edges, riparian zones, and lake perimeters where vines can climb into shrubs and small trees. Effective conservation of scheduled butterfly species requires systematic monitoring to track population trends, assess management effectiveness, and detect emerging threats. Monitoring should follow standardized protocols enabling comparison across sites and time periods, with data carefully documented to build long-term datasets. Maintain diverse vegetation in parks, as better maintenance increases flora and fauna diversity. Ensure parks contain a mix of trees, shrubs, and understory species to support these butterflies.

Avian Conservation Analysis

Of the 80 bird species recorded the Oriental Darter (Anhinga melanogaster) is classified as Near Threatened (NT). This species is threatened by habitat loss and pollution. Its presence necessitates the maintenance of wetland ecological integrity. The Painted Stork and Black-headed Ibis have moved from Near Threatened to Least Concern (LC) due to population recovery in South Asia. Once the wetlands and the habitat restoration is implemented, the bird population and diversity will increase, and the threats will be reduced.

Fish Diversity and Invasive Threats

Both Invasive and Vulnerable Species has been recorded, two species found in Hosur, Common Carp (Cyprinus carpio) are listed as Vulnerable (VU) by the IUCN in their native wild ranges. However, in Hosur, these are introduced, domesticated varieties that are globally abundant and invasive. The Tilapia, African Catfish (*Clarias gariepinus*), and Mosquito Fish (*Gambusia affinis*) are the invasive species.

Ecological Threat: The presence of Tilapia, African Catfish (*Clarias gariepinus*), and Mosquito Fish (*Gambusia affinis)* poses a severe risk to native biodiversity. Gambusia is listed among the world's 100 worst invasive species and preys on the eggs of native fish and amphibians. The Management Implicationis if the exotics are managed the native Indian major carps like Catla, Mrigal, and Rohu will thrive.

Management Strategies and Actions

Vulnerable Plant Species Protection - **Action Plan**

- Conduct detailed population surveys and GPS mapping of all four Vulnerable species (*Acacia ferruginea, Chloroxylon swietenia, Cleistanthus collinus, Santalum album*)
- Establish in-situ conservation zones around existing populations with clear demarcation and protective fencing where necessary
- Develop ex-situ propagation programs in partnership with botanical gardens and research institutions
- Implement enhanced protection for Sandalwood (Schedule III species), including regular patrolling, community watch programs, and prosecution of illegal harvesting

- Propagate and plant these species in suitable habitats, prioritizing Near Threatened Bael Tree in plantation activities
- Monitor population health, regeneration success, and threats every quarter

Protected Butterfly Species Habitat Management - Action Plan

- Identify and map larval host plants for Crimson Rose (*Atrophaneura hector*), Danaid Eggfly (*Hypolimnas misippus*), and Common Pierrot (*Castalius rosimon*)
- Develop vegetation management protocols that explicitly prohibit the removal of identified host plants
- Train field staff and contractors on host plant identification and legal protection requirements under Wildlife (Protection) Amendment Act, 2022
- Plant additional host plant species in parks and along water bodies to expand suitable habitat
- Establish butterfly-friendly nectar gardens in urban parks
- Conduct seasonal butterfly monitoring to track population trends

Bird Habitat Protection (Focus: Oriental Darter) - Action Plan

- Identify critical breeding and roosting sites for Oriental Darter and other waterbirds
- Establish seasonal access restrictions to minimize disturbance during breeding seasons
- Maintain and enhance perching and nesting substrates (dead snags, suitable trees) in key water bodies
- Improve water clarity and fish populations to support foraging success
- Conduct regular bird surveys to monitor population status and habitat use patterns

Invasive Species Control - Aquatic Plant Management

Control Strategy for Water Hyacinth and Other Invasive Macrophytes: Control Strategy for Water Hyacinth and Other Invasive Macrophytes:

- Implement mechanical removal programs with regular harvesting schedules during dry seasons
- Establish proper disposal systems for removed plant material (composting or biogas generation)
- Address root cause: reduce nutrient inputs through improved sewage treatment and prevention of domestic waste discharge
- Explore biological control options (e.g., weevils for Water Hyacinth) in consultation with environmental specialists
- Monitor water bodies monthly to track invasive species coverage and removal effectiveness
- Promote native submerged and emergent vegetation to outcompete invasives once nutrient levels are controlled

Invasive Fish Species Management Plan

- Conduct comprehensive fish surveys to map the distribution and population densities of all invasive species
- Develop targeted removal strategies using selective fishing methods (nets, traps) that minimize impact on native species
- Implement a strict prohibition on further introduction or stocking of invasive fish species
- Promote native fish species through controlled restocking programs focusing on Indian major carps

- Engage local fishing communities in invasive species removal with potential incentive programs
- Monitor fish population dynamics quarterly to assess control effectiveness

Habitat Restoration and Enhancement - Implementation Actions

- Develop site-specific riparian restoration plans for each major nallah and priority water bodies
- Plant native tree species along drainage channels and lake margins, prioritizing soil-binding species
- Use bioengineering techniques (vegetated gabions, coir logs, brush mattresses) for erosion control
- Establish continuous vegetated buffers (minimum 10m width where possible) along all water bodies
- Include grasses (particularly Typha angustifolia, where appropriate) for immediate stabilization
- Implement maintenance protocols for the first 3 years until vegetation is established

Native Vegetation Enhancement - Plantation Strategy

- Priority species: *Samanea saman, Pongamia pinnata, Delonix regia* (proven street trees), *Acacia chundra, Dalbergia lanceolaria, Gmelina arborea, Lagerstroemia speciosa, Mimusops elengi, Terminalia catappa, Simarouba glauca* (park species)
- Include Near Threatened Bael Tree (*Aegle marmelos*) in all plantation programs
- Propagate and plant Vulnerable species in protected sites
- Develop species-habitat matching guidelines ensuring the right species in the right locations
- Use locally sourced, genetically appropriate planting material
- Implement community tree planting events during monsoon seasons

Urban Park Enhancement – Actions

- Increase structural diversity through multi-layered vegetation (canopy, understory, shrub, herb layers)
- Establish butterfly gardens with native nectar plants and larval host plants
- Create micro-habitats including log piles, rock gardens, and water features
- Reduce chemical pesticide use; adopt integrated pest management approaches
- Install bird nesting boxes and perches where appropriate
- Improve maintenance practices to support biodiversity while maintaining recreational values

Community Engagement and Awareness

- Develop educational materials (brochures, posters, digital content) highlighting biodiversity values and conservation needs
- Organize regular nature walks, bird watching events, and butterfly surveys with community participation
- Establish interpretive signage at parks and water bodies explaining ecological features and species
- Launch social media campaigns during World Environment Day, World Wetlands Day, and other relevant occasions
- Partner with local media for biodiversity awareness coverage
- Develop age-appropriate biodiversity curriculum modules for integration into environmental studies
- Organize field trips to parks and water bodies for hands-on learning

- Establish school biodiversity clubs and youth conservation groups
- Conduct eco-art competitions, essay contests, and photography competitions
- Support student research projects on local biodiversity

Institutional Strengthening - Capacity Building

- Establish dedicated biodiversity management unit within HCMC with qualified staff
- Provide specialized training for field staff on species identification, habitat management, and legal requirements
- Develop partnerships with research institutions, NGOs, and biodiversity experts
- Allocate adequate budget for biodiversity management activities annually
- Integrate biodiversity considerations into urban planning, EIA processes, and development approvals
- Establish inter-departmental coordination mechanisms for holistic management

MUNICIPAL ADMINISTRATION AND WATER SUPPLY DEPARTMENT

From

Thiru. Md Sulaiman Alam, I.A.S.,
Commissioner,
Hosur City Municipal Corporation,
Krishnagiri District.

To

The Chief Engineer,
Water Resources Department (WRD),
Chennai Region, Chepauk, Chennai – 600 005.

Rc. No. E1/3033/2024. Dated: April 2025

Sub: Hosur (SWD – Hosur City Municipal Corporation - Preparation of Detailed Project Report (DPR) for providing Integrated Storm Water Drains (ISWD) for Hosur City Municipal Corporation – Request for issue of No Objection Certificate – Raja kalvai from Chenja Lake to Chinnar River, Raja kalvai from Kannavar Eri to Anthivadi/Veerasagaram Eri, Chenga/Chandrachennapal Lake and Shanthee Ram Lake Behind Leyland Unit-1 - Reg.

Ref: 1. Lr. No. WA/SWP-1/3033/2024, Hosur, dated: 25.07.2024
2. Agreement for the work is signed on 12.03.2024.
3. Draft Final Report submitted to WRD, dated 01.08.2025.

Hosur is a growing town located in Krishnagiri District in the state of Tamil Nadu located at 882 above MSL. The city has a population of about 4 lakhs, spread over 72.41 sq.km. The city is one which is one of the fastest growing cities of South India with several large, medium and small industries setting their fabrication units in the city.

There are several risks that can pose a threat to the city's growth. A case in point is the unprecedent flooding of the city due to heavy rains in October 2022 and October2023. Also during the rainy season, there is a constant threat of the highway roads and their service roads getting inundated because of inadequate network of the storm water drains. The city lacks a network of storm water drains that could take rainwater/storm water into waterways in a scientific manner.

Hence, there is a need for an integrated storm water drainage system in the city that can make the city resilient to face heavy downpours, which only seem like norm with climate change.

In this regard, there is an Integrated Storm Water Drain(ISWD) Master Plan and Detailed project report has prepared by the consultant which was appointed by Director of Municipal Administration (DMA) through M/s Tamil Nadu Urban Infrastructure Financial Services Limited (TNUIFS), Chennai. As a part of the DPR, it is suggested to rehabilitate all water bodies(28 nos) and Major Nallah (57.12 km) including cross-drainage as Raja Kaliel according to the designed size of Nallah considering extreme rainfall condition and climate change.

Out of 28 Water bodies and 57.12 km of Rajakaliel, Dhargal(Dandatirtha) Lake (1 no), Dhalithar Rao Lake Ashok Leyland Unit-I (1No), 2.30 km of Raja Kaliel from Dhargal(Dandatirtha) to Chinnar River and 1.0 km of Raja Kaliel(Pothi Kannan Eri to Anthivadi/Veerarajapuram Eris owned by Water Resource Department.

The Detailed Project Report is under final stage and planning to appointed funding agency to execute the works. Hence, we are requesting to issue the No Objection Certificate to the Hosur Municipal Corporation for the above-mentioned components to implement the same.

Commissioner,
Hosur City Municipal Corporation

Copy
1. Executive Engineer, Upper Pennaiyar Basin, Dharmapuri
2. Assistance Executive Engineer, WRD, Hosur

ANNEXURE 12

SAMPLE OUTLINE TRAFFIC MANAGEMENT PLAN

A. Principles for Traffic Management Plan (TMP)

• One of the prime objectives of this TMP is to ensure the safety of all the road users along the work zone and to address the following issues.

(i) the safety of pedestrians, bicyclists, and motorists travelling through the construction zone

(ii) protection of work crews from hazards associated with moving traffic

(iii) mitigation of the adverse impact on road capacity and delays to the road users

(iv) maintenance of access to adjoining properties

(v) addressing issues that may delay the project.

B. Operating Policies for TMP

• The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

(i) Make traffic safety and temporary traffic control an integral and high-priority element of project from planning through design, construction, and maintenance.

(ii) Inhibit traffic movement as little as possible.

(iii) Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.

(iv) Inspect traffic control elements routinely, both day and night, and make modifications when necessary.

(v) Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.

(vi) Train all persons that select, place, and maintain temporary traffic control devices.

(vii) Keep the public well informed.

(viii) Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

C. Analyze the impact due to street closure

• Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

(i) approval from the ULB/Water resources department (WRD) to use the local streets as detours

(ii) consultation with businesses, community members, traffic police, WRD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction

(iii) determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents

(iv) determining if additional traffic control or temporary improvements are needed along the detour route

(v) considering how access will be provided to the worksite

(vi) contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations

(vii) developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

• If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the detour street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

Policy Steps for the Traffic Management Plan

D. Public awareness and notifications

- As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

- The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

- The PIU will also conduct an awareness campaign to educate the public about the following issues:

  i) traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.)
  (ii) defensive driving behaviour along the work zones and
  (iii) reduced speeds enforced at the work zones and traffic diversions.

• It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

• The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the PIU, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

  (i) explain why the brochure was prepared, along with a brief description of the project
  (ii) advise the public to expect the unexpected
  (ii) educate the public about the various traffic control devices and safety measures adopted at the work zones
  (iv) educate the public about the safe road user behaviour to emulate at the work zones
  (v) tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person and

(vi) indicate the office hours of relevant offices.

E. Install traffic control devices at the work zones and traffic diversion routes

• The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- Warning Lights

• Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary "STOP" and "GO").

The following Figureillustrates a typical set-up for installing traffic control devices at the work zone of the area, depending on the location of work on the road way, and road geometrics:

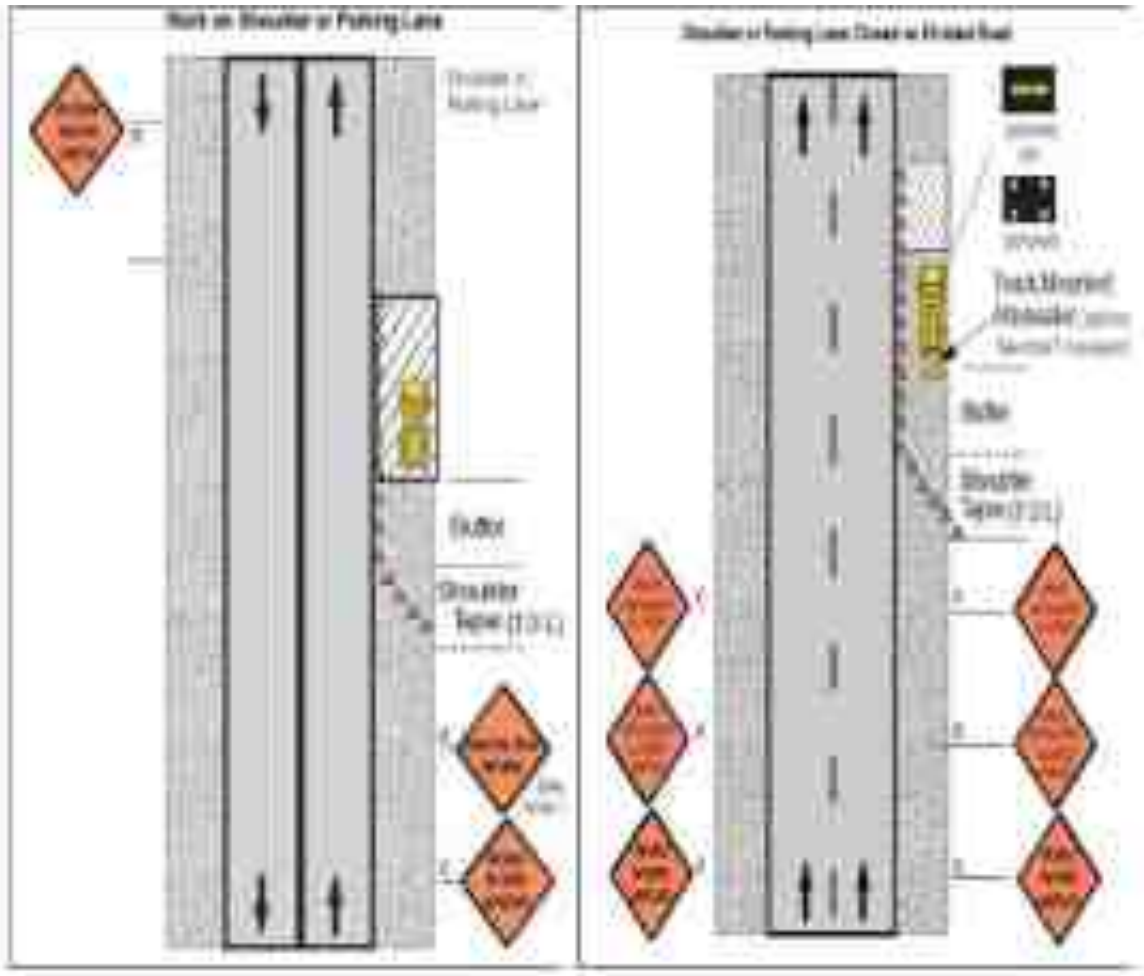
- Work on shoulder or parking lane
- Shoulder or parking lane closed on divided road
- Work in Travel Lane
- Lane closure on road with low volume
- Street closure with detour

• The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

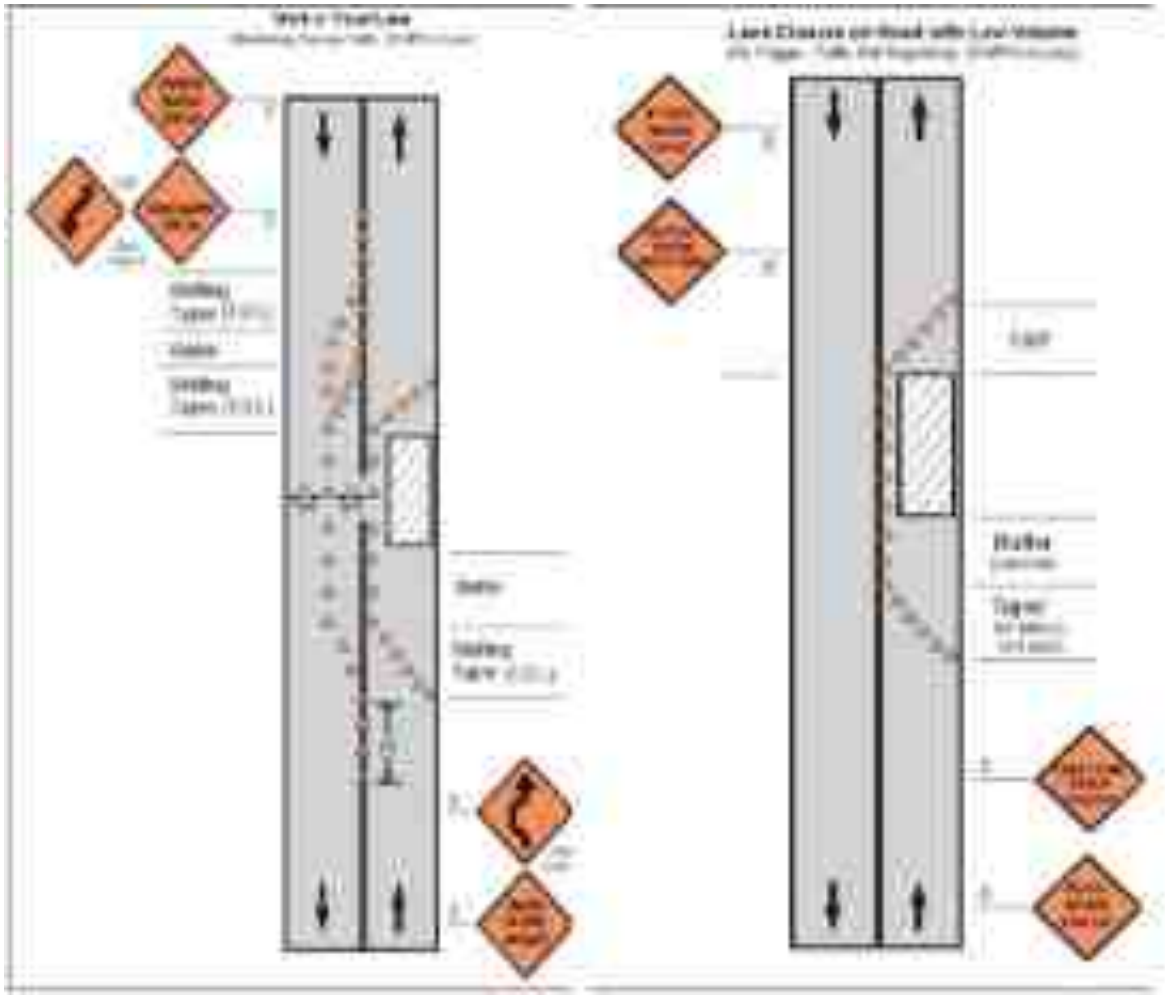
• Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flagggers/ personnel should be equipped

with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

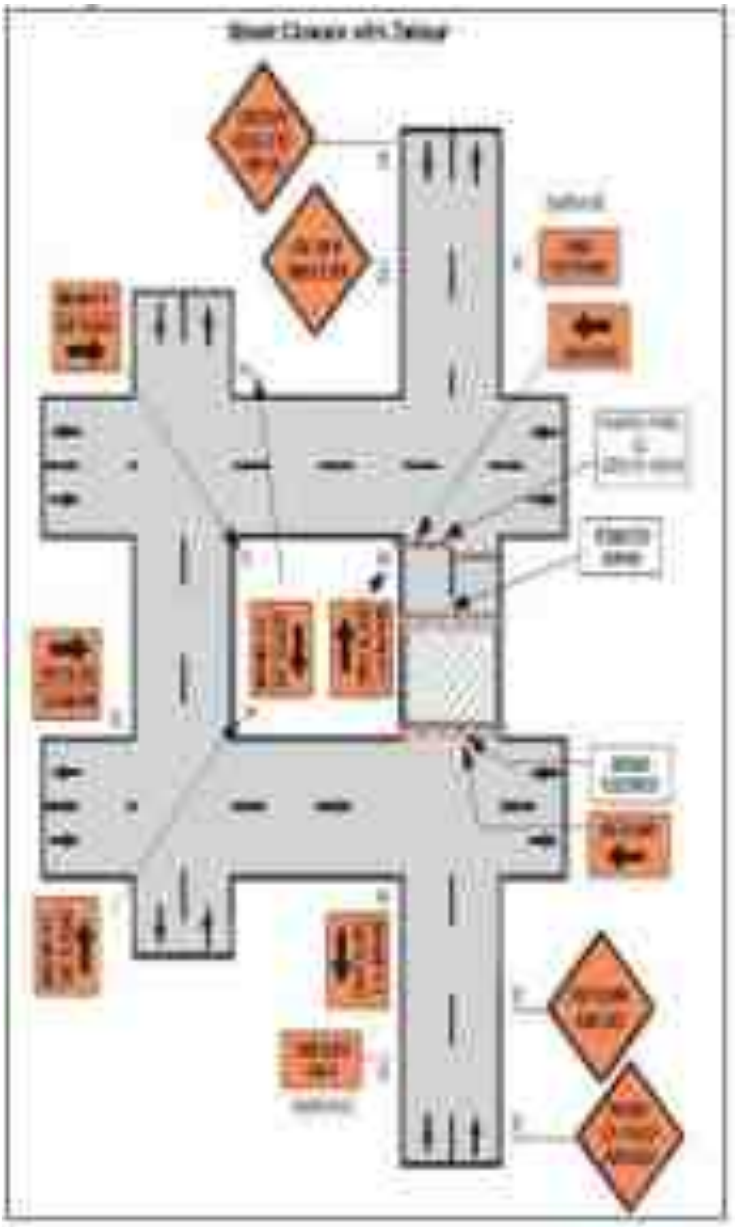
• In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.



Work on Shoulder or Parking Lane and Shoulder or Parking Lane Closed on Divided Road



Work in Travel Lane and Lane Closure on Road with Low Volume



Street Closure with Detour

Annexure – 13

Environmental Montioning Test Results

Surface Water – Test Result

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ULR NO: TC129862400217000F	SAMPLE NO : SW-01	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000007594
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	303, Level – IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai – 600029.
Sample Described by the Customer*	:	SURFACE WATER –Avalapalli – Avalapalli Eri (Chinna Eri) bund-1
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited – Hosur
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.22
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	7.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BQL(LOQ- 2.0)
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	28.14
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	150.20
6	Turbidity	IS 3025(P-10):2023	NTU	1.06
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1560.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQL(LOQ-0.1)
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	2.86
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	13.64
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	3.05
12	Iron as Fe	IS 3025(P-53):2003	mg/L	0.15
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	550.0
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.44
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.86

Authorised Signatory

"Continue..."

Chennai (HO &Lab): Plot no.A-10, Electronic By Electronic Estate, New SIDCO Industrial Estate, Chennai - 600 105
Lab: Hosur - Plot no. 108, (New) SIPCOT Industrial Estate, Perandapalli, Hosur - 635 109, Tamil Nadu
Mobile: 9884019887, 9884019881 | Email : info@nawallabs.com

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ULR NO: TC129962x000170937 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	140.28
17	Salinity at 250° C	NAL/SOP/W/091	ppt	<1.0
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.088
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.20
20	Orthophosphate	USEPA-365.3-1993	mg/L	0.74
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	16.48
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BLQ(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BLQ(LOQ-0.5)

Disclaimer:

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For NAWaL Analytical Labs India Private Limited

Authorized Signatory
R.Chakravarthi
Environment Engineer

End of Report

Bengal CHR (Kolkata): Plot no.16, Electronics Complex, New SIDCO Industrial Estate, Chennai - 600116
Labs (Kolkata): Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
044 - 26161967, 26161968 | Mail : (name_mail@nawalabs.com)

CIN :U71200TZ2023PTC029607

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ULR NO: TC129862100217094F	SAMPLE NO : SW-02	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000779S
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level – IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai – 600025.
Sample Described by the Customer*	:	SURFACE WATER – Ambattur – Mayil Ravanan Eri (north) – 2
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited – Hosur
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.56
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	17.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	3.0
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	9.08
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	40.67
6	Turbidity	IS 3025(P-10):2023	NTU	2.60
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1582.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	DL[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	2.74
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	9.66
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	2.91
12	Iron as Fe	IS 3025(P-53):2003	mg/L	2.21
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	571.19
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	2.24
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.36

Authorised Signatory

"Continue..."

Chennai (HO &Lab): Plot no.313, Ground & First Floor, New SIDCO Industrial Estate, Ambattur, Chennai – 600 098
Hosur Lab: Plot no. 108, New SIPCOT Industrial Estate, Attibele, Hosur – 635 109, Tamil Nadu
044-26581717, 9884041717 | www.nawal.co.in | info@nawal.co.in

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ULR NO: TC129862000170967 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	101.92
17	Salinity at 250° C	NAL/SOP/W/051	mg/L	<1.0
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.04
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.24
20	Orthophosphate	USEPA 365.3- 1993	mg/L	0.63
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	12.68
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BLQ(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/122	mg/L	BLQ(LOQ-0.5)

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For NAWaL Analytical Labs India Private Limited

Authorized Signatory
R.Chakravarthi
Environment Engineer

End of Report

Bengal Unit (Kolkata): Plot no.16, Electronic Complex, New SIDCO Industrial Estate, Chennai - 600116
Kolkata: Plot no. 10/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884847 [illegible] | Mail : [illegible]

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ULR NO: TC129962100217005F	SAMPLE NO : SW-03	Date: 26/07/2024

Sample ID No	:	NAL/2024080EW/00007796
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	303, Level – IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai – 600025.
Sample Described by the Customer*	:	SURFACE WATER – Anakapalli – Venkatagiri Eri [Bund] –3
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited – Hosur
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022		7.84
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	58.15
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	22.7
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	79.84
6	Turbidity	IS 3025(P-10):2023	NTU	1.56
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1414.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	1.16
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	46.04
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	1.42
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	550.0
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.42
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.72

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ULR NO: TC129962x000170957 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	162.98
17	Salinity at 250° C	NAL/SOP/W/051	ppt	1.10
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.33
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.92
20	Orthophosphate	USEPA 365.3 - 1993	mg/L	0.56
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	31.95
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BLQ(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BLQ(LOQ-0.5)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environment Engineer

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129862400216775F	SAMPLE NO : SW-04	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000729Z
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	SURFACE WATER [Cheruvathur - Renavakottai Eri -04]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 23/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.50
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	1.12
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	3000
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	BLQ[LOQ-1.0]
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	1115.20
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	2.06
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	BLQ[LOQ-1.0]

Authorised Signatory

Continue...*

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Labs. Add.: Plot no. 108, 26th SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu.
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ULR NO: TC129962x000167757 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(R-13)-2022	mg/L	82.50
17	Salinity at 250° C	NAL/SOP/W/051	ppt	<1.0
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.08
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.12
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.06
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	5.81
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.5)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Balamurali
Environment Engineer

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129862100217096F	SAMPLE NO : SW-05	Date: 26/07/2024

Sample ID No : NAL/2024080W/00007797
Discipline / Group : Chemical / Pollution & Environment
Name of the Customer* : Keyards Solutions Pvt. Ltd.
Address : 303, Level - IV, Diamond Point, Poonamallee High Road,
Amrutham, Chennai - 600029.
Sample Described by the Customer* : SURFACE WATER – Chemmathur – Krishnasamy Rd (Look India Opp)–S
Quantity of the Sample Received : 2 Ltr
Condition on Receipt : Fit for Analysis
Requested By* : Mr. Subhash Raman
Information about Sampling : Drawn by NAWaL Analytical Labs India Private Limited - Hosur
Customer Reference : By letter Dated 25/06/2024
Date of Sample Receipt : 25/06/2024
Date of test Starting : 25/06/2024
Date of test Completed : 08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.80
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	128.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	4.0
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	81.72
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	255.40
6	Turbidity	IS 3025(P-10):2023	NTU	4.77
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1126.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQL(LOQ-0.1)
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	1.15
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	110.84
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	1.39
12	Iron as Fe	IS 3025(P-53):2003	mg/L	1.04
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	261.16
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.26
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.61

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Continue...*

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ULR NO: TC129862x000170967 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	186.07
17	Salinity at 250° C	NAL/SOP/W/051	ppt	<1.0
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.24
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.38
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.68
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	115.11
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.5)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhakaravathi
Environment Engineer

End of Report

Bengal Off (Add.): Plot no.16, Electronics Complex, New SIDCO Industrial Estate, Chennai - 600116
Labs. Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884847 [illegible]

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ULR NO: TC129862400217097F	SAMPLE NO : SW-06	Date: 26/07/2024

Sample ID No	:	NAL/2024080EW0000007596
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	303, Level – IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai – 600029.
Sample Described by the Customer*	:	SURFACE WATER – Zamanadi – Venkatesan Eri near Uplink layout (Anamepalli) -6
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited – Hosur
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.51
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	1320
3	Oil & Grease	IS 3025(P-39):2021	mg/L	40
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	7264
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	27040
6	Turbidity	IS 3025(P-10):2023	NTU	65.25
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	2650.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQL(LOQ-0.1)
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	2.02
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	88.10
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	3.12
12	Iron as Fe	IS 3025(P-53):2003	mg/L	1.15
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	527.80
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.86
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	3.52

Authorised Signatory

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ULR NO: TC129862x000170977 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	305.69
17	Salinity at 250° C	NAL/SOP/W/091	ppt	1.50
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.08
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.36
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.62
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	91.66
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.5)

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For NAWaL Analytical Labs India Private Limited

Verified by
G Thangamani
Scientist

Authorised Signatory
R Chakravarthi
Environment Engineer

End of Report

Bengal CHE (Kolkata): Plot no.16, Electronics & Electronics Complex, New SIDCO Industrial Estate, Chinar - 712311 (W.B.)
Labs (Kolkata): Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
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CIN :U71200TZ2023PTC029607

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UIR NO: TC129962A032170968	SAMPLE NO : SW-07	Date: 26/07/2024

Sample ID No : NAL/2024080EW0000779
Discipline / Group : Chemical / Pollution & Environment
Name of the Customer* : Keyants Solutions Pvt. Ltd.
Address : 303, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600029.
Sample Described by the Customer* : SURFACE WATER – Eraiyanadi – Santhapuram Rd -7
Quantity of the Sample Received : 2 Ltr
Condition on Receipt : Fit for Analysis
Requested By* : Mr. Subhash Raman
Information about Sampling : Drawn by NAWaL Analytical Labs India Private Limited - Hosur
Customer Reference : By letter Dated 25/06/2024
Date of Sample Receipt : 25/06/2024
Date of test Starting : 25/06/2024
Date of test Completed : 08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.48
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	14.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BQ[LOQ- 2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	7.20
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	36.70
6	Turbidity	IS 3025(P-10):2023	NTU	BQ[LOQ- 0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	2098.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	2.62
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	9.14
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	2.80
12	Iron as Fe	IS 3025(P-53):2003	mg/L	0.16
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	512.17
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.76
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.76

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ULR NO: TC129862x000170907 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	211.08
17	Salinity at 250° C	NAL/SOP/W/051	mg/L	1.40
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.21
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.29
20	Orthophosphate	USEPA 365.3- 1993	mg/L	0.17
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	12.57
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.3)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environment Engineer

End of Report

Bengal Off (Add.): Plot no.16, Electronics Complex, New SIDCO Industrial Estate, Chennai - 600116
Labs. Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884687 88841 | Mail : (name_mail@nawalabs.com)

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400016875F	SAMPLE NO : SW-08	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000704S
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Vayam Solutions Pvt. Ltd.
Address	:	324, Level – IV, Diamond Dune, Poonamallee High Road, Ambujkhmi, Chennai – 600029
Sample Described by the Customer*	:	SURFACE WATER [Mochandapalli Sothuranan Eri - 08]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.89
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	146.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	3.0
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	27.24
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	129.74
6	Turbidity	IS 3025(P-10):2023	NTU	14.57
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1758.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQL(LOQ-0.1)
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	0.95
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	47.18
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	1.15
12	Iron as Fe	IS 3025(P-53):2003	mg/L	0.19
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	497.68
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.46
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.30

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Continue...*

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ULR NO: TC129962x000167757 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I):2022	mg/L	178.32
17	Salinity at 250° C	NAL/SOP/W/051	ppt	1.20
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1):2022	mg/L	0.07
19	Phosphate as PO4	IS:3025(P-31)(sec-1):2022	mg/L	0.13
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.72
21	Total Nitrogen	IS:3025(P-34)(sec-1):2022	mg/L	50.52
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1):2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.1)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhakaravathi
Environment Engineer

End of Report

Bengal Off (Add.): Plot no.16, Electronics Complex, New SIDCO Industrial Estate, Chennai - 600116
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ULR NO: TC129962400216625F	SAMPLE NO : SW-09	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000750
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Voyants Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	SURFACE WATER [EAVIHA ERI NEAR TVS COMPANY KOTTUR ERI SL.No:09]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited - Hosur
Customer Reference	:	By Letter Dated 26/06/2024
Date of Sample Receipt	:	26/06/2024
Date of test Starting	:	26/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.12
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	28.0
3	Oil and grease	IS 3025(P-39):2021	mg/L	BQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	9.86
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	47.36
6	Turbidity	IS 3025(P-10):2023	NTU	3.82
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	0580
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34/sec2):2021	mg/L	2.86
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	16.48
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	3.05
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	312.80
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.16
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.56

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ULR NO: TC129962x000166557				Date: 06/07/2024
S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2021	mg/L	99.10
17	Salinity at 250° C	NAL/SOP/W/051	ppt	<1.0
18	Dissolved Phosphate as P	IS:3025(P-31)(sec-1)-2022	mg/L	0.17
19	Total phosphorus (P)	IS:3025(P-31)(sec-1)-2022	mg/L	0.24
20	Orthophosphate	USEPA 365.3- 1993	mg/L	BLQ(LOQ-0.01)
21	Total nitrogen (N)	IS:3025(P-34)(sec-1)-2021	mg/L	BLQ(LOQ-0.5)
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BLQ(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BLQ(LOQ-0.5)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhakaravathi
Environment Engineer

End of Report

Bengal Off (Add.): Plot no.16, Electronics Complex, New SIDCO Industrial Estate, Guindy, Chennai - 600 032
Labs (Add.): Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
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ULR NO: TC129862x032170000F	SAMPLE NO : SW-10	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000780
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	303, Level – IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai – 600025.
Sample Described by the Customer*	:	SURFACE WATER – Kalingarajapuram Pond – 10
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited – Hosur
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022		7.56
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	12.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BDL[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	7.20
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	24.29
6	Turbidity	IS 3025(P-10):2023	NTU	2.27
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1120.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BDL[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	3.82
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	12.30
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	4.66
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BDL[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	152.80
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	1.86
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.16

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Certified by OHSAS 18001:2007, Notified by FSSAI, Associate Member IOPEPC & Recognized by MoEF

ULR NO: TC129962x000170907 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	178.80
17	Salinity at 250° C	NAL/SOP/W/091	ppt	1.20
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.02
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.01
20	Orthophosphate	USEPA 365.5- 1985	mg/L	0.04
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	18.50
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.1)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhanavathi
Environment Engineer

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400217100F	SAMPLE NO : SW-11	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000782I
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	323, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	SURFACE WATER – Sri Chandra Sudeshwar Kovil (Therpettai Street) – Thoppukadavu - 11
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited - Hosur
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.80
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	24.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BDL[LOQ- 2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	63.92
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	99.80
6	Turbidity	IS 3025(P-10):2023	NTU	15.04
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	3998.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BDL[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	2.74
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	18.47
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	2.50
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BDL[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	1135.39
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	1.12
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.74

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Continue...*

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ULR NO: TC129962x000171007 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	948.12
17	Salinity at 250° C	NAL/SOP/W/051	ppt	2.50
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.03
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.18
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.04
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	21.99
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.5)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhakaravathi
Environment Engineer

End of Report

Bengal CHE (Add.): Plot no.16, Electronic Complex, New SIDCO Industrial Estate, Chennai - 600 032
Lab. Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
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ULR NO: TC129962400216529F	SAMPLE NO : SW-12	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000730S
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	303, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600029.
Sample Described by the Customer*	:	SURFACE WATER (plagueshedwater 12)
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.81
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	3070
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34/sec2):2021	mg/L	5.14
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	1595.71
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.21
15	Nitrate as NO3	IS 3025(P-34/sec2):2021	mg/L	1.62

Authorised Signatory

"Continue..."

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ULR NO: TC129962x000165207 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(R13):2022	mg/L	72.04
17	Salinity at 250° C	NAL/SOP/W/051	ppt	<1.0
18	Dissolved Phosphate as P	IS:3025(P-31)(sec2):2022	mg/L	BLQ[LOQ-0.05]
19	Total phosphorous (P)	IS:3025(P-31)(sec2):2022	mg/L	BLQ[LOQ-0.05]
20	Orthophosphate	USEPA 365.3- 1993	mg/L	BLQ[LOQ-0.05]
21	Total nitrogen (N)	IS:3025(P-34)(sec4):2021	mg/L	6.97
22	Nitrite as NO2	IS:3025(P-34)(sec4):2021	mg/L	BLQ[LOQ-0.01]
23	Chlorophylls	NAL/SOP/W/120	mg/L	BLQ[LOQ-0.5]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhakaravathi
Environment Engineer

End of Report

Bengal CHE (Kolkata): Plot no.16, Electronics Complex, New SIDCO Industrial Estate, Chennai - 600 105
Labs, Kolkata - Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 105, Tamil Nadu
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ULR NO: TC129962400217101F	SAMPLE NO : SW-13	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000782C
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	303, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	SURFACE WATER -Dhanga Chandrambigai Lake - 13
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited - Hosur
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.47
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	6.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ- 2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	BLQ[LOQ- 2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	10.91
6	Turbidity	IS 3025(P-10):2023	NTU	1.56
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1940.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ- 0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	7.06
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ- 0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	0.12
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	559.20
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.52
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.54

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ULR NO: TC129962x000171017 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	161.20
17	Salinity at 250° C	NAL/SOP/W/051	ppt	1.10
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.18
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.42
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.94
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	10.15
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	1.50

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environment Engineer

End of Report

Bengal Off (Add.): Plot no.148, Electronics Complex, New SIDCO Industrial Estate, Chennai - 600116
Labs. Add.: Plot no. 148, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884847 [illegible]

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400016892F	SAMPLE NO : SW-14	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000070042
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	324, Level – IV, Diamond Dune, Poonamallee High Road, Ambujkkarai, Chennai – 600029
Sample Described by the Customer*	:	SURFACE WATER [Dhudhur Raz Lake - 14]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.01
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	19.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BQL[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	9.08
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	43.65
6	Turbidity	IS 3025(P-10):2023	NTU	1.10
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1362.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQL[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	0.78
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	10.35
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	0.95
12	Iron as Fe	IS 3025(P-53):2003	mg/L	0.57
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	394.20
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.31
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.93

Authorised Signatory

"Continue..."

Nangal CHE Addl.: Plot no.148, Electronic Complex, Near SIDCO Industrial Estate, Chennai - 600113
Lab: Addl.: Plot no. 108, Door: 5/2621 Industrial Estate, Perundurai, Erode - 638 052, Tamil Nadu
Mobile: 9894[illegible] | Email: [illegible]

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ULR NO: TC129962x000167757 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	198.22
17	Salinity at 250° C	NAL/SOP/W/051	ppt	<1.0
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.58
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.46
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.76
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	13.38
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.5)

Disclaimer:

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhakaravathi
Environment Engineer

End of Report

Bengal Off (Add.): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Chennai - 600116
Labs. Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884847 [illegible] | Mail : [illegible]

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216477F	SAMPLE NO : SW-15	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000743S
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	303, Level – IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai – 600029.
Sample Described by the Customer*	:	SURFACE WATER [AVALAPALLI –BARGAR DIS SL NO 10]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By letter Dated 23/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	–	6.94
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	38.0
3	Oil and grease	IS 3025(P-39):2021	mg/L	BQ[LOQ- 2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	13.62
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	60.29
6	Turbidity	IS 3025(P-10):2023	NTU	18.60
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1010
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34/sec2):2021	mg/L	2.87
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34/sec4):2021	mg/L	11.94
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	3.06
12	Iron as Fe	IS 3025(P-53):2003	mg/L	2.06
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	317.80
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.19
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.47

Authorised Signatory

Continue...*

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ULR NO: TC129962x000164777 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(R13):2022	mg/L	91.32
17	Salinity at 250° C	NAL/SOP/W/051	ppt	<1.0
18	Dissolved Phosphate as P	IS:3025(P-31)(sec2):2022	mg/L	0.21
19	Total phosphorus (P)	IS:3025(P-31)(sec2):2022	mg/L	0.28
20	Orthophosphate	USEPA 365.3 - 1978	mg/L	BLQ(LOQ-0.05)
21	Total nitrogen (N)	IS:3025(P-34)(sec4):2021	mg/L	14.31
22	Nitrite (as NO2)	IS:3025(P-34)(sec3):2021	mg/L	BLQ(LOQ-0.01)

Disclaimer:

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400016322F	SAMPLE NO : SW-16	Date: 26/07/2024

Sample ID No	:	NAL/2024080WA0000TGTS
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Vayuzh Solutions Pvt. Ltd.
Address	:	324, Level – IV, Diamond Dune, Poonamallee High Road, Ambujkhetri, Chennai – 600029
Sample Described by the Customer*	:	SURFACE WATER (Pathalamman - 16)
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.24
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	31.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	BLQ[LOQ-0.20]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	8.10
6	Turbidity	IS 3025(P-10):2023	NTU	1.12
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	908.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	1.56
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	21.84
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	288.80
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.22
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.56

Authorised Signatory

"Continue..."

Chennai (HO &Lab): Plot no.318, Electronic Complex, New SIDCO Industrial Estate, Chennai - 600105
Lab: Plot no. 105, New SIDCO Industrial Estate, Ambattur, Chennai - 600 105, Tamil Nadu

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ULR NO: TC129962x000167757 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I):2022	mg/L	95.21
17	Salinity at 250° C	NAL/SOP/W/051	ppt	<1.0
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1):2022	mg/L	1.25
19	Phosphate as PO4	IS:3025(P-31)(sec-1):2022	mg/L	1.33
20	Orthophosphate	USEPA-365.3-1993	mg/L	0.89
21	Total Nitrogen	IS:3025(P-34)(sec-1):2022	mg/L	7.74
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1):2021	mg/L	1.56
23	Chlorophylls	NAL/SOP/W/120	mg/L	BLQ(LOQ-0.5)

Disclaimer:
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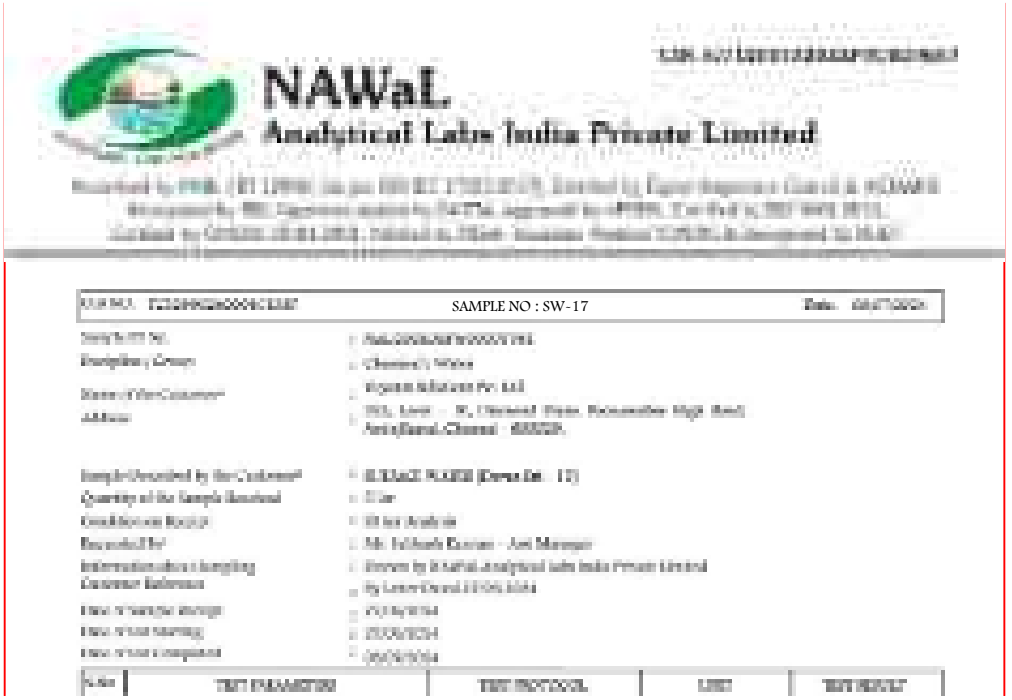
For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhakaravathi
Environment Engineer

End of Report

Unit-I (Regd. Office): Plot no.1/B, Electronics Complex, Near SIDCO Industrial Estate, Guindy, Chennai - 600 032
Unit-II: Plot no. 1/D, Near SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
044 - 22350107, 22350108 | Mail : enquiry@nawal.co.in



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SAMPLE NO : SW-17

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ULR NO: TC129962x000167757 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(R-13)-2022	mg/L	132.24
17	Salinity at 250° C	NAL/SOP/W/051	ppt	<1.0
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.32
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.13
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.71
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	21.29
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	1.14
23	Chlorophylls	NAL/SOP/W/120	mg/L	BLQ(LOQ-0.5)

Disclaimer:
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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environment Engineer

End of Report

Bengal Off (Add.): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Chennai - 600116
Labs. Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
044 - 26161617, 26161618 | Mail : (name_mail@nawalindia.com)

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ULR NO: TC129962400016025F	SAMPLE NO : SW-18	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000070862
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Voyanti Solutions Pvt. Ltd.
Address	:	324, Level – IV, Diamond Dune, Poonamallee High Road, Ambujkhemi, Chennai – 600029
Sample Described by the Customer*	:	SURFACE WATER [Venkatappan Rt – 18]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.59
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	640
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BQL[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	14.32
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	49.50
6	Turbidity	IS 3025(P-10):2023	NTU	0.75
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	11980
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQL[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	0.36
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	2.144
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	0.44
12	Iron as Fe	IS 3025(P-53):2003	mg/L	0.56
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	463.19
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.47
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.84

Authorised Signatory

"Continue..."

Bengal Off Addl.: Plot no.148, Electronic Complex, Near SIDCO Industrial Estate, Chennai - 600113
Labs. Addl.: Plot no. 108, Door No.2/2C1 Industrial Estate, Perungudi, Chennai - 600 096, Tamil Nadu

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ULR NO: TC129962x000167757 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I):2022	mg/L	182.09
17	Salinity at 250° C	NAL/SOP/W/051	ppt	1.10
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1):2022	mg/L	0.08
19	Phosphate as PO4	IS:3025(P-31)(sec-1):2022	mg/L	0.18
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.06
21	Total Nitrogen	IS:3025(P-34)(sec-1):2022	mg/L	20.67
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1):2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.5)

Disclaimer:

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhakaravathi
Environment Engineer

End of Report

Bengal Off (Add.): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Chennai - 600116
Labs. Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
044 - 26161617, 26161618 | Mail : (name_mail@nawalabs.com)

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400016533F	SAMPLE NO : SW-19	Date: 26/07/2024

Sample ID No	:	NAL/2024080WA0000T592
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Voyanti Solutions Pvt. Ltd.
Address	:	324, Level – IV, Diamond Dune, Poonamallee High Road, Ambujkhetri, Chennai – 600030
Sample Described by the Customer*	:	SURFACE WATER [Mochandapalli – Lakshmanan Eri – 20]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.48
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	6.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	3.0
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	9.8
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	60.80
6	Turbidity	IS 3025(P-10):2023	NTU	17.05
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	623.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQL(LOQ-0.1)
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	0.86
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	17.65
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	1.05
12	Iron as Fe	IS 3025(P-53):2003	mg/L	0.14
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	163.41
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.22
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.38

Authorised Signatory

Continue...*

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Trichy Address: Plot no. 108, New SIDCO Industrial Estate, Ariyalur, Trichy – 620 010, Tamil Nadu
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ULR NO: TC129962x000167757 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	78.22
17	Salinity at 250° C	NAL/SOP/W/091	ppt	<1.0
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.12
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.17
20	Orthophosphate	USEPA-365.3-1993	mg/L	0.08
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	23.10
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.08)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.3)

Disclaimer:

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For NAWaL Analytical labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environment Engineer

End of Report

Bengal CHR (Kolkata): Plot no.16B, Electronics Complex, New SIDCO Industrial Estate, Chennai - 600116
Labs, Kolkata - Plot no. 16B, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
044 - 26161967, 26161968 | Mail : (name_mail@nawalindia.com)

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ULR NO: TC129962400216552F	SAMPLE NO : SW-20	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000756
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	303, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	SURFACE WATER (Kannamoyan EPI 21)
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11) : 2022		7.84
2	Total Suspended Solids	IS 3025(P-17) : 2022	mg/L	8.0
3	Oil and grease	IS 3025(P-39) : 2021	mg/L	BQ[LOQ- 2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44) : 2023	mg/L	BQ[LOQ- 2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58) : 2023	mg/L	12.03
6	Turbidity	IS 3025(P-10):2023	NTU	BQ[LOQ- 0.5]
7	Total Dissolved Solids	IS 3025(P-16) : 2023	mg/L	1243.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/l	BQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34 / Sec 2) : 2021	mg/L	2.54
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34) :1988	mg/L	6.82
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	2.41
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32) :1988	mg/L	457.89
14	Fluoride as F	IS 3025(P-60/Sec 2) : 2022	mg/L	0.52
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.86

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ULR NO: TC129962x000165627 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 6328(P- 24) 30(1)- 2022	mg/L	112.81
17	Salinity at 250° C	NAL/SOP/W/051	ppt	<1.0
18	Dissolved Phosphate as P	IS 3025(P-31)(sec 1)-2022	mg/L	0.03
19	Total phosphorous (P)	IS 3025(P-31)(sec1)-2022	mg/L	0.13
20	Orthophosphate	USEPA 365.3- 1993	mg/L	0.06
21	Total nitrogen (N)	IS 3025(P-34)(sec1)-2022	mg/L	8.28
22	Nitrite as NO2	IS 3025(P-34)(sec1)-2021	mg/L	1.22
23	Chlorophylls	NAL/SOP/W/120	mg/L	BLQ(LOQ-0.5)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhakaravathi
Environment Engineer

End of Report

Nangal Unit (Solid): Plot no.148, Electronic Estate, New SIDCO Industrial Estate, Guindy - 600 032
Lab: Solid - Plot no. 148, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
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CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400016825F	SAMPLE NO : SW-21	Date: 26/07/2024

Sample ID No	:	NAL/2024080WA0000795Z
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Vayam Solutions Pvt. Ltd.
Address	:	324, Level – IV, Diamond Dune, Poonamallee High Road, Ambujkkam, Chennai – 600029
Sample Described by the Customer*	:	SURFACE WATER [Thothan Eri – 22]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.41
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	124.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-3.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	25.05
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	149.70
6	Turbidity	IS 3025(P-10):2023	NTU	4.41
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1842.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	0.88
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	49.48
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	1.06
12	Iron as Fe	IS 3025(P-53):2003	mg/L	0.14
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	483.19
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.74
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.46

Authorised Signatory

Continue...*

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ULR NO: TC129962x000167757 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(R-13)-2022	mg/L	148.42
17	Salinity at 250° C	NAL/SOP/W/051	ppt	1.10
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.03
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.93
20	Orthophosphate	USEPA-365.3-1978	mg/L	1.24
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	92.81
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.5)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhakaravathi
Environment Engineer

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400017038F	SAMPLE NO : SW-22	Date: 26/07/2024

Sample ID No	:	NAL/2024080WQ0007851
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Vayuth Solutions Pvt. Ltd.
Address	:	323, Level – IV, Diamond Daze, Poonamallee High Road, Aminjikarai, Chennai – 600029.
Sample Described by the Customer*	:	SURFACE WATER – [Anthiladi Veeraragavan Lake -22]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited – Hosur
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.11
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	BLQ[LOQ-2.5]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	9.56
6	Turbidity	IS 3025(P-10):2023	NTU	2.26
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	307.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	4.56
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.05]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	125.12
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.15
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.12

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ULR NO: TC129962x000171007 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	92.40
17	Salinity at 250° C	NAL/SOP/W/091	ppt	<1.0
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.08
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.11
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.06
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	5.53
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.1)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environment Engineer

End of Report

CIN :U71200TZ2023PTC029607

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Analytical Labs India Private Limited

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ULR NO: TC129962400017210F	SAMPLE NO : SW-23	Date: 26/07/2024

Sample ID No	:	NAL/2024080WQ0007021
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Vayuja Solutions Pvt. Ltd.
Address	:	323, Level – IV, Diamond Daze, Poonamallee High Road, Aminjikarai, Chennai – 600029.
Sample Described by the Customer*	:	SURFACE WATER - [Kannur Lake -2]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited – Kannur
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	6.69
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	176.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	4.0
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	42.86
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	170.69
6	Turbidity	IS 3025(P-10):2023	NTU	18.10
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	938.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQL(LOQ-0.1)
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	2.86
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	62.34
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	3.37
12	Iron as Fe	IS 3025(P-53):2003	mg/L	0.75
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	210.36
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.27
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.14

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ULR NO: TC129962x000171007 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	99.28
17	Salinity at 250° C	NAL/SOP/W/051	ppt	<1.0
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.06
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	1.37
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.92
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	32.42
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.5)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Dhakaravathi
Environment Engineer

End of Report

Bengal Off (Add.): Plot no.16, Electronics Complex, New SIDCO Industrial Estate, Chennai - 600116
Labs. Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884847 [illegible]

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216479F	SAMPLE NO : SW-24	Date: 22/07/2024

Sample ID No	:	NAL/2024080W0000743/
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Voyants Solutions Pvt. Ltd.
Address	:	303, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	SURFACE WATER [VEERATAGHI RH SLNO:27]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By letter Dated 22/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11) : 2022		6.69
2	Total Suspended Solids	IS 3025(P-17) : 2022	mg/L	BQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39) : 2021	mg/L	BQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44) : 2023	mg/L	72.64
5	Chemical Oxygen Demand (COD)	IS 3025(P-58) : 2023	mg/L	281.60
6	Turbidity	IS 3025(P-10):2023	NTU	21.8
7	Total Dissolved Solids	IS 3025(P-16) : 2023	mg/L	2499.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQ[LOQ-0.1
9	Ammonical Nitrogen as N	IS 3025(P-34 / Sec 2) : 2021	mg/L	2.02
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34) :1988	mg/L	17.03
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	3.12
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32) :1988	mg/L	1115.93
14	Fluoride as F	IS 3025(P-24/Sec 1) :2022	mg/L	0.76
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.62

Authorised Signatory

Continue...*

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ULR NO: TC129962x000164797 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 3025(P: 24) Sec 1) : 2022	mg/L	209.68
17	Salinity at 250° C	NAL/SOP/W/051	ppt	1.07
18	Dissolved Phosphate as P	IS 3025(P: 31) Sec 3) : 2022	mg/L	0.14
19	Total phosphorus (P)	IS 3025(P: 31) Sec 3) : 2022	mg/L	0.09
20	Orthophosphate	USEPA 365.3 - 1978	mg/L	0.09
21	Total nitrogen (N)	IS 3025(P: 34) Sec 3) : 2022	mg/L	20.41
22	Nitrite (as NO2)	IS 3025(P-34) Sec 3) : 2022	mg/L	BLQ[LOQ- 0.03]
23	Chlorophylls	NAL/SOP/W/120	mg/L	BLQ[LOQ-0.3]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environment Engineer

End of Report

Bengal CHE (Add.) : Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Chennai - 600116
Lab. Add. : Plot no. 16D, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884687 88841 | Mail : (email address)

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ULR NO: TC129962400016538F	SAMPLE NO : SW-25	Date: 26/07/2024

Sample ID No	:	NAL/2024080W0000078/12
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Voyanti Solutions Pvt. Ltd.
Address	:	324, Level - IV, Diamond Dune, Poonamallee High Road, Anna Nagar, Chennai - 600030
		SURFACE WATER [Alamathuram Eri - 28]
Sample Described by the Customer*	:	
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 23/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	08/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	mg/L	7.92
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	7.0
3	Oil & Grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ: 2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P- 44):2023	mg/L	5.17
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	40.06
6	Turbidity	IS 3025(P-10):2023	NTU	1.41
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	11800
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	0.72
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	6.84
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	0.88
12	Iron as Fe	IS 3025(P-53):2003	mg/L	0.16
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	128.12
14	Fluoride as F	IS 3025 (P-60/sec2):2022	mg/L	0.58
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.52

Authorised Signatory

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ULR NO: TC129962x000167757 Date: 06/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:3025(P-24)(Vol-I)-2022	mg/L	112
17	Salinity at 250° C	NAL/SOP/W/051	ppt	<1.0
18	Dissolved Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.11
19	Phosphate as PO4	IS:3025(P-31)(sec-1)-2022	mg/L	0.14
20	Orthophosphate	USEPA-365.3-1978	mg/L	0.0800
21	Total Nitrogen	IS:3025(P-34)(sec-1)-2022	mg/L	9.04
22	Nitrite (as NO2)	IS:3025(P-34)(sec-1)-2021	mg/L	BQL(LOQ-0.01)
23	Chlorophylls	NAL/SOP/W/120	mg/L	BQL(LOQ-0.5)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environment Engineer

End of Report

Bengal CHR (Kolkata): Plot no.16, Electronics Complex, New SIDCO Industrial Estate, Chennai - 600116
Labs, Kolkata - Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
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Ground Water – Test Result

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216473F	SAMPLE NO : GW-01	Date: 31/07/2024

Sample ID No	:	NAL/2024080W0000743-1
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level – IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai – 600029.
Sample Described by the Customer*	:	GROUND WATER [CHINNA ERI BASTHI SL.NO: 01]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	01/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	–	7.84
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	8800
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34):1988	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	3.40
11	Free Ammonia as NH3	IS 3025(P-34):1988	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	2860
14	Fluoride as F	IS 3025(P-60/Sec 2):2022	mg/L	0.26
15	Nitrate as NO3	IS 3025(P-34/Sec 3):2021	mg/L	1.52

Authorised Signatory

Continue...*

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Labs. Add.: Plot no. 148, New SIDCO Industrial Estate, Ambattur, Chennai - 600 105, Tamil Nadu
044-26581847, 26581848 | info@nawal-analytical.com

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ULR NO: TC129962x000164737 Date: 01/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 3025(P: 24)2001;2022	mg/L	82.50
17	Salinity at 250C	NAL/SOP/W/051	ppt	<1.0
18	Electrical conductivity at 250 C	IS 3025(P: 14);2013	µS/cm	1197.0
19	Dissolved Phosphate as P	IS 3025(P:-31/Sec):2022	mg/L	0.12

Disclaimer:

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangaraju
Sr. Chemist

Authorised Signatory
R Chakravarthi
Laboratory Supervisor

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962100216474F	SAMPLE NO : GW-02	Date: 31/07/2024

Sample ID No : NAL/2024080EW0000432
Discipline / Group : Chemical / Pollution & Environment
Name of the Customer* : Keyants Solutions Pvt. Ltd.
Address : 303, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600029.
Sample Described by the Customer* : GROUND WATER [MAYIL KAVANAN ERI BASIN SW NO:02]
Quantity of the Sample Received : 2 Ltr
Condition on Receipt : Fit for Analysis
Requested By* : Mr. Subhash Raman - Asst Manager
Information about Sampling : Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference : By letter Dated 25/06/2024
Date of Sample Receipt : 25/06/2024
Date of test Starting : 25/06/2024
Date of test Completed : 01/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.40
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025 (Part - 16):2023	mg/L	1622.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34):1988	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	6.56
11	Free Ammonia as NH3	IS 3025(P-34):1988	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	210.0
14	Fluoride as F	IS 3025(P-60/Sec 2):2022	mg/L	0.51
15	Nitrate as NO3	IS 3025(P-34/Sec 3):2021	mg/L	2.54

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Page 1 of 2

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ULR NO: TC129962x000164757				Date: 01/07/2024
S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 3025(P: 24)2001;1 2022	mg/L	181.28
17	Salinity at 250°C	NAL/SOP/W/051	PPt	<1.0
18	Electrical conductivity at 250 C	IS 3025(P: 14);2013	µS/cm	2.30
19	Dissolved Phosphate as P	IS 3025(P:31)(ver 1);2003	mg/L	0.12

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
R.Chakravarthi
Laboratory Supervisor

Bengal CHR (Kolkata): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Chennai - 600 054
Labs, Kolkata - Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 054, Tamil Nadu
Mob: 9884847 85841 | Mail : [illegible]

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216475F	SAMPLE NO : GW-03	Date: 31/07/2024

Sample ID No	:	NAL/2024080W0000743
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level – IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai – 600025.
Sample Described by the Customer*	:	GROUND WATER [NEMBATAGIRI ERI BASTHI SL.NO-03]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	01/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	–	7.21
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1118.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34):1988	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	6.04
11	Free Ammonia as NH3	IS 3025(P-34):1988	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	198.0
14	Fluoride as F	IS 3025(P-60/Sec 2):2022	mg/L	0.57
15	Nitrate as NO3	IS 3025(P-34/Sec 3):2021	mg/L	1.57

Authorised Signatory

Continue...*

Bengal Office (Mobile): Plot no.148, Electronics By Electronics Complex, Near SIDCO Industrial Estate, Chennai – 600113
Lab: (Mobile): Plot no. 148, Near SIDCO Industrial Estate, Ambattur, Chennai – 600 098, Tamil Nadu
Mobile: 9884047 88844 | Email : www.nawallabs.com

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ULR NO: TC129962x000164757 Date: 01/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 3025(P: 24)2001;1:2022	mg/L	116.58
17	Salinity at 250C	NAL/SOP/W/051	ppt	<1.0
18	Electrical conductivity at 250 C	IS 3025(P: 14):2013	mg/L	1020.0
19	Dissolved Phosphate as P	IS 3025(P:31)Sec1):2022	mg/L	0.13

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangaraju
Sr. Chemist

End of Report

Authorised Signatory
S.Chakravarthi
Laboratory Supervisor

CIN :U71200TZ2023PTC029607

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ULR NO: TC129862A032167745F	SAMPLE NO : GW-04	Date: 23/07/2024

Sample ID No : NAL2024080WA00007591
Discipline / Group : Chemical / Water
Name of the Customer* : Keyards Solutions Pvt. Ltd.
Address : 313, Level - IV, Diamond Point, Poonamallee High Road, Aminjikarai, Chennai - 600029.
Sample Described by the Customer* : GROUND WATER -(Chennekuppam - Reservoir(Lat:Rel:-04)
Quantity of the Sample Received : 5 Ltr
Condition on Receipt : Fit for Analysis
Requested By* : Mr. Subhash Raman - Asst Manager
Information about Sampling : Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference : By Letter Dated 27/06/2024
Date of Sample Receipt : 27/06/2024
Date of test Starting : 27/06/2024
Date of test Completed : 03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.58
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1128.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	3.07
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	210.00
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.52
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.17

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"Continue..."

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Lab: Main: Plot no. 10B, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
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ULR NO: TC129962x000167757 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	101.92
17	Salinity at 250C	NAL/SOP/W/051	ppt	<1.0
18	Electrical Conductivity at 250C	IS:3025(P: 14),2013	µS/cm	1623.80
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1),2022	mg/L	0.08

Disclaimer:

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangaraju
Sr. Chemist

End of Report

Authorised Signatory
S.Chakravarthi
Environment Engineer

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216782F	SAMPLE NO : GW-05	Date: 23/07/2024

Sample ID No	:	NAL/2024080WA00007589
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	GROUND WATER - [Chennakuppam - Krishnasamy Sri Leela India Opp]-05]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 22/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.84
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1940.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	8.56
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	211.0
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.44
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.82

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ULR NO: TC129962x000167827 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	182.98
17	Salinity at 250C	NAL/SOP/W/051	ppt	<1.0
18	Electrical Conductivity at 250C	IS:3025(P: 14)2013	µs/cm	1068.0
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1)2022	mg/L	0.13

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangaraju
Sr. Chemist

End of Report

Authorised Signatory
S.Chakravarthi
Laboratory Supervisor

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400016733F	SAMPLE NO : GW-06	Date: 23/07/2024

Sample ID No	:	NAU2024080AW000007159
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	504, Level - IV, Diamond Dots, Poonamallee High Road, Anna Nagar, Chennai - 600029.
Sample Described by the Customer*	:	GROUND WATER - [Guruvadi - Vavilasuram Pri near Ujjar layout (Arumarpalli)-6]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.08
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	2940.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	6.56
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	255
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.89
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.46

Authorised Signatory

Continue...*

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ULR NO: TC129962000167827				Date: 06/07/2024
S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	150
17	Salinity at 25°C	NAL/SOP/W/051	ppt	1.80
18	Electrical Conductivity at 25°C	IS:7022(P: 14)-2013	µs/cm	3.35
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1):2022	mg/L	0.07

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
R Chakravarthi
Laboratory Supervisor

ULR NO: TC129962400016732F	Date: 03/07/2024

Sample ID No.	:	**NAL/202406EW00007199**
Discipline / Group	:	**Chemical / Water**
Name of the Customer*	:	**Voyants Solutions Pvt. Ltd.**
Address	:	**323, Level - IV, Diamond Dune, Poonamallee High Road, Aminjikarai, Chennai - 600029.**
Sample Described by the Customer*	:	**GROUND WATER - [Zuzuwadi - Venkatesan Eri near Upkar layout (Anumepalli)-6]**
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated.27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.08
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.5]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	2340.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	6.54
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	233
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.89
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.46

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"Continue....."

ULR NO: TC129962400016782F				Date: 03/07/2024
S.No	**TEST PARAMETERS**	**TEST PROTOCOL**	**UNIT**	**TEST RESULT**
16	Sulphate as SO4	IS 3025(P-24/sec1):2022	mg/L	195
17	Salinity at 250°C	NAL/SOP/W/051	ppt	1.80
18	Electrical Conductivity at 250°C	IS 3025(P-14):2013	µs/cm	3.35
19	Dissolved Phosphate as PO4	IS 3025(P-31/sec1):2022	mg/L	0.07

Disclaimer:

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

End of Report

Authorized Signatory
R.Chakaravarthi
Environment Engineer

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216782F	SAMPLE NO : GW-07	Date: 23/07/2024

Sample ID No	:	NAL/2024080WA0000T026
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Voyanti Solutions Pvt. Ltd.
Address	:	324, Level - IV, Diamond Dune, Poonamallee High Road, Anna Nagar, Chennai - 600026
Sample Described by the Customer*	:	GROUND WATER - [Ennavadi - Sunkuppuram Eri - 07]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.59
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	2639.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	6.93
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	210
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.74
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.75

Authorised Signatory

Continue...*

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ULR NO: TC129962000167827 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 6020(P: 24)2013 R 2022	mg/L	181.22
17	Salinity at 250C	NAL/SOP/W/051	ppt	1.34
18	Electrical Conductivity at 250C	IS 3025(P: 14)2013	µs/cm	3.68
19	Dissolved Phosphate as PO4	IS 3025(P: 31)rev 1)2003	mg/L	0.08

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangaraju
Sr. Chemist

End of Report

Authorised Signatory
R Chakravarthi
Environment Engineer

CIN :U71200TZ2023PTC029607

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Analytical Labs India Private Limited

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ULR NO: TC129962400016789F	SAMPLE NO : GW-07	Date: 06/07/2024

Sample ID No	:	NAL/2024080WS000070028
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Vayuris Solutions Pvt. Ltd.
Address	:	323, Level – IV, Diamond Daze, Poonamallee High Road, Anna Nagar, Chennai - 600029
Sample Described by the Customer*	:	GROUND WATER - [Zuzuvadi - Santhapuram Dri - 07]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated:27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.09
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	2650.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	6.23
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	240
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.74
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	5.73

Authorised Signatory

"Continue....."

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ULR NO. TC129962400016782F				Date 03/07/2024
S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 3025(P 24/Sec1):2022	mg/L	184.22
17	Salinity @ 250°C	NALSOP/WQ/51	ppt	1.34
18	Electrical Conductivity at 250°C	IS 3025(P-14):2013	µs/cm	3.68
19	Dissolved Phosphate as PO4	IS 3025(P-31/Sec1):2022	mg/L	0.08

Conclusion:

All the above test parameters are carried out with the sample "as received condition". The results relate only to the items tested. This report is valid strictly for the sample submitted for analysis to NAWaL analytical Labs India Private Limited and shall not be under any circumstance extrapolated to any other product(s) made out of this sample. NAWaL analytical Labs India Private Limited is not responsible for any deterioration/ deviation in quality or quantity of the product due to the nature of the product or during transit.

For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorized Signatory
R.Chidambaranathan
Environment Engineer

End of Report

Bengal Off Addl.: Plot no.16, Electronics Complex, New SIDCO Industrial Estate, Guindy, Chennai - 600 032
Lab. Addl.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884849844 | Mail : info@nawallabs.com

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400017532F	SAMPLE NO : GW-08	Date: 03/07/2024

Sample ID No	:	NAL/2024080WA0000T004
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Voyanti Solutions Pvt. Ltd.
Address	:	324, Level - IV, Diamond Dune, Poonamallee High Road, Anna Nagar, Chennai - 600030
Sample Described by the Customer*	:	GROUND WATER - [Mookandapalli - Sothanaran Eri - 08]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.62
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1447.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	8.84
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	389
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.71
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.11

Authorised Signatory

"Continue..."

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Trichy Address: Plot no. 108, New SIDCO Industrial Estate, Ariyalur, Trichy - 620 010, Tamil Nadu
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ULR NO: TC129962x000167827 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	141.24
17	Salinity at 250C	NAL/SOP/W/051	ppt	1.40
18	Electrical Conductivity at 250C	IS:3025(P: 14)2013	µs/cm	2.05
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1)2022	mg/L	0.16

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
R Chakravarthi
Laboratory Supervisor

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962100216825F	SAMPLE NO : GW-09	Date: 02/07/2024

Sample ID No	:	NAL/2024/08/W/00007546
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyarts Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600029.
Sample Described by the Customer*	:	GROUND WATER [KOTHA BH NEAR TVS COMPANY KOTTUR BH SL.No:09]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited - Hosur
Customer Reference	:	By Letter Dated 26/06/2024
Date of Sample Receipt	:	28/06/2024
Date of test Starting	:	28/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.09
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-11):2022	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-44):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	mg/L	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	6830
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34):1988	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	3.40
11	Free Ammonia as NH3	IS 3025(P-34):1988	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	2118.8
14	Fluoride as F	IS 3025(P-60/Sec 2):2022	mg/L	0.16
15	Nitrate as NO3	IS 3025(P-34/Sec3):2021	mg/L	1.54

Authorised Signatory

Continue...*

Chennai - Corporate Office: Plot no.11B, Electronic By Electronic Complex, Phase-II, SIDCO Industrial Estate, Guindy, Chennai - 600 032
Hosur - Lab: Plot no. 108, 26th SIPCOT Industrial Estate, Perandapalli, Hosur - 635 126, Tamil Nadu
Mobile: 9884 / 9884 / 9884 | Email: enquiry@nawalindia.com

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ULR NO: TC129962000166537 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 6020(P: 23)2001(): 2022	mg/L	99.59
17	Salinity at 250C	NAL/SOP/W/051	ppt	<1.0
18	Electrical conductivity at 250 C	IS 3025(P: 14):2013	µS/cm	382.0
19	Dissolved Phosphate as P	IS 3025(P:31):2022	mg/L	0.13

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

Authorised Signatory
S.Chakravarthi
Laboratory Supervisor

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962x032167607	SAMPLE NO : GW-10	Date: 23/07/2024

Sample ID No	:	NAL/2024080/W/0000789
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600029.
Sample Described by the Customer*	:	GROUND WATER - [Kaliganda Road - 10]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.29
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	2.66
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1910.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	8.84
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	191.0
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.49
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.56

Authorised Signatory

Continue...*

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Lab: Addl.: Plot no. 108, (New) SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mobile: 9884047 [illegible]

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ULR NO: TC129962000167607				Date: 05/07/2024
S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)(R:13):2022	mg/L	146.91
17	Salinity at 250°C	NAL/SOP/W/051	mg/L	<1.0
18	Electrical Conductivity at 250°C	IS:3025(P: 14):2013	mS/cm	2.16
19	Dissolved Phosphate as PO4	IS:3025(P:31)(re v):2003	mg/L	0.14

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

Authorised Signatory
S.Chakravarthi
Environment Engineer

End of Report

Bengal CFR (Add.): Plot no.16, Electronic Complex, New SIDCO Industrial Estate, Guindy - 600 032
Lab. Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884869844 | Mail : enquiry.nawal@gmail.com

CIN :U71200TZ2023PTC029607

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ULR NO: TC129862400216779F	SAMPLE NO : GW-11	Date: 22/07/2024

Sample ID No : NAL/2024/08EW/0000729
Discipline / Group : Chemical / Water
Name of the Customer* : Keyards Solutions Pvt. Ltd.
Address : 303, Level - IV, Diamond Point, Poonamallee High Road, Amrutkuma, Chennai - 600029.
Sample Described by the Customer* : GROUND WATER - [Sri Chandra Sekeshwar Road (Thergattai Street) - Tiruppalaikam - 13]
Quantity of the Sample Received : 5 Ltr
Condition on Receipt : Fit for Analysis
Requested By* : Mr. Subhash Kannan - Asst Manager
Information about Sampling : Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference : By Letter Dated 27/06/2024
Date of Sample Receipt : 27/06/2024
Date of test Starting : 27/06/2024
Date of test Completed : 02/07/2024

S.NO	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	6.86
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	6280
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammoniacal Nitrogen as NH3- N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	6.82
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	197.10
14	fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.24

Authorised Signatory

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ULR NO: TC129962x000167797 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
15	Nitrite as NO2	IS:3025(P-34)(01):2021	mg/L	1.09
16	Sulphate as SO4	IS:3025(P-24)(sec 1):2022	mg/L	62.31
17	Salinity at 250C	NAL/SOP/W/051	ppt	<1.0
18	Electrical Conductivity at 250C	IS:3025(P-14):2013	µs/cm	998.0
19	Dissolved Phosphate as PO4	IS:3025(P-31)(sec 1):2022	mg/L	0.11

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Jr. Chemist

Authorised Signatory
K.Chakaravarthi
Environment Engineer

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962100216530F	SAMPLE NO : GW-12	Date: 31/07/2024

Sample ID No	:	NAL/2024080W0000/324
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyarts Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	GROUND WATER (Telegandeshwar 12)
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager)
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	01/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.68
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1889.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34/Sec2):2023	mg/L	BQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	6.89
11	Free Ammonia as NH3	IS 3025(P-34/Sec2):2023	mg/L	BQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	514
14	Fluoride as F	IS 3025(P-60/Sec2):2022	mg/L	0.47
15	Nitrate as NO3	IS 3025(P-34/Sec3):2023	mg/L	2.15

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ULR NO: TC129962x000165607 Date: 01/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 3025(P: 24)2001;1:2022	mg/L	102.69
17	Salinity at 250C	NAL/SOP/W/051	ppt	<1.0
18	Electrical conductivity at 250 C	IS 3025(P: 14):2013	mS/cm	5.28
19	Dissolved Phosphate as P	IS 3025(P:31/Sec1):2022	mg/L	0.23

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

Authorised Signatory
R Chakravarthi
Laboratory Supervisor

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962A032167877F	SAMPLE NO : GW-13	Date: 22/07/2024

Sample ID No	:	NAL2024080W0000013624
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	GROUND WATER - [Olcott Chandrambigai Lake - 13]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.41
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	12360
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	8.84
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	3700
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.52
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.76

Authorised Signatory

Continue...*

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ULR NO: TC129962x000167877 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	99.12
17	Salinity at 250C	NAL/SOP/W/051	PPt	<1.0
18	Electrical Conductivity at 250C	IS:3025(P: 14),2013	µS/cm	1737.0
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1),2022	mg/L	0.13

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
R Chakravarthi
Laboratory Supervisor

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400017282F	SAMPLE NO : GW-14	Date: 23/07/2024

Sample ID No	:	NAU2024080AW000007005
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	324, Level - IV, Diamond Dots, Poonamallee High Road, Aminjikarai, Chennai - 600029
Sample Described by the Customer*	:	GROUND WATER - [Dhadhan Rao Lake - 14]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.54
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1108.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	7.06
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	198
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.42
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.86

Authorised Signatory

Continue...*

Bengal Office (Addl.): Plot no.148, Electronics Complex, Near SIDCO Industrial Estate, Guindy, Chennai - 600 032
Lab: Addl.: Plot no. 108, Door No.5/2621, Industrial Estate, Perundurai, Erode - 638 052, Tamil Nadu
Mobile: 9894167 [illegible] | Email : [illegible]

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ULR NO: TC129962x000167827 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	149.07
17	Salinity at 250C	NAL/SOP/W/051	ppt	< 1.0
18	Electrical Conductivity at 250C	IS:3025(P: 14),2013	µs/cm	2.01
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1),2003	mg/L	0.14

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

Authorised Signatory
R Chakravarthi
Laboratory Supervisor

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962100216478F	SAMPLE NO : GW-15	Date: 31/07/2024

Sample ID No	:	NAL/2024080W0000434
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Keyanta Solutions Pvt. Ltd.
Address	:	303, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	GROUND WATER [AVALAPALLI SARGAM RH SLNO 15]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	01/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.56
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	8010
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34/sec2):2021	mg/L	3.68
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	2060
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.50
15	Nitrate as NO3	IS 3025(P-34/sec2):2021	mg/L	1.58

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ULR NO: TC129962x000164797 Date: 01/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 6032(P: 24)2019:2022	mg/L	89.46
17	Salinity at 250C	NAL/SOP/WC/01	mg/L	<1.0
18	Electrical conductivity at 250 C	IS 3025(P: 14):2013	µS/cm	1243.60
19	Dissolved Phosphate as P	IS 3025(P: 31):2003	mg/L	0.14

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

End of Report

Authorised Signatory
S.Chakravarthi
Environment Engineer

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962100216777F	SAMPLE NO : GW-16	Date: 22/07/2024

Sample ID No	:	NAL/2024080W0000729/4
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level – IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai – 600025.
Sample Described by the Customer*	:	GROUND WATER – [Chevvaithur – Varatharayan Sri – 16]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	–	6.80
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1010.00
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	7.56
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	397.00
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.24
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.62

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Continue...*

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Trichy Address: Plot no. 108, 2nd Main, SIDCO Industrial Estate, Ariyalur, Trichy - 620 010, Tamil Nadu
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ULR NO: TC129962x000167777 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	95.52
17	Salinity at 250C	NAL/SOP/W/051	ppt	<1.0
18	Electrical Conductivity at 250C	IS:3025(P: 14),2013	µs/cm	1560.0
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1),2022	mg/L	0.11

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
S.Chakravarthi
Environment Engineer

Bengal CHE (Add.): Plot no.16, Electronic Complex, New SIDCO Industrial Estate, Guindy - 600 032
Lab: Add.: Plot no. 10/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884867 [illegible] | Mail : [illegible]

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216775F	SAMPLE NO : GW-17	Date: 23/07/2024

Sample ID No	:	NAL2024080WA00007595
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	GROUND WATER - [Chevvaithur - Pattalamman Eri - 17]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.43
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	9630
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	5.12
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	2503.87
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.29
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.56

Authorised Signatory

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ULR NO: TC129962x000167787 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	92.59
17	Salinity at 25°C	NAL/SOP/W/051	ppt	<1.0
18	Electrical Conductivity at 25°C	IS:3025(P: 14),2013	µS/cm	1403.60
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1),2022	mg/L	0.08

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
S.Chakravarthi
Laboratory Supervisor

Bengal CHR (Addl.): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Chennai - 600 054
Labs (Addl.): Plot no. 3/D, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884847 85841 | Mail : (name_mail@naclabs.com)

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216784F	SAMPLE NO : GW-18	Date: 23/07/2024

Sample ID No	:	NAL/2024080W0000016/21
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level – IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai – 600025.
Sample Described by the Customer*	:	GROUND WATER – Cheruvathur – Down Str (Thenpettai Str) – 18
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	–	7.09
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	9180
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	6.59
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	2200
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.26
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.82

Authorised Signatory

Continue...*

Chennai (HO &Lab): Plot no.313, Ground & 1st Floor, New SIDCO Industrial Estate, Ambattur, Chennai – 600 098
Lab: Plot no. 108, New SIDCO Industrial Estate, Ambattur, Chennai – 600 098, Tamil Nadu
Mobile: 9884[illegible]

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ULR NO: TC129962x000167867 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	91.21
17	Salinity at 250C	NAL/SOP/W/051	ppt	<1.0
18	Electrical Conductivity at 250C	IS:3025(P: 14),2013	µs/cm	1507.0
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1),2022	mg/L	0.09

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
S.Chakravarthi
Laboratory Supervisor

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216785F	SAMPLE NO : GW-19	Date: 23/07/2024

Sample ID No	:	NAL/2024080WA0000820
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyarts Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Plaza, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	GROUND WATER - [Easwaradi - Venkatapuram Sri Brahmpeth - 19]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.48
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	2282.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	3.68
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	211.0
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.39
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.42

Authorised Signatory

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Labs. Add.: Plot no. 148, New SIDCO Industrial Estate, Ambattur, Chennai - 600105, Tamil Nadu
044-26251887, 26251891 | info@nawal-analytical.com

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Analytical Labs India Private Limited

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ULR NO: TC129962x000167837 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	116.62
17	Salinity at 25°C	NAL/SOP/W/051	ppt	1.00
18	Electrical Conductivity at 25°C	IS:3025(P: 14),2013	mS/cm	5.03
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1),2003	mg/L	0.14

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
R Chakravarthi
Laboratory Supervisor

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962100216829F	SAMPLE NO : GW-20	Date: 22/07/2024

Sample ID No	:	NAL/2024/08/W/0000/551
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	GROUND WATER [KARIKHANNARAR ERI MOTTA ERI SL.No 20]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited - Hosur
Customer Reference	:	By Letter Dated 26/06/2024
Date of Sample Receipt	:	28/06/2024
Date of test Starting	:	28/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022		7.42
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023		BQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	11160
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34/sec2):2021	mg/L	BQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	7.06
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	3600
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.52
15	Nitrate as NO3	IS 3025(P-34/sec2):2021	mg/L	1.61

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ULR NO: TC129962000166567 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	118.82
17	Salinity at 250C	NAL/SOP/WQ/051	mg/L	<1.0
18	Electrical conductivity at 250 C	IS:7022(P: 14)-2013	µs/cm	1022.0
19	Dissolved Phosphate as P	IS:3025(P:31)rev 1):2022	mg/L	0.13

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
S.Chakravarthi
Environment Engineer

CIN :U71200TZ2023PTC029607

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Analytical Labs India Private Limited

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ULR NO: TC129962400216555F	SAMPLE NO : GW-21	Date: 29/06/2024

Sample ID No	:	NAL/2024062W0000007557
Discipline / Group	:	Chemical / Water
Name of the Customer	:	Keyards Solutions Pvt. Ltd.
Address	:	323, Level – IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai – 600025.
Sample Described by the Customer	:	GROUND WATER (Ramanayyan BH 21)
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	29/06/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	–	7.26
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BQ[LOQ-4.0]
6	Turbidity	IS 3025 (Part - 10):2023	NTU	BQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1227.0
8	Total Residual Chlorine	IS 3025 (Part – 26):2021	mg/L	BQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34/sec2):2021	mg/L	BQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	7.56
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BQ[LOQ-0.05]
13	Chloride as Cl	IS 3025 (Part – 32):1988	mg/L	1050
14	Fluoride as F	IS 3025 (Part – 60/sec 2):2022	mg/L	0.55
15	Nitrate as NO3	IS 3025 (Part – 34/sec 3):2021	mg/L	1.86

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ULR NO: TC129962x000165637 Date: 29/04/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 3025 (Part - 24)(2001):2022	mg/L	99.57
17	Salinity at 250C	NWL/SOP/WQ/01	PPt	<1.0
18	Electrical conductivity at 250 C	IS 3025(P: 14):2013	µS/cm	1451.0
19	Dissolved Phosphate as P	IS 3025(P:31)(ver 1):2003	mg/L	0.12

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangaraju
Sr. Chemist

End of Report

Authorised Signatory
S.Chakravarthi
Environment Engineer

Bengal CBE (Solid): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Chennai - 600113
Labs (Solid): Plot no. 3/D, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
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CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216785F	SAMPLE NO : GW-22	Date: 23/07/2024

Sample ID No	:	NAL/2024080WA0000T622
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	GROUND WATER - [House Municipality - Thiruvallur (Alamathur Erly.-22)]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.89
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1270.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	5.12
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	1010
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.24
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.14

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Continue...*

Chennai (HO Address): Plot no.313, Electronic By Electronic Complex, Near SIDCO Industrial Estate, Ambattur, Chennai - 600 098
Trichy Address: Plot no. 108, Door No. 5/2/2, Industrial Estate, Ariyalur, Trichy - 620 010, Tamil Nadu
Mobile: 9884 [illegible] | Email: [illegible]

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ULR NO: TC129962x000167857 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6925(P: 24)2012:2022	mg/L	126.88
17	Salinity at 250C	NAL/SOP/W/051	mg/L	<1.0
18	Electrical Conductivity at 250C	IS:3025(P: 14):2013	mg/L	1886.40
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1):2022	mg/L	0.08

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
R Chakravarthi
Laboratory Supervisor

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216781F	SAMPLE NO : GW-23	Date: 23/07/2024

Sample ID No	:	NAL/2024080WA0000729S
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	GROUND WATER - [Spot Lake - Chinna Elangiri- 23]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.29
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	5.08
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	1734.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	6.89
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	201.43
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.26
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	2.37

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ULR NO: TC129962x000167817 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6925(P: 24)2012:2022	mg/L	182.98
17	Salinity at 250C	NAL/SOP/WQ/051	ppt	1.26
18	Electrical Conductivity at 250C	IS:3025(P: 14):2013	mS/cm	2.53
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1):2022	mg/L	0.12

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
R Chakravarthi
Environment Engineer

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962100216657F	SAMPLE NO : GW-24	Date: 22/07/2024

Sample ID No	:	NAL/2024/08/W/0007552
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level – IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai – 600025.
Sample Described by the Customer*	:	GROUND WATER [KALKERI THALLY ROAD ERI SL.No 24]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited – Hosur
Customer Reference	:	By Letter Dated 26/06/2024
Date of Sample Receipt	:	28/06/2024
Date of test Starting	:	28/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025 (Part – 11):2022	–	7.02
2	Total Suspended Solids	IS 3025(P- 17):2022	mg/L	BQ[LOQ- 5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BQ[LOQ- 2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BQ[LOQ- 2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BQ[LOQ- 4.0]
6	Turbidity	IS 3025(P- 10):2023	NTU	BQ[LOQ- 0.5]
7	Total Dissolved Solids	IS 3025(P- 16):2023	mg/L	6330
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34/sec2):2021	mg/L	BQ[LOQ- 0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	7.56
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BQ[LOQ- 0.25]
12	Iron as Fe	IS 3025(Part – 53):2003	mg/L	BQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	392.17
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.16
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.48

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ULR NO: TC129962x000166577 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 6032(P: 24)2019 Cl.3.2022	mg/L	68.12
17	Salinity at 250C	NAL/SOP/W/051	PPt	<1.0
18	Electrical conductivity at 250 C	IS 3025(P: 14)2013	µS/cm	325.0
19	Dissolved Phosphate as P	IS 3025(P:31)rev 1)2022	mg/L	0.09

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
R.Chakravarthi
Laboratory Supervisor

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962100216629F	SAMPLE NO : GW-25	Date: 22/07/2024

Sample ID No	:	NAL/2024/08/W/0000/524
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyarts Solutions Pvt. Ltd.
Address	:	323, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	GROUND WATER [ANTHIRWADI VEERARAGAVAN LAKE SL.No:25]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited - Hosur
Customer Reference	:	By Letter Dated 26/06/2024
Date of Sample Receipt	:	28/06/2024
Date of test Starting	:	28/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022		7.68
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-1.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	mg/L	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	7980
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34):1988	mg/L	7.98
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	2020.05
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.22
15	Nitrate as NO3	IS 3025(P-34/sec2):2021	mg/L	1.52

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ULR NO: TC129962x000166507 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 6020(P: 24)(R13):2022	mg/L	69.21
17	Salinity at 250C	NAL/SOP/WQ/051	ppt	<1.0
18	Electrical conductivity at 250 C	IS 3025(P: 14):2013	µs/cm	1155.0
19	Dissolved Phosphate as P	IS 3025(P:31)(rev 1):2022	mg/L	0.12

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
R Chakravarthi
Laboratory Supervisor

Bengal CHR (Add.): Plot no.16, Electronic Complex, New SIDCO Industrial Estate, Guindy - 600 032
Lab. Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
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CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400016788F	SAMPLE NO : GW-26	Date: 23/07/2024

Sample ID No	:	NAL/2024080WQ0007573
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Vayuth Solutions Pvt. Ltd.
Address	:	323, Level – IV, Diamond Dune, Poonamallee High Road, Anna Nagar West, Chennai – 600020
Sample Described by the Customer*	:	GROUND WATER - [Ramanur Eri – 26]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.62
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	881.0
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	3.07
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	202.05
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.26
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.51

Authorised Signatory

Continue...*

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Trichy Address: Plot no. 10B, New SIDCO Industrial Estate, Irumbuthalai, Manapparai - 621 306, Tamil Nadu
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ULR NO: TC129962x000167757 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	72.48
17	Salinity at 250C	NAL/SOP/W/051	ppt	<1.0
18	Electrical Conductivity at 250C	IS:3025(P: 14),2013	µS/cm	1603.0
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1),2003	mg/L	0.11

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Laboratory Supervisor

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962100216450F	SAMPLE NO : GW-27	Date: 31/07/2024

Sample ID No	:	NAL/2024080W0000007436
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	303, Level – IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai – 600025.
Sample Described by the Customer*	:	GROUND WATER [WEMBATAGIRI ERI THOTTAGIRI SL.No:27]
Quantity of the Sample Received	:	2 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By letter Dated 25/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	01/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	–	6.82
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	350
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	BLQ[LOQ-0.1]
9	Ammonical Nitrogen as N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen as N	IS 3025(P-34/sec4):2021	mg/L	BLQ[LOQ-1.0]
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	10.20
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.04
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	BLQ[LOQ-1.0]

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ULR NO: TC129962x000164607 Date: 01/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS 6232(P: 24)2013:2022	mg/L	BLQ(LOQ: 0.05)
17	Salinity at 250C	NAL/SOP/WQ/051	ppt	<1.0
18	Electrical conductivity at 250 C	IS 3025(P: 14):2013	µS/cm	73.80
19	Dissolved Phosphate as P	IS 3025(P-31/sec):2022	mg/L	BLQ(LOQ-0.05)

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangamani
Sr. Chemist

End of Report

Authorised Signatory
S.Chakravarthi
Environment Engineer

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400216796F	SAMPLE NO : GW-28	Date: 23/07/2024

Sample ID No	:	NAL/2024080W0000028
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	303, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	GROUND WATER - [Ekanathapuram (Near Micro Labs company)- 28]
Quantity of the Sample Received	:	5 Ltr
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	pH @ 25°C	IS 3025(P-11):2022	-	7.24
2	Total Suspended Solids	IS 3025(P-17):2022	mg/L	BLQ[LOQ-5.0]
3	Oil and grease	IS 3025(P-39):2021	mg/L	BLQ[LOQ-2.0]
4	Biochemical Oxygen Demand (BOD) 3 days @ 27°C	IS 3025(P-44):2023	mg/L	BLQ[LOQ-2.0]
5	Chemical Oxygen Demand (COD)	IS 3025(P-58):2023	mg/L	BLQ[LOQ-4.0]
6	Turbidity	IS 3025(P-10):2023	NTU	BLQ[LOQ-0.5]
7	Total Dissolved Solids	IS 3025(P-16):2023	mg/L	8080
8	Total Residual Chlorine	IS 3025(P-26):2021	mg/L	0.0000 BLQ[LOQ-0.1]
9	Ammonical Nitrogen as NH3-N	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
10	Total Kjeldahl Nitrogen	IS 3025(P-34):1988	mg/L	7.06
11	Free Ammonia as NH3	IS 3025(P-34/sec2):2021	mg/L	BLQ[LOQ-0.25]
12	Iron as Fe	IS 3025(P-53):2003	mg/L	BLQ[LOQ-0.05]
13	Chloride as Cl	IS 3025(P-32):1988	mg/L	3515.75
14	Fluoride as F	IS 3025(P-60/sec2):2022	mg/L	0.26
15	Nitrate as NO3	IS 3025(P-34/sec3):2021	mg/L	1.72

Authorised Signatory

Continue...*

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ULR NO: TC129962x000167967 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
16	Sulphate as SO4	IS:6232(P: 24)2013,2022	mg/L	110.21
17	Salinity at 250C	NAL/SOP/W/051	ppt	<1.0
18	Electrical Conductivity at 250C	IS:3025(P: 14),2013	µs/cm	1061.0
19	Dissolved Phosphate as PO4	IS:3025(P:31)rev 1),2022	mg/L	0.12

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For NAWaL Analytical Labs India Private Limited

Verified by
S Thangamani
Sr. Chemist

End of Report

Authorised Signatory
R Chakravarthi
Laboratory Supervisor

Sediment – Test Result

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400016751F	SAMPLE NO : SS-01	Date: 23/07/2024

Sample ID No	:	NAU2024080WA000007562
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	504, Level - IV, Diamond Dots, Poonamallee High Road, Aminjikarai, Chennai - 600029.
Sample Described by the Customer*	:	SILT (Chinna Eri Basin-01)
Quantity of the Sample Received	:	1 kg
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Blackish Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD-2009	%	Sand - 18.0, Silt - 30.0, Clay - 32.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD-2009	Kg/ha	61.36
4	Available Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD-2009	Kg/ha	442.09
5	Nitrate	NAL/SOP/SAP/116	mg/kg	217.89
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	2.69
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	3.74
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	8.65
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	4.48
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	30.02

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"Continues ..."

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ULR NO: TC129962x000167767 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	7.56
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	2.92
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	57.69
15	Aluminium as Al	USEPA 3050 B Rev. 2: 1996	mg/kg	2615.71
16	Mercury as Hg	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic as As	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
G Thangamani
Sr.Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Nagpal CHE (India): Plot no.16, Electronic Complex, Near NEEPCO Industrial Estate, Dimapur - 797115
Lab: Delhi - Plot no. 1/1, Near NEEPCO Industrial Estate, Dimapur, Nagaland - 797115, Tamil Nadu
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CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400016766F	SAMPLE NO : SW-02	Date: 06/07/2024

Sample ID No	:	NAL/2024/06SW00000780
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Veyantz Solutions Pvt. Ltd.
Address	:	323, Level – IV, Diamond Daze, Rootamallee High Road, Ambattur, Chennai – 600020
Sample Described by the Customer*	:	SILT-Myil Ravanan Eri-2
Quantity of the Sample Received	:	1 kg
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated:27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	–	Blackish Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	%	Sand-21.0, Silt-34.0, Clay-45.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	Kg/ha	58.82
4	Available Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	Kg/ha	445.68
5	Nitrate	NAL/SOP/SAP/118	mg/kg	225.65
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	0.56
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.86
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	8.55
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQL(LOQ- 1.0)
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	33.27

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ULR NO. TC125962420001677GF				Date 03/07/2024
S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2 : 1996	mg/kg	16.88
12	Nickel as Ni	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.70
13	Cobalt as Co	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQL(LOQ-1.0)
14	Silica	NAL/SOP/SAS/003	%	71.47
15	Aluminium as Al	USEPA 3050 B Rev. 2 : 1996	mg/kg	1095.17
16	Mercury as Hg	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQL(LOQ-1.0)
17	Arsenic as As	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQL(LOQ-1.0)

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For NAWaL Analytical Labs India Private Limited

Verified by
G Thangamani
Sr.Chemist

Authorised Signatory
R.Chidambaranathi
Environment Engineer

End of Report

Bengal Off Addl.: Plot no.16, Electronic Complex, New SIDCO Industrial Estate, Guindy - 600 032
Labs. Addl.: Plot no. 3/D, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
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ULR NO: TC129962400016756IF	SAMPLE NO : SS-03	Date: 03/07/2024

Sample ID No	:	NAL/2024080WO0000785
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Vayuja Solutions Pvt. Ltd.
Address	:	323, Level – IV, Diamond Dune, Poonamallee High Road, Anna Nagar West, Chennai – 600101
Sample Described by the Customer*	:	SILT (Venkatagiri Iyan Eri-03)
Quantity of the Sample Received	:	1 kg
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	–	Light Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD-2009	%	Sand-48.0, Silt-34.0, Clay-18.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD-2009	Kg/ha	44.78
4	Available Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD-2009	Kg/ha	310.02
5	Nitrate	NAL/SOP/SAP/116	mg/kg	28.79
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	2.06
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.19
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	BLQ(LOQ-1.0)
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	BLQ(LOQ- 3.0)
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	8.19

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ULR NO: TC129962x000167767 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	6.05
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	92.68
15	Aluminium as Al	USEPA 3050 B Rev. 2: 1996	mg/kg	738.55
16	Mercury as Hg	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic as As	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
G Thangamani
Sr.Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Nagpur CHE (Solid): Plot no.16, Electrical & Electronics Estate, New MIDC Industrial Estate, Umrer - 441203
Lab: Solid - Plot no. 16/1, New MIDC Industrial Estate, Ambadam, Salem - 636 308, Tamil Nadu
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ULR NO: TC129862400216777GF	SAMPLE NO : SS-04	Date: 31/07/2024

Sample ID No	:	NAL/2024080WA0000789
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Keyants Solutions Pvt. Ltd.
Address	:	303, Level – IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai – 600029.
Sample Described by the Customer*	:	SUT [Chennakur – Rasenkuttai Eri – 04]
Quantity of the Sample Received	:	1 kg
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	–	Light Brown Colour
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand-8.0, Silt-32.0, Clay-61.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	72.29
4	Available Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	354.25
5	Nitrate	NAL/SOP/SAP/116	mg/kg	218.91
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.95
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	03.61
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	03.48
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQL[LOQ: 1.0]
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	03.69

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ULR NO: TC129962x000167767				Date: 05/07/2024
S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	22.40
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	8.70
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	38.01
15	Aluminium as Al	USEPA 3050 B Rev. 2: 1996	mg/kg	1038.08
16	Mercury as Hg	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic as As	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
G Thangamani
Sr.Chemist

End of Report

Authorised Signatory
R.Chakravarthi
Environmental Engineer

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ULR NO: TC129862400216551F	SAMPLE NO : SS-05	Date: 22/07/2024

Sample ID No	:	NAL/2024080WA0007555
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Vayam Solutions Pvt. Ltd.
Address	:	324, Level - IV, Diamond Dunz, Poonamallee High Road, Anna Nagar, Chennai - 600050
Sample Described by the Customer*	:	SILT - Chennakur - Krishnavur Rd - 5
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown Colour
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand - 1.0, Silt - 12.0, Clay - 87.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	64.23
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	750.60
5	Nitrate	NAL/SOP/SAP/116	mg/kg	250.02
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	2.20
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.18
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	8.54
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.62
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	69.00

Authorised Signatory

Continue...*

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	6.68
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	13.52
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	1.03
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	7575.50
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

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ULR NO: TC129962400016421F	SAMPLE NO : SS-06	Date: 22/07/2024

Sample ID No	:	NAL/2024/08W/0007672
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanti Solutions Pvt. Ltd.
Address	:	323, Level - IV, Diamond Daze, Poonamallee High Road, Anna Nagar, Chennai - 600026
Sample Described by the Customer*	:	SILT - Vembakkam Dt - 06
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	–	Grey Colour
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	%	Sand-8.0, Silt-19.0, Clay-73.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	Kg/ha	76.55
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	Kg/ha	3845.12
5	Nitrate	NAL/SOP/SAP/116	mg/kg	387.50
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.47
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.23
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	BLQ(LOQ-1.0)
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	3.89
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	0.68

Authorised Signatory

"Continues ..."

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ULR NO: TC129962x000165317				Date: 02/07/2024
S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	0.25
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	14.27
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	23.57
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	3.41
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Nagpur CHE (Solid): Plot no.16, Electrical & Electronic Estate, New MIDC Industrial Estate, Umrer - 441203
Lab: Solid - Plot no. 16/1, New MIDC Industrial Estate, Ambadam, Salem - 636 308, Tamil Nadu
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ULR NO: TC129962400017348F	SAMPLE NO : SS-07	Date: 22/07/2024

Sample ID No	:	NAL/2024080WA0000772
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Vayam Solutions Pvt. Ltd.
Address	:	324, Level - IV, Diamond Daze, Poonamallee High Road, Aminjikarai, Chennai - 600029
Sample Described by the Customer*	:	SILT - Santhapuram Eri - 07
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	–	Blackish Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand-1.0, Silt-16.0, Clay-83.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	71.37
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	3265.60
5	Nitrate	NAL/SOP/SAP/116	mg/kg	358.22
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.59
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.11
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	BLQ(LOQ-1.0)
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.71
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	88.03

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	8.34
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	8.35
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	1.0
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	8557.00
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Nagpur CHE (Solid): Plot no.16, Electrical & Electronic Estate, New MIDC Industrial Estate, Umred - 441203
Lab: Solid - Plot no. 8/D, New MIDC Industrial Estate, Ambadgaon, Nagpur - 440 034, Tamil Nadu
Mob: 9989879 88841 | Mail : (green_nabl@yahoo.com)

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400017342F	SAMPLE NO : SS-08	Date: 22/07/2024

Sample ID No	:	NAL/2024080W0000T12
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Vayam Solutions Pvt. Ltd.
Address	:	324, Level - IV, Diamond Dunz, Poonamallee High Road, Anna Nagar, Chennai - 600050
Sample Described by the Customer*	:	SILT - [Mocharalapalli Sothuruman Tri - 08]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand - 7.0, Silt - 24.0, Clay - 69.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	60.04
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	548.23
5	Nitrate	NAL/SOP/SAP/116	mg/kg	282.07
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.70
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.73
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	5.91
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	BLQ(LOQ)-1.0
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	69.03

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	3.03
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	16.42
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	66.18
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	0.75
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorized Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Bengal CBE (India) : Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Chennai - 600 054
Labs (India) : Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 054, Tamil Nadu
044 - 26581647 26581648 | Mail : (name_mail@nawalabs.com)

ULR NO: TC129962400018654F	SAMPLE NO : SS-09	Date: 02/07/2024

Sample ID No.	:	NAL/20240626EW0107549
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Voyants Solutions Pvt. Ltd.
Address	:	325, Level – IV, Diamond Dune, Poonamallee High Road, Aminjikarai, Chennai – 600029.
Sample Described by the Customer*	:	SILT [DATHA IRI NEAR TVS COMPANY KOTTUR IRI SL.No 09]
Quantity of the Sample Received	:	1 Kg
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan – Asst Manager
Information about Sampling	:	Drawn by NAWAL Analytical Labs India Private Limited – Hosur.
Customer Reference	:	By letter Dated:26/06/2024
Date of Sample Receipt	:	26/06/2024
Date of test Starting	:	26/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown Colour

CIN :U71200TZ2023PTC029607

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ULR NO: TC129862400216425F	SAMPLE NO : SS-09	Date: 22/07/2024

Sample ID No	:	NAL/2024080W0000007549
Discipline / Group	:	Chemical / Water
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	323, Level – IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai – 600025.
Sample Described by the Customer*	:	SILT [DATHA BIRLA TVS COMPANY KOTTUR BH SL No:09]
Quantity of the Sample Received	:	1 Kg
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman – Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited – Hosur
Customer Reference	:	By Letter Dated 26/06/2024
Date of Sample Receipt	:	28/06/2024
Date of test Starting	:	28/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	–	Light Brown Colour
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	%	Sand- 11.0, Silt- 32.0, Clay- 57.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	Kg/ha	67.33
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	Kg/ha	229.50
5	Nitrate	NAL/SOP/SAP/116	mg/kg	473.97
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.49
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.07
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.56
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQL[LOQ: 1.0]
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	69.02

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ULR NO: TC129962x000166557 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	11.0
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	4.02
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	78.91
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	3523.58
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Bengal CHE (Kolkata): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Uttarpara - 712258 (WB)
Lab: Kolkata - Plot nos. 16/1, New SIDCO Industrial Estate, Uttarpara, Hooghly - 712258 (WB), Tamil Nadu
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ULR NO: TC129962400017672F	SAMPLE NO : SS-10	Date: 22/07/2024

Sample ID No	:	NAL/2024/06EM/0000/7832
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyants Solutions Pvt. Ltd.
Address	:	323, Level - IV, Diamond Dune, Poonamallee High Road, Arumpakkam, Chennai - 600106
Sample Described by the Customer*	:	SEZ - [Kalpganda Zone1-32]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kumar - Asst Manager
Information about Sampling	:	Drawn by NAWAL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated 24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	%	Clay- 7.0, Silt- 38.0, Clay- 55.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	Kg/ha	23.97
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	Kg/ha	387.45
5	Nitrate	NAL/SOP/SAP/116	mg/kg	229.03
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	0.04
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.63
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	5.91
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.65
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	47.0

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	5.01
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	6.42
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	38.97
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	10822.27
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400017322F	SAMPLE NO : SS-11	Date: 22/07/2024

Sample ID No	:	NAL/2024/08EW/0000007942
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	323, Level - IV, Diamond Dune, Poonamallee High Road, Arumgakanai, Chennai - 600032.
Sample Described by the Customer*	:	SILT - [Sri Chandra Sadashivar Road - 11]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated:24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	%	Sand-9.0, Silt-27.0, Clay-64.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	Kg/ha	72.37
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	Kg/ha	1258.05
5	Nitrate	NAL/SOP/SAP/116	mg/kg	528.42
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.47
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	5.63
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	BLQ(LOQ-1.0)
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.33
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	50.73

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	8.52
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	12.61
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	63.50
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	0.66
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129862400216531F	SAMPLE NO : SS-12	Date: 22/07/2024

Sample ID No	:	NAL/2024062AW0000755
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Keyants Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600029.
Sample Described by the Customer*	:	SOIL (Jalagandeshwar-12)
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 21/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown Colour
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	%	Sand-7.0, Silt-28.0, Clay-65.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	Kg/ha	65.34
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by DBED.2009	Kg/ha	855.71
5	Nitrate	NAL/SOP/SAP/116	mg/kg	358.10
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.85
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.40
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.56
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.35
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	63.88

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	5.85
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	12.51
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	49.48
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	4725.13
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

Disclaimer:

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Nagpur CHE (Solid): Plot no.16, Electrical & Electronic Estate, New MIDC Industrial Estate, Umrer - 441203
Lab: Solid - Plot no. 16/1, New MIDC Industrial Estate, Ambadam, Salem - 636 308, Tamil Nadu
Mob: 9894879894 | Mail : enquiry.india@nawalabs.com

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400017455F	SAMPLE NO : SS-13	Date: 22/07/2024

Sample ID No	:	NAL/2024/08EW/0000007862
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanik Solutions Pvt. Ltd.
Address	:	324, Level - IV, Diamond Dune, Poonamallee High Road, Arumgakanai, Chennai - 600120.
Sample Described by the Customer*	:	SELT - Dharga Chandrambigai Salai - 13
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated:24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Clay-71.0,
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	62.09
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	1128.42
5	Nitrate	NAL/SOP/SAP/116	mg/kg	205.23
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.66
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.15
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	4.02
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.45
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	59.03

Authorised Signatory

Continue...*

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	3.72
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	12.11
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	5.03
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	10486.03
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400017692F	SAMPLE NO : SS-14	Date: 22/07/2024

Sample ID No	:	NAL/2024/08EW/00007572
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	323, Level - IV, Diamond Dune, Poonamallee High Road, Arumgakanai, Chennai - 600120.
Sample Described by the Customer*	:	SILT - [Dhadhav Rao Lake - 14]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated:24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Blackish Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand - 5.0 Silt - 25.0 Clay - 70.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	68.30
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	587.99
5	Nitrate	NAL/SOP/SAP/116	mg/kg	207.80
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.29
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	3.80
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	BLQ(LOQ-1.0)
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.12
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	66.09

Authorised Signatory

"Continues ..."

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Labs. Addl.: Plot no. 108, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
044 - 26161967, 26161968 | info@nawal.co.in

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ULR NO: TC129962x000165317 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	21.68
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	8.41
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	44.50
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	4984.0
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Nagpur CHE (Solid): Plot no.16, Electronic Complex, New MIDC Industrial Estate, Hingna, Nagpur - 440 016
Lab: Solid - Plot no. 16/1, New MIDC Industrial Estate, Hingna, Nagpur - 440 016, Tamil Nadu
Mob: 9989879894 | Mail : [illegible]

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ULR NO: TC129862400216478F	SAMPLE NO : SS-15	Date: 22/07/2024

Sample ID No	:	NAL/2024080W0000436
Discipline / Group	:	Chemical / Pollution & Environment
Name of the Customer*	:	Keyanta Solutions Pvt. Ltd.
Address	:	303, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600029.
Sample Described by the Customer*	:	SILT [AVALAPALLI -SARGAR BH SLNO -15]
Quantity of the Sample Received	:	1 Kg
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By letter Dated 23/06/2024
Date of Sample Receipt	:	25/06/2024
Date of test Starting	:	25/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination		Light Brown Colour
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	%	Sand-9.0, Silt-18.0, Clay-73.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	kg/ha	60.7312
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	kg/ha	411.56
5	Nitrate	NAL/SOP/SAP/116	mg/kg	329.22
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	2.86
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	3.17
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.29
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQL(LOQ: 1.0)
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	63.33

Authorised Signatory

"Continue..."

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ULR NO: TC129962x000164787 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	2.07
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	16.04
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	42.08
15	Aluminium	USEPA 3050 B Rev. 2: 1996	%	1.11
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorized Signatory
R.Chakravarthi
Laboratory Supervisor

End of Report

Bengal Unit (Solid): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Chennai - 600116
Labs, Solid: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
044 - 26161617, 26161618 | Mail : (name_mail@nawalabs.com)

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ULR NO: TC129862A032167907F	SAMPLE NO : SS-16	Date: 31/07/2024

Sample ID No	:	NAL/2024080WA0000829
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Keyants Solutions Pvt. Ltd.
Address	:	303, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600029.
Sample Described by the Customer*	:	SIT - Kheeratbur - Varatharajan Sri - 16]
Quantity of the Sample Received	:	1 Kg
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Brown colour
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand-21.0, Silt-27.0, Clay-52.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	kg/ha	28.44
4	Available Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	kg/ha	423.99
5	Nitrate	NAL/SOP/SAP/116	mg/kg	65.45
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	3.06
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.18
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQL(LOQ-1.0)
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.41
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	66.23

Authorised Signatory

"Continue..."

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ULR NO: TC129962x000167907				Date: 05/07/2024
S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	8.88
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	10.98
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	43.58
15	Aluminium as Al	USEPA 3050 B Rev. 2: 1996	%	1.55
16	Mercury as Hg	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic as As	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Bengal Unit (Kolkata): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Uttarpara - 712258 (WB)
Lab: Kolkata - Plot no. 16/1, New SIDCO Industrial Estate, Uttarpara, Hooghly - 712258 (WB), Tamil Nadu
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ULR NO: TC129962x032167807F	SAMPLE NO : SS-17	Date: 23/07/2024

Sample ID No	:	NAL/2024080WA0000626
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Keyants Solutions Pvt. Ltd.
Address	:	323, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600029.
Sample Described by the Customer*	:	SET - [Cheranallur - Pattalamman Eri - 17]
Quantity of the Sample Received	:	1 Kg
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown Colour
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand-7.0, Silt-25.0, Clay-68.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	56.42
4	Available Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	921.41
5	Nitrate	NAL/SOP/SAP/116	mg/kg	289.86
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	3.41
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.25
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	BLQ(LOQ-1.0)
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.56
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	50.98

Authorised Signatory

Continue...*

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044-2... (...) ...

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ULR NO: TC129962x000167607 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	5.87
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	31.52
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	39.68
15	Aluminium as Al	USEPA 3050 B Rev. 2: 1996	mg/kg	14459.52
16	Mercury as Hg	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic as As	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Authorised Signatory
S.Chakravarthi
Environmental Engineer

End of Report

Bengal CHE (Kolkata): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Uttarpara - 712258 (WB)
Lab: Kolkata - Plot nos. 16/1, New SIDCO Industrial Estate, Uttarpara, Hooghly - 712258 (WB), Tamil Nadu
9836 / 98867 98841 | Mail : (name_mail@nawalindia.com)

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ULR NO: TC129962400017502F	SAMPLE NO : SS-18	Date: 22/07/2024

Sample ID No	:	NAL/2024/08EW/0000/1622
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	324, Level - IV, Diamond Dune, Poonamallee High Road, Arumgakanai, Chennai - 600120.
Sample Described by the Customer*	:	SILT - [Devan Dri - 18]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated:24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand - 17.0 Silt - 31.0 Clay - 52.0.
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	21.30
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	162.78
5	Nitrate	NAL/SOP/SAP/116	mg/kg	196.43
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	0.82
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	4.47
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.96
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	6.65
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	20.09

Authorised Signatory

"Continue..."

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	20.11
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	1.19
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	33.84
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	1971.12
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

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ULR NO: TC129962400017581F	SAMPLE NO : SS-19	Date: 22/07/2024

Sample ID No	:	NAU2024080EW000007542
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanti Solutions Pvt. Ltd.
Address	:	303, Level - IV, Diamond Dune, Poonamallee High Road, Arumgakanai, Chennai - 600120.
Sample Described by the Customer*	:	SELT - [Venkatappan Ext -19]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated:24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand- 6.0 Silt- 25.0 Clay- 69.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	68.72
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	748.64
5	Nitrate	NAL/SOP/SAP/116	mg/kg	305.50
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	2.54
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	4.50
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.51
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQ(LOQ-1.0)
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	9.863

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	4.89
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	12.13
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	45.40
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	0.75
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

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ULR NO: TC129962400017631F	SAMPLE NO : SS-20	Date: 22/07/2024

Sample ID No	:	NAL/2024/08EWA/00007322
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	323, Level - IV, Diamond Dune, Poonamallee High Road, Arumgakanai, Chennai - 600120.
Sample Described by the Customer*	:	SILT - [Lakshmanarur Tri -20]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated:24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand- 5.0 Silt- 30.0 Clay- 65.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	63.14
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	256.34
5	Nitrate	NAL/SOP/SAP/116	mg/kg	223.44
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.06
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.14
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.26
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.15
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	27.09

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Continue...*

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	17.85
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	15.87
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	57.69
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	3626.16
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorized Signatory
R.Chakravarthi
Laboratory Supervisor

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129862400216554F	SAMPLE NO : SS-21	Date: 02/07/2024

Sample ID No	:	NAL/2024062W0000756
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Keyarts Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600029.
Sample Described by the Customer*	:	SILT (RAMANARAYAN RFI 21)
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 21/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown Colour
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	%	Sand-9.0, Silt-29.0, Clay-62.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	kg/ha	60.22
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by DRD.2009	kg/ha	512.55
5	Nitrate	NAL/SOP/SAP/116	mg/kg	334.51
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.59
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.01
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.99
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.95
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	29.13

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ULR NO: TC129962x000165657 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	20.84
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	8.11
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	42.75
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	6198.50
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Laboratory Supervisor

End of Report

Bengal Office (Kolkata): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Uttarpara - 712258 (WB)
Labs, Kolkata - Plot nos. 16/1, New SIDCO Industrial Estate, Uttarpara, Hooghly - 712258 (WB), Tamil Nadu
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ULR NO: TC129962400017703F	SAMPLE NO : SS-22	Date: 22/07/2024

Sample ID No	:	NAL/2024/08EW/00007429
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	3/23, Level - IV, Diamond Dune, Poonamallee High Road, Arumgakanai, Chennai - 600120.
Sample Described by the Customer*	:	SILT - [Thothas Dri -22]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated:24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand- 5.0 Silt- 35.0 Clay- 61.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	74.33
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	1680.92
5	Nitrate	NAL/SOP/SAP/116	mg/kg	582.89
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.28
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.33
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.73
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	5.17
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	80.70

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ULR NO: TC129962x000165317 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	9.09
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	11.40
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	36.69
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	0.63
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Bengal Office (Kolkata): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Uttarpara - 712258 (WB)
Labs, Kolkata - Plot nos. 16/1, New SIDCO Industrial Estate, Uttarpara, Hooghly - 712258 (WB), Tamil Nadu
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ULR NO: TC129862x032167917F	SAMPLE NO : SS-23	Date: 31/07/2024

Sample ID No	:	NAL/2024080WA0000626
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Keyants Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Dista, Poonamallee High Road, Ambattur, Chennai - 600029.
Sample Described by the Customer*	:	SIIT - [Spent Lube - Chinna Elangiri -23]
Quantity of the Sample Received	:	1 Kg
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited
Customer Reference	:	By Letter Dated 27/06/2024
Date of Sample Receipt	:	27/06/2024
Date of test Starting	:	27/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Brown Colour
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand- 11.0, Silt- 33.2, Clay- 56.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	62.45
4	Available Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	383.45
5	Nitrate	NAL/SOP/SAP/116	mg/kg	221.57
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.96
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.34
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	BLQ[LOQ-1.0]
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	BLQ[LOQ-1.0]
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	68.11

Authorised Signatory

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ULR NO: TC129962x000167917 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	23.16
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	7.35
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	32.44
15	Aluminium as Al	USEPA 3050 B Rev. 2: 1996	mg/kg	7327.27
16	Mercury as Hg	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic as As	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Bengal Unit (Add.): Plot no.16, Electronic Complex, New SIDCO Industrial Estate, Guindy - 600 032
Lab: Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884847 [illegible]

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ULR NO: TC129962400216628F	SAMPLE NO : SS-24	Date: 26/07/2024

Sample ID No	:	NAL/2024080WA0000729
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Keyards Solutions Pvt. Ltd.
Address	:	313, Level - IV, Diamond Point, Poonamallee High Road, Ambattur, Chennai - 600025.
Sample Described by the Customer*	:	SILT [KALKERI LAKE THALLY ROAD ERI SL.No 24]
Quantity of the Sample Received	:	1 Kg
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Raman - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited - Hosur
Customer Reference	:	By Letter Dated 26/06/2024
Date of Sample Receipt	:	26/06/2024
Date of test Starting	:	26/06/2024
Date of test Completed	:	03/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Brown colour
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand- 18.0, Silt- 27.0, Clay- 55.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	kg/ha	693.05
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	kg/ha	378.60
5	Nitrate	NAL/SOP/SAP/116	mg/kg	23.45
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	10.82
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	5.03
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	BLQ(LOQ- 1.0)
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.42
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	62.23

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ULR NO: TC129962000166587 Date: 05/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	4.60
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	21.21
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	57.80
15	Aluminium	USEPA 3050 B Rev. 2: 1996	%	1.47
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400017871F	SAMPLE NO : SS-25	Date: 22/07/2024

Sample ID No	:	NAU2024080EW0000712
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanik Solutions Pvt. Ltd.
Address	:	324, Level - IV, Diamond Dune, Poonamallee High Road, Arumgakanai, Chennai - 600120.
Sample Described by the Customer*	:	SELT - [Arthanadi Veeraragavan Lalee - 25]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated:24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Clay- 5.0, Silt- 29.0 Clay- 66.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	62.83
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	329.85
5	Nitrate	NAL/SOP/SAS/116	mg/kg	186.23
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.57
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.79
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQ[LOQ-1.0]
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQ[LOQ-1.0]
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	97.24

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	7.52
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	35.70
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	16.80
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	4405.28
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Bengal Office (Kolkata): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Uttarpara - 712258 (WB)
Labs, Kolkata - Plot nos. 16/1, New SIDCO Industrial Estate, Uttarpara, Hooghly - 712258 (WB), Tamil Nadu
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ULR NO: TC129962400017803F	SAMPLE NO : SS-26	Date: 22/07/2024

Sample ID No	:	NAL/2024/08EW/00007912
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	324, Level - IV, Diamond Dune, Poonamallee High Road, Arumgakanai, Chennai - 600120.
Sample Described by the Customer*	:	SELT - [Kottaver Lake - 26]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated:24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand-4.0, Silt-32.0 Clay- 64.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	62.89
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	634.18
5	Nitrate	NAL/SOP/SAP/116	mg/kg	317.50
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.92
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.34
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.80
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.61
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	105.44

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"Continue..."

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ULR NO: TC129962x000165317				Date: 02/07/2024
S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	5.54
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	23.29
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	35.19
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	15407.75
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

CIN :U71200TZ2023PTC029607

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ULR NO: TC129962400017803F	SAMPLE NO : SS-27	Date: 02/07/2024

Sample ID No	:	NAL/2024/08EW/0000/0919
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	3/24, Level - IV, Diamond Dune, Poonamallee High Road, Arumgakanai, Chennai - 600120.
Sample Described by the Customer*	:	SELT - [Venkatagiri Erl - 27]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated:24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Light Grey
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand - 12.0, Silt - 21.0 Clay - 67.0
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	67.84
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	748.54
5	Nitrate	NAL/SOP/SAP/116	mg/kg	591.50
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	1.25
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.04
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	5.10
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	2.43
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	22.85

Authorised Signatory

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ULR NO: TC129962x000165617 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	27.50
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	12.91
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	35.17
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	1.20
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelan
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Bengal Office (Kolkata): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Dankuni - 712311 (W.B.)
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ULR NO: TC129962400017621F	SAMPLE NO : SS-28	Date: 22/07/2024

Sample ID No	:	NAL/2024/08EWA/0007629
Discipline / Group	:	Chemical / Miscellaneous
Name of the Customer*	:	Voyanit Solutions Pvt. Ltd.
Address	:	3/24, Level - IV, Diamond Dune, Poonamallee High Road, Arumgakanai, Chennai - 600120.
Sample Described by the Customer*	:	SELT - [Alamathum Eri -28]
Quantity of the Sample Received	:	500 g
Condition on Receipt	:	Fit for Analysis
Requested By*	:	Mr. Subhash Kannan - Asst Manager
Information about Sampling	:	Drawn by NAWaL Analytical Labs India Private Limited By Letter
Customer Reference	:	Dated:24/06/2024
Date of Sample Receipt	:	24/06/2024
Date of test Starting	:	24/06/2024
Date of test Completed	:	02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
CHEMICAL PARAMETERS				
1	Colour	Visual Examination	-	Blackish Brown
2	Texture	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	%	Sand - 17.0 Silt - 32.0 Clay - 51.0.
3	Phosphate as PO4	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	29.12
4	Sodium as Na	Laboratory Testing Procedure for Soil & Water Sample Analysis by TNRD.2009	Kg/ha	575.99
5	Nitrate	NAL/SOP/SAP/116	mg/kg	264.9
6	Iron as Fe	USEPA 3050 B Rev. 2 : 1996	%	0.81
7	Chromium as Cr	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.22
8	Manganese as Mn	USEPA 3050 B Rev. 2 : 1996	mg/kg	1.31
9	Lead as Pb	USEPA 3050 B Rev. 2 : 1996	mg/kg	BQ(LOQ-1.0)
10	Zinc as Zn	USEPA 3050 B Rev. 2 : 1996	mg/kg	47.32

Authorised Signatory

Continue...*

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ULR NO: TC129962x000165317 Date: 02/07/2024

S.No	TEST PARAMETERS	TEST PROTOCOL	UNIT	TEST RESULT
11	Copper as Cu	USEPA 3050 B Rev. 2: 1996	mg/kg	21.56
12	Nickel as Ni	USEPA 3050 B Rev. 2: 1996	mg/kg	7.31
13	Cobalt as Co	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
14	Silica	NAL/SOP/SAS/030	%	35.41
15	Aluminium	USEPA 3050 B Rev. 2: 1996	mg/kg	0.62
16	Mercury	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]
17	Arsenic	USEPA 3050 B Rev. 2: 1996	mg/kg	BLQ[LOQ: 1.0]

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For NAWaL Analytical Labs India Private Limited

Verified by
S.Thangavelu
Sr. Chemist

Authorised Signatory
R.Chakravarthi
Environmental Engineer

End of Report

Ambient Air – Test Result

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ULR NO: TC123036240001737IF | SAMPLE NO : A&N-01 | Date: 05/07/2024

Sample ID No.	:	NAL/2024/07/EMW0003/5361
Discipline / Group	:	Chemical / Atmospheric Pollution
Name of the Customer	:	**Voyants Solutions Pvt. Ltd.**
Address	:	323, Level – IV, Diamond Plaza, Poonamallee High Road, Anna Nagar, Chennai – 600029.
Source of the Monitoring	:	**AMBIENT AIR**
Requested by	:	Mr. Subhash Kannan – Asst Manager
Date & Duration of monitoring	:	04.07.2024 (24 Hours)
Location of Sampling	:	B POINT
Ambient Temperature	:	21.5 °C (Min) 30.6 °C (Max)
Relative Humidity	:	63.6 % (Min) 82.8 % (Max)
Wind Speed (Avg)	:	2.1 m/Sec
Sky Appearance	:	Clear Sky
Customer Reference	:	Submission Form Dated 04/07/2024
Date of Sample Receipt	:	05/07/2024
Date of Test Starting	:	06/07/2024
Date of Test Completed	:	08/07/2024

S No.	PARAMETERS	UNIT	TEST RESULTS	NAAQ NORMS	TEST PROTOCOL
1	Sulphur Dioxide as SO2	µg/m3	8.4	80.0	IS 5182 (part 2): 2023
2	Nitrogen Dioxide as NO2	µg/m3	28.0	80.0	IS 5182 (part 6): 2018
3	Particulate Matter as PM10	µg/m3	97.0	100.0	IS 5182 (Part-23):2006
4	Particulate Matter as PM2.5	µg/m3	48.0	60.0	IS 5182 (part 24): 2019
5	Ozone as O3	µg/m3	BLQ(LOQ- 10.0)	180.0	IS 5182 (Part-9):1974
6	Lead as Pb	µg/m3	BLQ(LOQ- 0.05)	1.0	BSEN 14902:2005
7	Carbon Monoxide as CO	mg/m3	BLQ(LOQ- 0.115)	2.0	IS 5182 (Part-10):1999
8	Ammonia as NH3	µg/m3	BLQ(LOQ- 20.0)	400.0	IS 5182 (Part-25):2018
9	Benzene as C6H6	µg/m3	BLQ(LOQ- 1.0)	5.0	IS 5182 (Part-11):2006
10	Benzo (a) Pyrene	ng/m3	BLQ(LOQ- 0.1)	1.0	IS 5182 (Part-12):2004
11	Arsenic as As	ng/m3	BLQ(LOQ- 2.0)	6.0	BSEN 14902:2005
12	Nickel as Ni	ng/m3	BLQ(LOQ- 2.0)	20.0	BSEN 14902:2005

Note: BLQ: Below Limit of Quantification, LOQ: Limit of Quantification All the above test parameters are well within the NAAQ Norms (Industrial area) for sampling carried. IS/4 PSU: Sampling Monitor Valid up to 29.11.2024.

Authorised Signatory

"Continue....."

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ULR NO: TC129968260001793ST | Date: 09/07/2024

For NAWaL Analytical Labs India Private Limited

Verified by
C Dhanaraju
Field Technician

End of Report

Authorized Signatory
R.Lakshmanan
Environmental Engineer

Bengal Off (Add.): Plot no.16, Electronic Complex, New SIDCO Industrial Estate, Guindy - 600 032
Lab: Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884878884, 9884878885 | Mail : (name.nabl@nawalindia.com)

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ULR NO: TC123036240001739BF	SAMPLE NO : A&N-02	Date: 05/07/2024

Sample ID No.	:	NAL/2024/07/EMW0005360
Discipline / Group	:	Chemical / Atmospheric Pollution
Name of the Customer	:	**Voyants Solutions Pvt. Ltd.**
Address	:	323, Level – IV, Diamond Plaza, Poonamallee High Road, Anna Nagar, Chennai – 600029.
Source of the Monitoring	:	**AMBIENT AIR**
Requested by	:	Mr. Subhash Kannan – Asst Manager
Date & Duration of monitoring	:	04.07.2024 (24 Hours)
Location of Sampling	:	C POINT
Ambient Temperature	:	21.5 °C (Min) 30.6 °C (Max)
Relative Humidity	:	63.6 % (Min) 82.8 % (Max)
Wind Speed (Avg)	:	2.1 m/Sec
Sky Appearance	:	Clear Sky
Customer Reference	:	Submission Form Dated 04/07/2024
Date of Sample Receipt	:	05/07/2024
Date of Test Starting	:	06/07/2024
Date of Test Completed	:	08/07/2024

S No.	PARAMETERS	UNIT	TEST RESULTS	NAAQ NORMS	TEST PROTOCOL
1	Sulphur Dioxide as SO2	µg/m3	19.0	80.0	IS 5182 (part 2): 2023
2	Nitrogen Dioxide as NO2	µg/m3	38.0	80.0	IS 5182 (part 6): 2018
3	Particulate Matter as PM10	µg/m3	227.0	100.0	IS 5182 (Part-23):2006
4	Particulate Matter as PM2.5	µg/m3	118.0	60.0	IS 5182 (part 24): 2019
5	Ozone as O3	µg/m3	BLQ(LOQ- 10.0)	180.0	IS 5182 (Part-9):1974
6	Lead as Pb	µg/m3	BLQ(LOQ- 0.05)	1.0	BSEN 14902:2005
7	Carbon Monoxide as CO	mg/m3	0.152	2.0	IS 5182 (Part-10):1999
8	Ammonia as NH3	µg/m3	BLQ(LOQ- 20.0)	400.0	IS 5182 (Part-25):2018
9	Benzene as C6H6	µg/m3	BLQ(LOQ- 1.0)	5.0	IS 5182 (Part-11):2006
10	Benzo (a) Pyrene	ng/m3	BLQ(LOQ- 0.1)	1.0	IS 5182 (Part-12):2004
11	Arsenic as As	ng/m3	BLQ(LOQ- 2.0)	6.0	BSEN 14902:2005
12	Nickel as Ni	ng/m3	BLQ(LOQ- 2.0)	20.0	BSEN 14902:2005

Note: BLQ: Below Limit of Quantification, LOQ: Limit of Quantification All the above test parameters are well within the NAAQ Norms (Industrial area) for sampling carried out & PM2.5 sampler calibration Valid up to 29.11.2024.

Authorised Signatory

"Continue....."

Bengal Office (Add.): Plot no.418, Electronic Complex, Near SIDCO Industrial Estate, Guindy – 600 032
Labs. Add.: Plot no. 108, Phase-II SIDCO Industrial Estate, Ambattur, Chennai – 600 098, Tamil Nadu
Mobile: 9884047 [illegible] | Mail: [illegible]

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ULR NO: TC129062600017393F Date: 09/07/2024

For NAWaL Analytical Labs India Private Limited

Verified by
C.Dhanaraju
Field Technician

Authorized Signatory
R.Lakshmanan
Environmental Engineer

End of Report

Nagpur CHE (Solid): Plot no.16, Electronic Complex, New MIDC Industrial Estate, Umrer - 441203
Lab: Solid - Plot no. 3/D, New MIDC Industrial Estate, Ambajari, Nagpur - 440 034, Tamil Nadu
Mob: 9881878884 | Mail : [illegible]

CIN :U71200TZ2023PTC039607

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ULR NO: TC123036240001739SF	SAMPLE NO : A&N-03	Date: 05/07/2024

Sample ID No.	:	NAL/2024/07/EMW/0003/5399
Discipline / Group	:	Chemical / Atmospheric Pollution
Name of the Customer	:	**Voyants Solutions Pvt. Ltd.**
Address	:	323, Level – IV, Diamond Plaza, Poonamallee High Road, Anna Nagar, Chennai – 600029.
Source of the Monitoring	:	**AMBIENT AIR**
Requested by	:	Mr. Subhash Kannan – Asst Manager
Date & Duration of monitoring	:	04.07.2024 (24 Hours)
Location of Sampling	:	**FRONT**
Ambient Temperature	:	21.5 °C (Min) 30.6 °C (Max)
Relative Humidity	:	63.6 % (Min) 82.8 % (Max)
Wind Speed (Avg)	:	2.1m/Sec
Sky Appearance	:	Clear Sky
Customer Reference	:	Submission Form Dated 04/07/2024
Date of Sample Receipt	:	05/07/2024
Date of Test Starting	:	06/07/2024
Date of Test Completed	:	08/07/2024

S No.	PARAMETERS	UNIT	TEST RESULTS	NAAQ NORMS	TEST PROTOCOL
1	Sulphur Dioxide as SO2	µg/m3	11.8	80.0	IS 5182 (part 2): 2023
2	Nitrogen Dioxide as NO2	µg/m3	29.0	80.0	IS 5182 (part 6): 2018
3	Particulate Matter as PM10	µg/m3	155.0	100.0	IS 5182 (Part-23):2006
4	Particulate Matter as PM2.5	µg/m3	70.0	60.0	IS 5182 (part 24): 2019
5	Ozone as O3	µg/m3	BLQ(LOQ- 10.0)	180.0	IS 5182 (Part-9):1974
6	Lead as Pb	µg/m3	BLQ(LOQ- 0.05)	1.0	BSEN 14902:2005
7	Carbon Monoxide as CO	mg/m3	0.125	2.0	IS 5182 (Part-10):1999
8	Ammonia as NH3	µg/m3	BLQ(LOQ- 20.0)	400.0	IS 5182 (Part-25):2018
9	Benzene as C6H6	µg/m3	BLQ(LOQ- 1.0)	5.0	IS 5182 (Part-11):2006
10	Benzo (a) Pyrene	ng/m3	BLQ(LOQ- 0.1)	1.0	IS 5182 (Part-12):2004
11	Arsenic as As	ng/m3	BLQ(LOQ- 2.0)	6.0	BSEN 14902:2005
12	Nickel as Ni	ng/m3	BLQ(LOQ- 2.0)	20.0	BSEN 14902:2005

Note: BLQ: Below Limit of Quantification, LOQ: Limit of Quantification All the above test parameters are well within the NAAQ Norms (Industrial area) for sampling carried out & result is subject to above mentioned validity w.e.f. 29.11.2021.

Authorised Signatory

"Continue....."

Nawal CHE (India) : Plot no.11B, Electronic Complex, New SIDCO Industrial Estate, Chennai - 600105
Labs (India) : Plot no. 10B, New SIDCO Industrial Estate, Ambattur, Chennai - 600 105, Tamil Nadu
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Certified by OHSAS 18001:2007, Notified by FSSAI, Associate Member IOPEPC & Recognized by MoEF

ULR NO: TC129062600017935F Date: 09/07/2024

For NAWaL Analytical Labs India Private Limited

Verified by
C.Dhanaraju
Field Technician

End of Report

Authorized Signatory
R.Lakshmanan
Environmental Engineer

Bengal CFR (Kolkata): Plot no.16, Electronics & Electronics Estate, New SIDCO Industrial Estate, Uttarpara - 712258 (WB)
Lab: Kolkata - Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884849844 | Mail : [illegible]

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ULR NO: TC123036240001739G3F | SAMPLE NO : A&N-04 | Date: 05/07/2024

Sample ID No.	:	NAL/2024/07/EW/0003/5267
Discipline / Group	:	Chemical / Atmospheric Pollution
Name of the Customer	:	**Voyants Solutions Pvt. Ltd.**
Address	:	323, Level – IV, Diamond Plaza, Poonamallee High Road, Anna Nagar, Chennai – 600029.
Source of the Monitoring	:	**AMBIENT AIR**
Requested by	:	Mr. Subhash Kannan – Asst Manager
Date & Duration of monitoring	:	04.07.2024 (24 Hours)
Location of Sampling	:	**ROOF**
Ambient Temperature	:	21.5 °C (Min) 30.6 °C (Max)
Relative Humidity	:	63.6 % (Min) 82.8 % (Max)
Wind Speed (Avg)	:	2.1 m/Sec
Sky Appearance	:	Clear Sky
Customer Reference	:	Submission Form Dated 04/07/2024
Date of Sample Receipt	:	05/07/2024
Date of Test Starting	:	06/07/2024
Date of Test Completed	:	08/07/2024

S No.	PARAMETERS	UNIT	TEST RESULTS	NAAQ NORMS	TEST PROTOCOL
1	Sulphur Dioxide as SO2	µg/m3	15.3	80.0	IS 5182 (part 2): 2023
2	Nitrogen Dioxide as NO2	µg/m3	32.0	80.0	IS 5182 (part 6): 2018
3	Particulate Matter as PM10	µg/m3	175.0	100.0	IS 5182 (Part-23):2006
4	Particulate Matter as PM2.5	µg/m3	91.0	60.0	IS 5182 (part 24): 2019
5	Ozone as O3	µg/m3	BLQ(LOQ- 10.0)	180.0	IS 5182 (Part-9):1974
6	Lead as Pb	µg/m3	BLQ(LOQ- 0.05)	1.0	BSEN 14902:2005
7	Carbon Monoxide as CO	mg/m3	0.158	2.0	IS 5182 (Part-10):1999
8	Ammonia as NH3	µg/m3	BLQ(LOQ- 20.0)	400.0	IS 5182 (Part-25):2018
9	Benzene as C6H6	µg/m3	BLQ(LOQ- 1.0)	5.0	IS 5182 (Part-11):2006
10	Benzo (a) Pyrene	ng/m3	BLQ(LOQ- 0.1)	1.0	IS 5182 (Part-12):2004
11	Arsenic as As	ng/m3	BLQ(LOQ- 2.0)	6.0	BSEN 14902:2005
12	Nickel as Ni	ng/m3	BLQ(LOQ- 2.0)	20.0	BSEN 14902:2005

Note: BLQ: Below Limit of Quantification, LOQ: Limit of Quantification All the above test parameters are well within the NAAQ Norms (Industrial area) for sampling carried out & Public Exposure (Monitor Valid up to 19.1.2025).

Authorised Signatory

"Continue....."

Bengal Office (Kolkata): Plot no.11B, Electronics By Electronics Complex, Near NICCO Industrial Estate, Chinar – 712235, Labs, Kolkata – Plot nos. 11B, 11C, 11D, SIDCO Industrial Estate, Ambattur, Chennai – 600 058, Tamil Nadu
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Certified by OHSAS 18001:2001, Notified by FSSAI, Associate Member IOPEPC & Recognized by MoEF

ULR NO: TC129062600017962F | Date: 09/07/2024

For NAWaL Analytical Labs India Private Limited

Verified by
C.Dhanaraju
Field Technician

End of Report

Authorized Signatory
R.Lakshmanan
Environmental Engineer

Bengal CHE (Add.) : Plot no.16, Electronic Complex, New SIDCO Industrial Estate, Guindy - 600 032
Lab. Add. : Plot no. 105, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884878884, 9884878885 | Mail : (green_nabl@yahoo.com)

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ULR NO: TC123036240001853IF | SAMPLE NO : A&N-05 | Date: 12/07/2024

Sample ID No.	:	NAL/2024/07/EW/0000/0190
Discipline / Group	:	Chemical / Atmospheric Pollution
Name of the Customer	:	**Voyants Solutions Pvt. Ltd.**
Address	:	323, Level – IV, Diamond Plaza, Poonamallee High Road, Anna Nagar, Chennai – 600029.
Source of the Monitoring	:	**AMBIENT AIR**
Requested by	:	Mr. Subhash Kannan – Asst Manager
Date & Duration of monitoring	:	06.07.2024 (24 Hours)
Location of Sampling	:	A POINT
Ambient Temperature	:	21.5 °C (Min) , 28.2 °C (Max)
Relative Humidity	:	63.8 % (Min) , 83.4 % (Max)
Wind Speed (Avg)	:	1.5 m/Sec
Sky Appearance	:	Clear Sky
Customer Reference	:	Submission Form Dated 06/07/2024
Date of Sample Receipt	:	09/07/2024
Date of Test Starting	:	10/07/2024
Date of Test Completed	:	10/07/2024

S No.	PARAMETERS	UNIT	TEST RESULTS	NAAQ NORMS	TEST PROTOCOL
1	Sulphur Dioxide as SO2	µg/m3	12.5	80.0	IS 5182 (Part-2):2023
2	Nitrogen Dioxide as NO2	µg/m3	26.0	80.0	IS 5182 (Part-6):2006
3	Particulate Matter as PM10	µg/m3	138.0	100.0	IS 5182 (Part-23):2006
4	Particulate Matter as PM2.5	µg/m3	65.0	60.0	IS 5182 (Part-24):2019
5	Ozone as O3	µg/m3	BLQ(LOQ- 10.0)	180.0	IS 5182 (Part-9):1974
6	Lead as Pb	µg/m3	BLQ(LOQ- 0.05)	1.0	IS EN 14902:2005
7	Carbon Monoxide as CO	mg/m3	BLQ(LOQ- 0.115)	2.0	IS 5182 (Part-10):1999
8	Ammonia as NH3	µg/m3	BLQ(LOQ- 20.0)	400.0	IS 5182 (Part-25):2018
9	Benzene as C6H6	µg/m3	BLQ(LOQ- 1.0)	5.0	IS 5182 (Part-11):2006
10	Benzo (a) Pyrene	ng/m3	BLQ(LOQ- 0.1)	1.0	IS 5182 (Part-12):2004
11	Arsenic as As	ng/m3	BLQ(LOQ- 2.0)	6.0	IS EN 14902:2005
12	Nickel as Ni	ng/m3	BLQ(LOQ- 2.0)	20.0	IS EN 14902:2005

Note: BLQ: Below Limit of Quantification, LOQ: Limit of Quantification, All the above test parameters are well within the NAAQ Norms (Industrial area) for sampling duration. IS/EN Public Exposure Norms Valid up to 29.11.2024.

Authorised Signatory

"Continue....."

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Labs. Add.: Plot nos. 11B, 11C, 11D, SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
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Certified by OHSAS 18001:2007, Notified by FSSAI, Associate Member IOPEPC & Recognized by MoEF

ULR NO: TC129968260001883IF **Date:** 11/07/2024

For NAWaL Analytical Labs India Private Limited

Verified by
C.Dhanaraju
Field Technician

End of Report

Authorized Signatory
R.Lakshmanan
Environmental Engineer

Nangal CHE (Mohali): Plot no.148, Electronic By Electronic Estate, New NEEDS Industrial Estate, Dhanas - 160101
Labs, Mohali - Plot no. 148, New NEEDS Industrial Estate, Jeevanpur, Mohali - 140308, Punjab
Mob: 98887 88881 | Mail : (email address)

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ULR NO: TC129916240001853F	SAMPLE NO : A&N-06	Date: 11/07/2024

Sample ID No.	:	NAL/2024070SW0000849F
Discipline / Group	:	Chemical / Atmospheric Pollution
Name of the Customer	:	Wapauto Solutions Pvt. Ltd.
Address	:	523, Level - IV, Diamond Dune, Poonamallee High Road, Anna Nagar, Chennai - 600089.
Source of the Monitoring	:	AMBIENT AIR
Requested By	:	Mr. Subhash Kannan - Asst Manager
Date & Duration of monitoring	:	08.07.2024 (24 Hours)
Location of Sampling	:	G POINT
Ambient Temperature	:	23.2 °C (Min) 27.6 °C (Max)
Relative Humidity	:	64.6 % (Min) 83.7 % (Max)
Wind Speed (Avg)	:	2.6 m/Sec
Sky Appearance	:	Clear Sky
Customer Reference	:	Submission Form Dated 08/07/2024
Date of Sample Receipt	:	09/07/2024
Date of Test Starting	:	10/07/2024
Date of Test Completed	:	10/07/2024

S.No.	PARAMETERS	UNIT	TEST RESULTS	NAAQ NORMS	TEST PROTOCOL
1	Sulphur Dioxide as SO2	µg/m3	7.6	80.0	IS 5182 (Part-2):2023
2	Nitrogen Dioxide as NO2	µg/m3	20.0	80.0	IS 5182 (Part-6):2006
3	Particulate Matter as PM10	µg/m3	89.0	100.0	IS 5182 (Part-23):2006
4	Particulate Matter as PM2.5	µg/m3	40.0	60.0	IS 5182 (Part-24):2019
5	Ozone as O3	µg/m3	BLQ(LOQ- 10.0)	180.0	IS 5182 (Part-9):1974
6	Lead as Pb	µg/m3	BLQ(LOQ- 0.05)	1.0	BS EN 14902:2005
7	Carbon Monoxide as CO	mg/m3	BLQ(LOQ- 0.113)	2.0	IS 5182 (Part-10):1999
8	Ammonia as NH3	µg/m3	BLQ(LOQ- 20.0)	400.0	IS 5182 (Part-25):2018
9	Benzene as C6H6	µg/m3	BLQ(LOQ- 1.0)	5.0	IS 5182 (Part-11):2006
10	Benzo (a) Pyrene	ng/m3	BLQ(LOQ- 0.1)	1.0	IS 5182 (Part-12):2004
11	Arsenic as As	ng/m3	BLQ(LOQ- 2.0)	6.0	BS EN 14902:2005
12	Nickel as Ni	ng/m3	BLQ(LOQ- 2.0)	20.0	BS EN 14902:2005

Note: BLQ-Below Limit of Quantification; LOQ- Limit of Quantification All the above test parameters are well within the NAAQ Norms for remote/rural for Sampling.

Environment Monitoring Compliance Validity as on 19.1.2024

Authorized Signatory

"Continue...."

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ULR NO: TC123102400016533F	Date: 11/07/2024

For NAWaL Analytical labs India Private Limited

Verified by
C.Dhanraju
Field Technician

Authorized Signatory
R.Chakravarthi
Environmental Engineer

CIN :U71200TZ2023PTC039607

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ULR NO: TC123036240001853417 | SAMPLE NO : A&N-07 | Date: 12/07/2024

Sample ID No.	:	NAL/2024/07/EMW0000/0198
Discipline / Group	:	Chemical / Atmospheric Pollution
Name of the Customer	:	**Voyants Solutions Pvt. Ltd.**
Address	:	323, Level – IV, Diamond Plaza, Poonamallee High Road, Anna Nagar, Chennai – 600029.
Source of the Monitoring	:	**AMBIENT AIR**
Requested by	:	Mr. Subhash Kannan – Asst Manager
Date & Duration of monitoring	:	08.07.2024 (24 Hours)
Location of Sampling	:	**II FLOOR**
Ambient Temperature	:	23.2 °C (Min) 27.6 °C (Max)
Relative Humidity	:	64.8 % (Min) 83.7 % (Max)
Wind Speed (Avg)	:	2.6 m/Sec
Sky Appearance	:	Clear Sky
Customer Reference	:	Submission Form Dated 08/07/2024
Date of Sample Receipt	:	09/07/2024
Date of Test Starting	:	10/07/2024
Date of Test Completed	:	10/07/2024

S No.	PARAMETERS	UNIT	TEST RESULTS	NAAQ NORMS	TEST PROTOCOL
1	Sulphur Dioxide as SO2	µg/m3	7.8	80.0	IS 5182 (Part-2):2023
2	Nitrogen Dioxide as NO2	µg/m3	17.0	80.0	IS 5182 (Part-6):2006
3	Particulate Matter as PM10	µg/m3	70.0	100.0	IS 5182 (Part-23):2006
4	Particulate Matter as PM2.5	µg/m3	31.0	60.0	IS 5182 (Part-24):2019
5	Ozone as O3	µg/m3	BLQ(LOQ- 10.0)	180.0	IS 5182 (Part-9):1974
6	Lead as Pb	µg/m3	BLQ(LOQ- 0.05)	1.0	BSEN 14902:2005
7	Carbon Monoxide as CO	mg/m3	BLQ(LOQ- 0.115)	2.0	IS 5182 (Part-10):1999
8	Ammonia as NH3	µg/m3	BLQ(LOQ- 20.0)	400.0	IS 5182 (Part-25):2018
9	Benzene as C6H6	µg/m3	BLQ(LOQ- 1.0)	5.0	IS 5182 (Part-11):2006
10	Benzo (a) Pyrene	ng/m3	BLQ(LOQ- 0.1)	1.0	IS 5182 (Part-12):2004
11	Arsenic as As	ng/m3	BLQ(LOQ- 2.0)	6.0	BSEN 14902:2005
12	Nickel as Ni	ng/m3	BLQ(LOQ- 2.0)	20.0	BSEN 14902:2005

Note: BLQ: Below Limit of Quantification, LOQ: Limit of Quantification All the above test parameters are well within the NAAQ Norms (Industrial area) for sampling carried out & PM2.5 sampler calibration Valid up to 29.11.2024.

Authorised Signatory

"Continue....."

Regd. Off. (Add.): Plot no.11B, Electronics By Electronic Complex, Near SIDCO Industrial Estate, Guindy, Chennai - 600 032
Labs. Add.: Plot nos. 10B, 10C, SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
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ULR NO: TC129968260003830341F | Date: 11/07/2024

For NAWaL Analytical Labs India Private Limited

Verified by
C.Dhanaraju
Field Technician

End of Report

Authorized Signatory
R.Lakshmanan
Environmental Engineer

Bengal CHE (Add.) : Plot no.16, Electronic & Electronic Estate, New SIDCO Industrial Estate, Guindy - 600 032
Lab: Add.: Plot no. 16/1, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884878884, 9884878885 | Mail : mail@nawalindia.com

CIN :U71200TZ2023PTC029607

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ULR NO: TC122036240001855SF | SAMPLE NO : A&N-08 | Date: 12/07/2024

Sample ID No.	:	NAL/2024/07/EMW0000084199
Discipline / Group	:	Chemical / Atmospheric Pollution
Name of the Customer	:	**Voyants Solutions Pvt. Ltd.**
Address	:	323, Level – IV, Diamond Plaza, Poonamallee High Road, Anna Nagar, Chennai – 600029.
Source of the Monitoring	:	**AMBIENT AIR**
Requested by	:	Mr. Subhash Kannan – Asst Manager
Date & Duration of monitoring	:	08.07.2024 (24 Hours)
Location of Sampling	:	**ENOBT**
Ambient Temperature	:	23.2 °C (Min) 27.6 °C (Max)
Relative Humidity	:	64.8 % (Min) 83.7 % (Max)
Wind Speed (Avg)	:	2.6 m/Sec
Sky Appearance	:	Clear Sky
Customer Reference	:	Submission Form Dated 08/07/2024
Date of Sample Receipt	:	09/07/2024
Date of Test Starting	:	10/07/2024
Date of Test Completed	:	10/07/2024

S No.	PARAMETERS	UNIT	TEST RESULTS	NAAQ NORMS	TEST PROTOCOL
1	Sulphur Dioxide as SO2	µg/m3	9.5	80.0	IS 5182 (Part-2):2023
2	Nitrogen Dioxide as NO2	µg/m3	28.0	80.0	IS 5182 (Part-6):2006
3	Particulate Matter as PM10	µg/m3	113.0	100.0	IS 5182 (Part-23):2006
4	Particulate Matter as PM2.5	µg/m3	56.0	60.0	IS 5182 (Part-24):2019
5	Ozone as O3	µg/m3	BLQ(LOQ- 10.0)	180.0	IS 5182 (Part-9):1974
6	Lead as Pb	µg/m3	BLQ(LOQ- 0.05)	1.0	BSEN 14902:2005
7	Carbon Monoxide as CO	mg/m3	BLQ(LOQ- 0.115)	2.0	IS 5182 (Part-10):1999
8	Ammonia as NH3	µg/m3	BLQ(LOQ- 20.0)	400.0	IS 5182 (Part-25):2018
9	Benzene as C6H6	µg/m3	BLQ(LOQ- 1.0)	5.0	IS 5182 (Part-11):2006
10	Benzo (a) Pyrene	ng/m3	BLQ(LOQ- 0.1)	1.0	IS 5182 (Part-12):2004
11	Arsenic as As	ng/m3	BLQ(LOQ- 2.0)	6.0	BSEN 14902:2005
12	Nickel as Ni	ng/m3	BLQ(LOQ- 2.0)	20.0	BSEN 14902:2005

Note: BLQ: Below Limit of Quantification, LOQ: Limit of Quantification All the above test parameters are well within the NAAQ Norms (Industrial area) for sampling carried. IS/USEPA Sampling Monitor Valid up to 29.11.2024.

Authorised Signatory

"Continue....."

Nawal ORP (India) : Plot no.11B, Electronic By Electronic Complex, New SIDCO Industrial Estate, Chennai - 600105
Labs (India) : Plot no. 11B, New SIDCO Industrial Estate, Ambattur, Chennai - 600 105, Tamil Nadu
044-26 [illegible] 044-26 [illegible] | Mail : [illegible]

NAWaL
Analytical Labs India Private Limited

Accredited by NABL (TC-12996) (as per ISO/IEC 17025:2017), Certified by Export Inspection Council & AGMARK,
Recognized by BIS, Approved analyst by CAFTA, Approved by APEDA, Certified by ISO 9001:2015,
Certified by OHSAS 18001:2007, Notified by FSSAI, Associate Member IOPEPC & Recognized by MoEF

ULR NO: TC129968260001883SF **Date:** 11/07/2024

For NAWaL Analytical Labs India Private Limited

Verified by
C.Dhanaraju
Field Technician

End of Report

Authorized Signatory
R.Lakshmanan
Environmental Engineer

Nagal Off (Add.): Plot no.1/6, Electronic By Electronic Estate, New SIDCO Industrial Estate, Chennai - 600 119
Lab. Add.: Plot no. 1/6, New SIDCO Industrial Estate, Ambattur, Chennai - 600 098, Tamil Nadu
Mob: 9884849844 | Mail : [illegible]

Annexure – 14

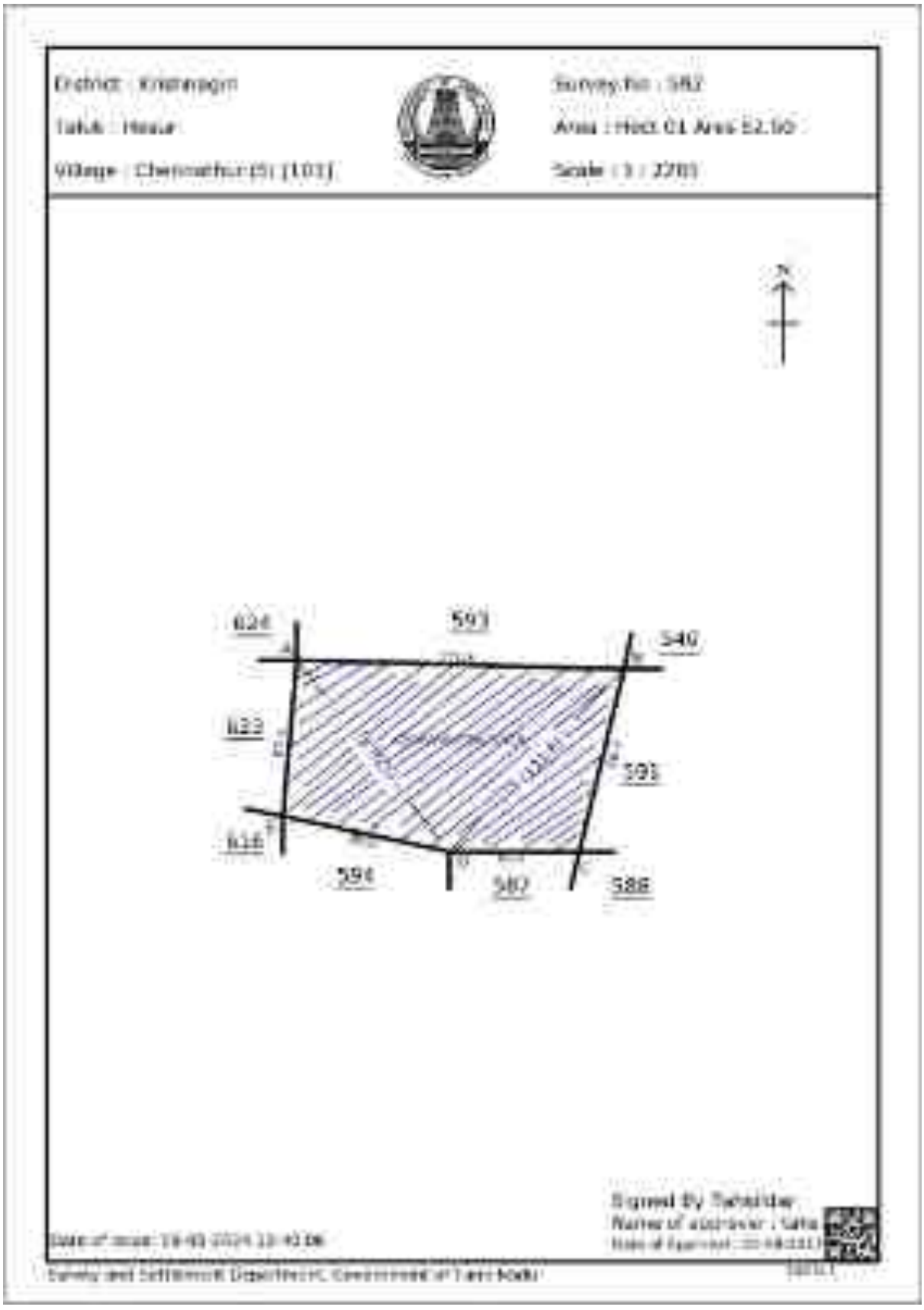
Land Records and FMB Sketches

Water Bodies FMB Sketches

S.No.	Waterbody No	Waterbody Name	Village Name	Ownership Details	FMB No
1	4	KESAVAKUTTAI ERI	Chennathur	Hosur Corporation	592, 593, 591 & 594
2	5	KRISHNARAV ERI (LOOK INDIA OPP)	Chennathur	Hosur Corporation	769
3	6	VENKATESAN ERI	Anumepalli	Hosur Corporation	15
4	7	SANTHAPURAM ERI	Zuzuvadi	Hosur Corporation	463
			Santhapuram	Hosur Corporation	9
5	8	SEETHARAMAN ERI	Zuzuvadi	Hosur Corporation	122
6	11	SRI CHANDRA SUDESHWAR KOVIL THEPPAKULAM	Chennathur	Hindu Religious & Charitable Endowments Department (HR & CE)	920
7	12	JALAGANDESHWAR SWAMY KOIL (RAMANAIKAN ERI)	Hosur	Hindu Religious & Charitable Endowments Department (HR & CE)	712
8	13	DHARGA CHANDRAMBIGAI LAKE	Hosur	WRD	408
			Mukondapalli		368, 257 & 256
9	14	DHADHAV RAO LAKE ASHOK LEYLAND UNIT-1	Zuzuvadi	WRD	79
10	16	VARATHARAYAN ERI	Chennathur	Hosur Corporation	132, 599, 600, 162 & 163
11	17	PATTALAMMAN ERI	Chennathur	Hosur Corporation	327, 466, 467 & 474
12	18	DEVAN ERI (THERPETTAI ERI)			953
13	19	VENKATAPPAN ERI (BEDRAPALLI)	Zuzuvadi	Hosur Corporation	375
14	20	LAKSHMANARAV ERI (MOTTA ERI)	Mukondapalli	Hosur Corporation	692
			Motham Agharam		76
15	22	THOTTAN ERI (ALASANATHAM ERI)	Hosur	Hosur Corporation	2
			Chennathur		1170 & 1169

S.No.	Waterbody No	Waterbody Name	Village Name	Ownership Details	FMB No
16	28	ALASANATHAM ERI	Avalapalli	Hosur Corporation	417
			Chennathur		1043, 1039 & 1041

Water body N0.: 4. KESAVAKUTTAI ERI



District : Krishnagiri

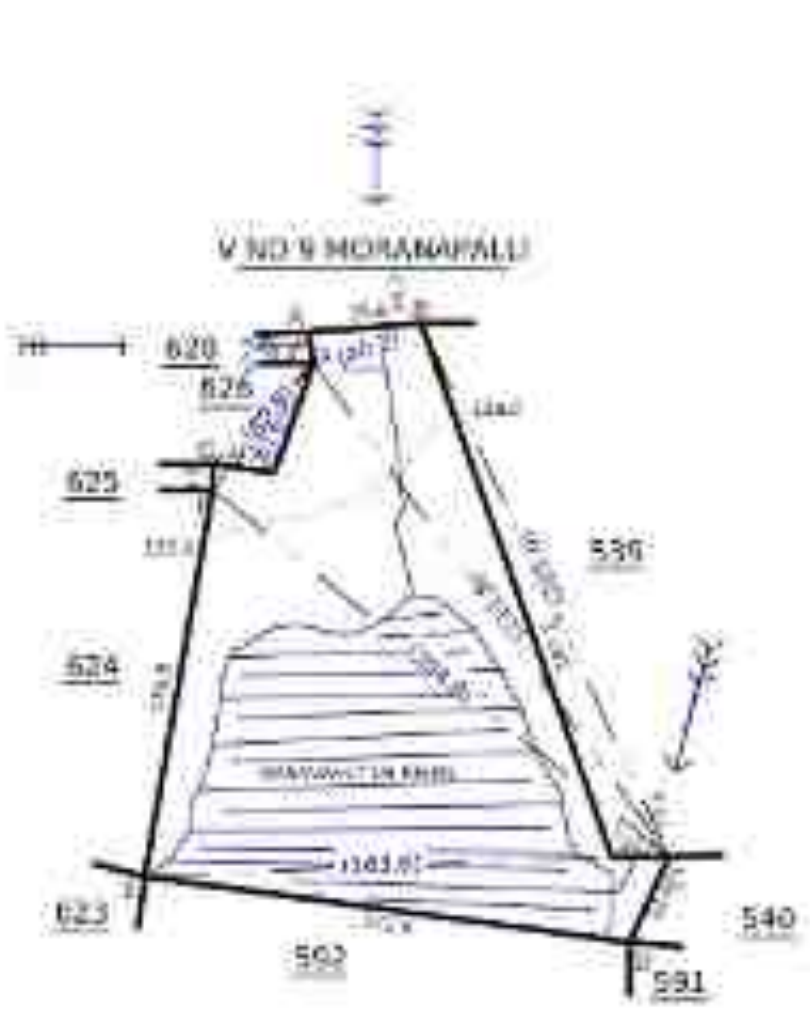
Taluk : Hosur

Village : Chennathur (S) [103]

Survey No : 593

Area : Hect. 02 Ares 21.00

Scale : 1 : 2171



Signed By Tahsildar

Name of approver : tahsildar

Date of Approval : 01.08.2017

Date of Issue : 08.09.2024 13:41:30

Survey and Settlement Department, Government of Tamil Nadu

District : Krishnagiri

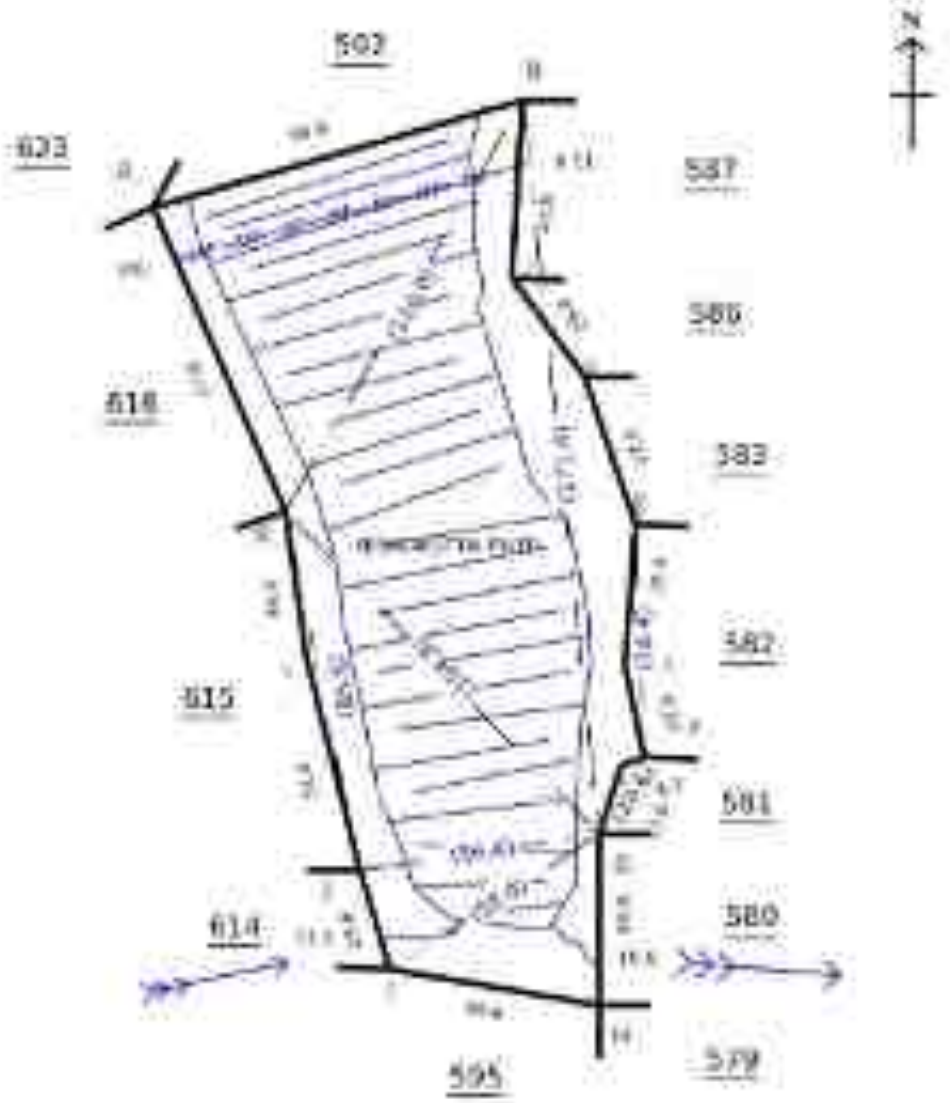
Taluk : Hosur

Village : Chennathur [S] [103]

Survey No : 588

Area : Hect.01 Ares 40.58

Scale : 1 : 1410



Signed By Tahsildar

Name of approver :

Date of Approval :

Date of issue: 08-05-2024 11:41:51

Survey and Settlement Department, Government of Tamil Nadu.

District : Krishnagiri

Taluk : Hosur

Village : Chennathur (St [103])

Survey No : 591

Area : Hect 00 Ares 82.50

Scale : 1 : 1249

Signed By Tahsildar

Date of Issue : 08-05-2024 13:39:39

Survey and Settlement Department, Government of Tamil Nadu

Water body N0.: 5. KRISHNARAV ERI (LOOK INDIA OPP)

District : Krishnagiri

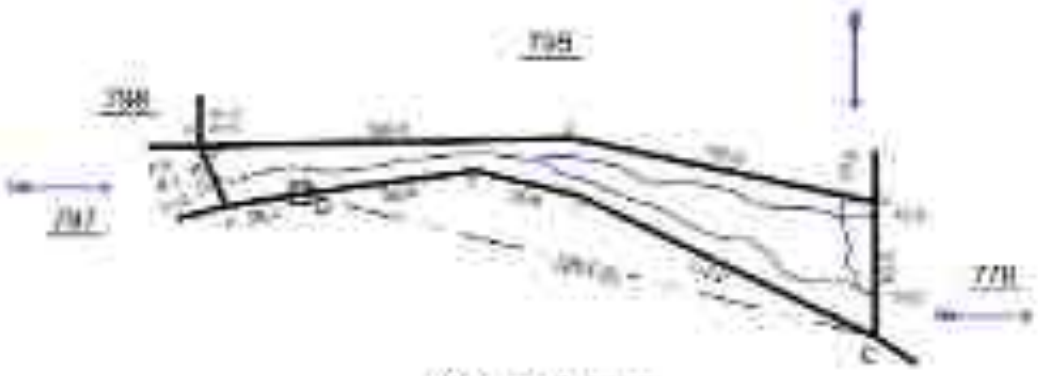
Survey No : 736

Taluk : Hosur (N)

Area : Hect 00 Ares 50 00

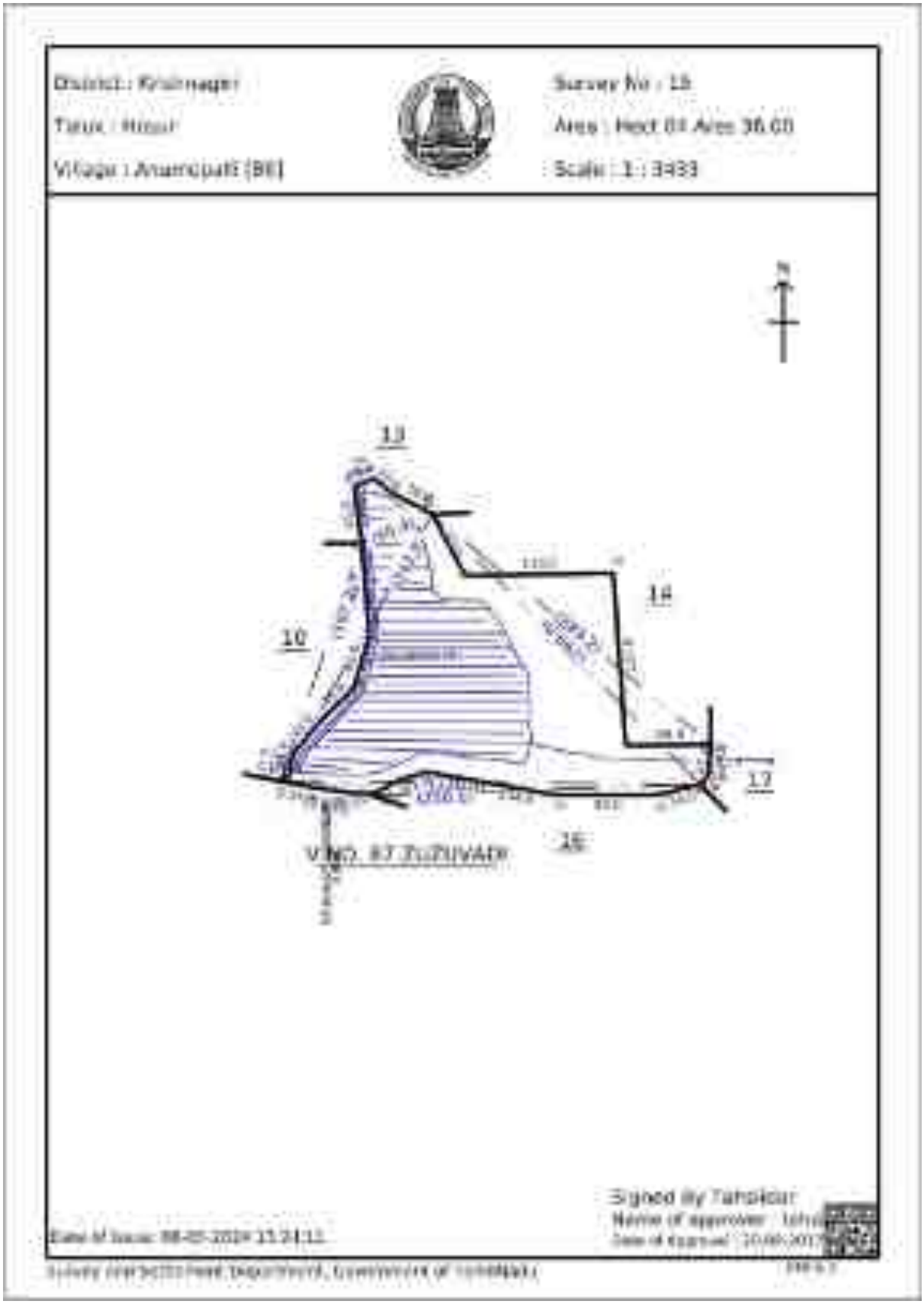
Village : CHENNATHUR (N) [603]

Scale : 1 : 3000

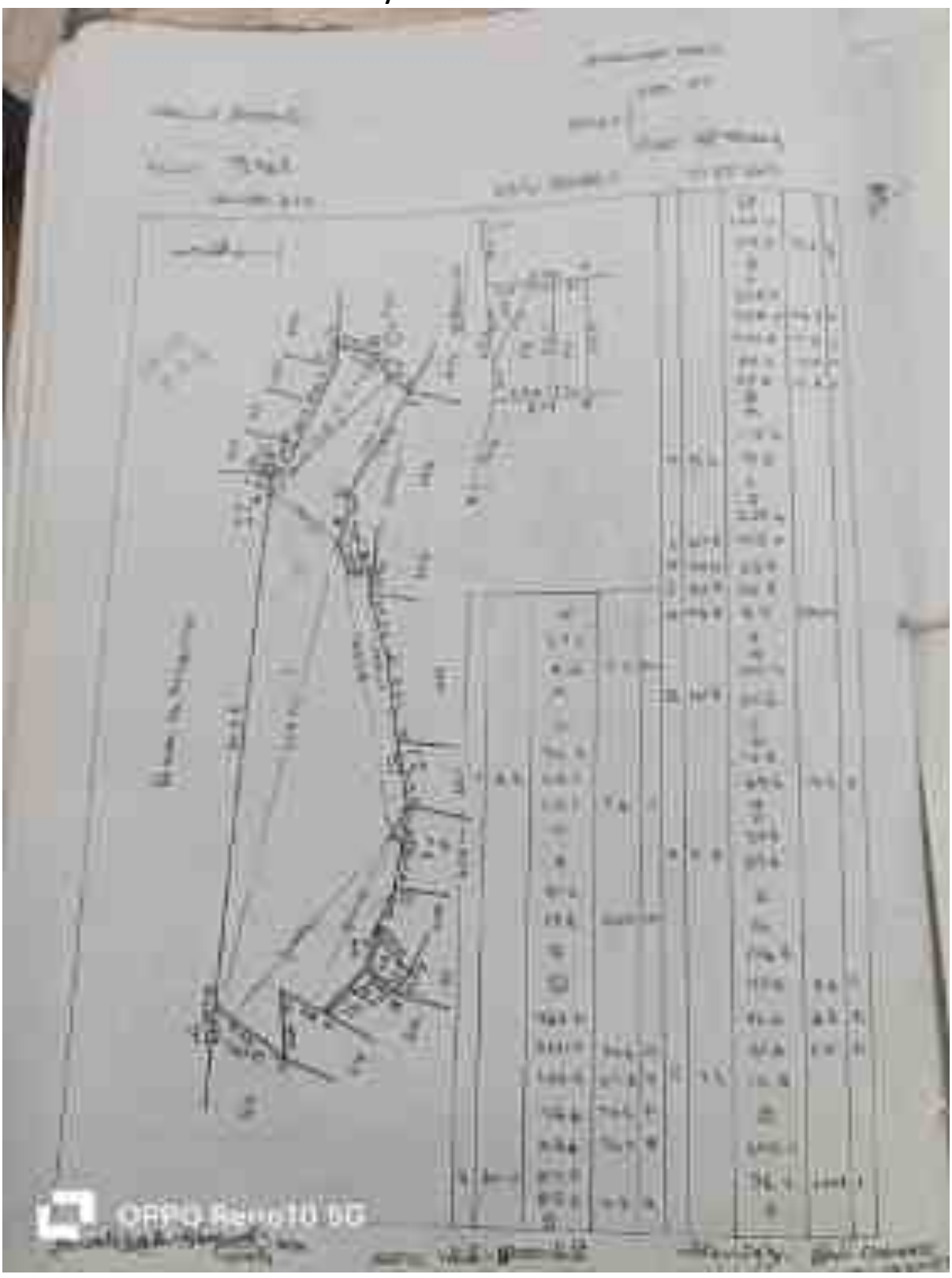


Village Map Portion

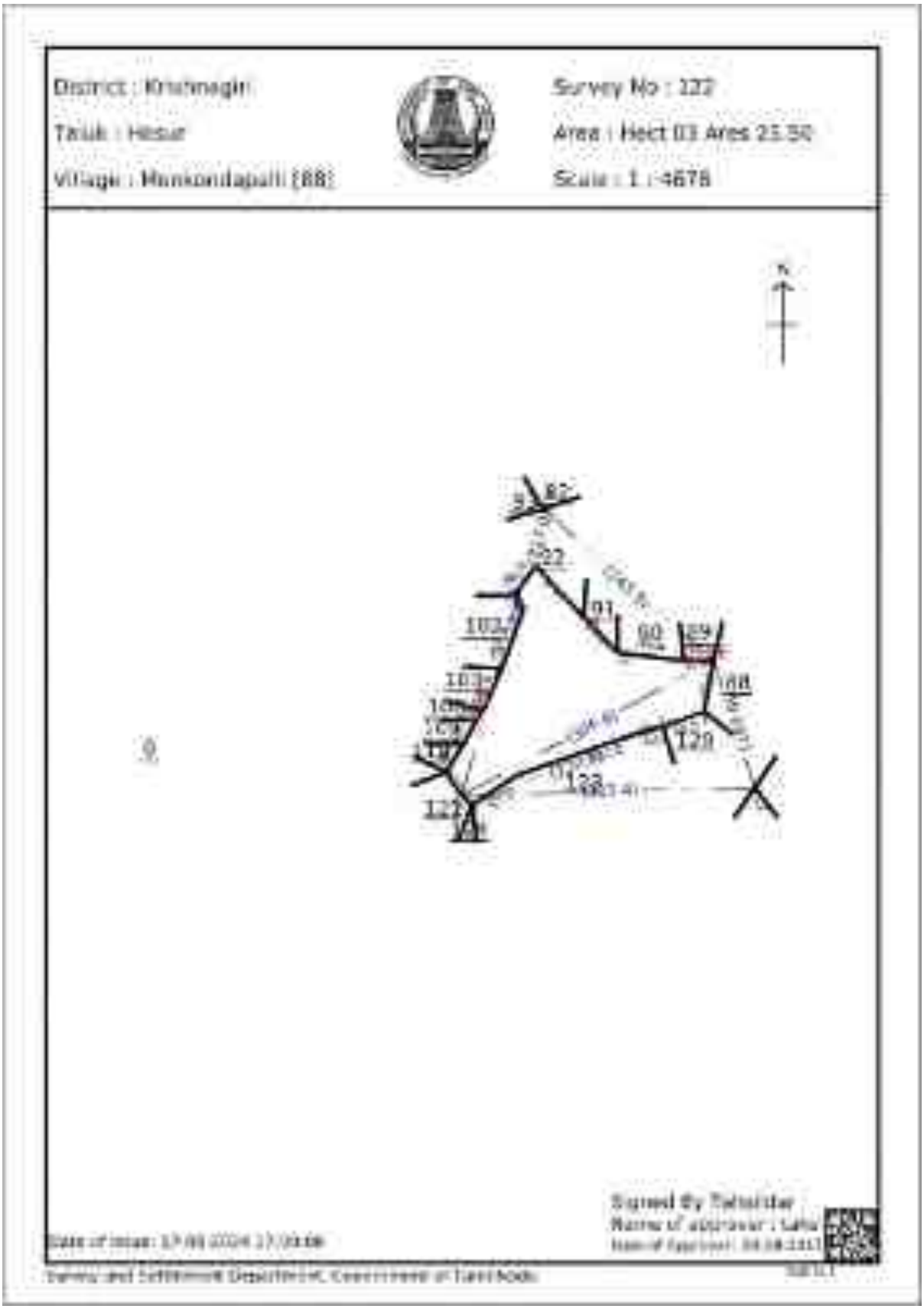
Water body No.: 6.VENKATESAN ERI



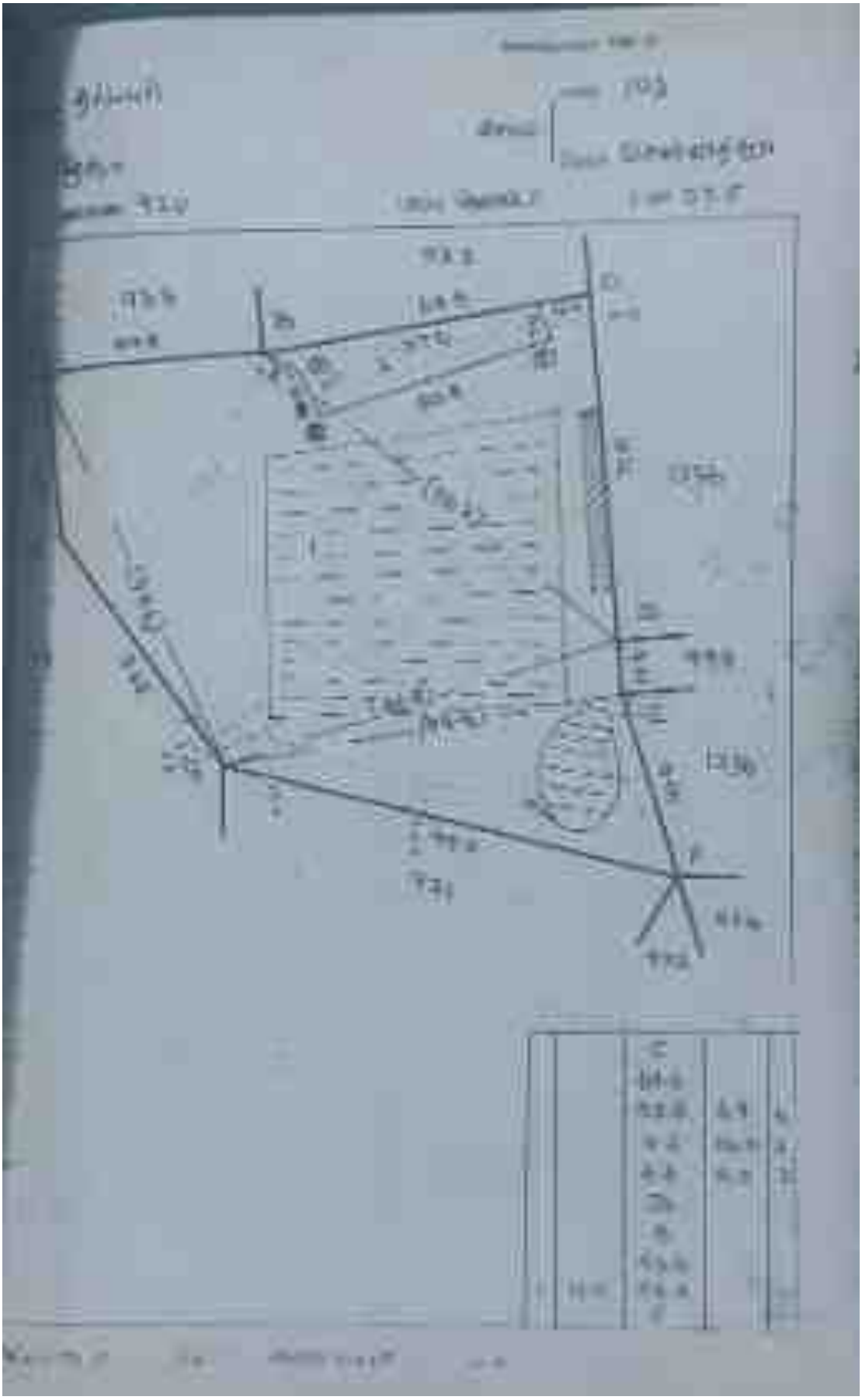
Water body No.: 7. SANTHAPURAM ERI



Water body No.: 8. SEETHARAMAN ERI

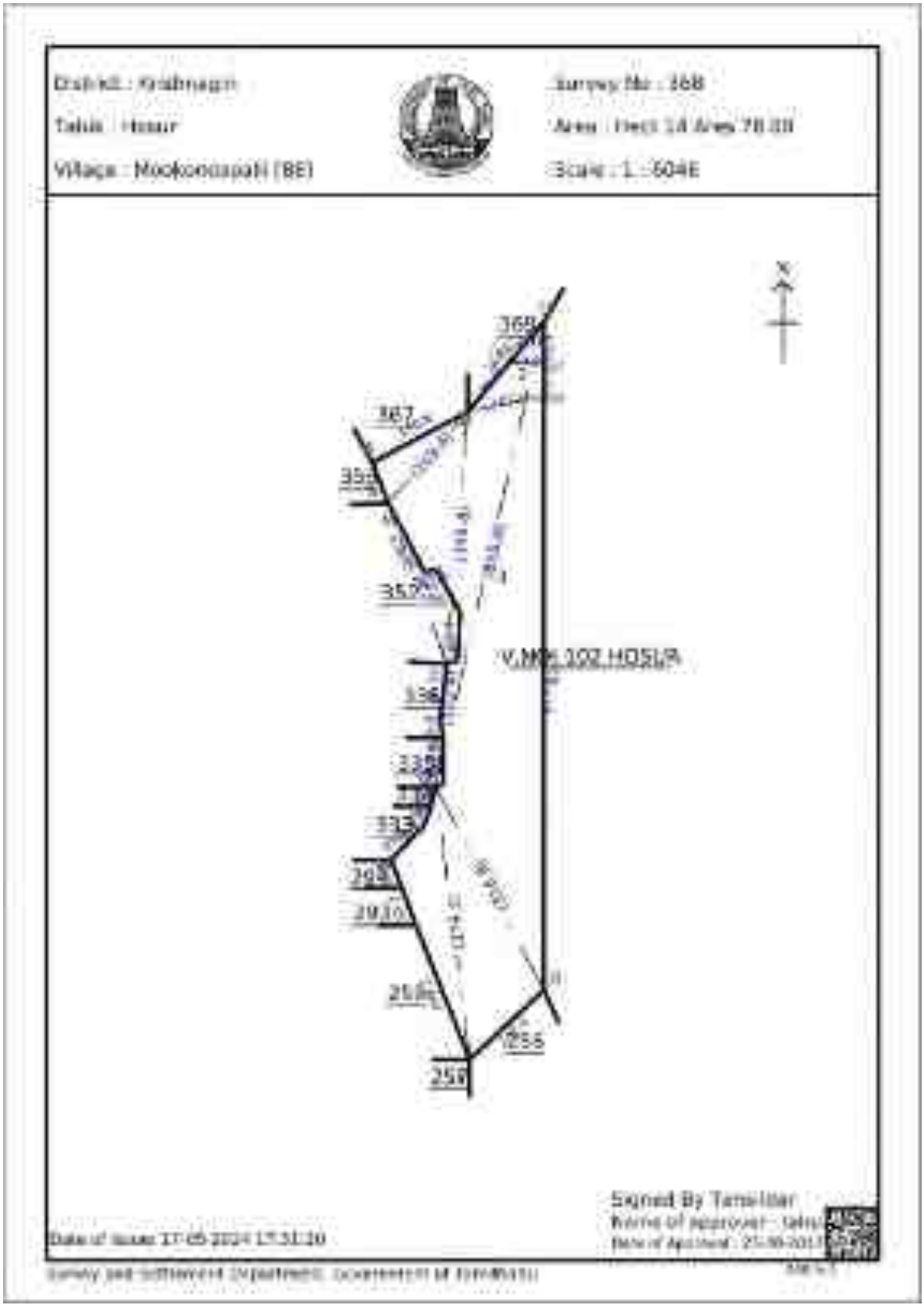


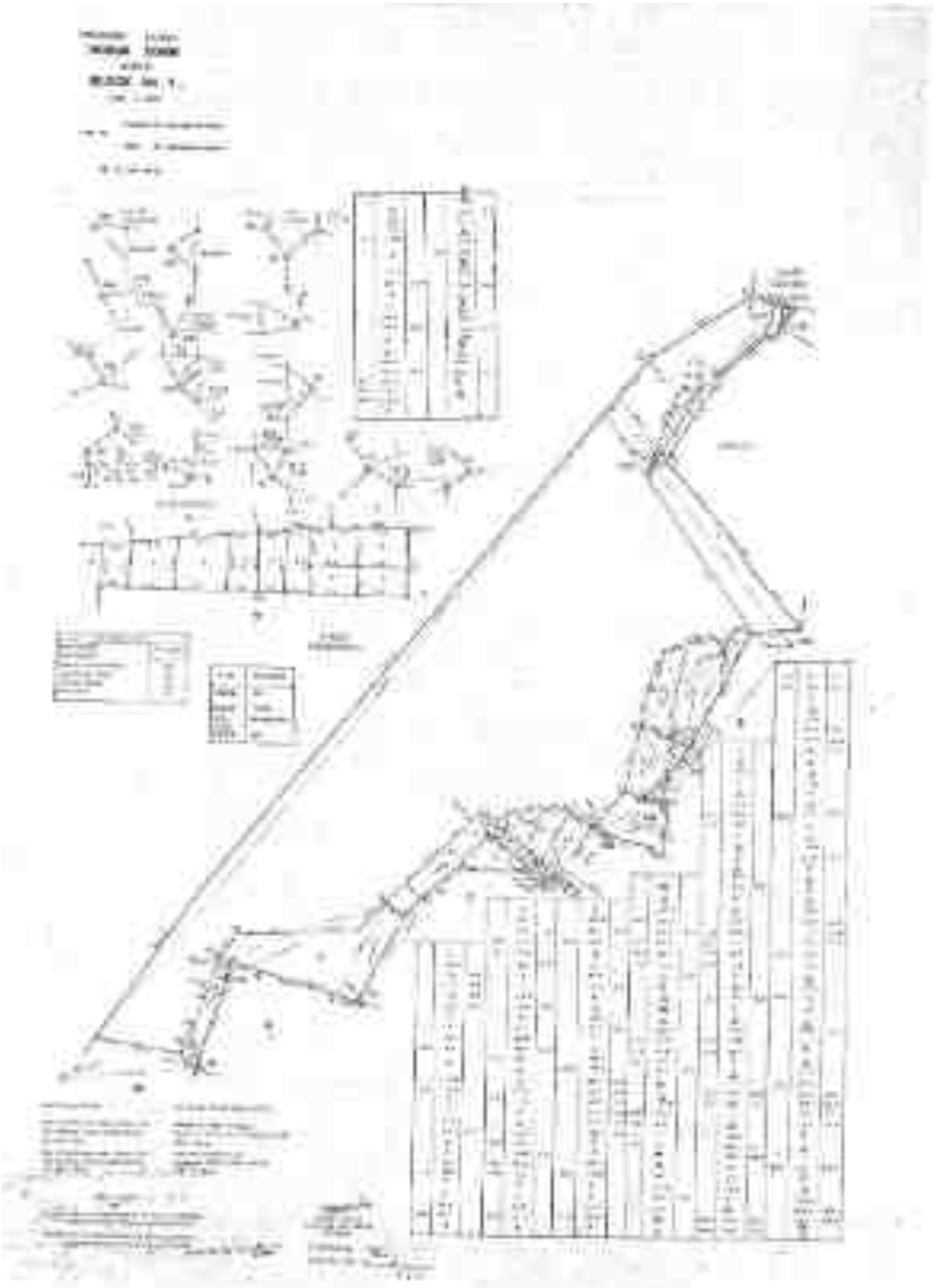
Water body No.: 11. SRI CHANDRA SUDESHWAR KOVIL THEPPAKULAM



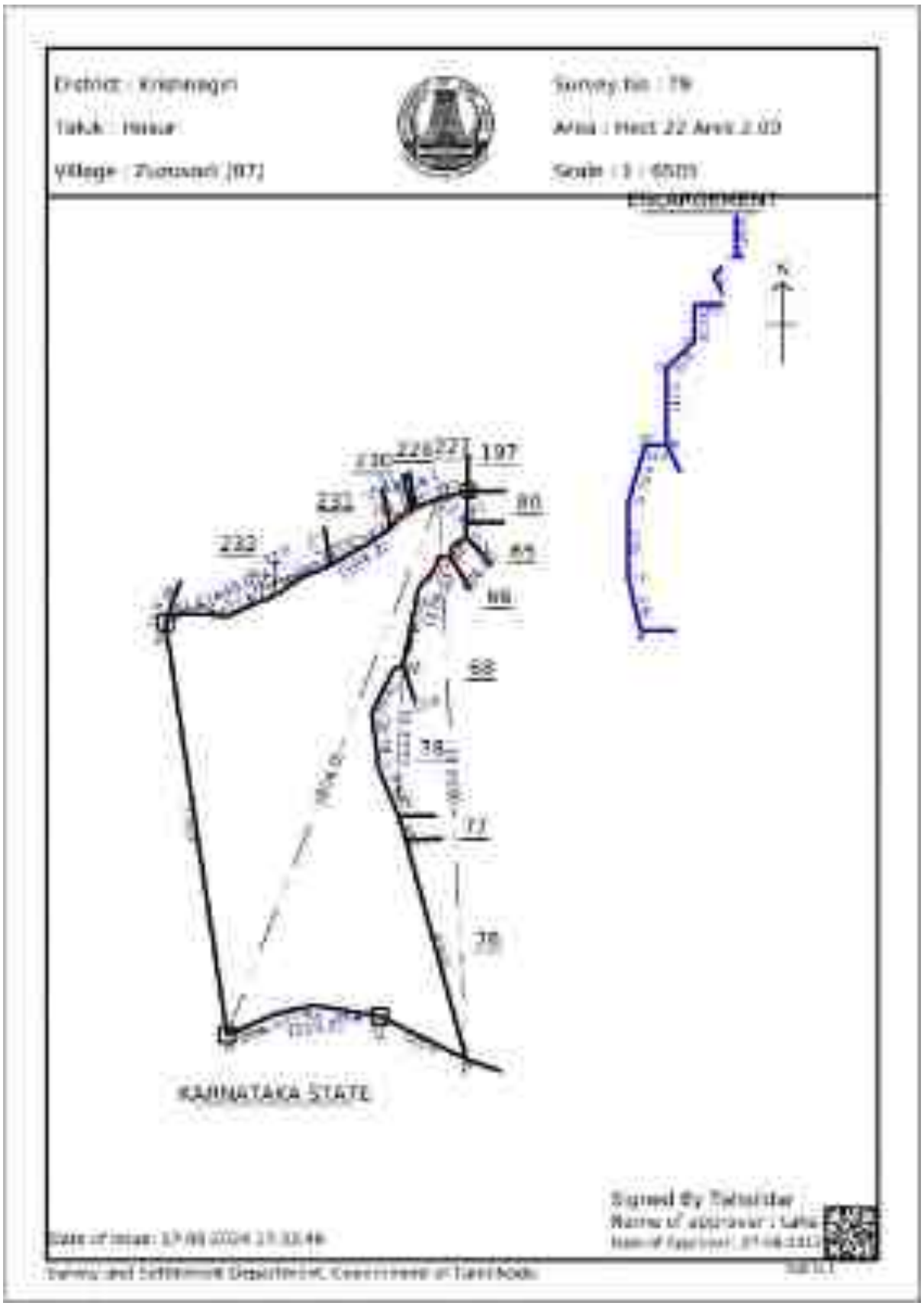
Water body No.: 12. JALAGANDESHWAR SWAMY KOIL (RAMANAIKAN ERI)

Water body No.: 13. DHARGA CHANDRAMBIGAI LAKE

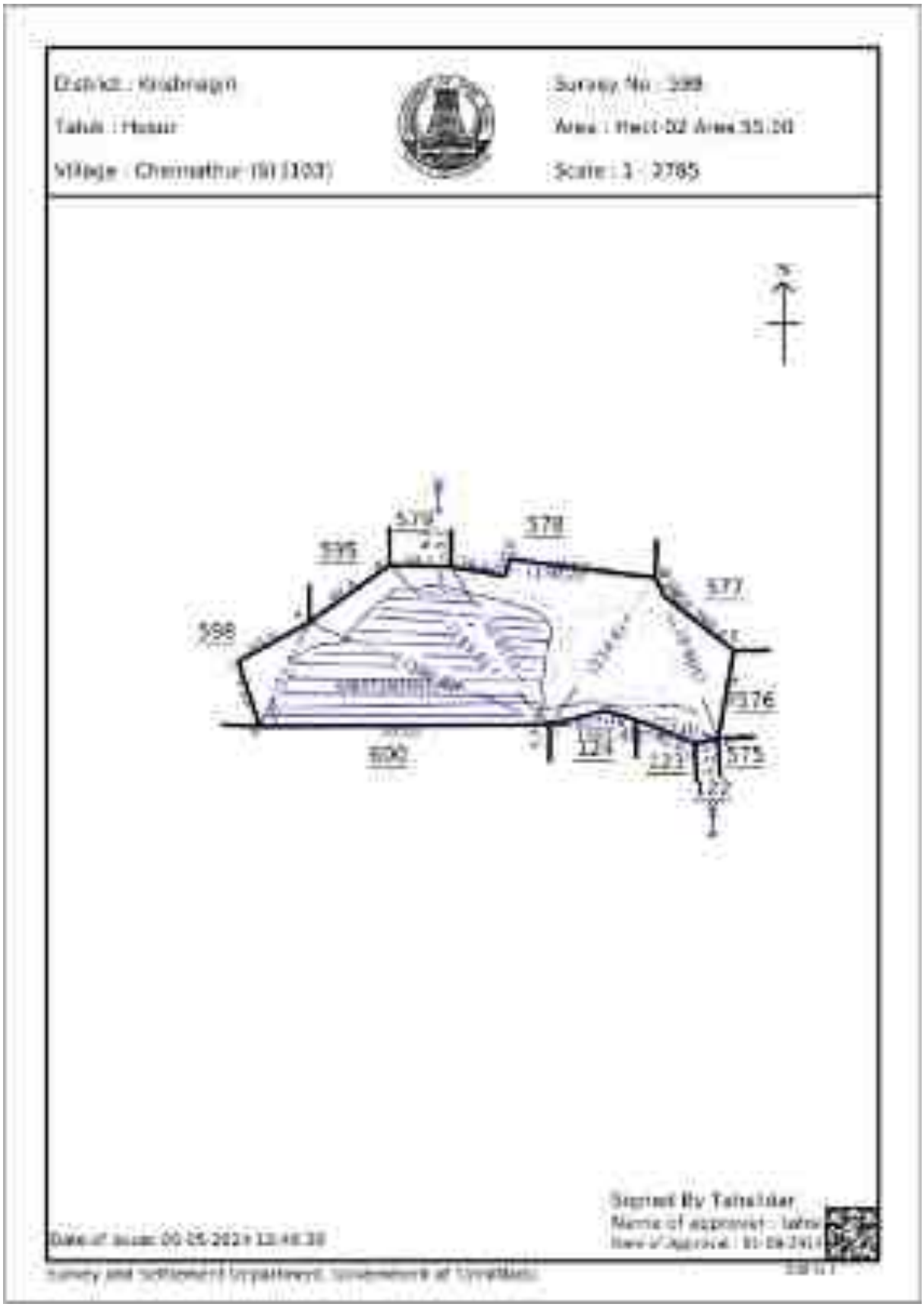




Water body No.: 14. DHADHAV RAO LAKE ASHOK LEYLAND UNIT-1



Water body No.: 16.VARATHARAYAN ERI



District : Krishnagiri

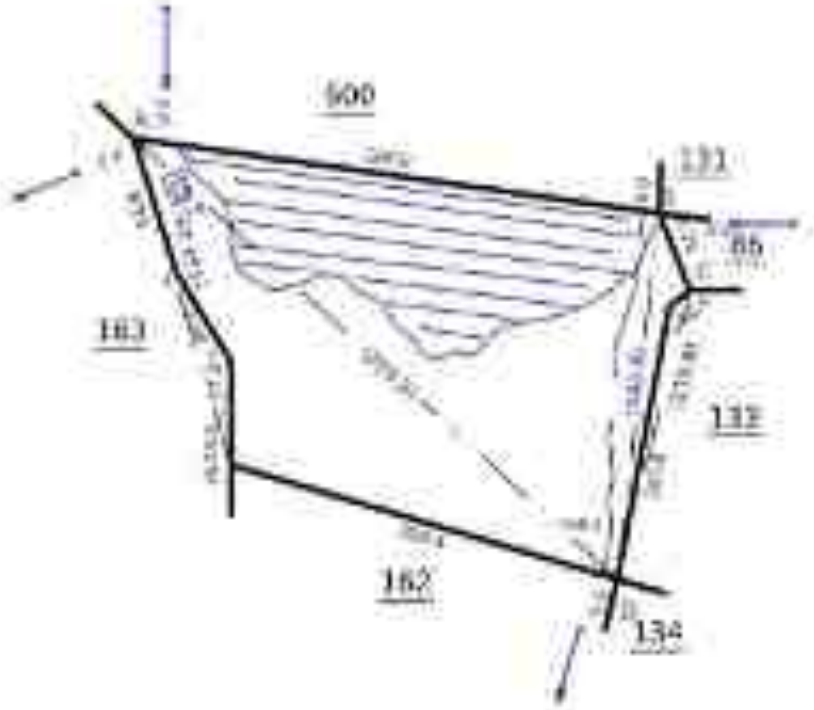
Taluk : Hosur

Village : Chennattur (5)[133]

Survey No : 132

Area : Plot(02 Area 38.00

Scale : 1 : 2275



Signed By Tahsildar

Name of approver : bahu

Date of Approval : 04.07.2017

Date of Issue: 09-05-2024 12:41:15

Survey and Settlement Department, Government of Tamil Nadu

District : Krishnagiri

Taluk : Hosur

Village : Chennathur (S) [101]

Survey No : 86

Area : Hect 00 Ares 22.50

Scale : 1 : 881

Signed By Tahsildar

Name of approver : Latha

Date of issue: 19-09-2024 11:37:31

Survey and Settlement Department, Government of Tamil Nadu

District : Krishnagiri

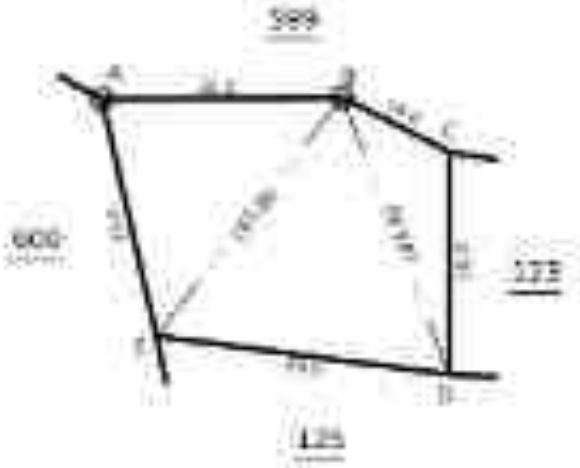
Taluk : Hosur

Village : Chennathur (S) [103]

Survey No : 124

Area : Hect 00 Ares 18.50

Scale : 1 : 502



Signed By Tahsildar

Name of approver : Latha

Date of issue: 19-09-2024 17:13:49

This is a computer generated document. It does not require signature.

Survey and Settlement Department, Government of Tamil Nadu.

District : Krishnagiri

Taluk : Hosur

Village : Chennathur (S) [103]

Survey No : 125

Area : Hect 00 Ares 22.50

Scale : 1 : 813

Signed By Tahsildar

Name of approver : Latha

Date of issue: 19-09-2024 11:13:45

Survey and Settlement Department, Government of Tamil Nadu

District : Krishnagiri

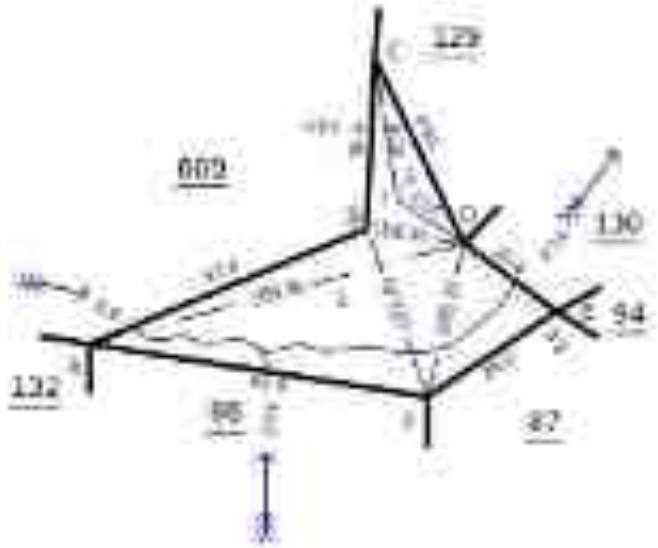
Taluk : Hosur

Village : Chennathur (S) [101]

Survey No : 131

Area : Hect 00 Ares 16.50

Scale : 1 : 1029



Signed By Tahsildar

Name of approver : Latha

Date of Approval : 19.09.2024

Date of issue : 19-09-2024 17:03:08

Survey and Settlement Department, Government of Tamil Nadu.

1 of 1

District : Krishnagiri

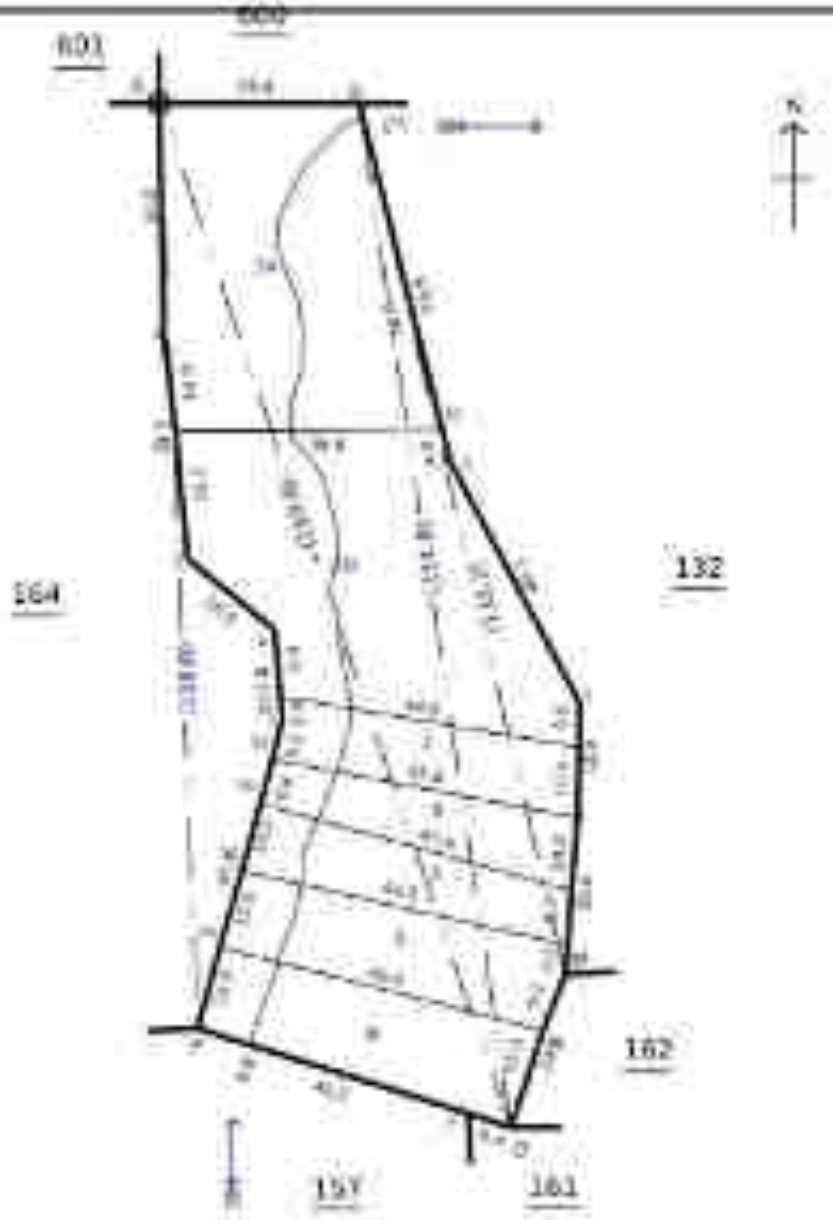
Taluk : Hosur

Village : Chennathur (S) [101]

Survey No : 163

Area : Hect 00 Ares 58.50

Scale : 1 : 840



Signed By Tahsildar

Name of approver : Latha

Date of issue: 19-09-2024 17:36:41

Survey and Settlement Department, Government of Tamil Nadu

District : Krishnagiri

Taluk : Hosur

Village : Chennathur (S) [101]

Survey No : 178

Area : Hect 00 Ares 8.00

Scale : 1 : 521

Signed By Tahsildar

Name of approver : Latha

Date of issue: 19/09/2024 17:10:20

Survey and Settlement Department, Government of Tamil Nadu

District : Krishnagiri

Taluk : Hosur

Village : Chennathur (S) [101]

Survey No : 596

Area : Hect 0.1 Ares 46.80

Scale : 1 : 1000

Data Digitally Signed By
RAMAKRISH K

Date of Issue : 19-09-2024 17:13:49

Survey and Settlement Department, Government of Tamil Nadu

District : Krishnagiri

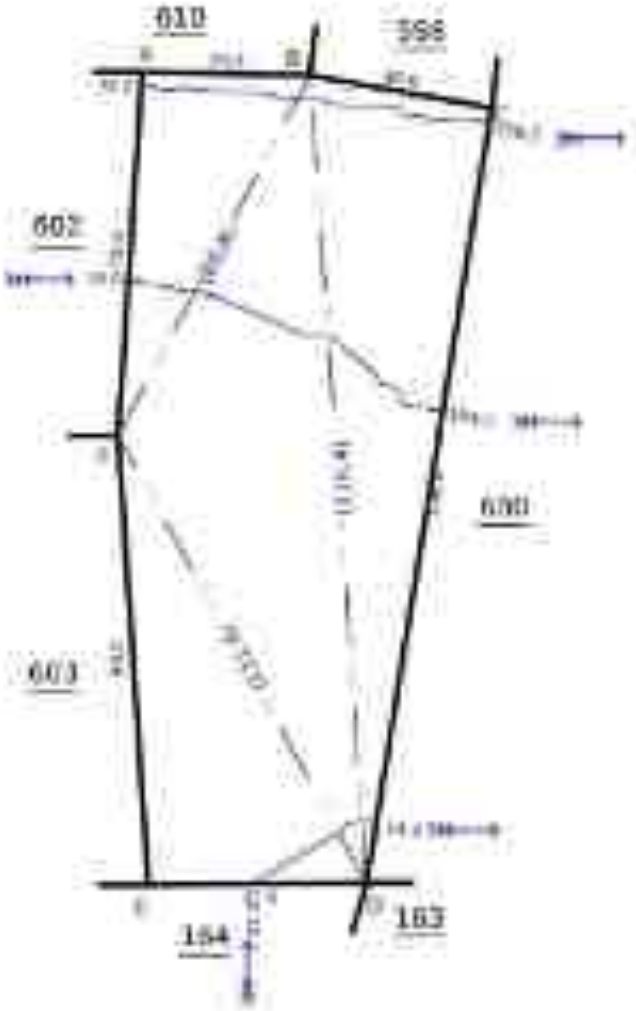
Taluk : Hosur

Village : Chennathur (S) [103]

Survey No : 601

Area : Hect 01 Ares 11.00

Scale : 1 : 1248



Signed By Tahsildar

Name of approver : Latha

Date of issue: 19-09-2024 17:34:23

Survey and Settlement Department, Government of Tamil Nadu

District : Krishnagiri

Taluk : Hosur

Village : Chennathur (S) [101]

Survey No : 668

Area : Hect 00 Ares 00.50

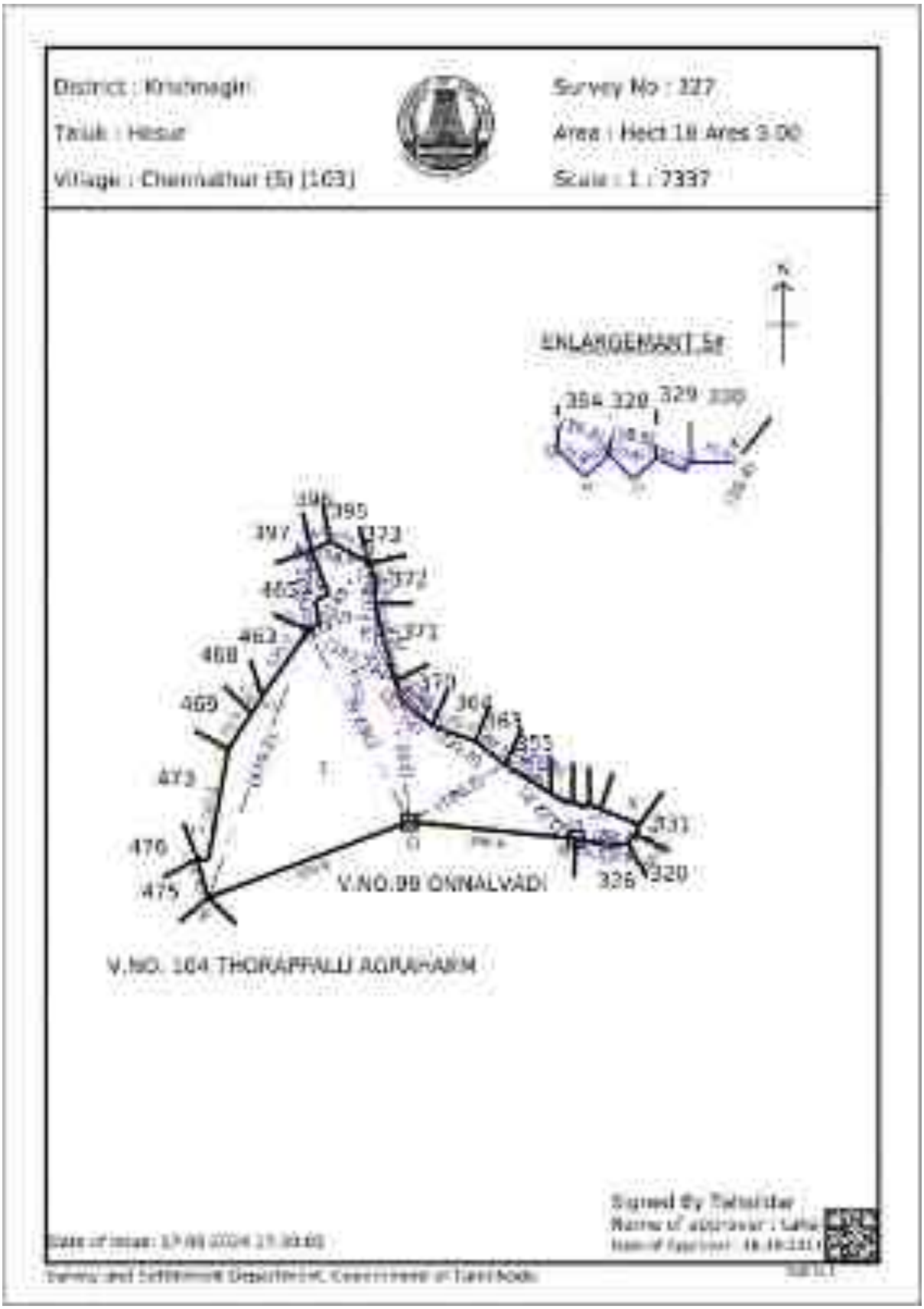
Scale : 1 : 1333

Data Digitally Signed By
RAMAKRISH K

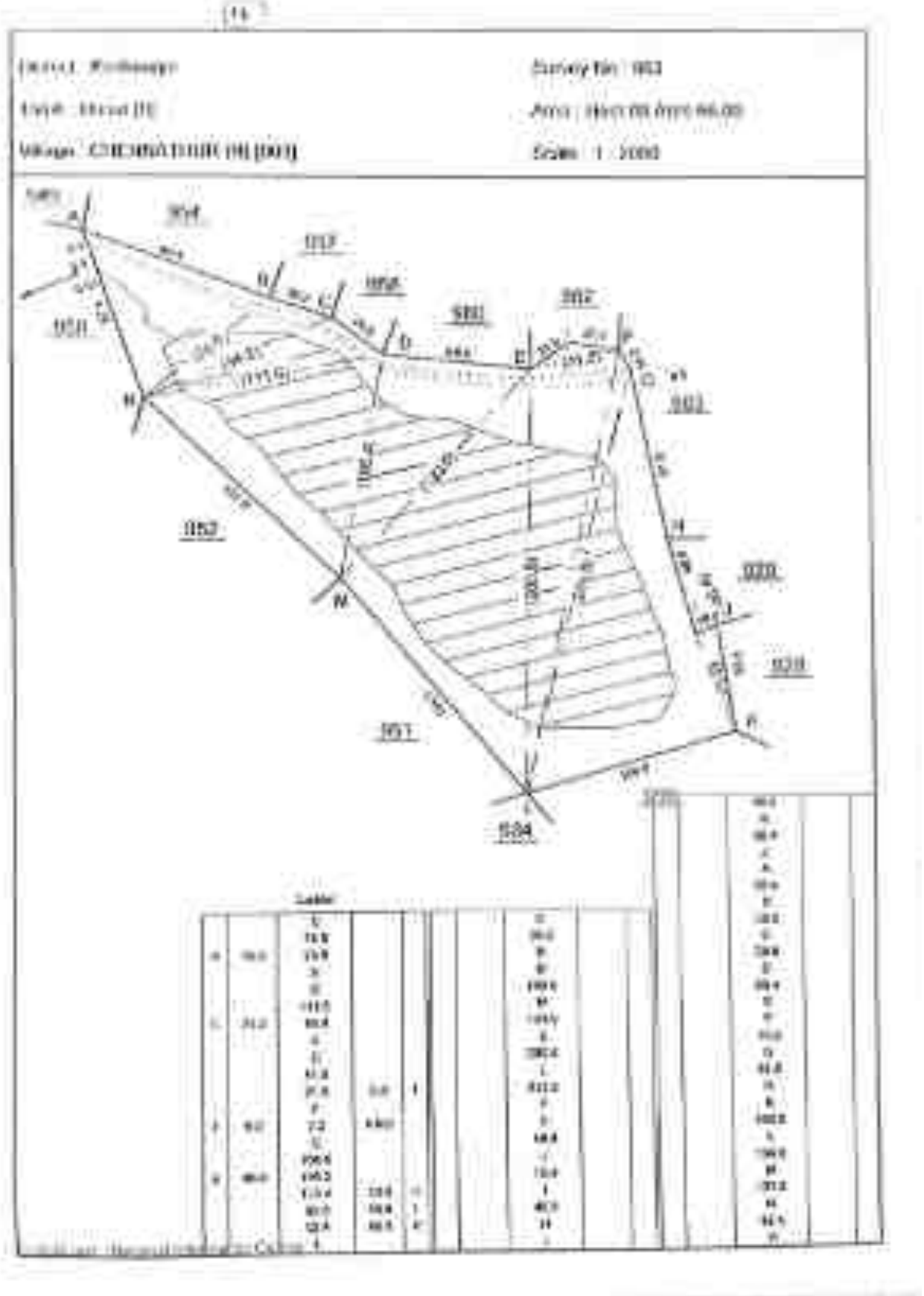
Date of Issue : 19-09-2024 23:11:58

Survey and Settlement Department, Government of Tamil Nadu.

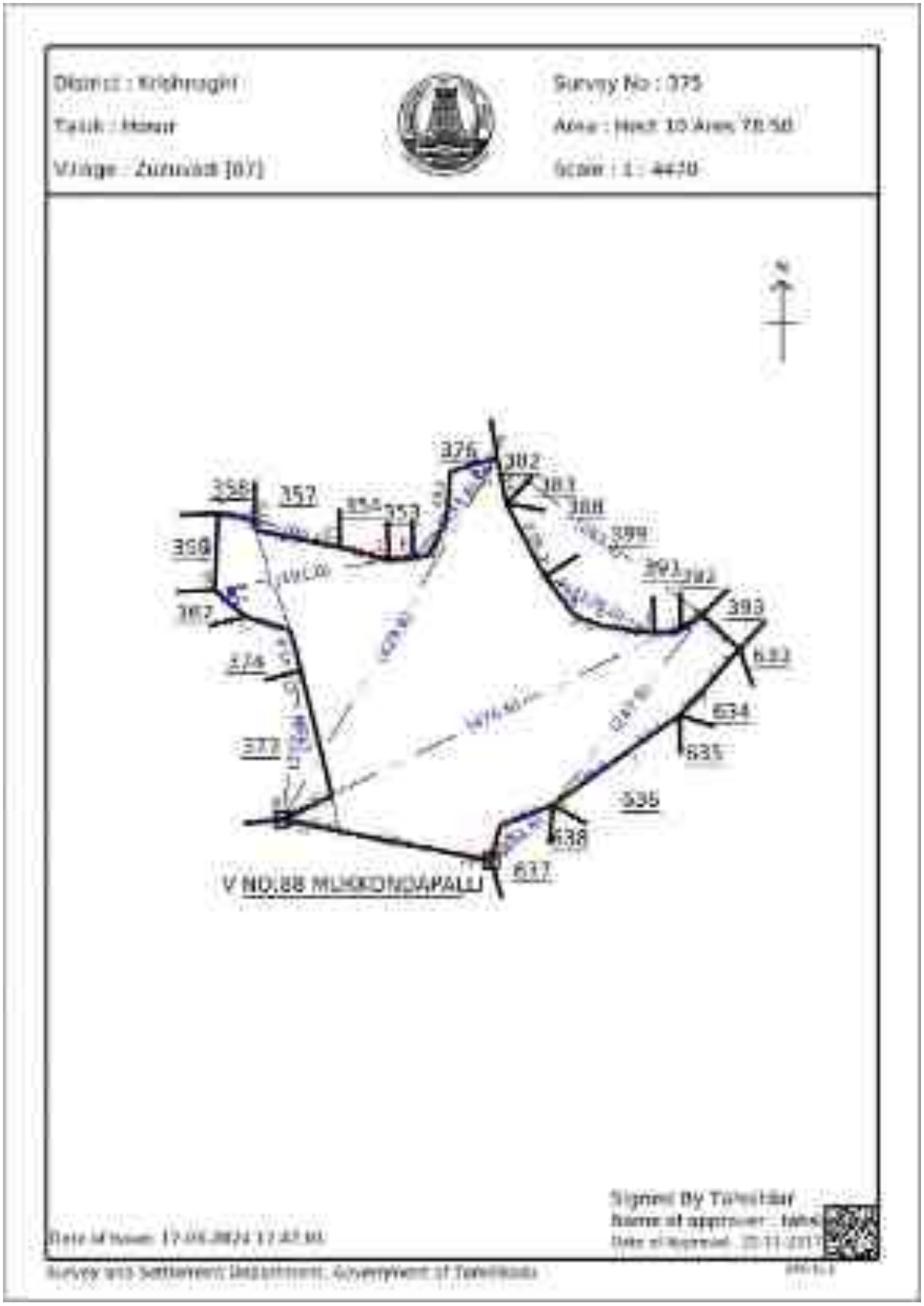
Water body No.: 17. PATTALAMMAN ERI



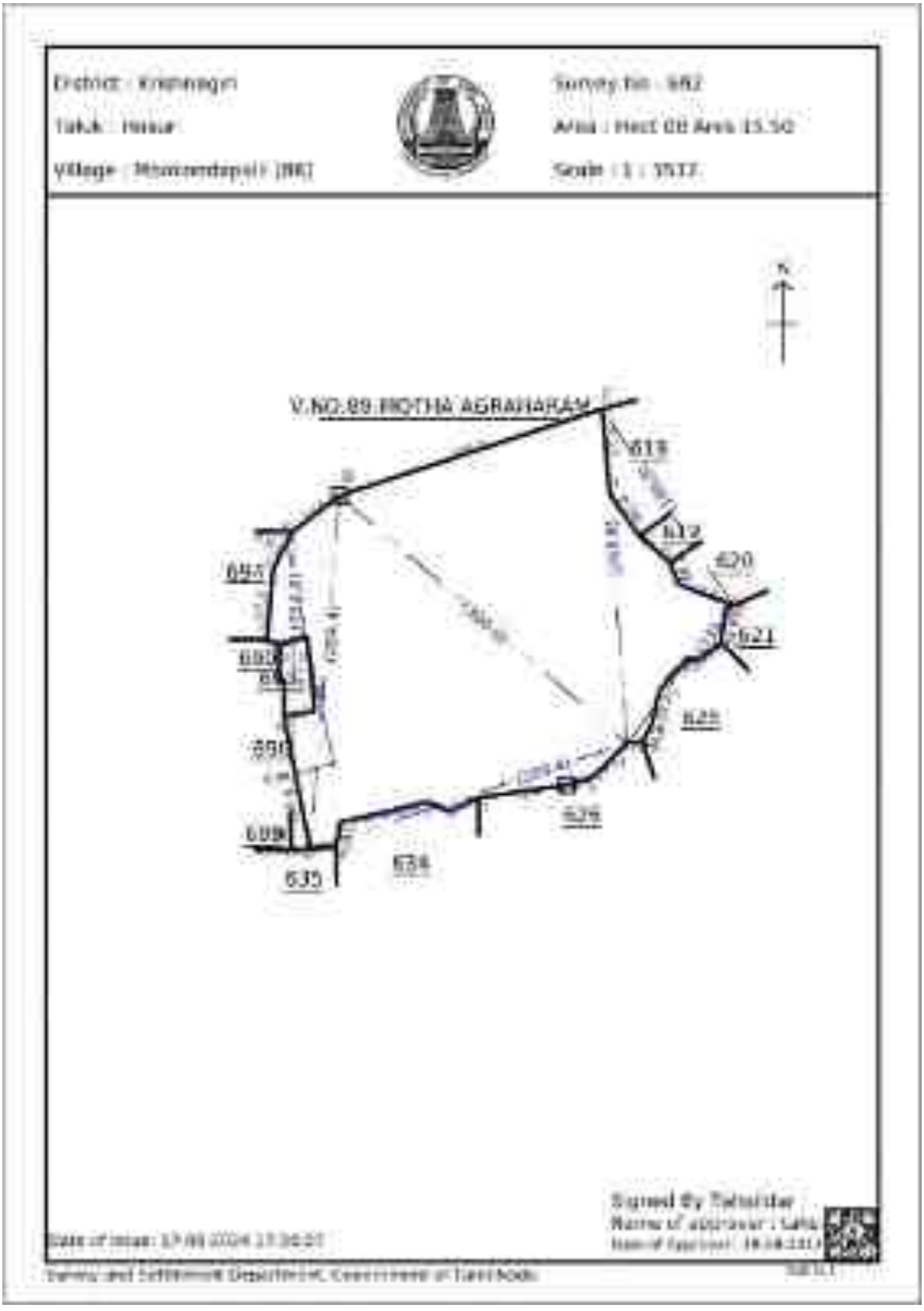
Water body No.: 18. DEVAN ERI (THERPETTAI ERI)



Water body No.: 19. VENKATAPPAN ERI (BEDRAPALLI)



Water body No.: 20. LAKSHMANARAV ERI (MOTTA ERI)



District : Krishnagiri

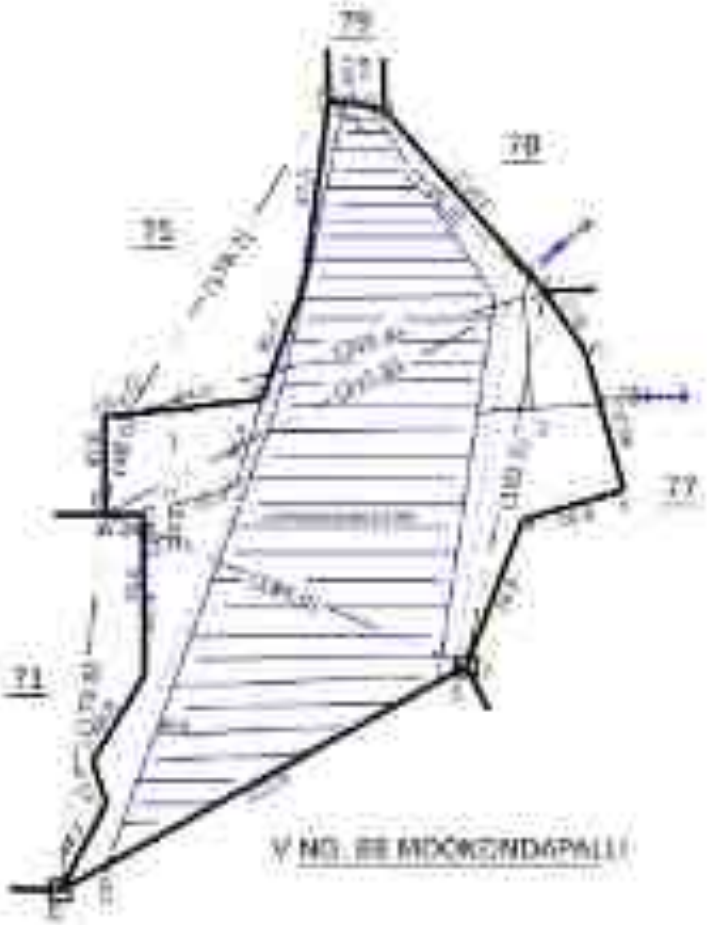
Taluk : Hosur

Village : Mottham Agraharam (RI)

Survey No : 76

Area : Hect 04-Area 73.10

Scale : 1 / 2730



Signed By Tahsildar

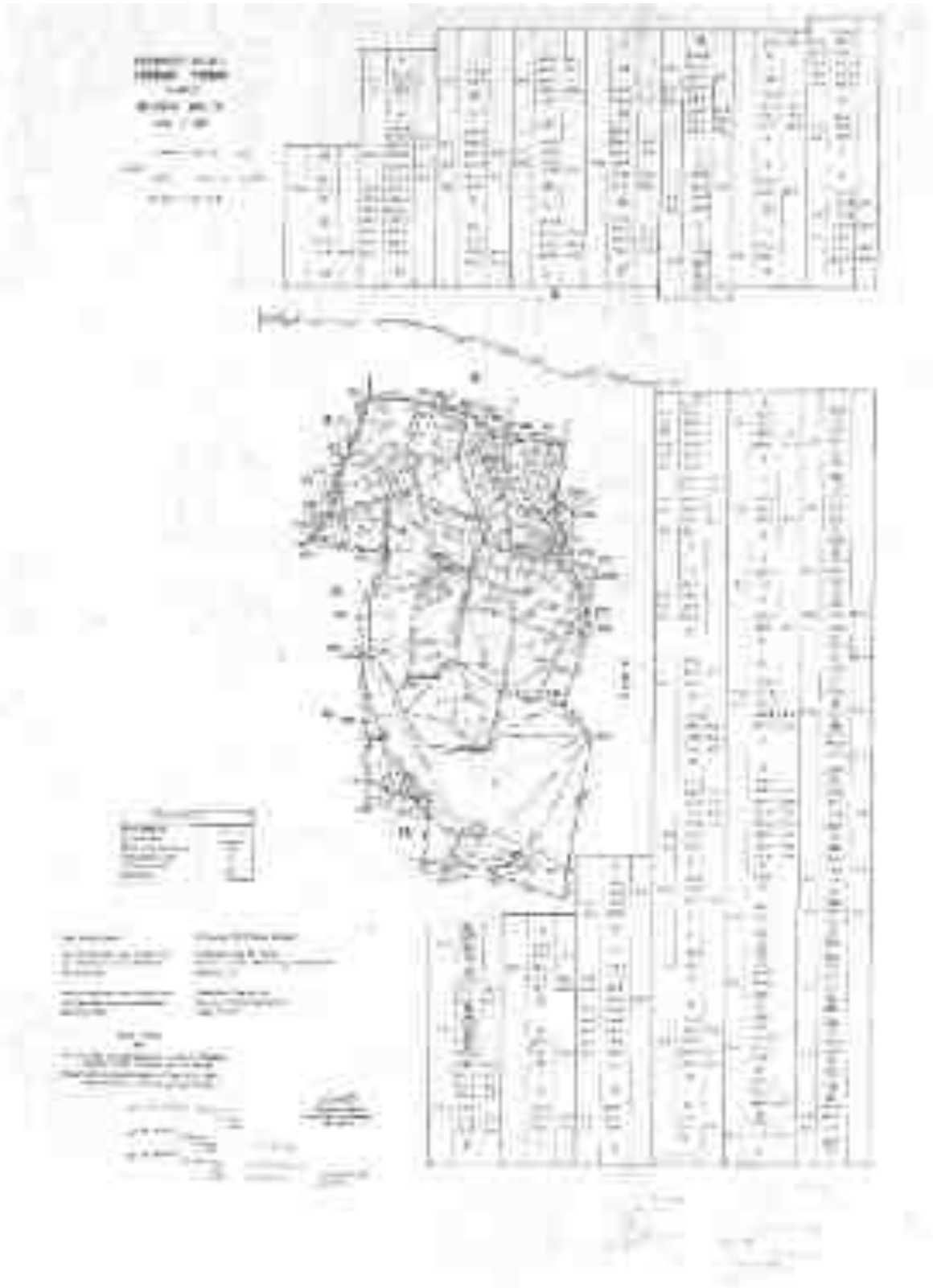
Name of approver : Latha

Date of Approval : 17/08/2024

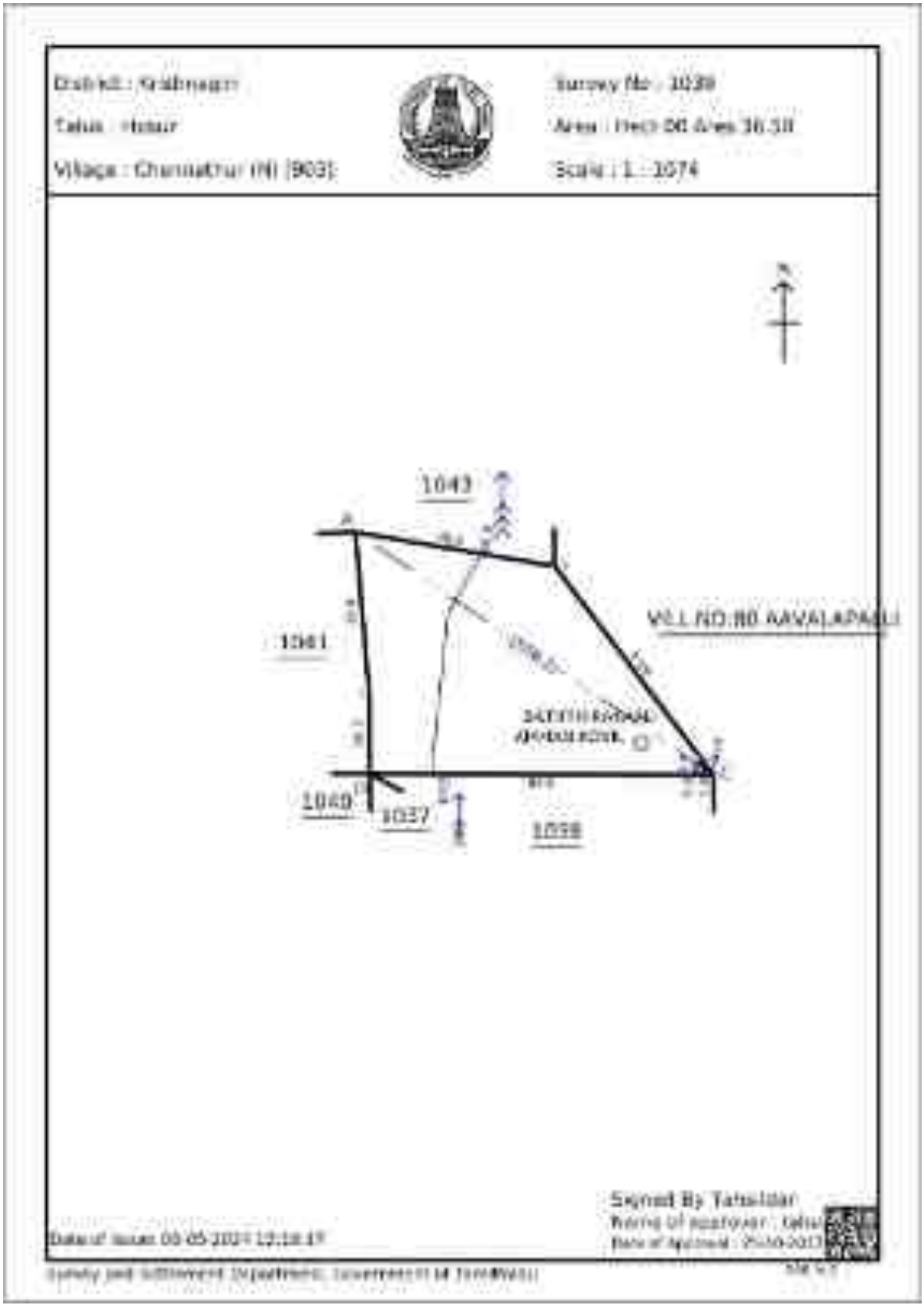
Date of issue: 19/08/2024 12:36:24

Survey and Settlement Department, Government of Tamil Nadu

Water body No.: 22.THOTTAN ERI (ALASANATHAM ERI)



Water body No.: 28. ALASANATHAM ERI



District : Krishnagiri

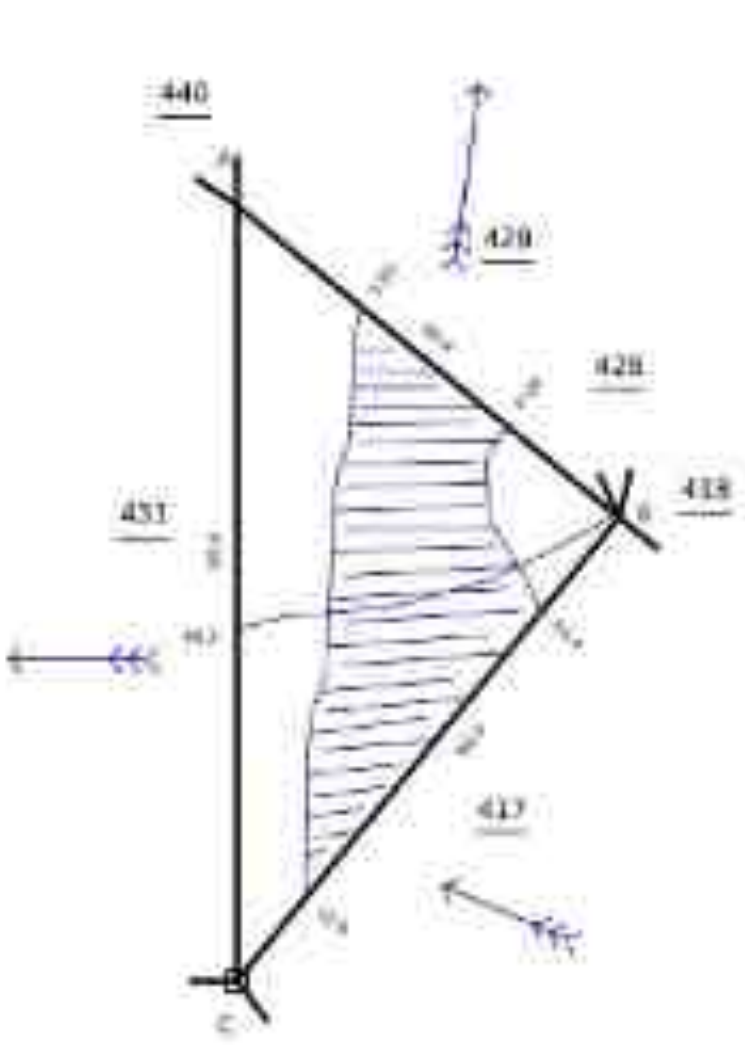
Taluk : Hosur

Village : Avvaiyarnagar [00]

Survey No : 430

Area : Hect 00 Ares 18.50

Scale : 1 : 653



NO.153- CHENNANTHUR

Signed By Tahsildar

Name of approver : Latha

Date of Issue: 17/03/2024 16:27:01

Survey and Settlement Department, Government of Tamil Nadu

District : Krishnagiri

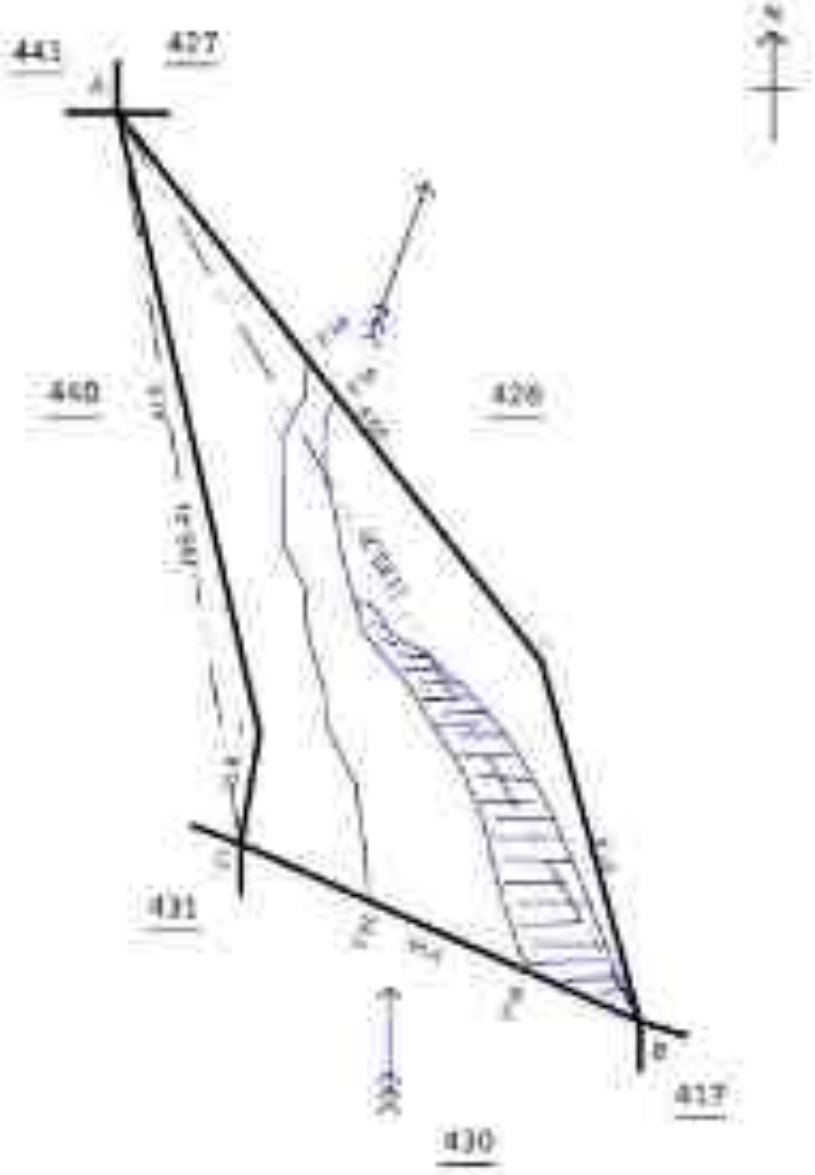
Taluk : Hosur

Village : Avalapalli [60]

Survey No : 429

Area : Hect 00 Ares 27.00

Scale : 1 : 754

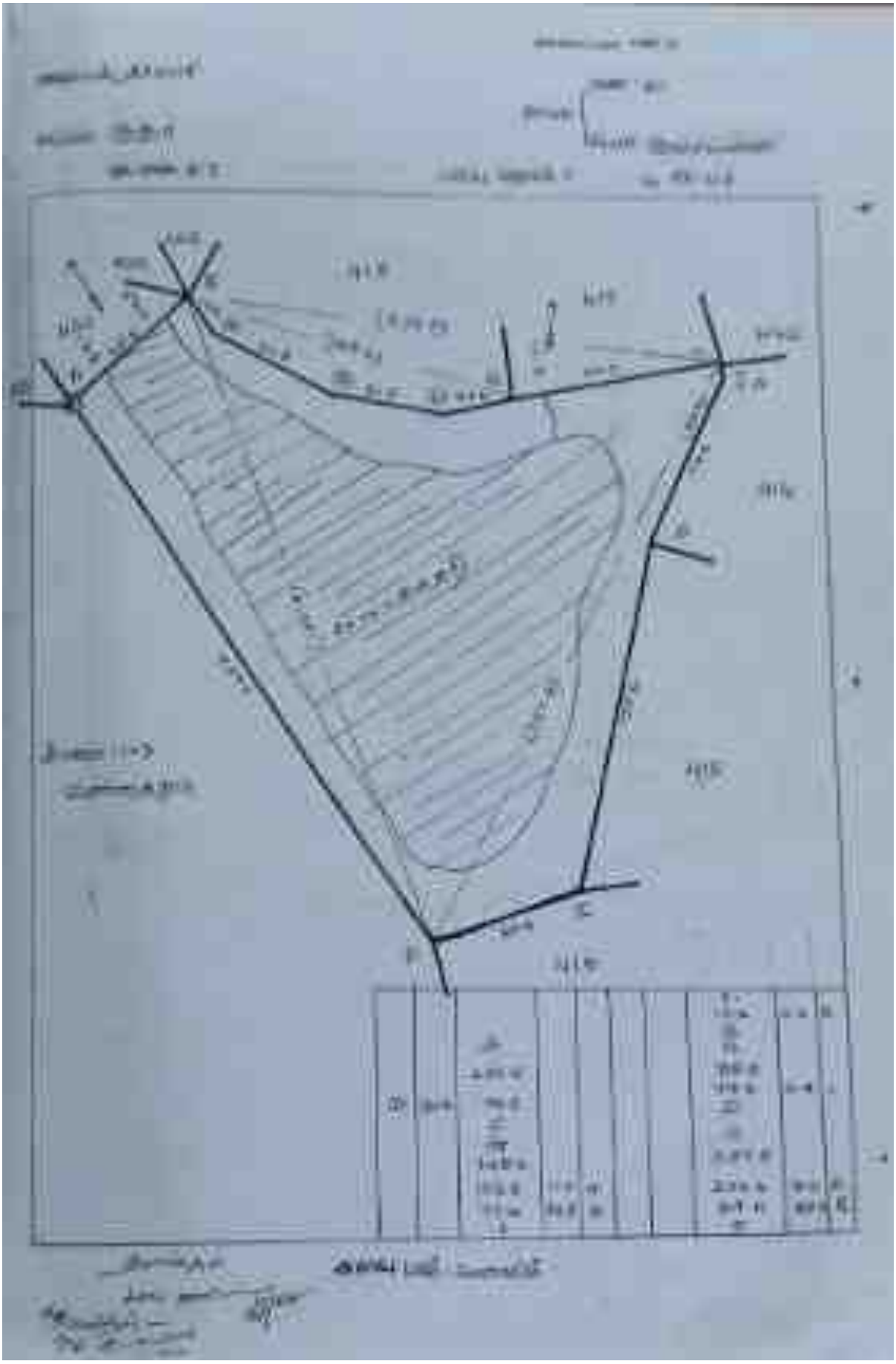


Signed By Tahsildar

Name of approver : tahsildar

Date of approval : 09/10/2024

Survey and Settlement Department, Government of Tamilnadu



District : Krishnagiri

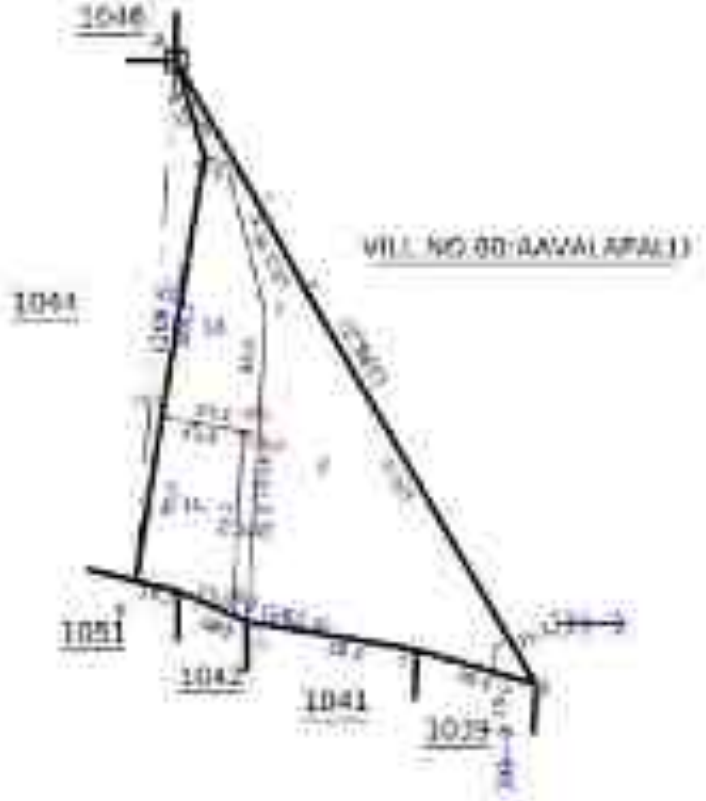
Taluk : Hosur

Village : Chennarthol (N) [303]

Survey No : 1043

Area : Hect 01 Ares 57.52

Scale : 1 / 2275



Date of issue: 19-03-2024 11:13:30

Survey and Settlement Department, Government of Tamil Nadu

Annexure – 4b

FMB Sketches

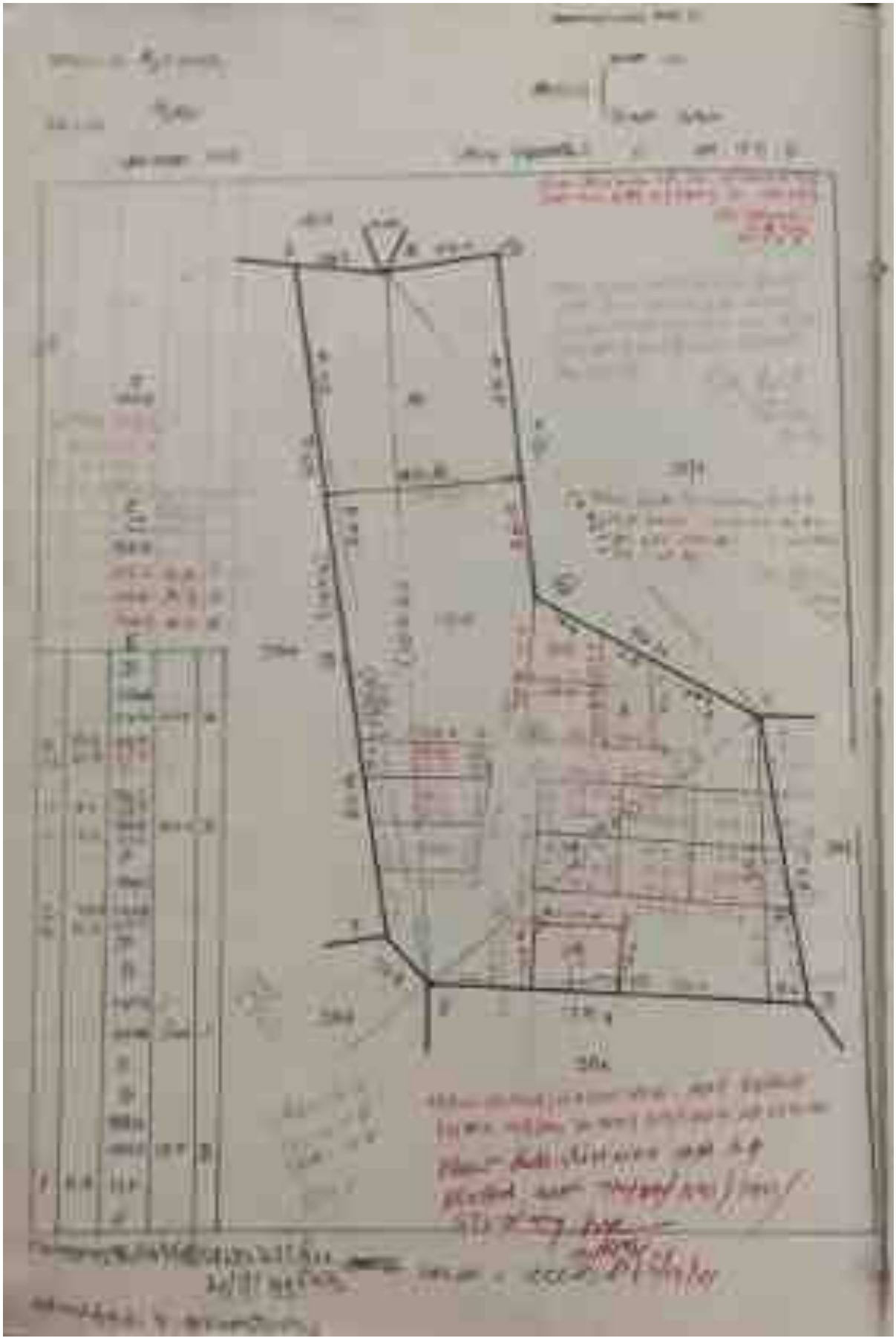
Parks FMB Sketches

SPONGE PARK - FMB DETAILS					
Sl.No	**Park No**	**Park Name**	**Village Name**	**Ownership Details**	**TS WARD NO, BLOCK NO & TS NO/ SF No.**
1	3	Mahalakshmi Nagar	Hosur	ULB	Ward No 23
2	5	Hosur - Ward No 15 Samathanapuram	Hosur	ULB	S.F.No. 335, 336 & 337
3	15	Hosur - Devi Nagar	Hosur	ULB	SF NO: 385/ 1 Pt

Park No.: 3. Mahalakshmi Nagar

Park No.: 5. Hosur - Ward No 15 Samathanapuram

Park No.: 15. Hosur - Devi Nagar



Annexure – 4c

FMB Sketches

OSR FMB Sketches

PHASE 1 OSR SITE – FMB DETAILS					
S.no	**NAME**	**OSR Categorization**	**Area (Acre)**	**Perimeter rounded in m**	**OSR Park Category**
1	18. Ward - A/22/1/0	Park	2.442	399	Large
2	22. Ward - A/18//17/0	Park	1.768	336	Large
3	43. Ward - A/11/19/7, 20/3	Park	0.260	224	Small
4	20. Ward - A/25/6/0	Park	0.113	86	Small
5	119- 121. Ward - A/14/46/7, 8, 9	Park	1.282	323	Large
6	142, 143. Ward - A/12/2/19, 20	Park	0.065	66	Very Small
7	44. Ward - A Sr No 749	Park	0.406	165	Small
8	77. Ward - B/4/54/0	Park	0.341	151	Small
9	78. Ward - B/17/147/0	Park	0.314	143	Small
10	79. Ward - B/6/78/0	Park	0.218	120	Small
11	01. Ward - D/3/57/0	Park	0.076	71	Very Small
12	331. Mookandapalli Sr No 352/7,8	Park	0.217	142	Small
13	376. Avalapalli Sr No 794/13A	Park	0.342	160	Small
14	362. Avalapalli Sr No 711/1B	Park	0.177	110	Small
15	362. Avalapalli Sr No 711/1C	Park	0.347	173	Small
16	21. Ward - A/23//37/0	Open Space	0.895	245	Percolation Pond
17	60. Ward - A/26/123/0	Open Space	0.100	108	Recharge Well
18	35. Ward - A/26/120/3	Open Space	0.139	111	Recharge Well
19	59. Ward - A/27/139	Open Space	1.460	313	Retention Pond
20	472, 473. Ward - A/10/162/3, 2	Open Space	0.259	152	Recharge Well

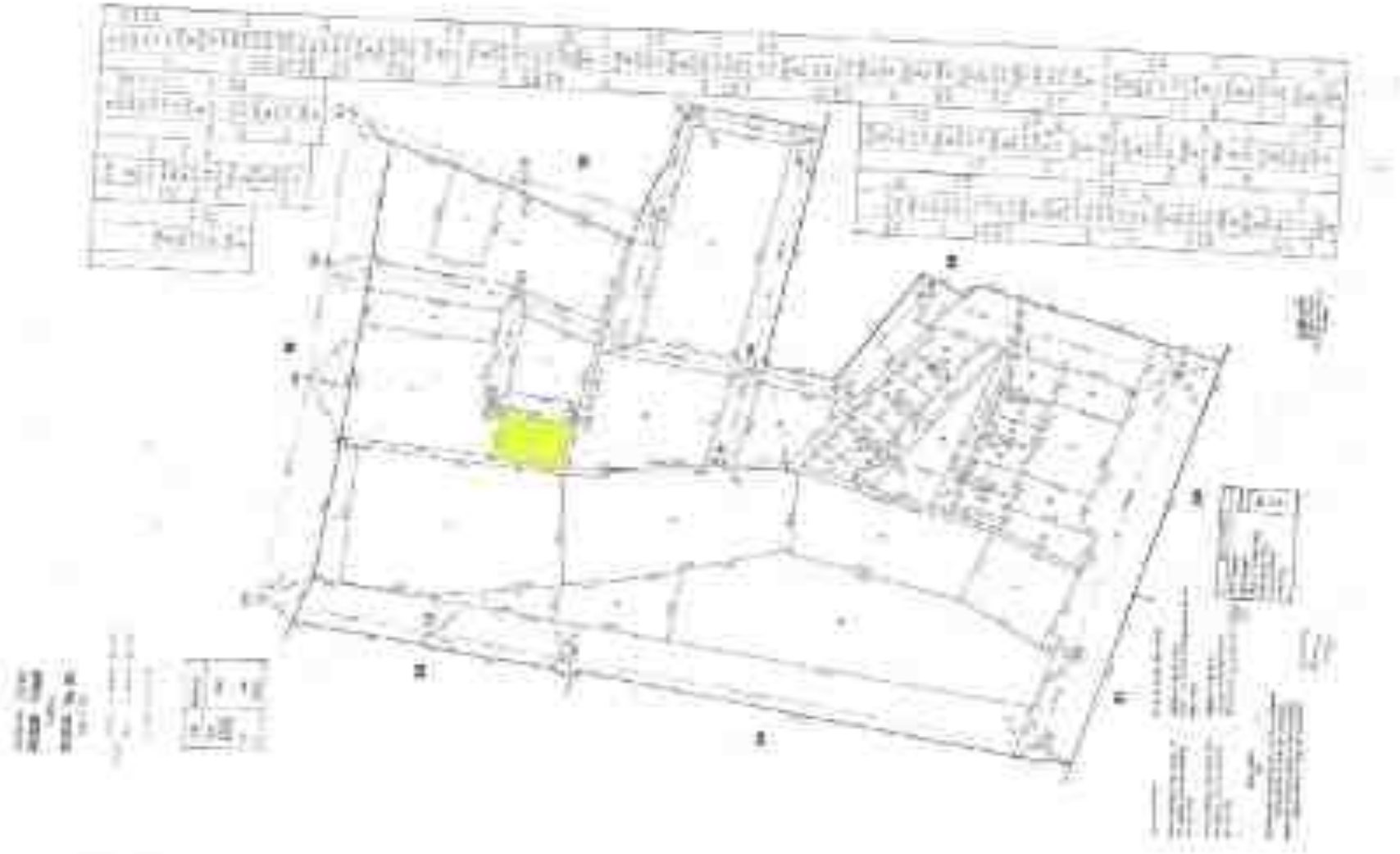
1. **18. Ward - A/22/1/0**


WARD - A
BLOCK - 22
TS - 1

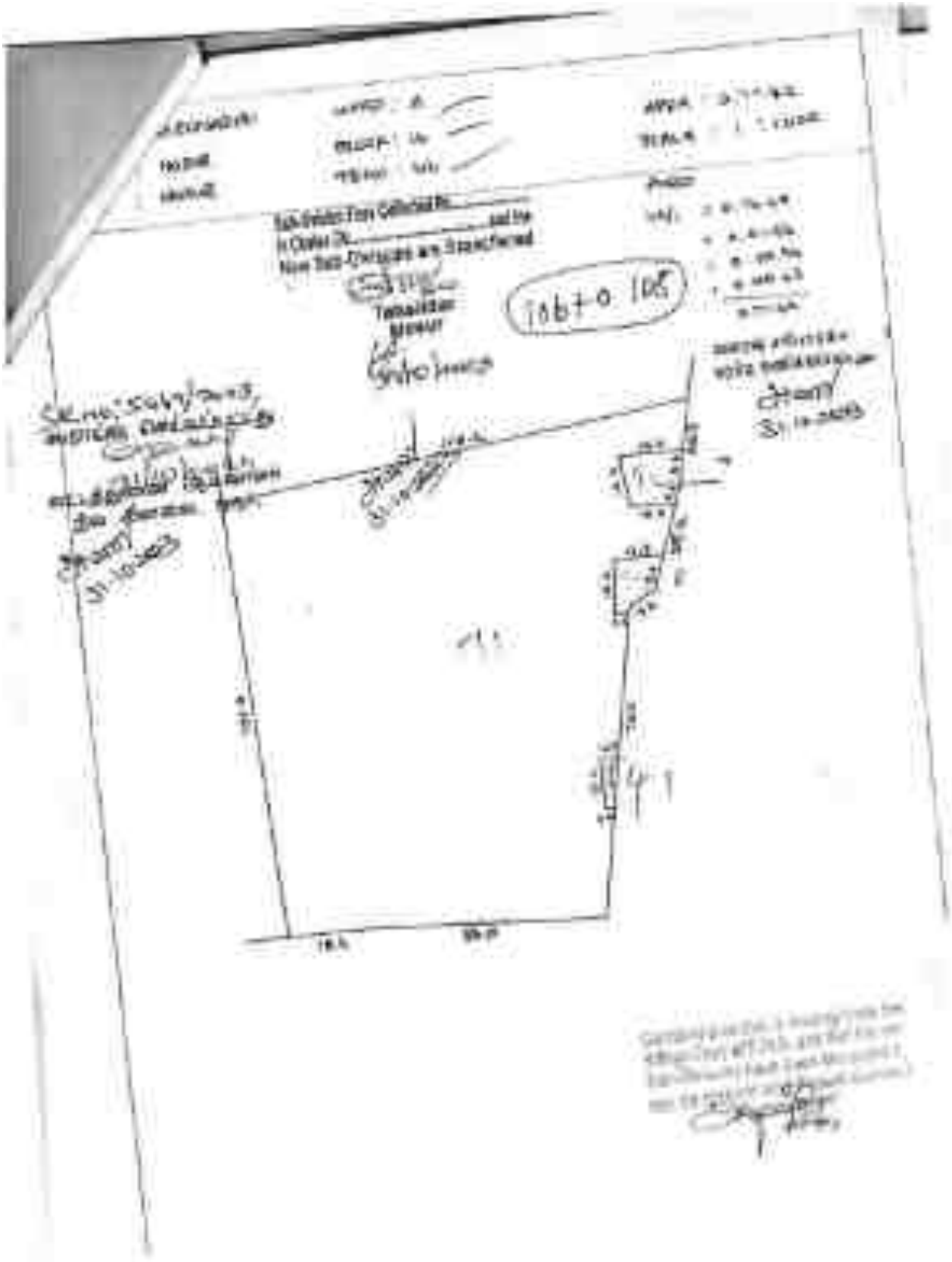
2. 22. Ward - A/18//17/0

3. 43. Ward - A/11/19/7, 20/3

4. 20. Ward - A/25/6/0

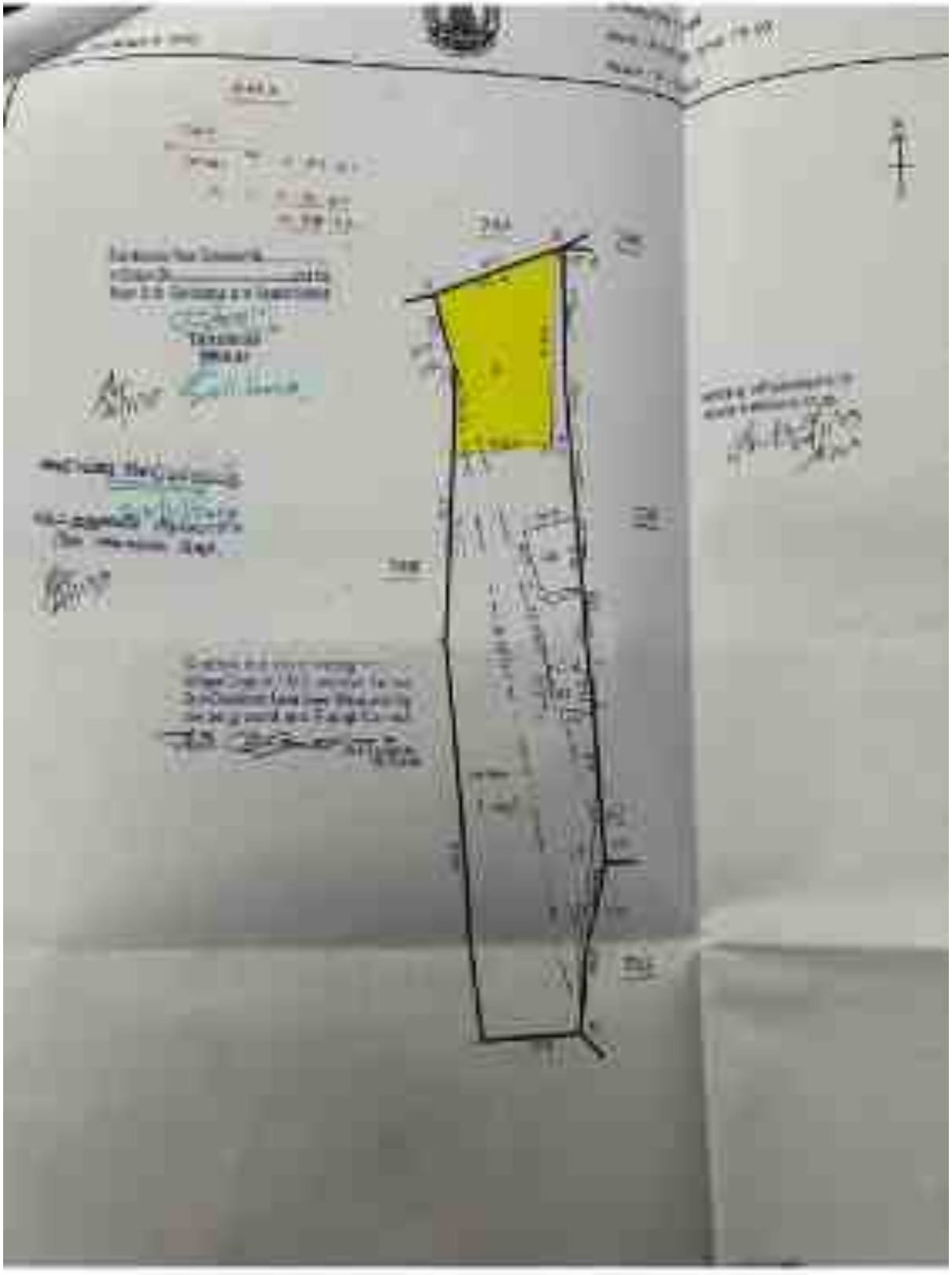


5. 119- 121. Ward - A/14/46/7, 8, 9



6. 142, 143. Ward - A/12/2/19, 20

7. 44. Ward - A Sr No 749



8. 77. Ward - B/4/54/0

B(4)[19]

(52)

9. 78. Ward - B/17/147/0

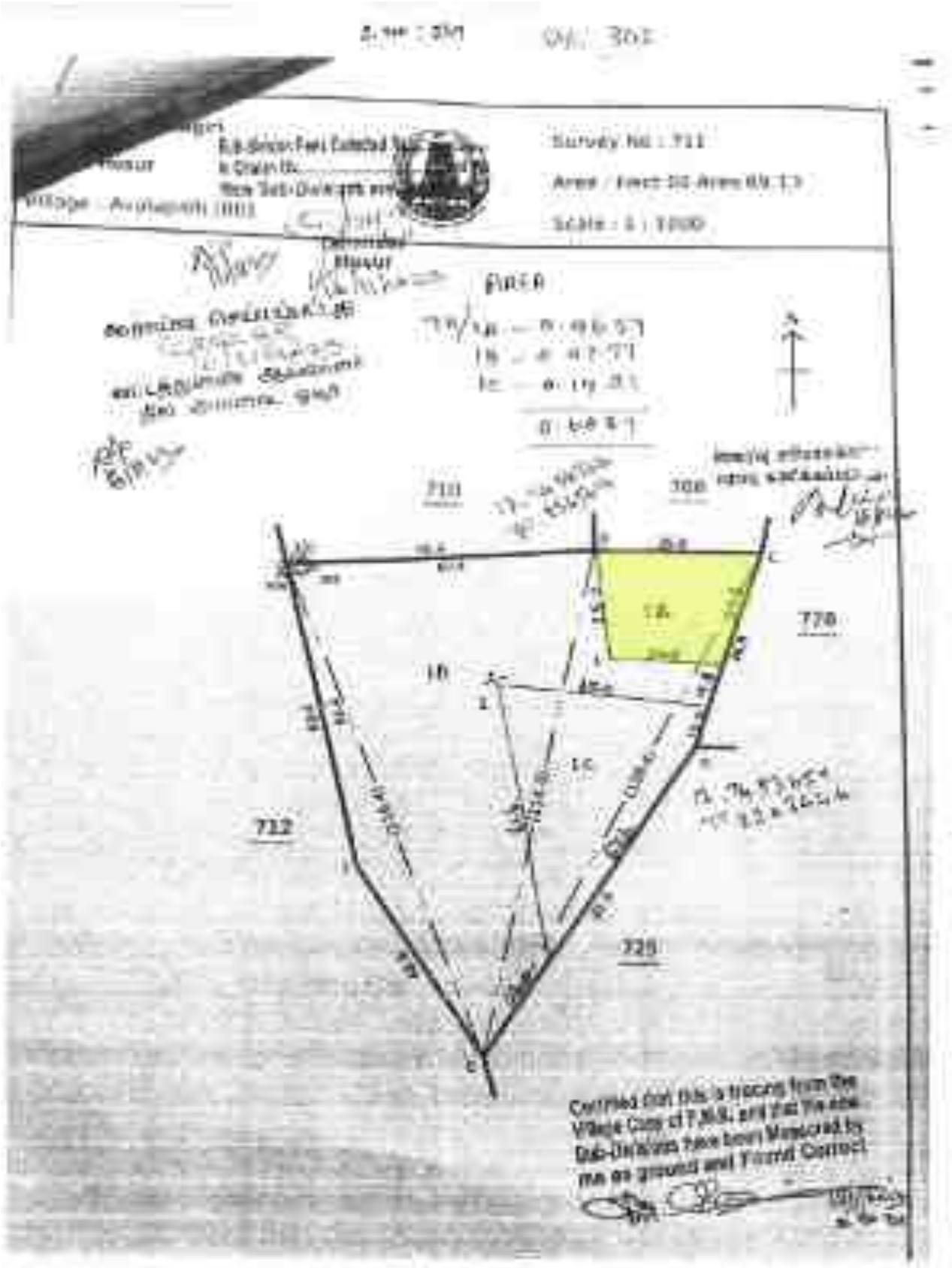
10. 79. Ward - B/6/78/

11. 01. Ward - D/3/57/0

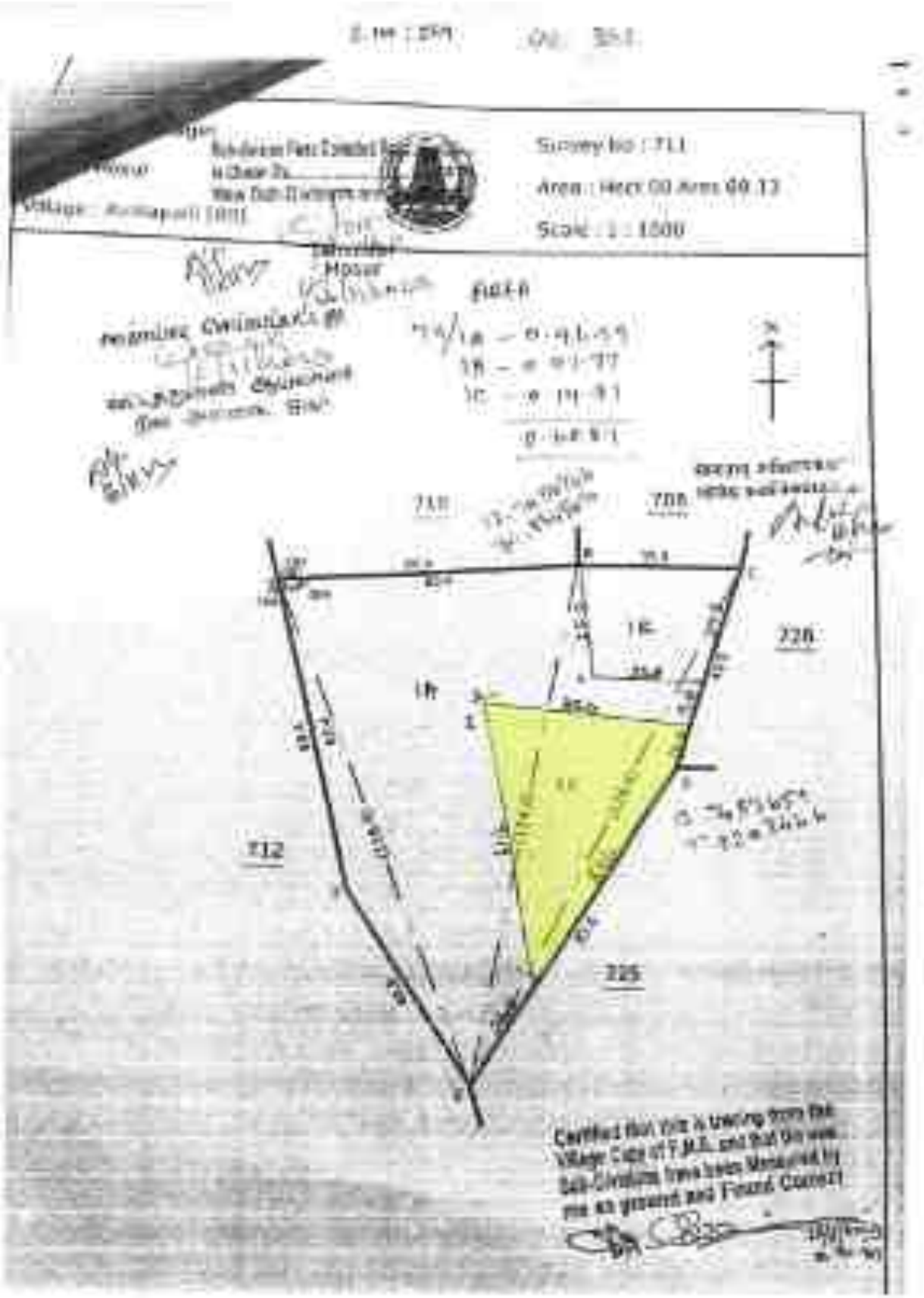
12. 331. Mookandapalli Sr No 352/7,8

13. 376. Avalapalli Sr No 794/13A

14. 362. Avalapalli Sr No 711/1B



15. 362. Avalapalli Sr No 711/1C



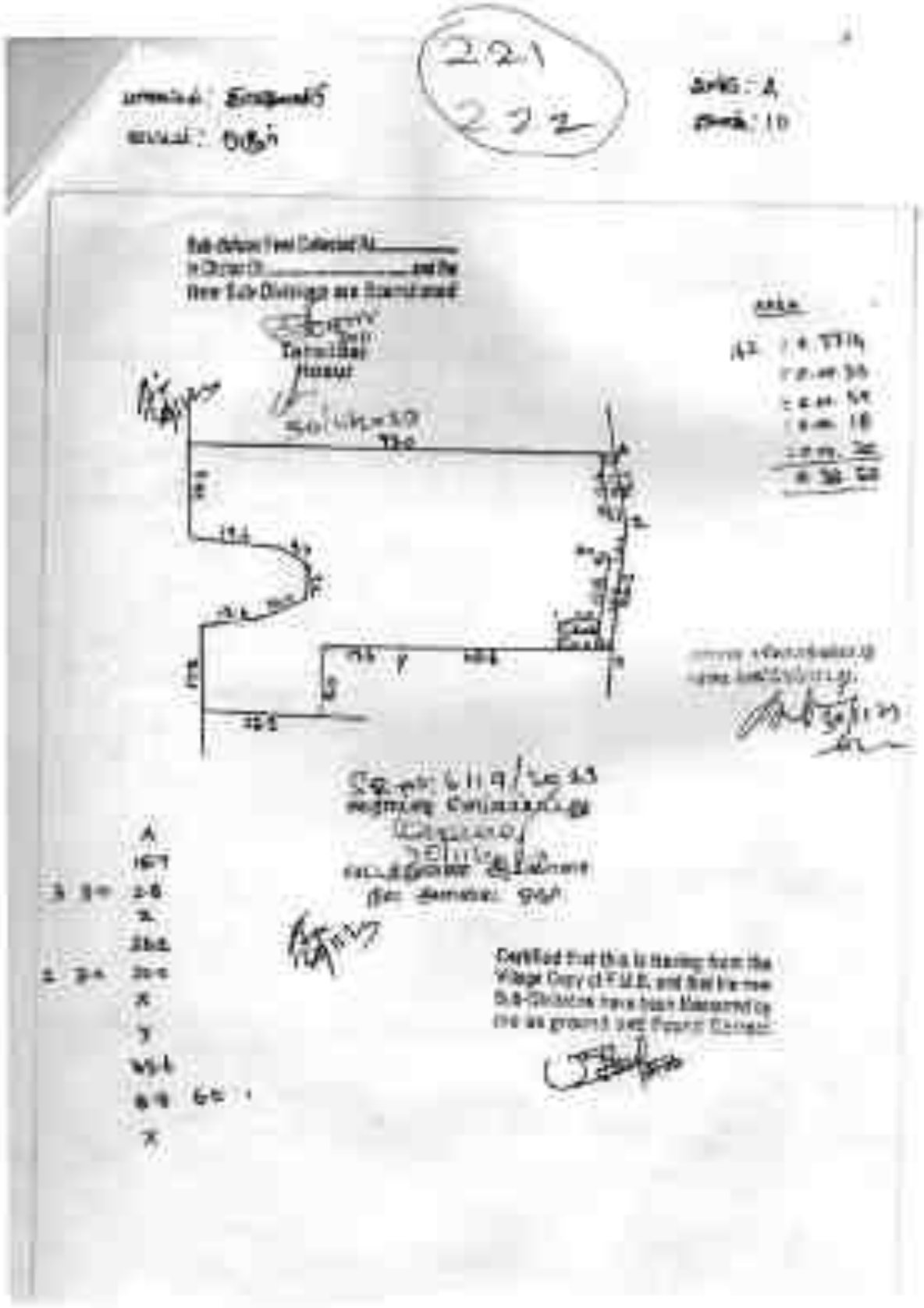
16. 21. Ward - A/23//37/0

17. 60. Ward - A/26/123/0

18. 35. Ward - A/26/120/3

19. 59. Ward - A/27/139

20. 472, 473. Ward - A/10/162/3, 2



Annexure – 14a

FMB Sketches

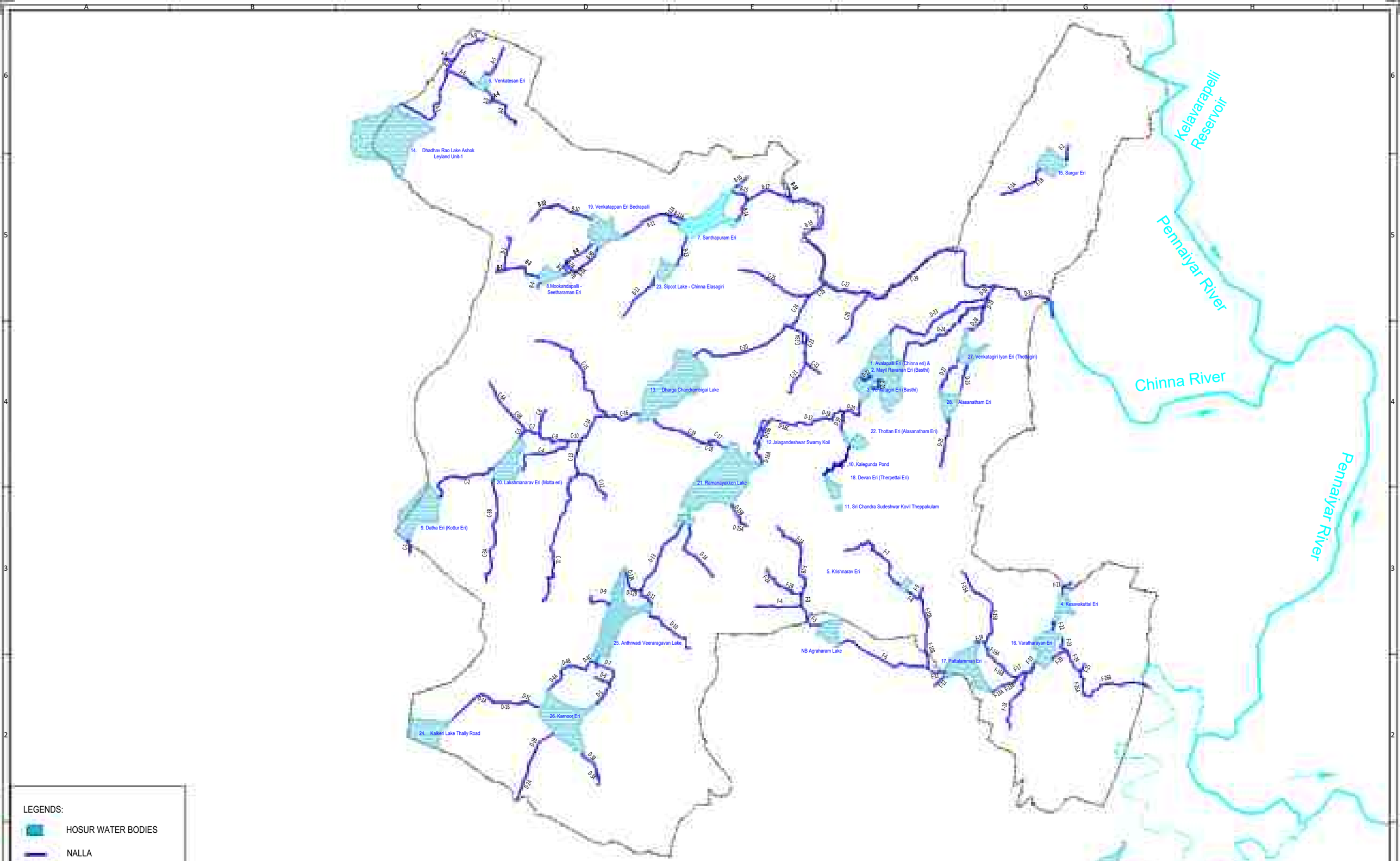
Nallah FMB Sketches

S.NO	VILLAGE NAME	SURVEY NUMBER	NALLA NUMBER
1	Anumepalli Agraharam	8, 7, 2, 3, 4	A9
		13, 19, 12	A5
		16	A2
2	Zuzuvadi	183, 176, 175, 177, 167, 184	A2
		218, 219, 268, 271, 272, 273	A6
		236, 234, 233, 247, 255, 256, 257, 253, 261, 279, 275, 287, 273	A1
		86, 290, 291, 367, 374, 298	B10
		208, 184, 209	A3
		393, 399, 401, 400, 402, 403, 616	B11
		583, 579	B12
		744, 718, 500	C25
		746,747	C20
3	Santapuram Agraharam	42, 41	B16
		44, 51, 52, 53	B15
		7, 8	B11
		57, 58, 63	B17
4	Mukondapalli	99, 98, 97	B2
		23	B10
		104, 108	B3
		121,124	B4
		42, 41, 87, 29, 30, 28, 32, 35, 36, 10, 9, 11, 6	B6,7 & 8
		4, 3, 45	B9
		71, 68	B12
		162,175,179, 219, 222, 272	C15
		237, 239, 267, 266, 255, 256	C5
		588, 586, 587, 585, 579, 578, 419, 420, 577,442, 441, 421, 440, 436, 437, 434	C12
		485, 486, 480, 479, 497, 462, 552, 555, 554, 556, 461, 560, 562, 567, 574, 575, 576, 443, 577	C11
		597, 598, 599, 610, 611, 613, 615, 614, 616, 606, 617, 605, 621, 622	C4

S.NO	VILLAGE NAME	SURVEY NUMBER	NALLA NUMBER
		690, 689, 635, 636, 686, 633, 637, 533, 638,531, 639, 530, 529, 640, 641, 642, 646, 759,644, 760, 765, 645, 764, 663, 761	C3
		694, 695, 690, 688, 687, 697, 708, 709, 716, 712, 713, 723, 724, 708, 730, 731, 735, 736, 734, 709, 715	C2
		748	C1
5	Motham Agraharam	12	C15
		103, 104, 105, 108, 107, 112, 113	C4
		101, 111, 112, 113, 114, 78, 79	C5,7 & 9
		107, 115, 113	C13
		100, 85	C8
		31, 82, 81, 80	C6
		457, 454, 456, 455, 489, 488, 490, 494, 495, 497, 499, 498, 501, 608, 607, 606, 620, 619, 617, 630, 618, 632, 634	C26
		523, 522, 521, 524, 520, 531, 532, 541, 532, 541, 539, 538, 537, 534	C21 & 23
		530, 529, 528	C22
		478, 480, 479, 481	C28
		763, 764, 765, 783, 766, 767, 781, 780, 779, 791, 778, 792, 803, 801, 802, 810, 798, 797, 820, 821, 819, 818, 777, 780, 800, 799	D16, 17 & 18
		790, 793, 794, 792, 782	D19
		560,559,692, 693,694, 735,728,729, 722,721,731, 716,715,714	D16
		700,316,315,314,322,323, 355,351, 699, 700, 701	C17,18 & 19
		128, 127	B15
		172, 177, 214	B15
		34, 33, 32, 854, 75, 853, 852, 847, 866 ,886, 887, 883, 881, 841, 842, 843	F1 & 3
		89,95,96,874, 870,884,886	F2
		115,106,101,100, 107,108,99, 98, 109,110, 97,876,877,883, 881	F4
		221	D11

S.NO	VILLAGE NAME	SURVEY NUMBER	NALLA NUMBER
7	Mathigiri	692,691,682,683,684, 685,675,674,665, 649, 667,654,666,651,772, 650,777,779,778	D13
		630,634,635,637, 638,639,648,649	D12
		760,757,755,753,754, 720,716,722,715,714	D10
		622,571,620,621, 623,613, 607,609,608	D9
		579,581,273,271, 580	D4
		239,234,231, 229,232	D6
		214, 213, 217, 816, 817	D7
		273, 275, 576, 281, 282, 283, 277, 260, 284, 303	D4
		313,312, 295,320,322, 356,355,367,368, 455,454,371,452, 372,373,375,446	D1
		310,392,393	D2
		140,826,141,825,142,828,829,830	D3
8	Avalapalli	178,177,199,198	E2
		227,230,249,248,247,246	E1
		321,334,337	C29 & D31
		642, 641, 643, 639, 644, 649, 551, 554, 553, 552, 649, 650, 651, 550, 549, 547, 546, 537,538, 543, 547, 546, 482, 481, 778, 791, 790, 789, 788, 800, 801, 802	D23
		639, 638, 553, 556, 530, 552, 557, 552, 527,526,562,518,520, 776, 772, 461, 462, 513, 510, 487, 488, 485, 486, 511, 489, 490, 494, 493, 479, 477, 474, 475, 476,469, 470, 468	D24
		565,576,577, 559,634, 636,559,555	D28
		379,422,424, 421,419,4 20,414	D26
		505,423,425, 426,427, 429,430	D27
		733,732,731,730,729,726,725	C28

S.NO	VILLAGE NAME	SURVEY NUMBER	NALLA NUMBER
9	Chennathur	1037,1038,1039, 1231,1027,1230,1028, 1030,1128,1126,1127, 1129,755,754	D25
		866, 869, 871, 862, 859, 857, 860, 852, 841, 842, 795	F7
		777, 778	F8
		783, 781, 777, 782, 776, 484, 490, 489, 483	F10
		677, 674, 673, 671, 409, 408, 407, 404, 403, 389, 390, 391, 375, 378, 346, 345, 344, 178, 153, 152, 157, 163	F16, 17 & 19
		395, 373, 374	F14
		330, 331, 337, 180, 179	F13
		149, 143, 139, 187, 300, 301, 302, 298, 307, 305	F18
		539, 628	F21
		580, 579	F22
		119, 96, 97, 99, 63, 101, 31, 32,33, 59, 58, 40, 55, 41, 14, 17, 7, 6	F24
		104, 103, 105, 31	F25
		86, 130, 131, 668, 128	F20



LEGENDS:

- HOSUR WATER BODIES
- NALLA
- PROJECT BOUNDARY

VOYANTS
Solutions Pvt Ltd
LEVEL-4,"DIAMOND DUNE" NO:323,P.H.ROAD,CHENNAI-29,INDIA,WWW.VOYANTS.IN TEL:+91-044-42698584,42034972, CHENNAI-GURGAON-HYDERABAD-KOLKATA-MUMBAI

REV	DATE	DESCRIPTION
	REVISION: R0	DATE: NOV 2025

PROJECT:
Preparation of Detailed Project Report (DPR) for Providing Integrated Storm Water Drains (ISWD) for Hosur City Municipal Corporation Rejuvenation of Water Bodies

CLIENT:
Project Development Grant Fund (PDGF)Managed by Tamil Nadu Urban Infrastructure Financial Services Limited (TNUIFSL)
Hosur City Municipal Corporation

SHEET SIZE: A2	DRAWN BY:	CHECKED BY:	APPROVED BY:
SCALE: NTS	WSD TEAM	VN	BJN

TITLE: ISWD - NALLAH DETAILS

DRG NO: VSPL/WSD/2324-059/HCMC/ISWD/FR/P1-11 | R0

FINAL REPORT | SHEETS: 01/01

NALLAH NUMBER – A1

District : Krishnagiri

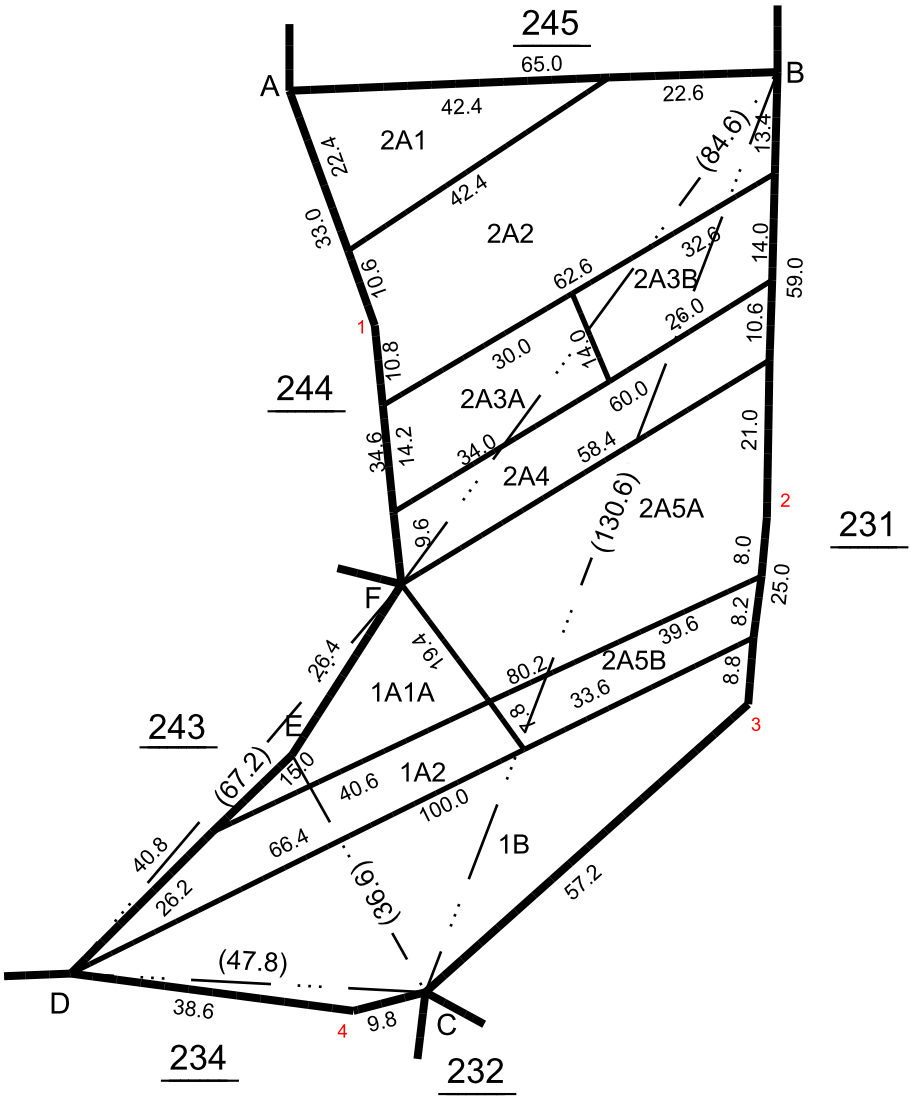
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 233

Area : Hect 00 Ares 65.00

Scale : 1 : 1000



District : Krishnagiri

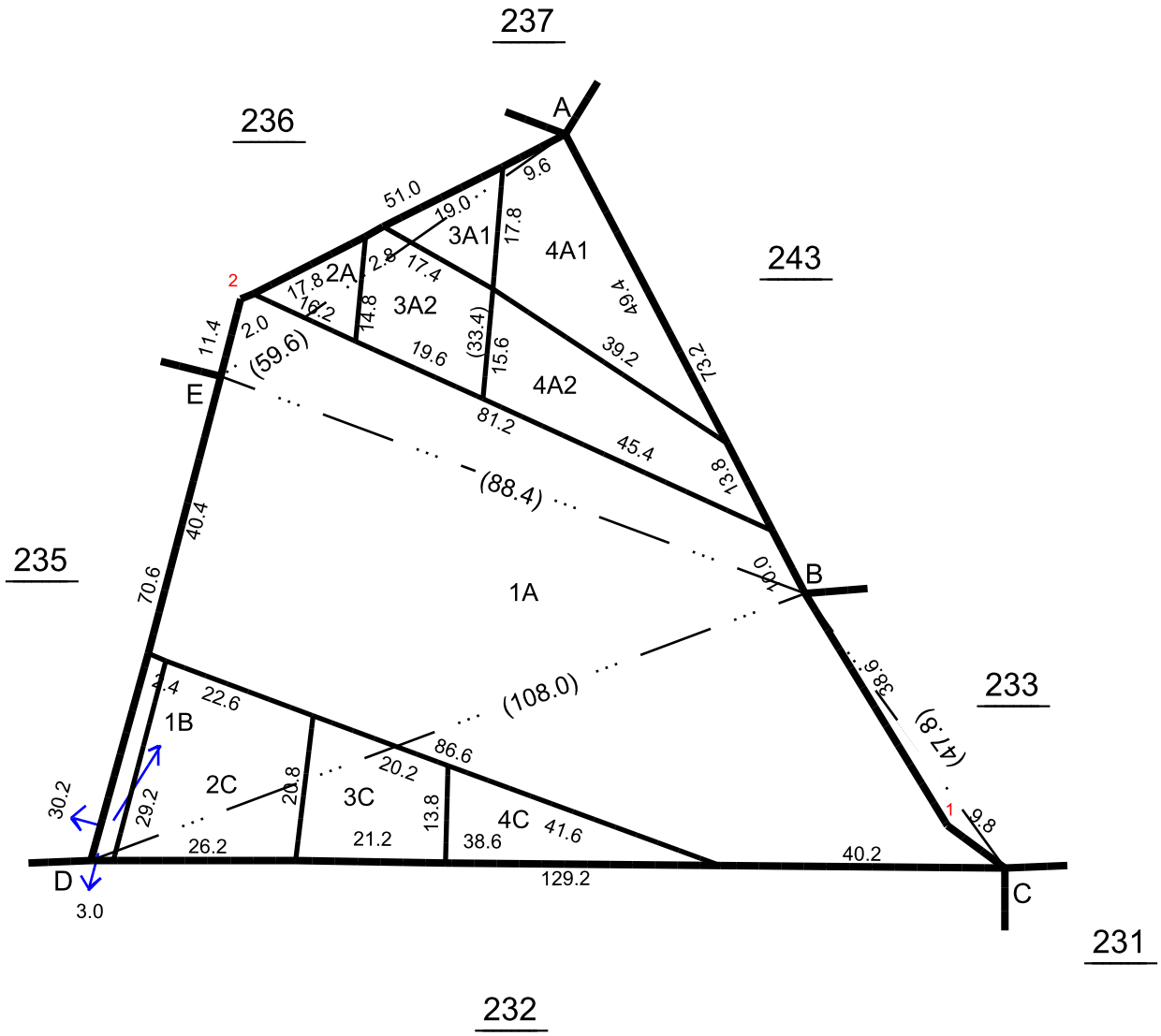
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 234

Area : Hect 00 Ares 80.00

Scale : 1 : 1000



District : Krishnagiri

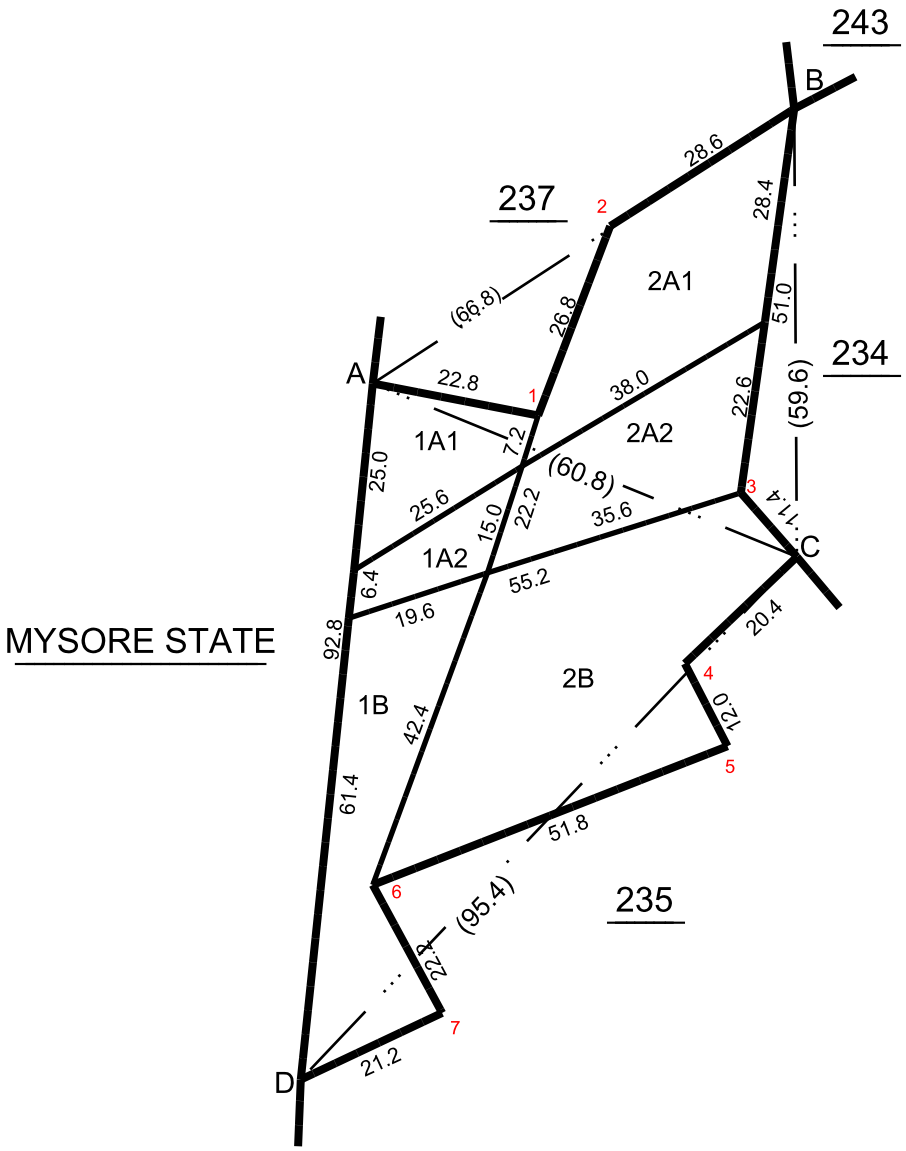
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 236

Area : Hect 00 Ares 39.50

Scale : 1 : 1000



District : Krishnagiri

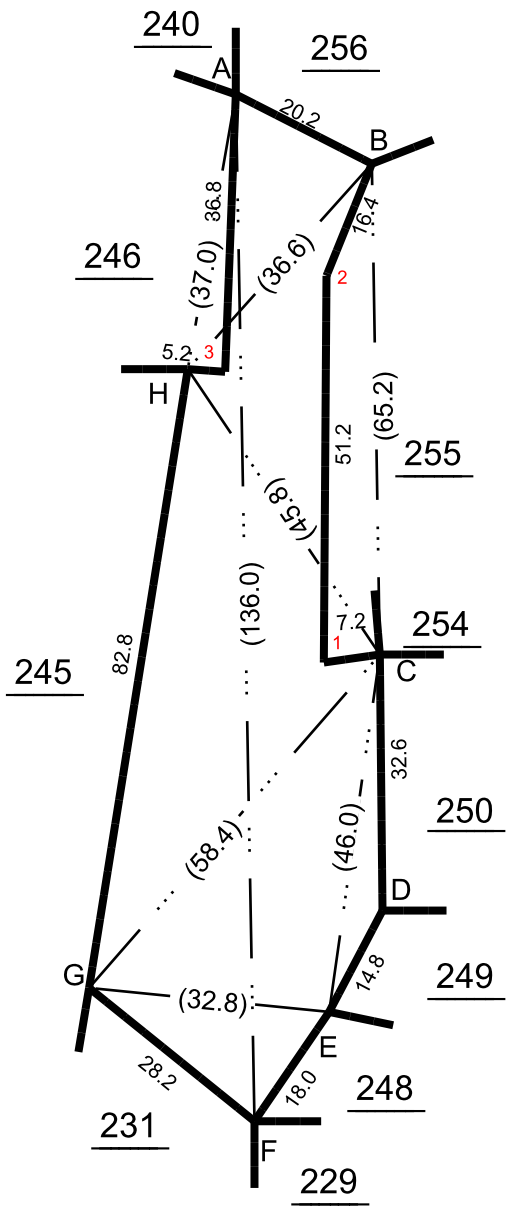
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 247

Area : Hect 00 Ares 33.50

Scale : 1 : 1000



District : Krishnagiri

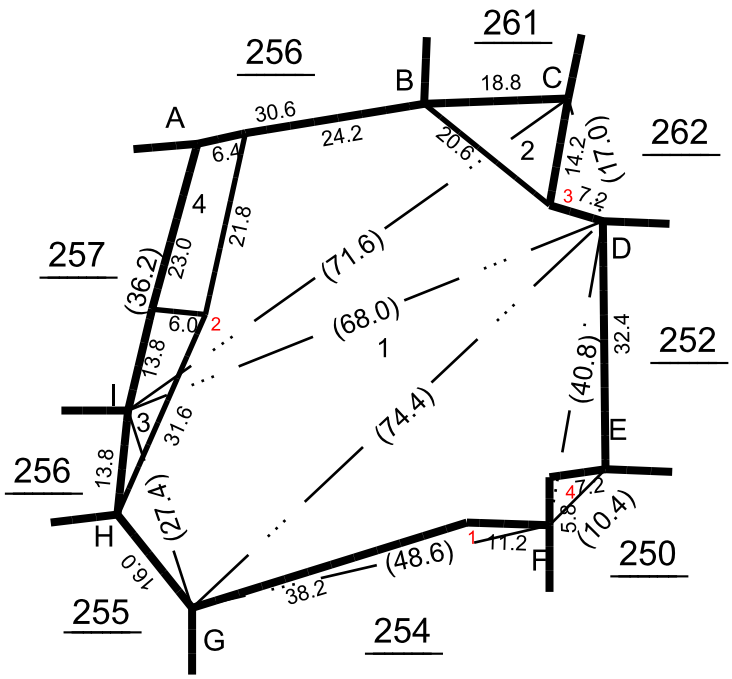
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 253

Area : Hect 00 Ares 34.00

Scale : 1 : 1000



District : Krishnagiri

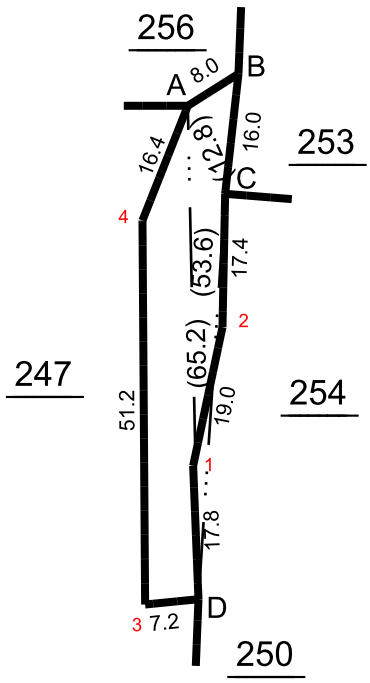
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 255

Area : Hect 00 Ares 6.00

Scale : 1 : 1000



District : Krishnagiri

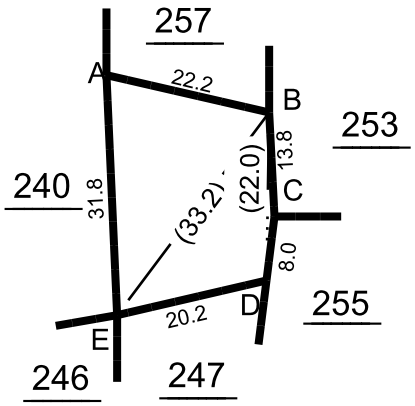
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 256

Area : Hect 00 Ares 5.50

Scale : 1 : 1000



District : Krishnagiri

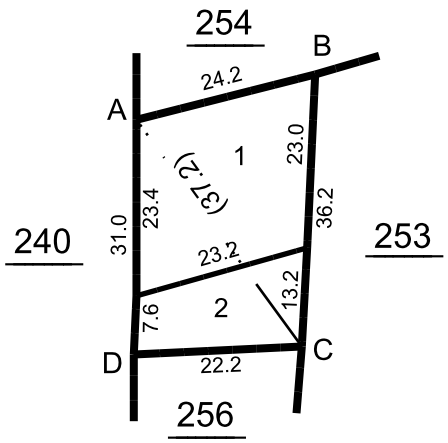
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 257

Area : Hect 00 Ares 7.50

Scale : 1 : 1000



District : Krishnagiri

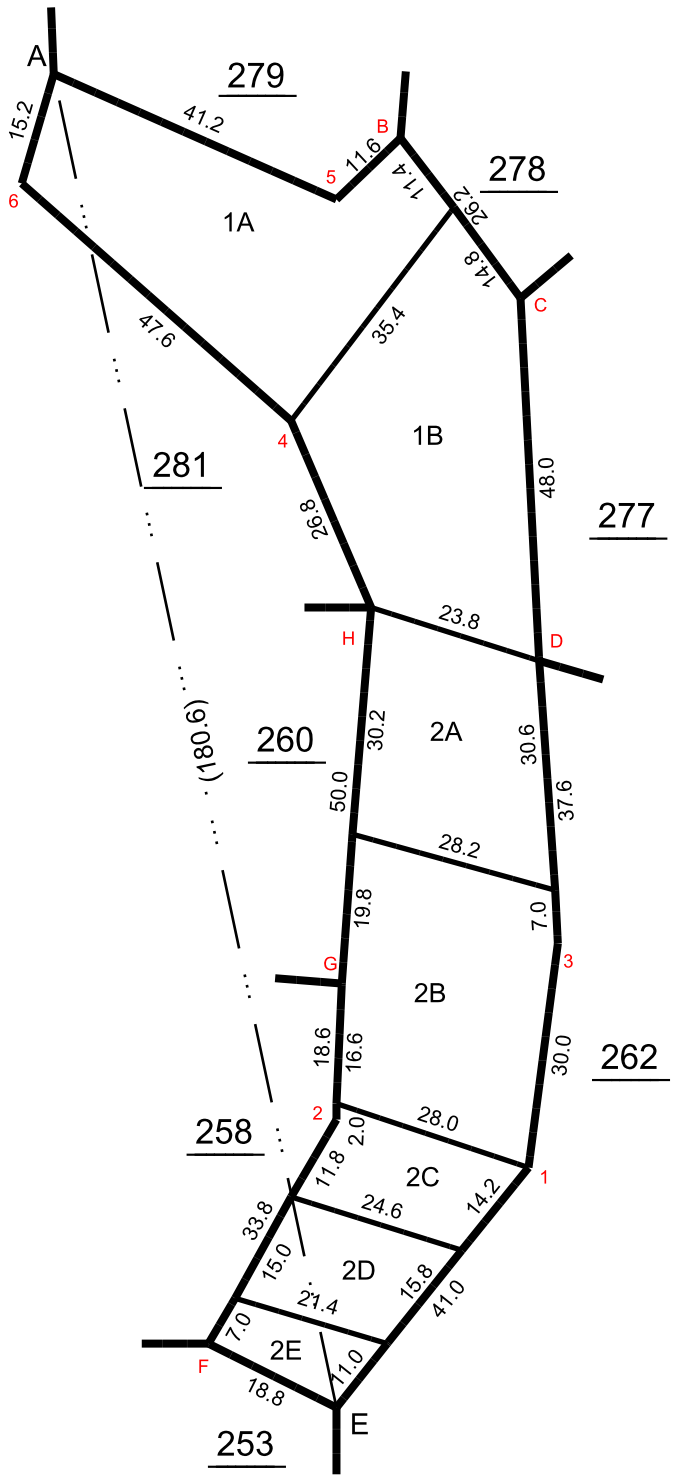
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 261

Area : Hect 00 Ares 51.00

Scale : 1 : 1000



District : Krishnagiri

Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 273

Area : Hect 00 Ares 41.50

Scale : 1 : 1000

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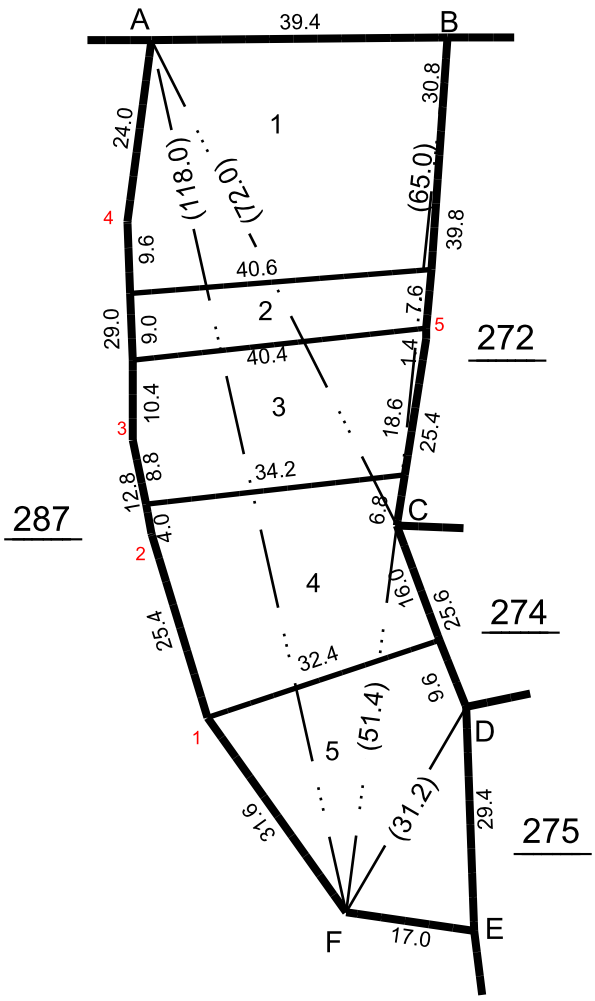


District : Krishnagiri

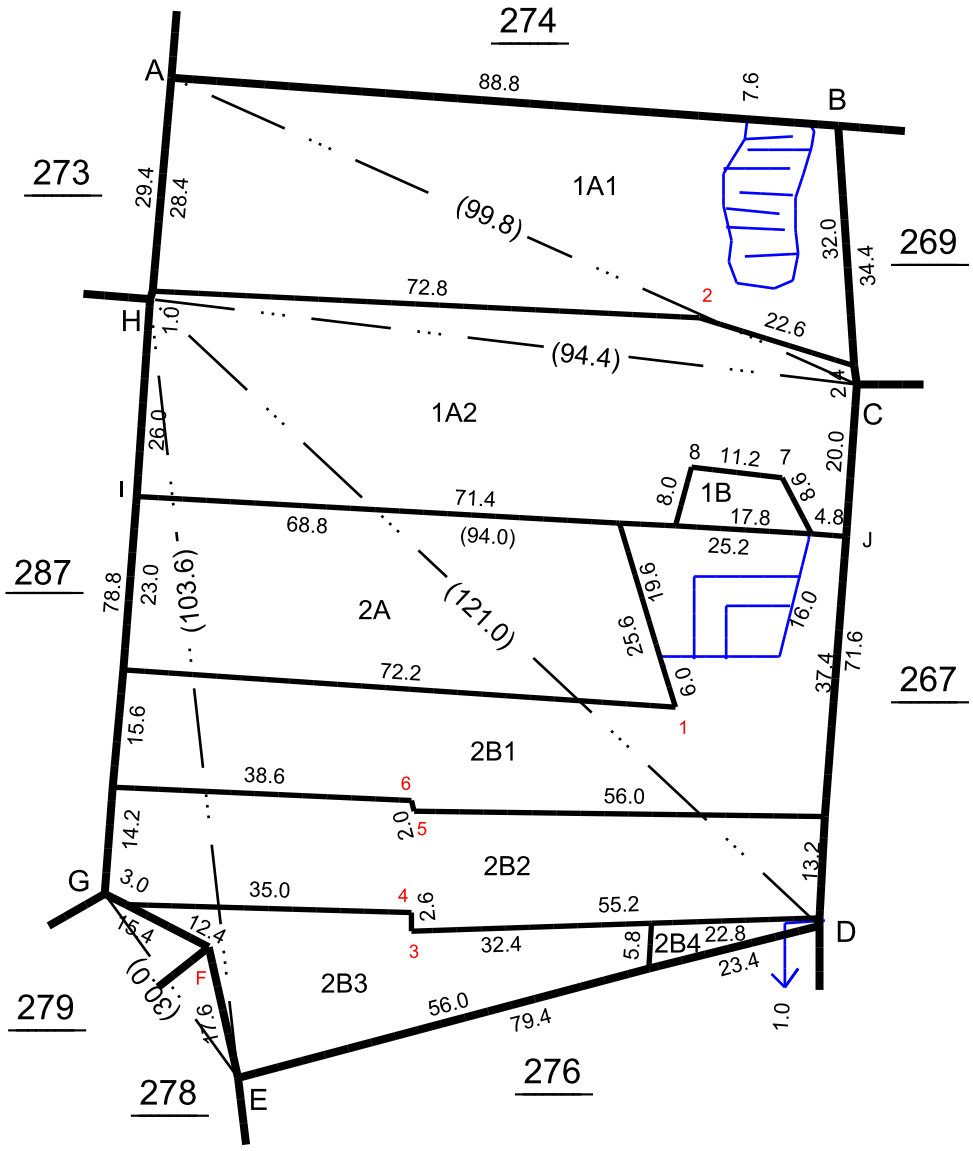
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 275

Area : Hect 01 Ares 11.00

Scale : 1 : 1000



District : Krishnagiri

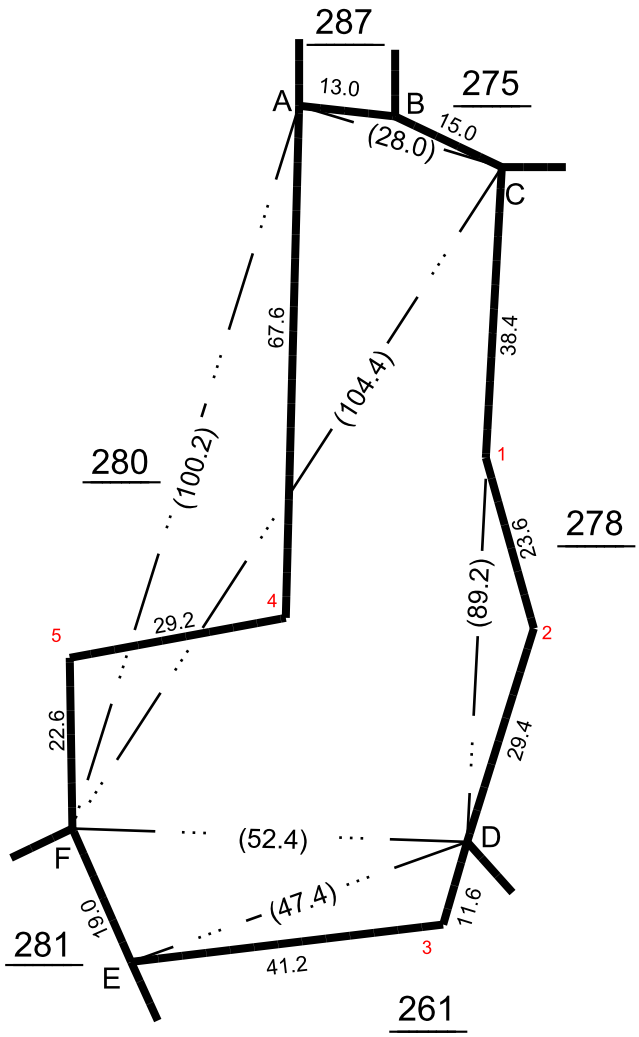
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 279

Area : Hect 00 Ares 40.50

Scale : 1 : 1000



District : Krishnagiri

Taluk : Hosur [9]

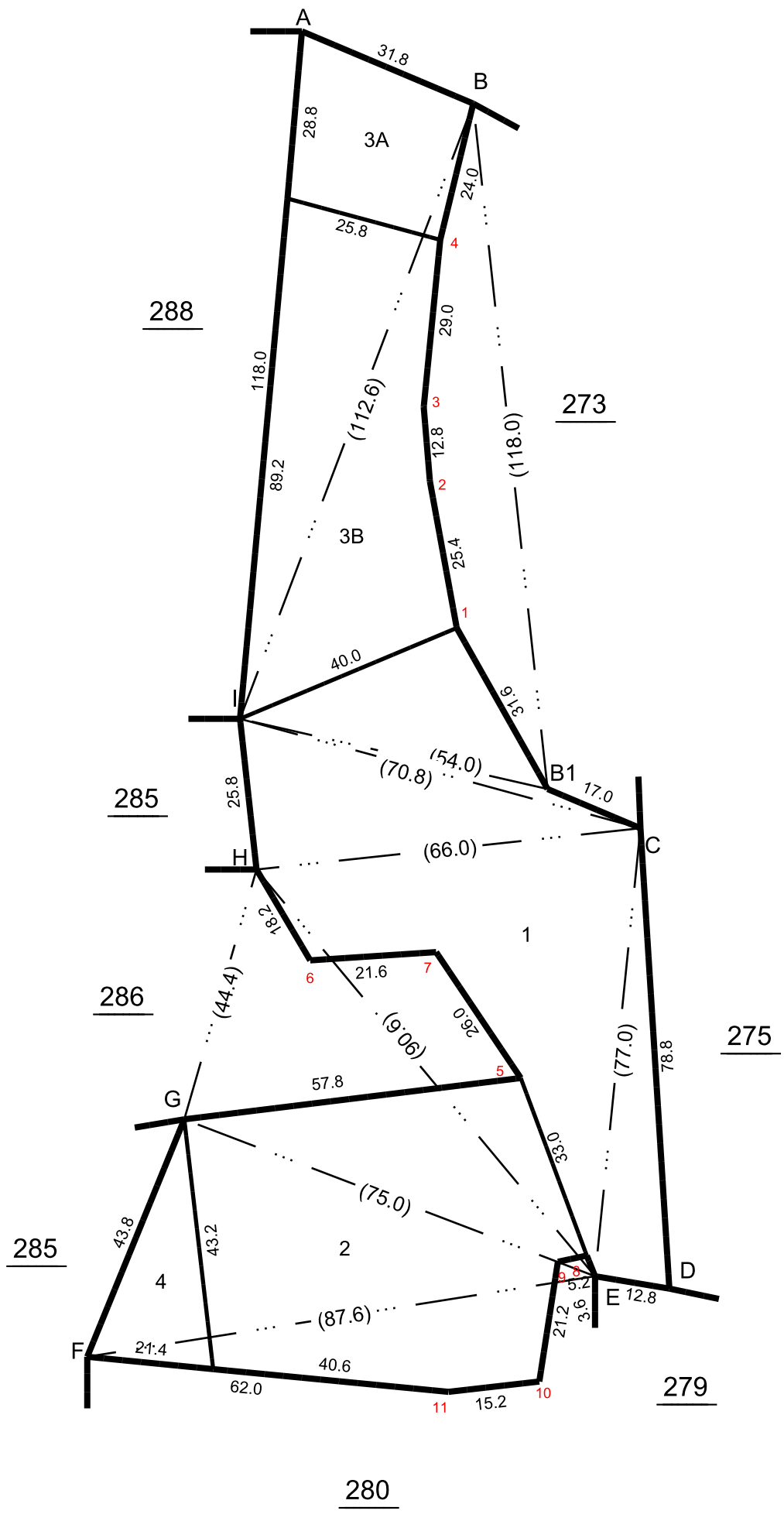
Village : ZUZUVADI [87]

Survey No : 287

Area : Hect 01 Ares 5.00

Scale : 1 : 1000

V NO:86 ANUMEYPPALLI



NALLAH NUMBER – A2

District : Krishnagiri

Survey No : 16

Taluk : Hosur [9]

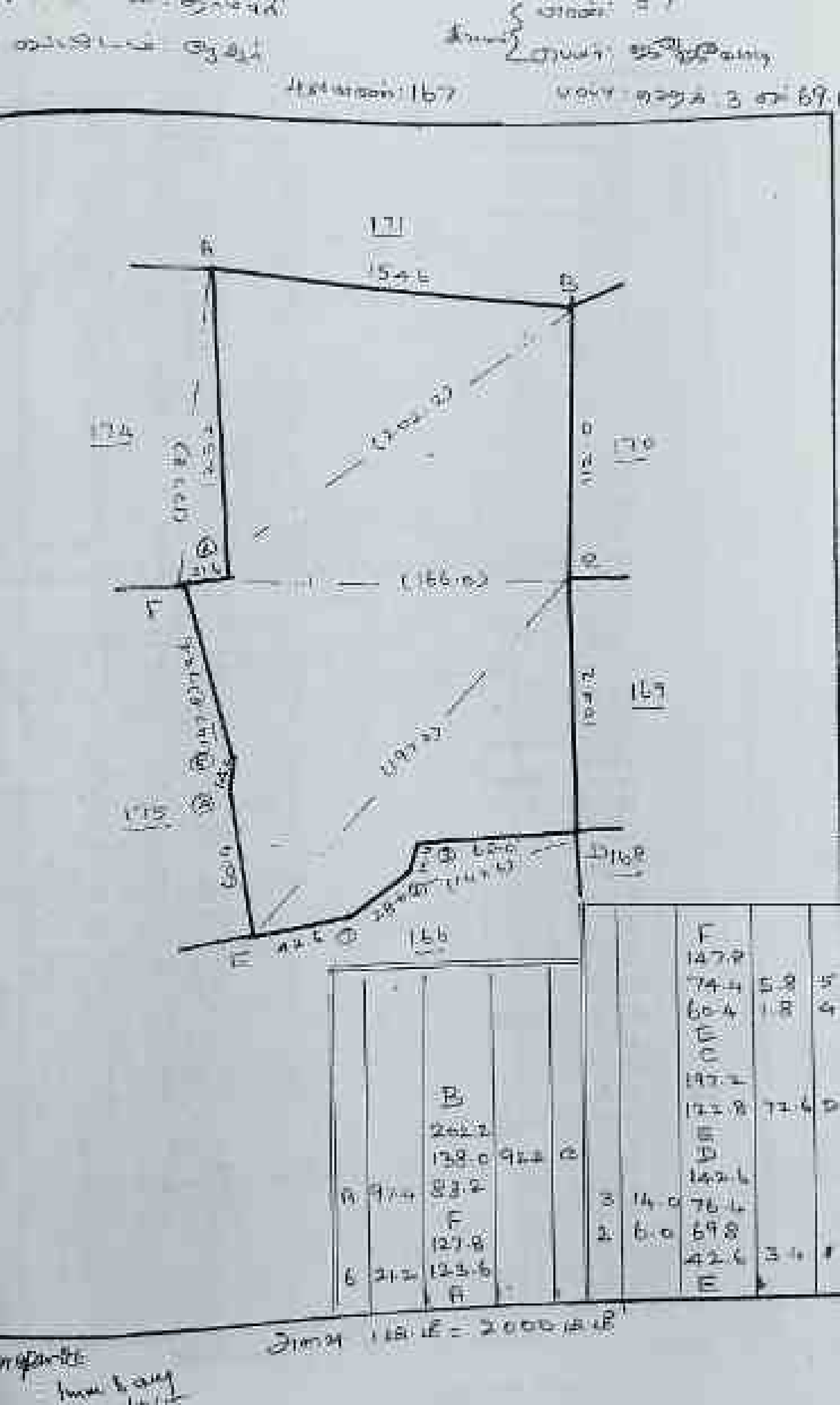
Area : Hect 02 Ares 66.00

Village : ZUZUVADI [67]

Scale : 1 : 1000

Ladder				
E 105.8 102.4 17.0 F 154.0 144.0 120.0	4.2		0.4	
B 210.4	80.8	87.8		
	146.2		78.8	38
	110.8		107.0	0
A B 210.4	33.2	2.8		
		15.2	78.2	44
		14.4	8.6	43
A B 153.0				
	13.8	104.0		
		77.4	20.8	5
		65.2	66.2	0
D B 153.8				
		143.8	37.4	3
		86.2	38.8	4
	72.8	90.8		
	43.2	73.2		
E		60.0	23.8	1

Collected : National Informatics Centre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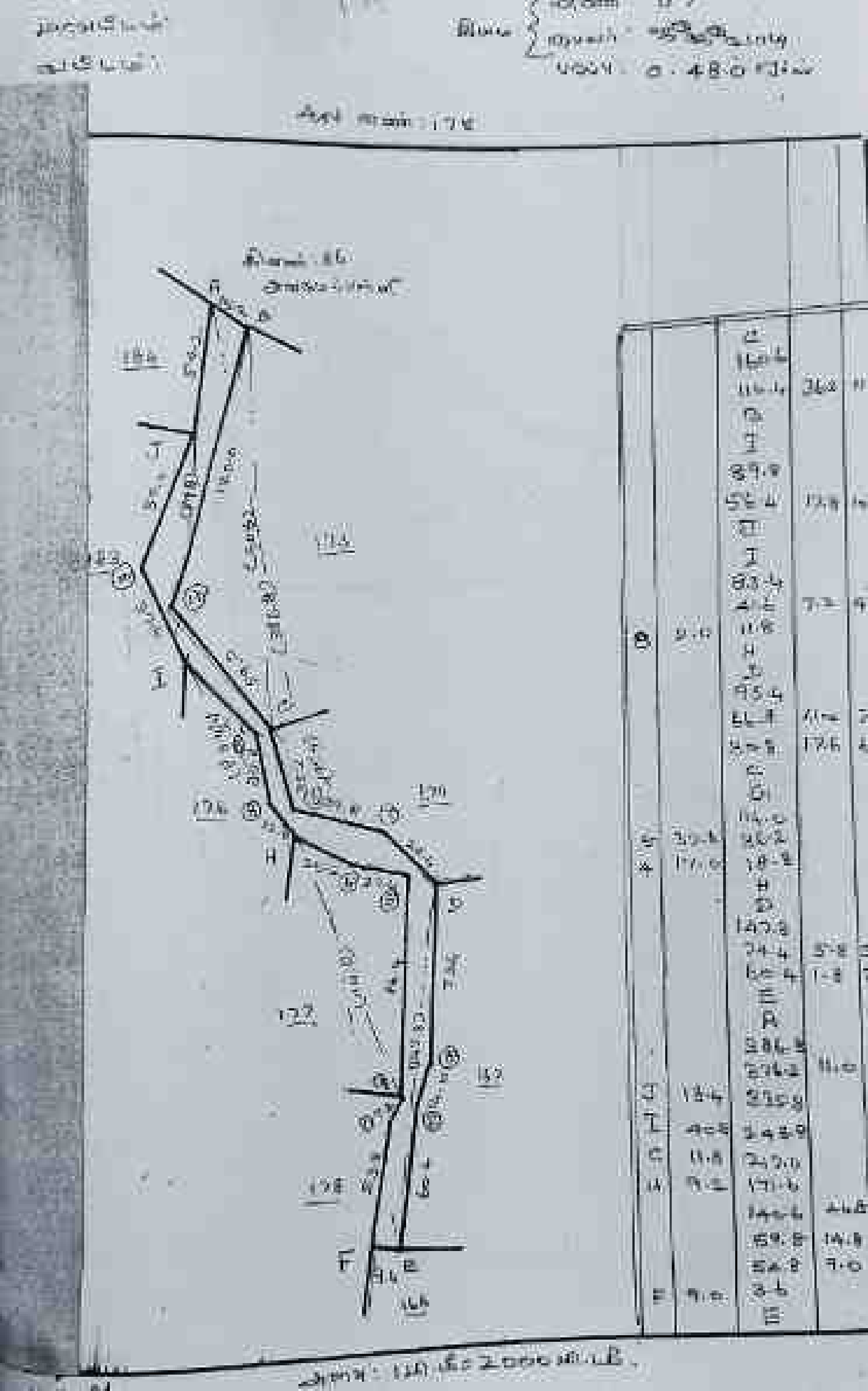

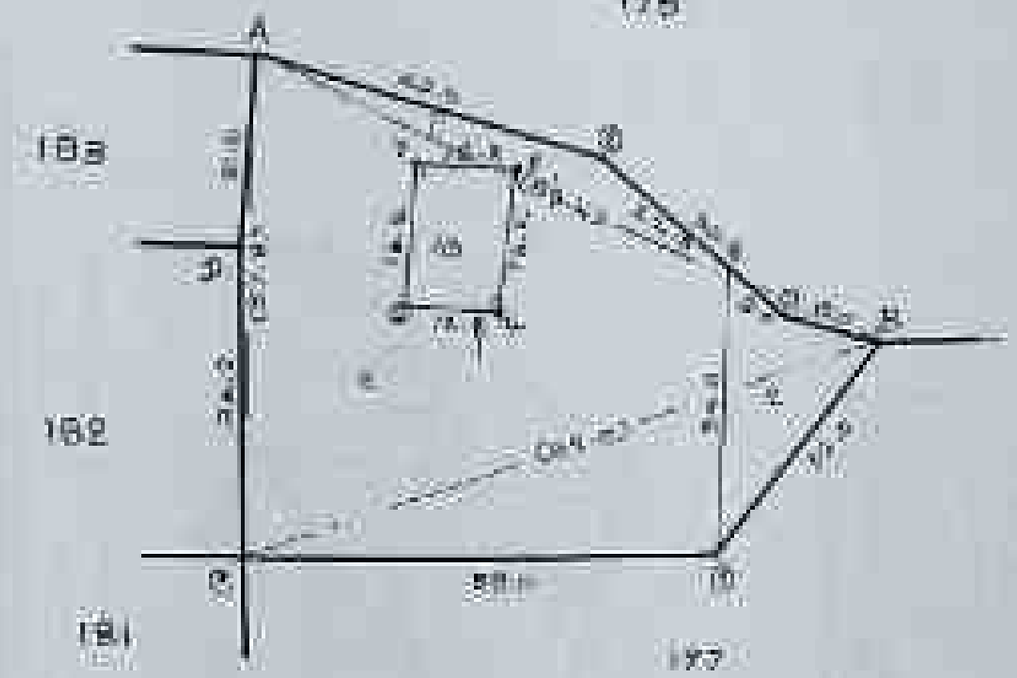
A
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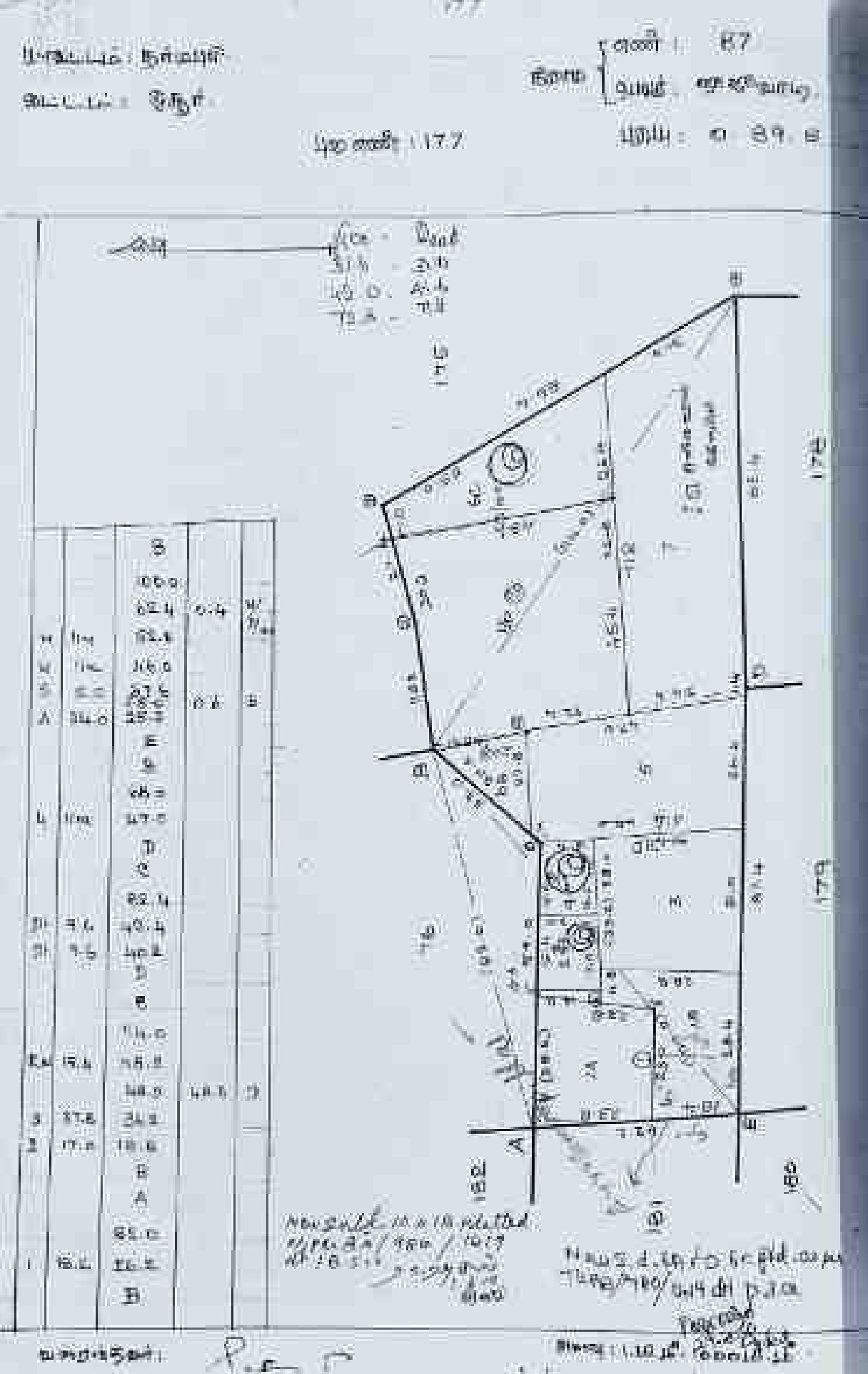


District : Krishnagiri

Taluk : Hosur

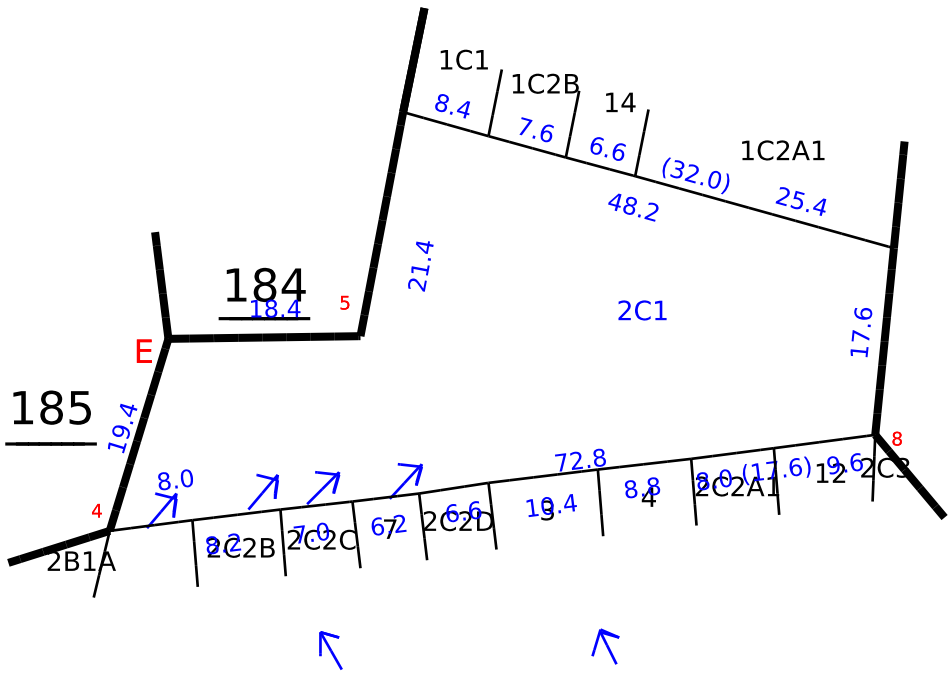
Village : Zuzuvadi(R)

Survey No : 183/2C1

Area : Hect 00 Ares 16 Sqm 50

Scale : 1 : 709 mm

FMB Sketch



Approved By Tahsildar

kgi_vijayakumar

Date of Approved : 01-06-2024

Date of Issue: 13-05-2025 12:42:12

Survey and Settlement Department, Government of TamilNadu

mv240 v270.001

District : Krishnagiri

Taluk : Hosur

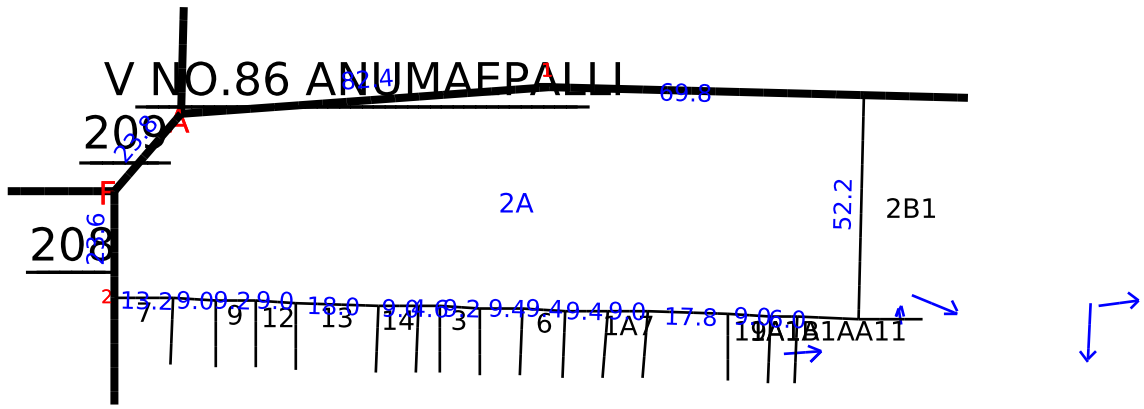
Village : Zuzuvadi(R)

Survey No : 184/2A

Area : Hect 00 Ares 74 Sqm 00

Scale : 1 : 1685 mm

FMB Sketch



Approved By Tahsildar

kgi_subramanik

Date of Approved : 15-11-2023

Date of Issue: 13-05-2025 12:51:02

Survey and Settlement Department, Government of TamilNadu

mv260 v270.001

District : Krishnagiri

Taluk : Hosur

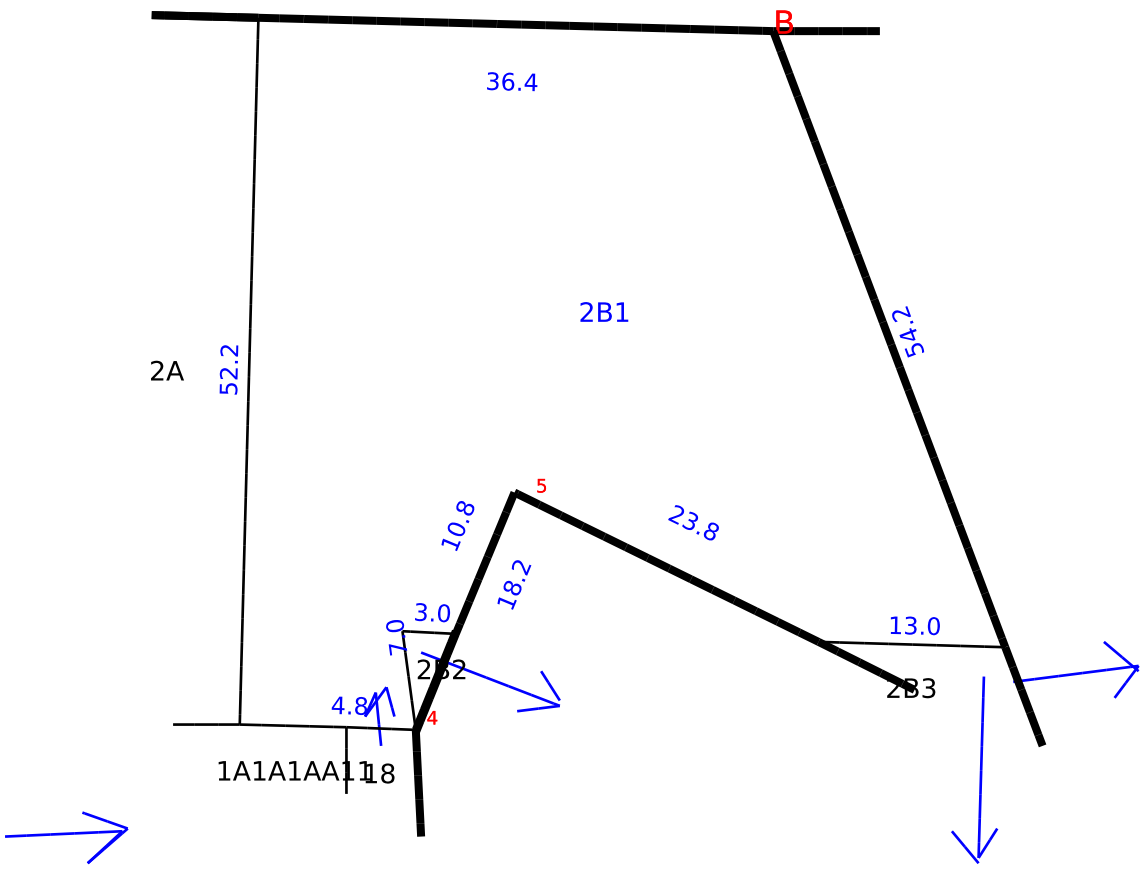
Village : Zuzuvadi(R)

Survey No : 184/2B1

Area : Hect 00 Ares 18 Sqm 47

Scale : 1 : 531 mm

FMB Sketch



Approved By Tahsildar

kgi_subramanik

Date of Approved : 15-11-2023

Date of Issue: 13-05-2025 12:50:34

Survey and Settlement Department, Government of TamilNadu

mv260 v270.001

NALLAH NUMBER – A3

District : Krishnagiri

Taluk : Hosur [5]

Village : ZUZUVADI [87]

Survey No : 184

Area : Hect.01 Ares 69.47

Scale : 1 : 1000

V.NO.86 ANUMAEPALLI

Land Record Information Centre

District : Krishnagiri

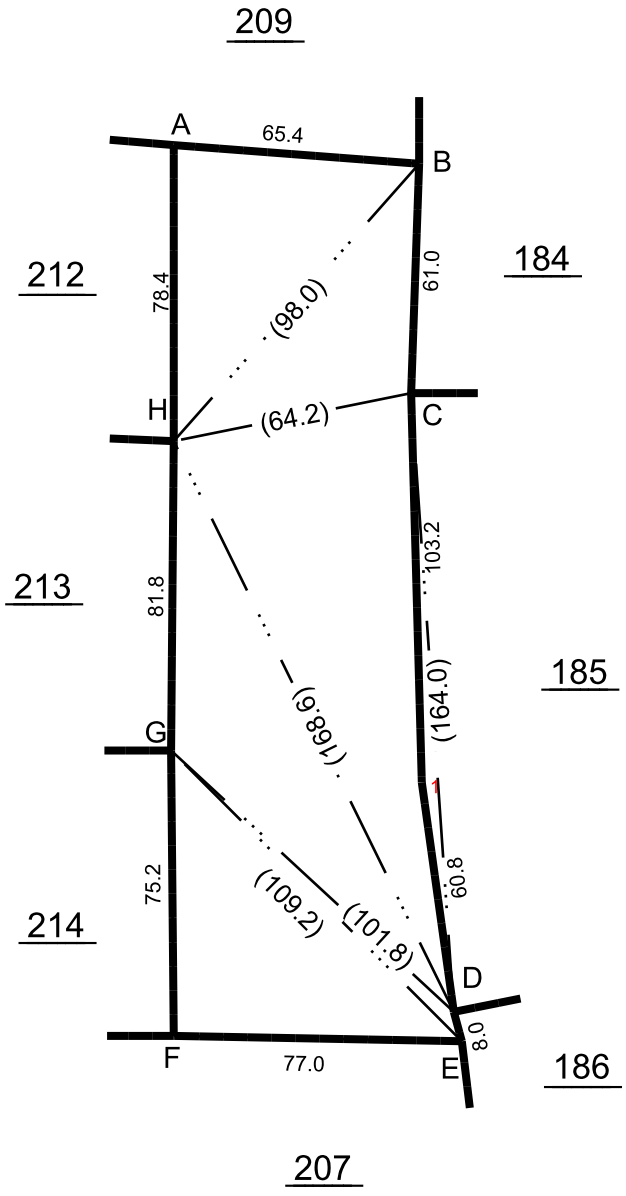
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 208

Area : Hect 01 Ares 56.50

Scale : 1 : 2000



		Ladder		
		C		
		164.0		
1	4.2	60.8		
		D		
		H		
		98.0		
C	38.8	46.8		
		39.4	52.2	A
		B		
		H		
		168.6		
		151.4	61.8	C
G	37.0	95.6		
		D		
		G		
		109.2		
F	53.2	55.6		
		7.2	4.0	D
		E		
		H		
		64.2		
		C		
		G		
		101.8		
		D		
		A		
		65.4		
		B		
		61.0		
		C		
		D		
		8.0		
		E		
		77.0		
		F		
		75.2		
		G		
		81.8		
		H		
		78.4		
		A		

District : Krishnagiri

Taluk : Hosur [9]

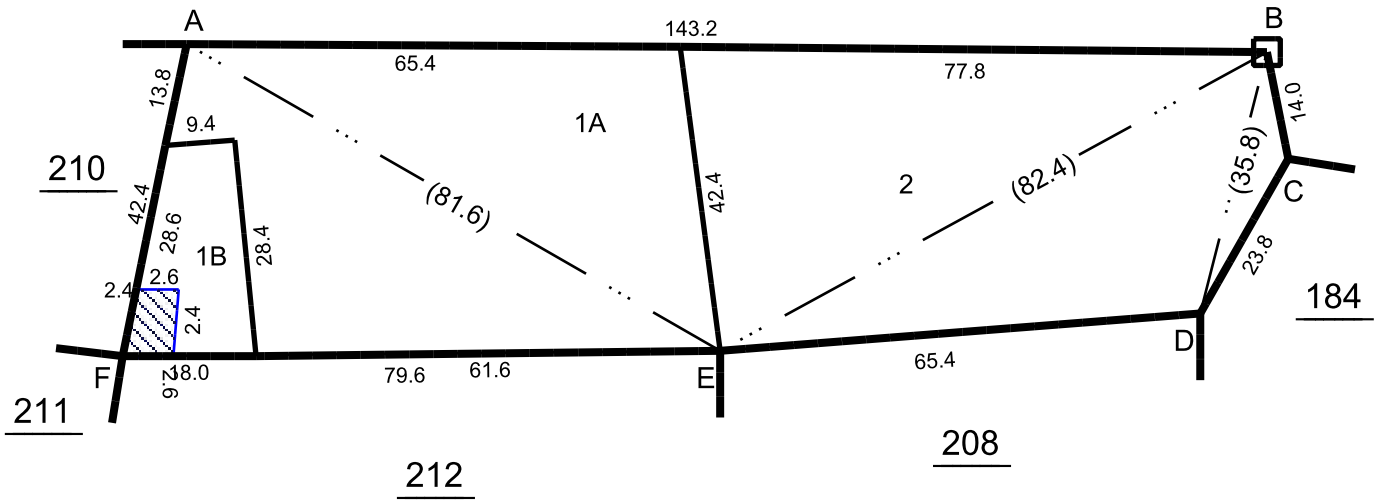
Village : ZUZUVADI [87]

Survey No : 209

Area : Hect 00 Ares 58.50

Scale : 1 : 1000

V NO:86 ANUMEIPPALLI



Ladder

		B		
		35.8		
		23.0	6.2	C
		D		
		E		
		82.4		
D	26.2	24.4		
		B		
		A		
		81.6		
F	40.2	68.4		
210	8.0	69.6		
		E		
		A		
		143.2		
		B		
		14.0		
		C		
		23.8		
		D		
		65.4		
		E		
		79.6		
		F		
		42.4		
		A		

NALLAH NUMBER – A5

District : Krishnagiri

Taluk : Hosur [9]

Village : ANJUMEPALLI [86]

Survey No : 12

Area : Hect 06 Ares 14.84

Scale : 1 : 1000

V NO.29 BEGEPALLI

Created and : National Informatics Centre

District : Krishnagiri

Taluk : Hosur [9]

Village : ANUMEPALLI [86]

Survey No : 13

Area : Hect 05 Ares 50.13

Scale : 1 : 1000

Collected : National Informatics Centre

District : Krishnagiri

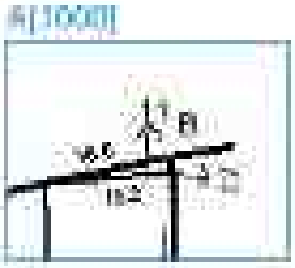
Survey No : 19

Taluk : Hosur [9]

Area : Hect 03 Aces 72.73

Village : ANJUMEPALLI [86]

Scale : 1 : 2000



		Ladder B		
		388.4		
A	49.0	392.0		
27	5.5	219.0		
		120.0	9.4	28
		D		
		C		
		288.8		
		299.4	42.8	19
19	77.4	162.2		
		A		
		C		
		303.8		
17	27.2	170.8		
16	5.2	139.2		
		134.8	44.8	15
		129.4	7.0	01
		128.8	37.8	14
		127.8	9.8	07
		125.4	40.0	13
12	48.2	120.2		
		101.4	18.8	11
		91.0	94.2	10
		44.8	38.6	9
		31.8	36.6	8
		18.8	11.2	7
		D		
		B		
		403.2		
6	5.2	200.0		
5	2.8	196.6		
		194.2	28.8	4
		163.8	18.2	6
		83.0	8.8	3
03	37.2	53.0		
		45.8	1.2	1
02	26.4	296.4		
29	28.8	326.8		
28	29.6	343.0		
		C		

NALLAH NUMBER – A6

District : Krishnagiri

Survey No : 218

Taluk : Hosur [9]

Area : Hect 01 Aces 32.11

Village : ZUZUVADI [87]

Scale : 1 : 1000

V NO:86 ANUMEIPPALLI

		Latitude												
		E						E						
		89.2						145.8						
		80.2	4.8	3				61.8	52.8	F				
8	8.8	2.8			D	96.0		40.2						
9	1.2	3.0						84.8	12.2	6				
10	2.8	17.0						56.4	18.8	7	1	26.8		
11	7.8	18.2						37.8	52.8	21	A	28.8		
14	10.8	11.8						39.2	21.4	10				
15	7.8	12.4						B						
16	10.2	25.0						139.8						
17	9.2	25.8						83.4	26.2	C				
		F						61.8	7.0	4				
		D						80.8	9.0	5				
		142.6						D						
2	8.2	71.8						B						

		81.2		
		73.6	LINE	
		61.8	LINE	
		19.6		
		94.0		
		F		
		82.0		
		A		
		B		
		83.2		
		C		
		87.4		
		D		

Courtesy : National Informatics Centre

District : Krishnagiri

Taluk : Hosur [9]

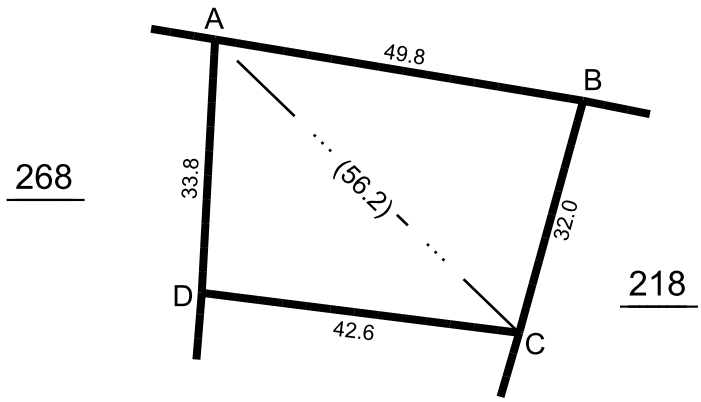
Village : ZUZUVADI [87]

Survey No : 219

Area : Hect 00 Ares 15.50

Scale : 1 : 1000

V NO:86 ANUMAPPALLI



Ladder

D	25.6	A 56.2 34.2 15.2 C A 49.8 B 32.0 C 42.6 D 33.8 A	28.0	B

District : Krishnagiri

Taluk : Hosur [9]

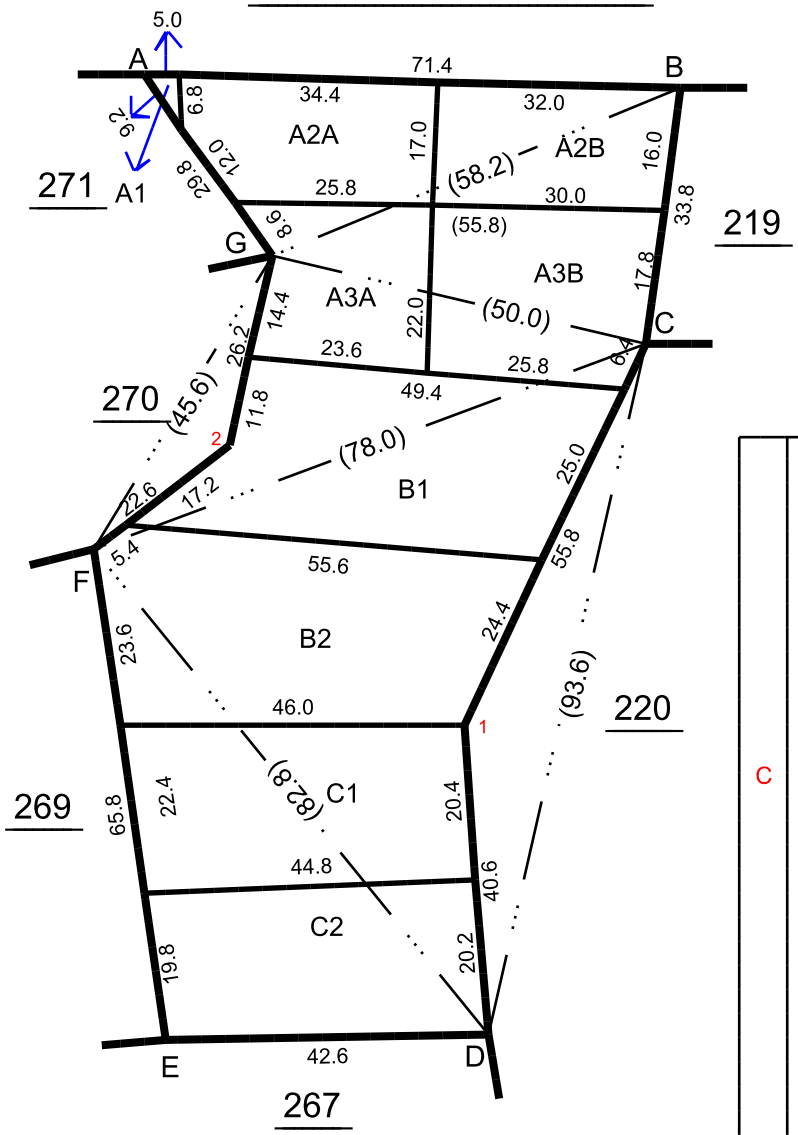
Village : ZUZUVADI [87]

Survey No : 268

Area : Hect 00 Ares 55.50

Scale : 1 : 1000

V NO:86 ANUMEYPPALLI



		Ladder		
		G		
		45.6		
		21.2	8.2	2
		F		
		D		
		93.6		
		54.6	12.0	1
		C		
		G		
		58.2		
C	29.4	17.2		
		B		
		G		
		50.0		
		C		
		F		
		78.0		
		C		
		F		
		82.8		
		D		
		A		
		71.4		
		B		
		33.8		
		C		
		D		
		42.6		
		E		
		65.8		
		F		
		G		
		29.8		
		A		

District : Krishnagiri

Taluk : Hosur [9]

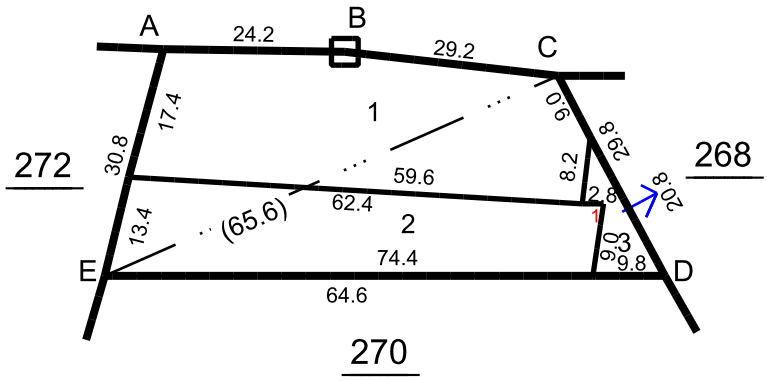
Village : ZUZUVADI [87]

Survey No : 271

Area : Hect 00 Ares 18.00

Scale : 1 : 1000

V NO:86 ANUMEYPPALLI



		Ladder		
B	14.2	C 65.6 41.0 E D 29.8 17.8 C E 74.4 D E 30.8 A 24.2 B 29.2 C	2.8	1

District : Krishnagiri

Taluk : Hosur [9]

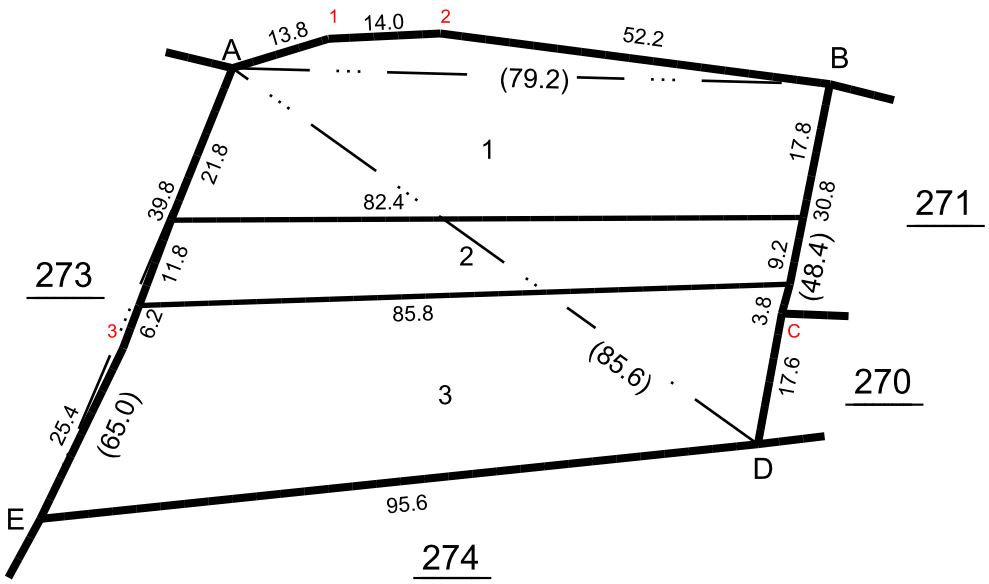
Village : ZUZUVADI [87]

Survey No : 272

Area : Hect 00 Ares 47.00

Scale : 1 : 1000

V NO:86 ANUMEYPPALLI



Ladder

		E		
		65.0		
3	1.2	39.8		
		A		
		D		
		48.4		
		30.8	0.2	C
		B		
		79.2		
2	5.4	27.4		
1	4.2	12.8		
		A		
		A		
		85.6		
		D		
		E		
		95.6		
		D		

District : Krishnagiri

Taluk : Hosur [9]

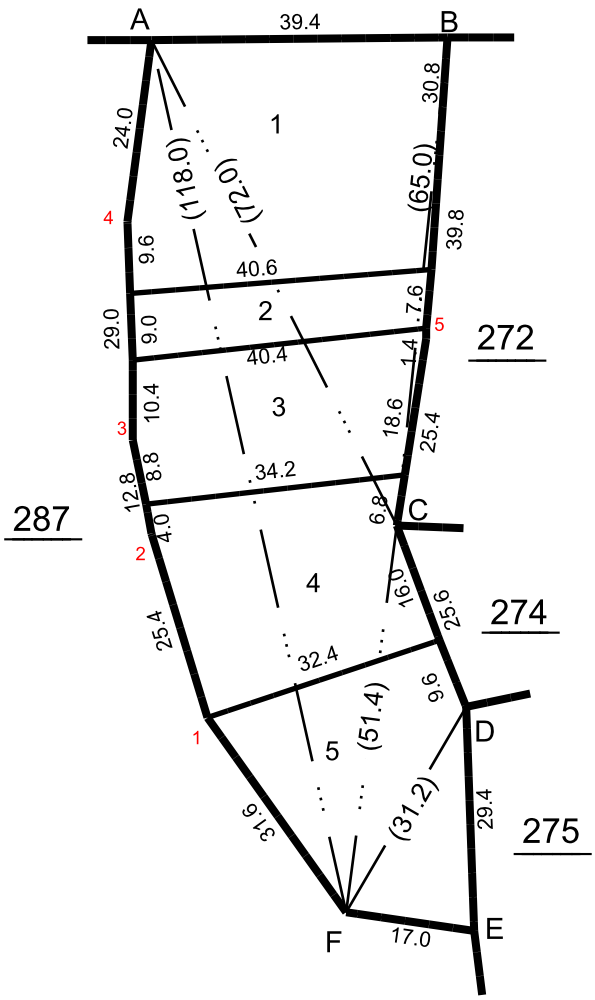
Village : ZUZUVADI [87]

Survey No : 273

Area : Hect 00 Ares 41.50

Scale : 1 : 1000

V NO:86 ANUMEYPPALLI



		Ladder		
		C		
		65.0		
5	1.2	39.8		
		B		
		D		
		31.2		
		25.0	15.6	
		F		
		C		
		51.4		
		29.0	12.4	
		F		
		A		
		118.0		
4	8.4	95.4		
3	14.0	67.2		
2	14.6	54.4		
		48.0	17.8	C
1	12.4	29.0		
		F		
		A		
		39.4		
		B		
		C		
		25.6		
		D		
		29.4		
		E		
		17.0		
		F		
		A		
		72.0		
		C		

NALLAH NUMBER – A9

District : Krishnagiri

Taluk : Hosur

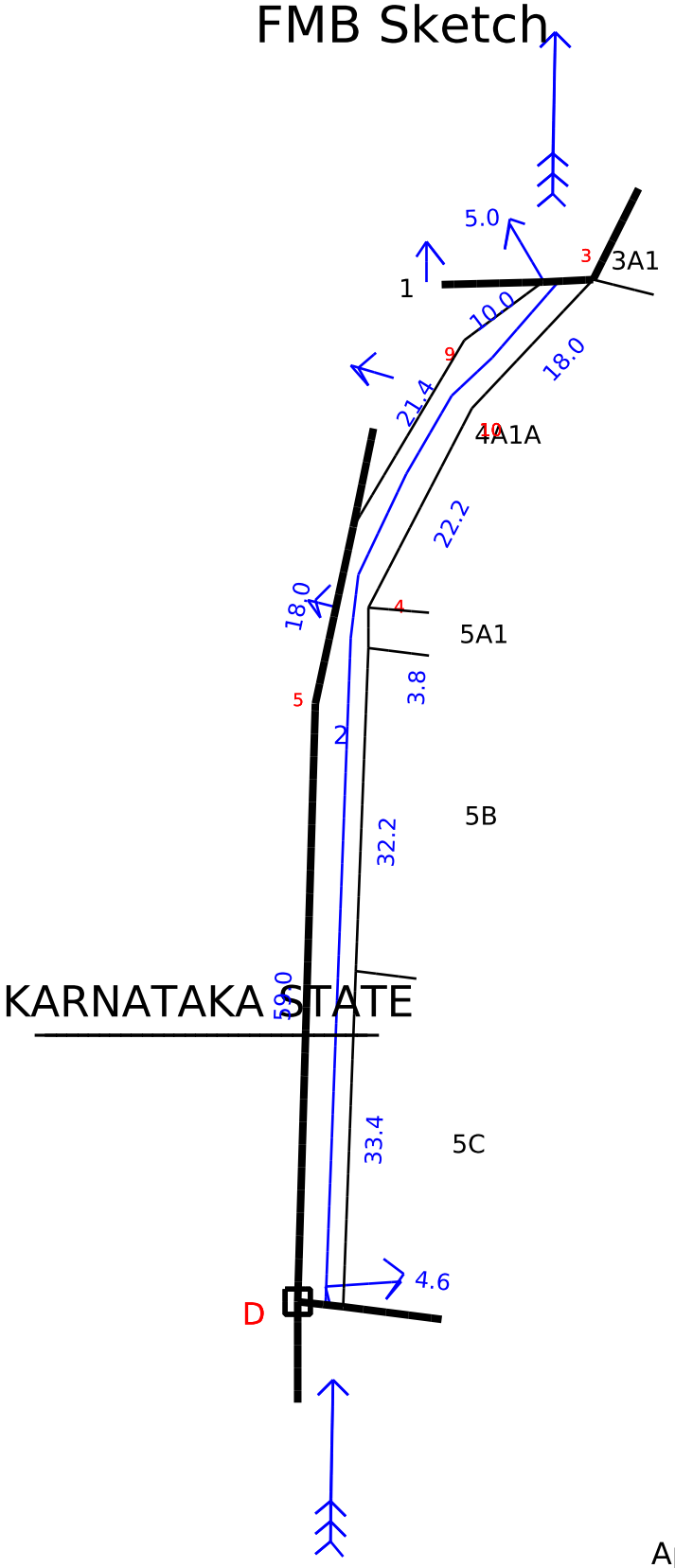
Village : Anumepalli(R)

Survey No : 2/2

Area : Hect 00 Ares 5 Sqm 00

Scale : 1 : 707 mm

FMB Sketch



Approved By Tahsildar

tahsildar

Date of Approved : 11-05-2020

Date of Issue: 13-05-2025 12:52:25

Survey and Settlement Department, Government of TamilNadu

mv260 v270.001

District : Krishnagiri

Taluk : Hosur [9]

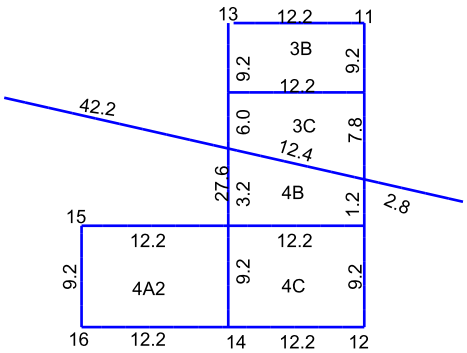
Village : ANUMEPALLI [86]

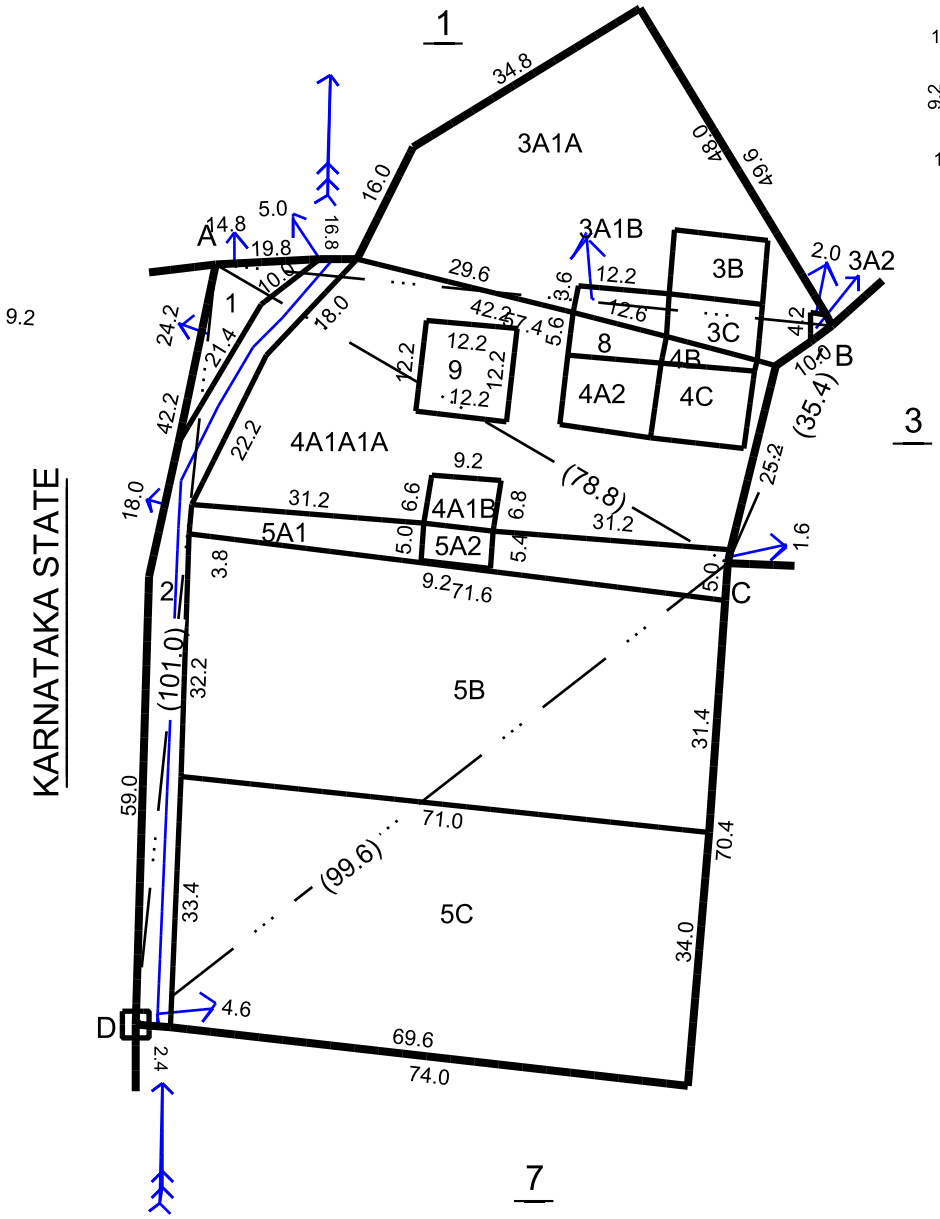
Survey No : 2

Area : Hect 00 Ares 90.76

Scale : 1 : 1000

ENLARGEMENT





District : Krishnagiri

Survey No : 3

Taluk : Hosur [9]

Area : Hect 02.Ares 16.07

Village : ANUMEPALLI [86]

Scale : 1 : 1000

Collected : Revenue Informatics Centre

District : Krishnagiri

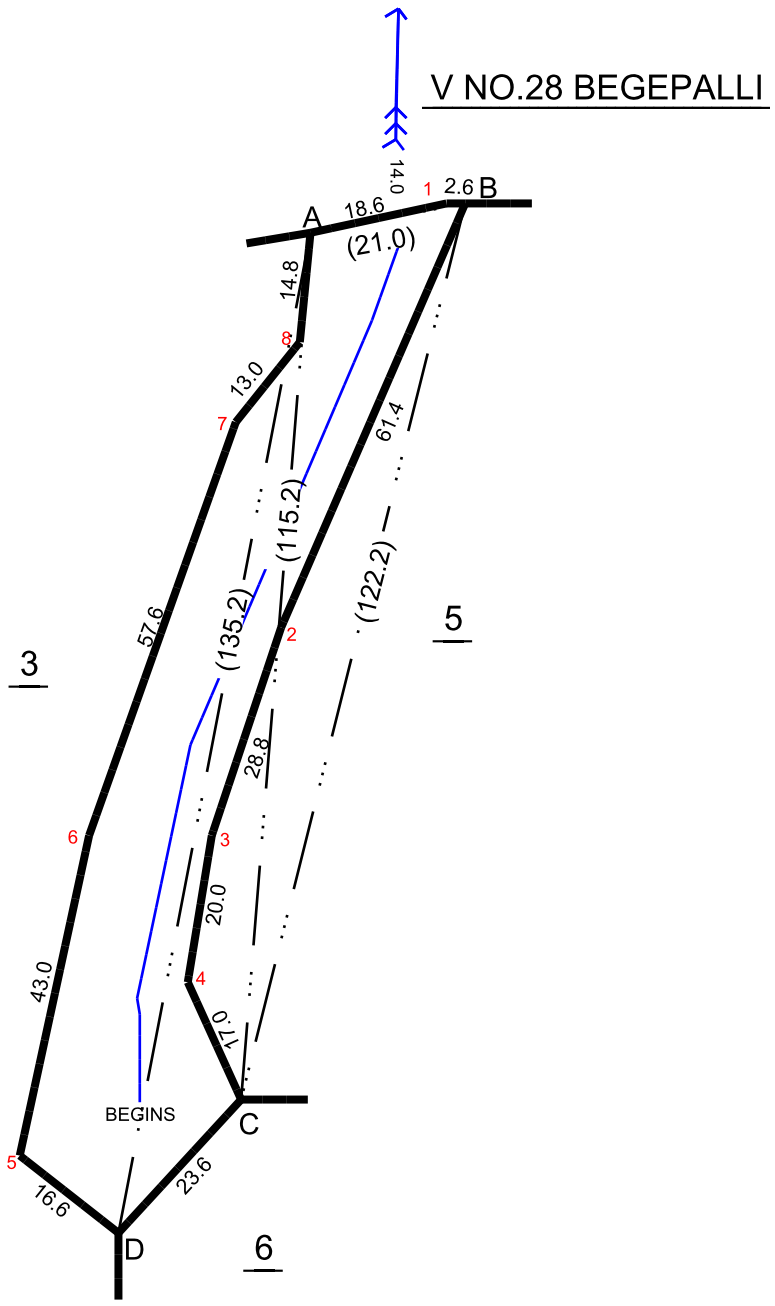
Taluk : Hosur [9]

Village : ANUMEPALLI [86]

Survey No : 4

Area : Hect 00 Ares 26.00

Scale : 1 : 1000



District : Krishnagiri

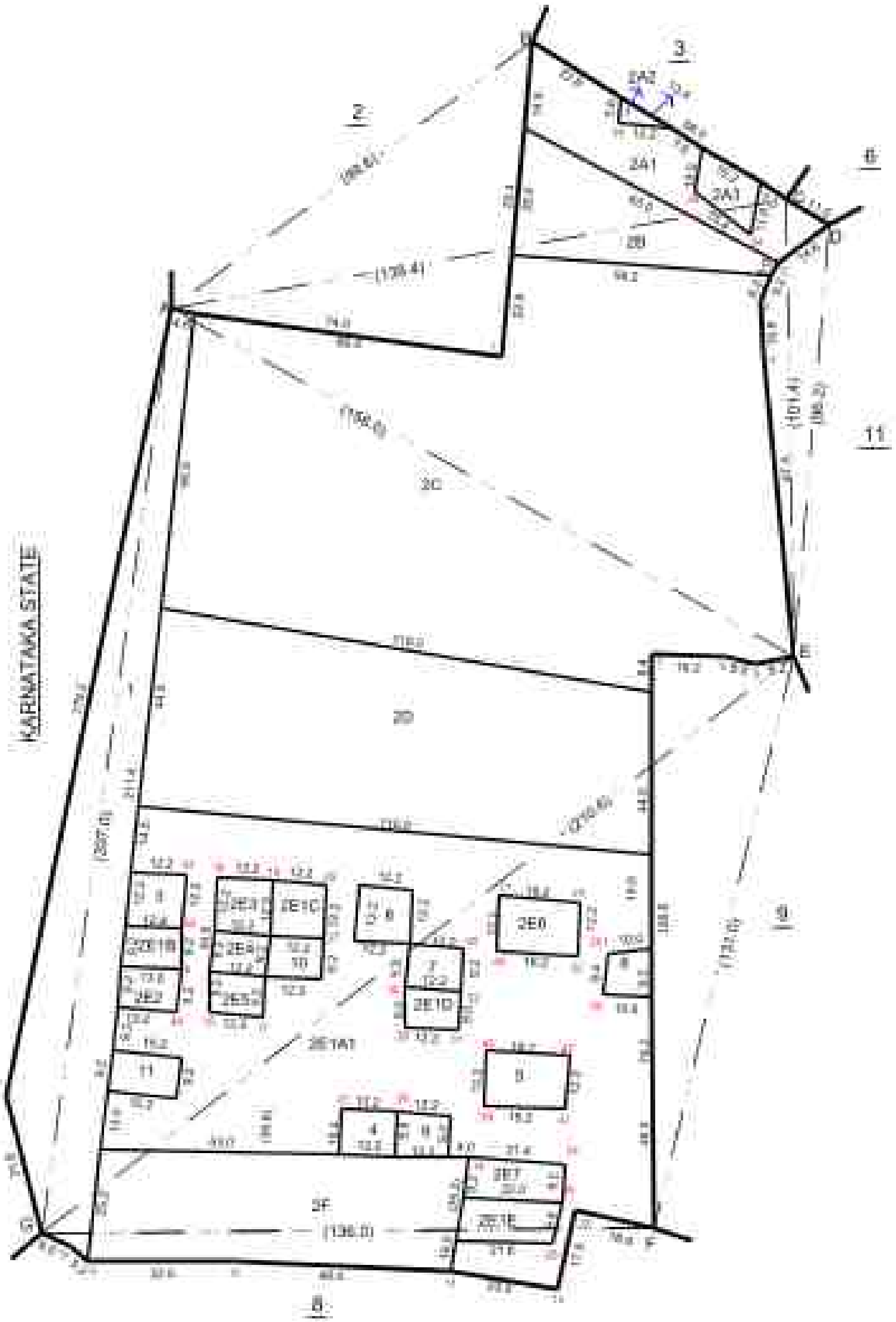
Survey No : 7

Taluk : Hosur [9]

Area : Hect 03 Ares 7.50

Village : ANJUMEPALLI [86]

Scale : 1 : 1000



District : Krishnagiri

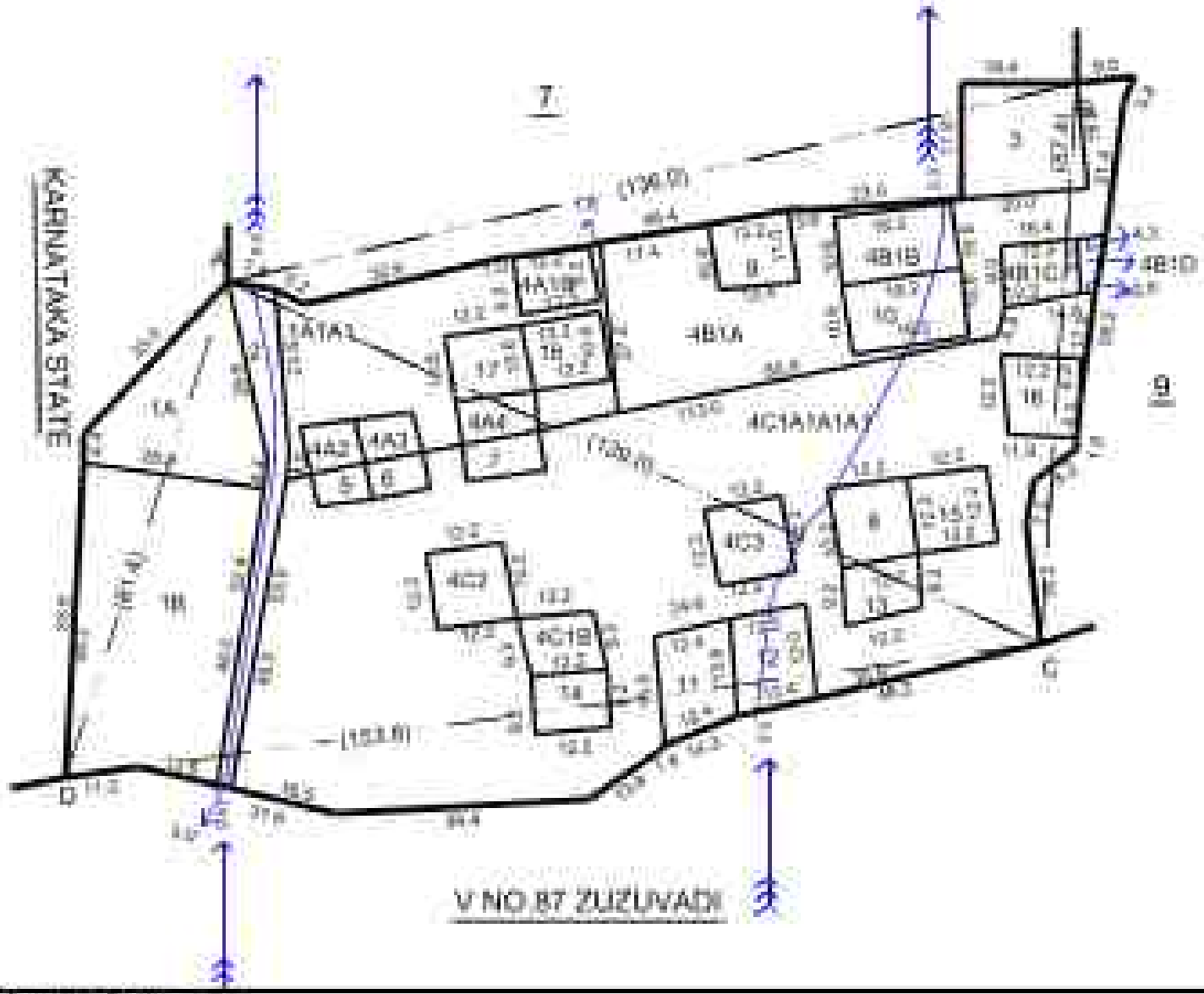
Survey No : 8

Taluk : Hosur [9]

Area : Hect 01 Ares 27.18

Village : ANUMEPALLI [88]

Scale : 1 : 1000



Created and : National Informatics Centre

NALLAH NUMBER – B2

District : Krishnagiri

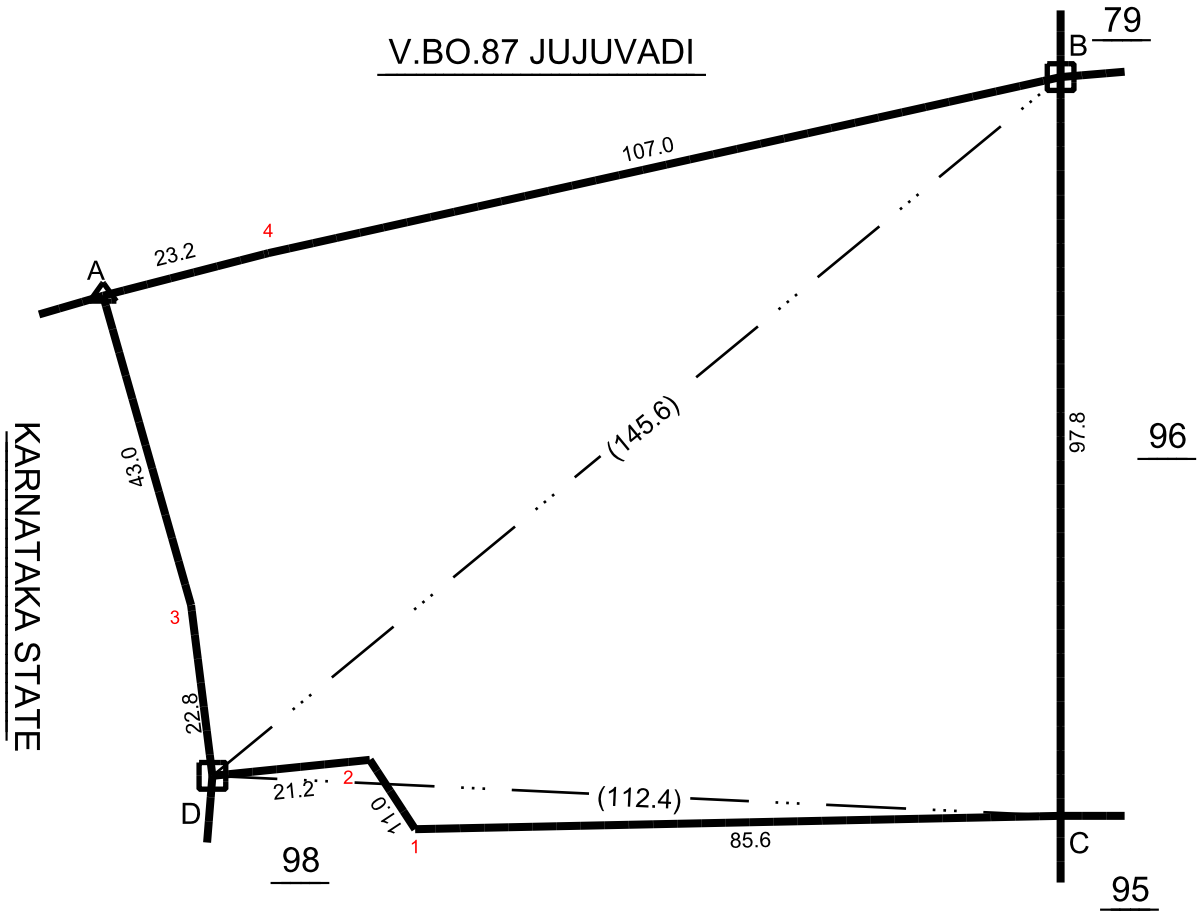
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 97

Area : Hect 01 Ares 3.00

Scale : 1 : 1000



		Ladder		
		B		
		145.6		
		82.8	75.6	C
4	48.6	49.8		
A	58.4	29.4		
3	19.4	12.2		
		D		
		112.4		
		91.8	3.0	2
1	5.8	85.4		
		C		
		97.8		
		B		

District : Krishnagiri

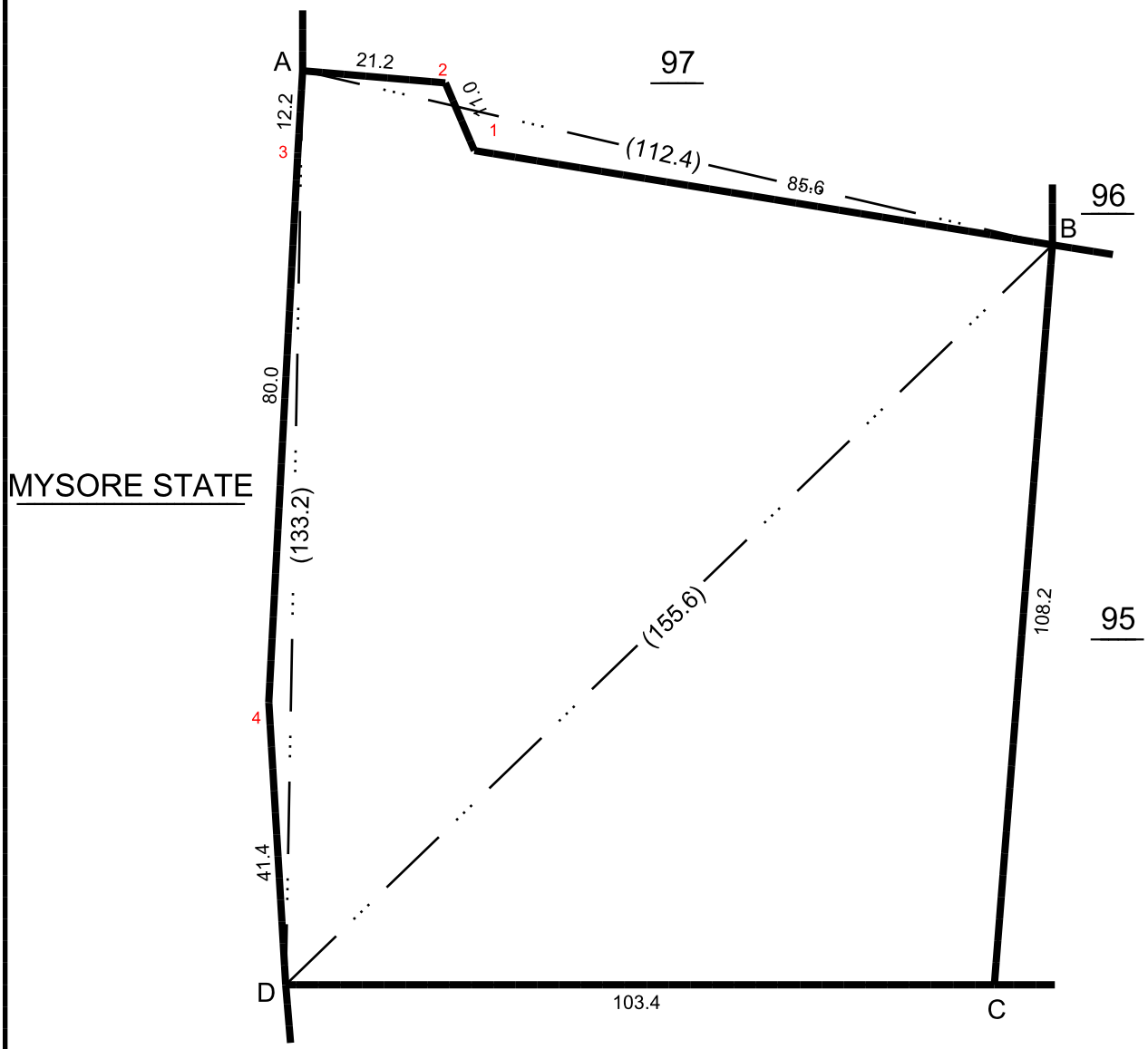
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 98

Area : Hect 01 Ares 29.50

Scale : 1 : 1000



Ladder

		B		
		155.6		
		74.0	72.0	C
		D		
		133.2		
		92.0	3.6	4
B	110.4	24.2		
		12.0	0.4	3
		A		
		112.4		
		91.8	3.0	2
1	5.8	85.4		
		B		
		108.2		
		C		
		103.4		
		D		

District : Krishnagiri

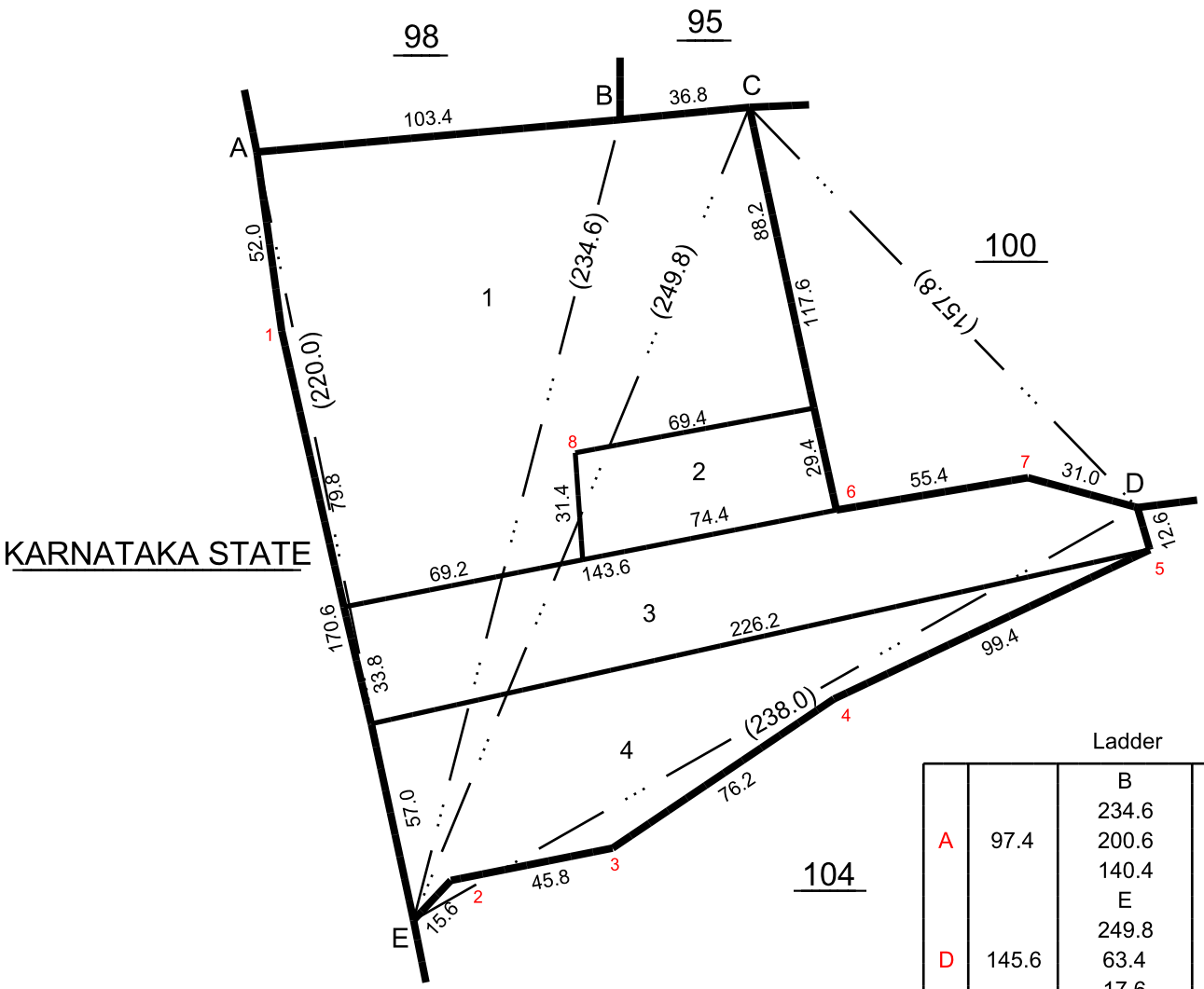
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 99

Area : Hect 03 Ares 9.00

Scale : 1 : 2000



Ladder

		B		
		234.6		
A	97.4	200.6		
		140.4	11.4	8
		E		
		249.8		
D	145.6	63.4		
		17.6	32.4	B
		C		
		D		
		157.8		
		130.8	16.0	7
		100.0	61.4	6
		C		
		D		
		238.0		
		234.0	12.0	5
		135.4	4.8	4
		59.2	9.8	3
2	4.6	14.6		
		E		
		220.0		
		51.6	3.4	1
		A		
		103.4		
		B		
		36.8		
		C		

NALLAH NUMBER – B3

District : Krishnagiri

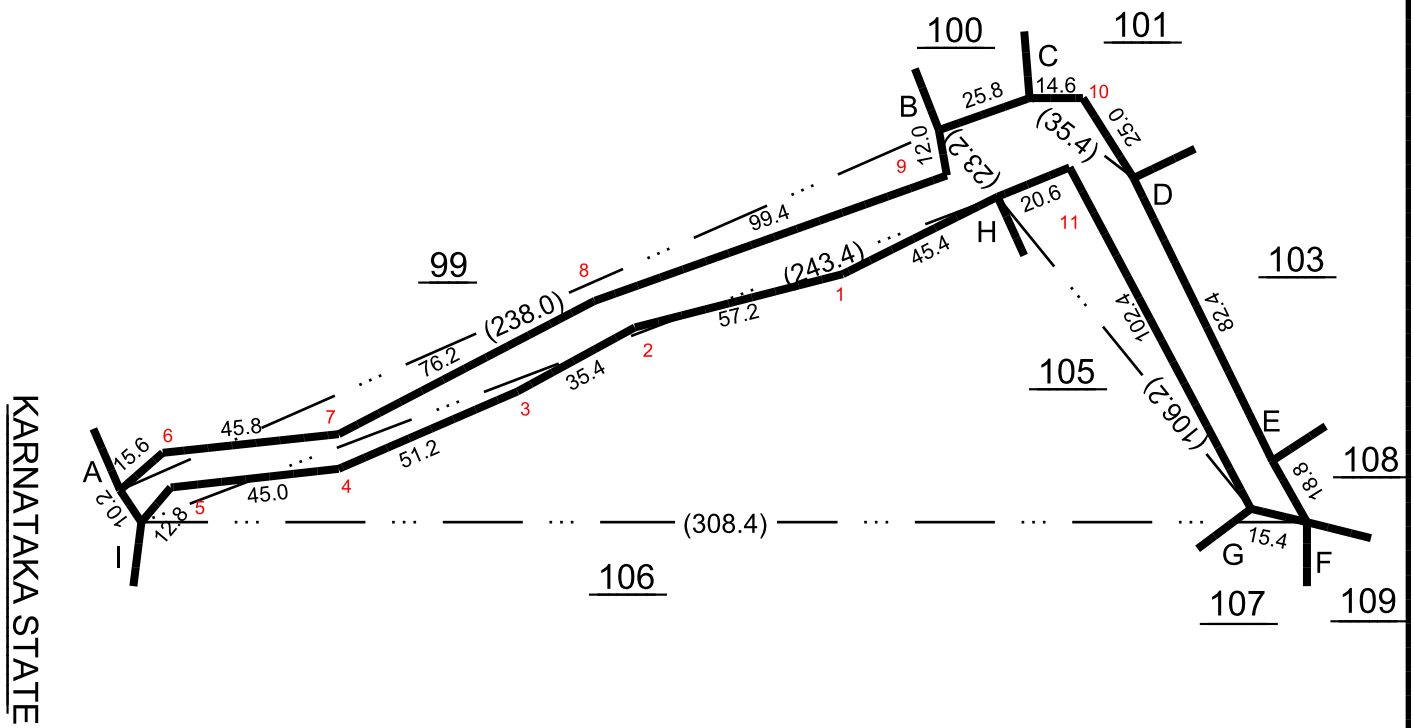
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 104

Area : Hect 00 Ares 52.00

Scale : 1 : 2000



District : Krishnagiri

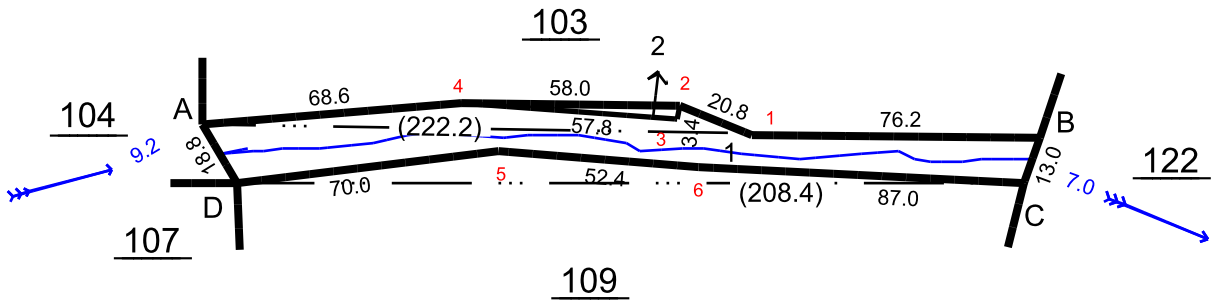
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 108

Area : Hect 00 Ares 32.50

Scale : 1 : 2000



NALLAH NUMBER – B4

District : Krishnagiri

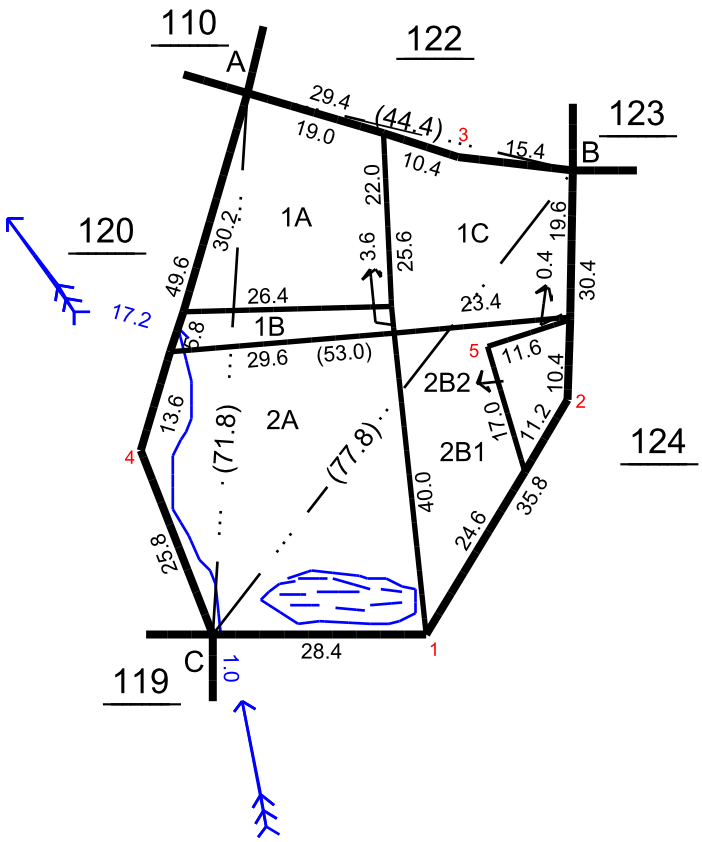
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 121

Area : Hect 00 Ares 30.00

Scale : 1 : 1000



District : Krishnagiri

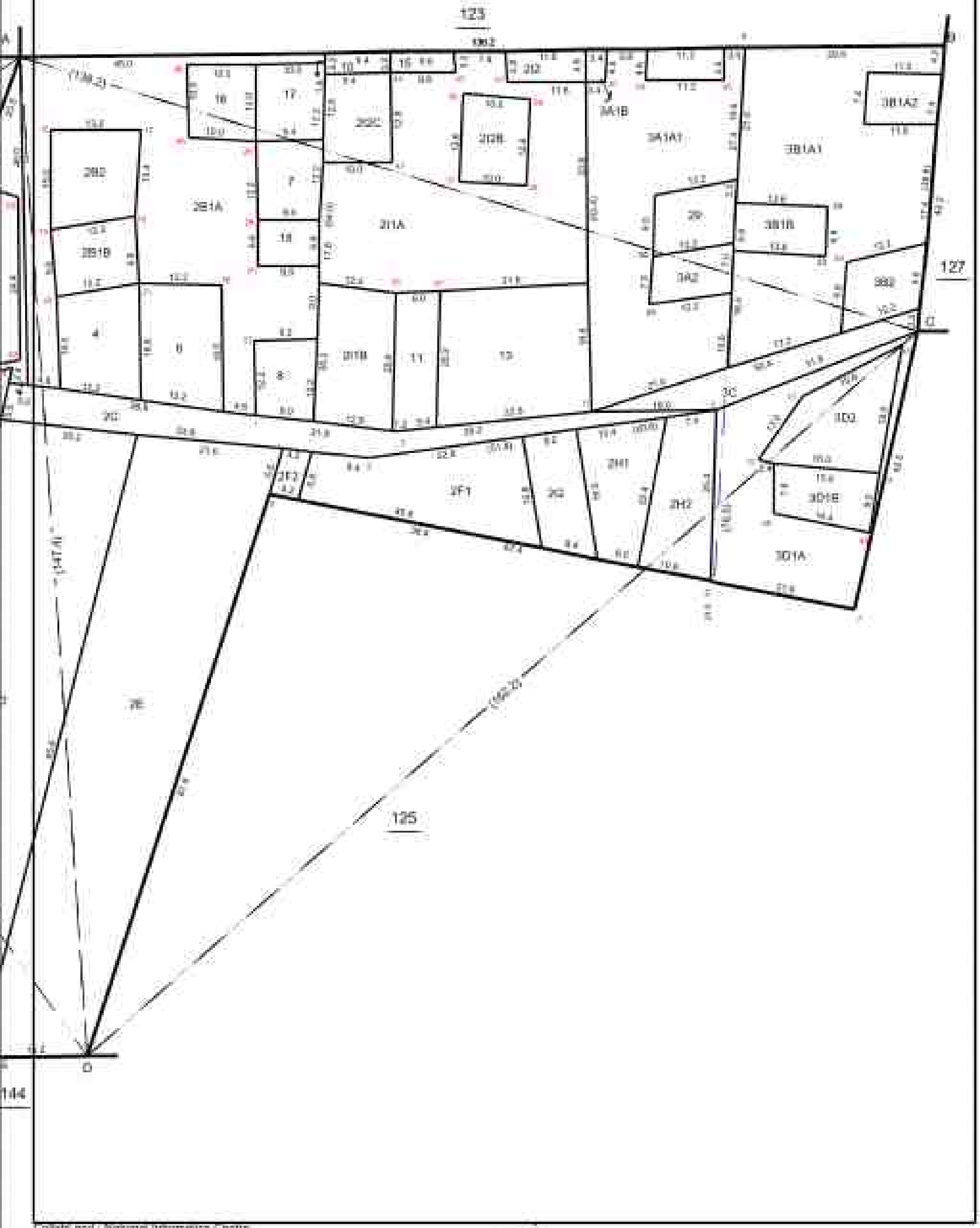
Taluk : Hosur [5]

Village : MUKONDAPALLI [68]

Survey No : 124

Area : Hect.01 Ares.77.11

Scale : 1 : 500



Collected : National Informatics Centre

NALLAH NUMBER – B6

District : Krishnagiri

Taluk : Hosur [9]

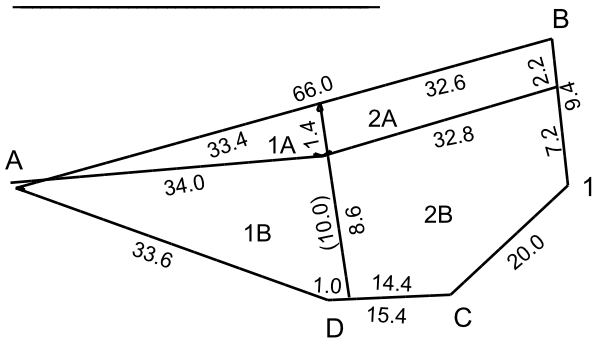
Village : MUKONDAPALLI [88]

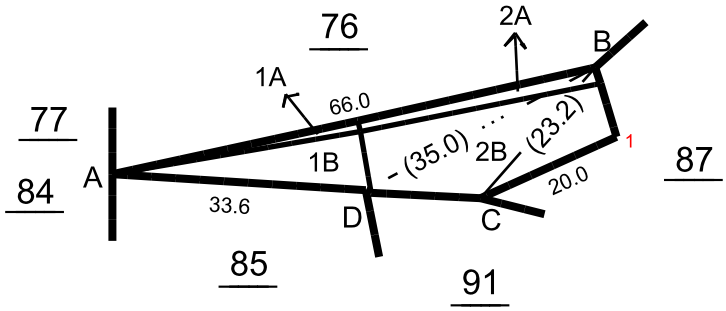
Survey No : 86

Area : Hect 00 Ares 4.50

Scale : 1 : 1000

ENLARGEMENT SKETCH





Ladder

		B		
		23.2		
		18.2	8.0	1
		C		
		D		
		35.0		
C	7.6	22.0		
		B		
		66.0		
		31.8	8.8	D
		A		
		33.6		
		D		
		15.4		
		C		

District : Krishnagiri

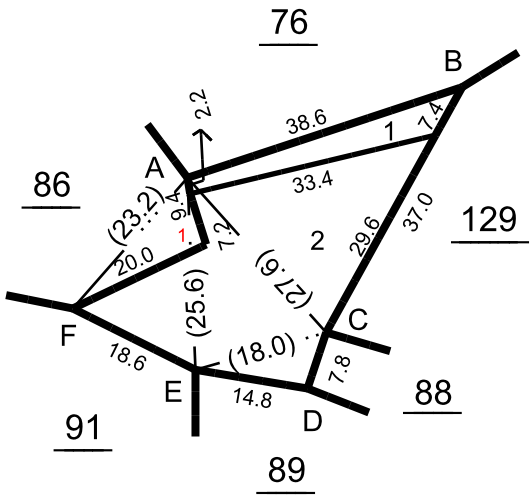
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 87

Area : Hect 00 Ares 8.50

Scale : 1 : 1000



Ladder

		C		
		18.0		
		13.4	6.6	D
		E		
		C		
		27.6		
B	35.4	17.0		
		A		
		25.6		
F	16.2	9.2		
		E		
		A		
		23.2		
		18.2	8.0	1
		F		
		18.6		
		E		
		14.8		
		D		
		7.8		
		C		
		37.0		
		B		
		38.6		
		A		

District : Krishnagiri

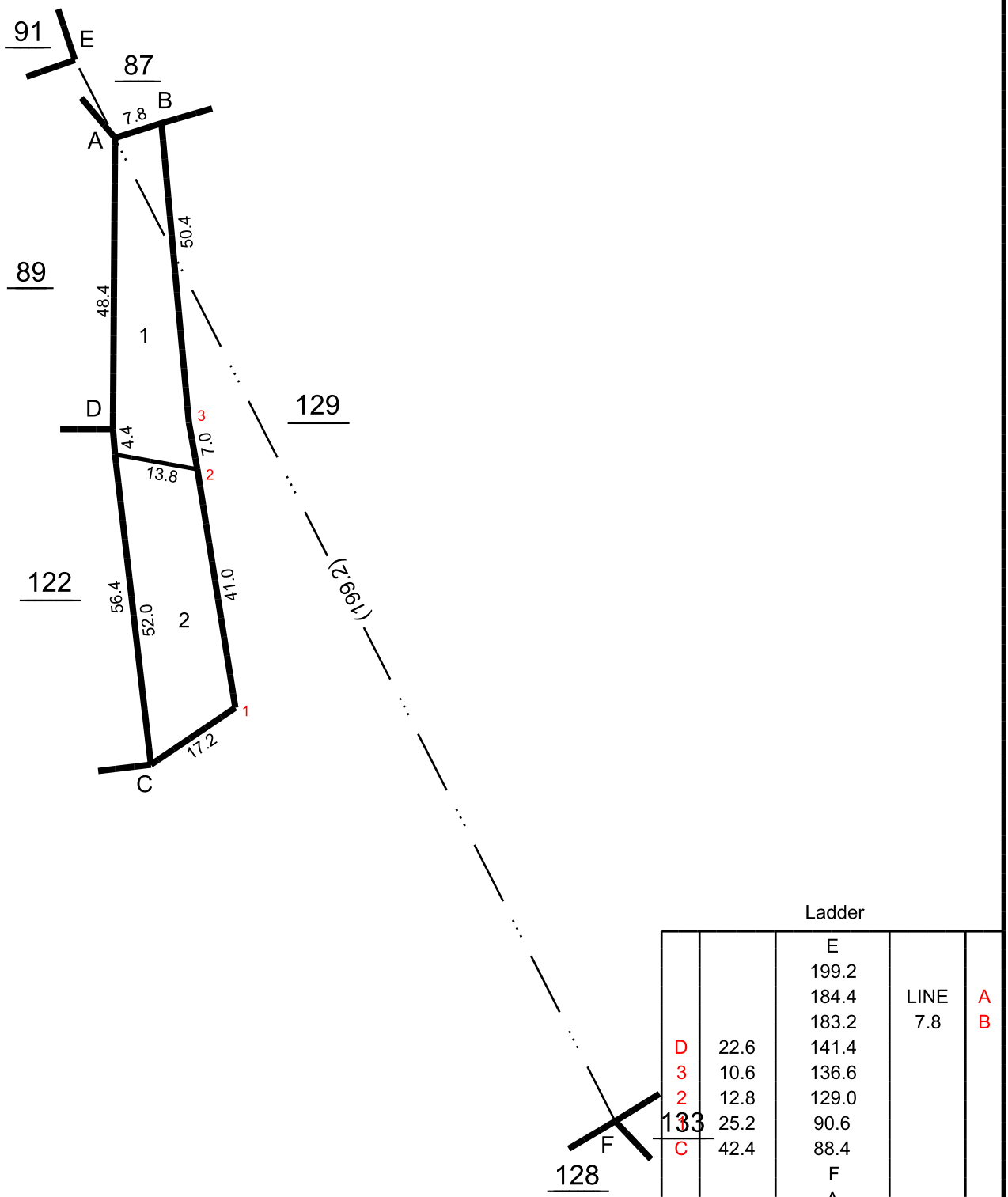
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 88

Area : Hect 00 Ares 12.00

Scale : 1 : 1000



		Ladder		
		E		
		199.2		
		184.4	LINE	A
		183.2	7.8	B
D	22.6	141.4		
3	10.6	136.6		
2	12.8	129.0		
1	25.2	90.6		
C	42.4	88.4		
		F		
		A		
		7.8		
		B		
		C		
		56.4		
		D		
		48.4		
		A		

District : Krishnagiri

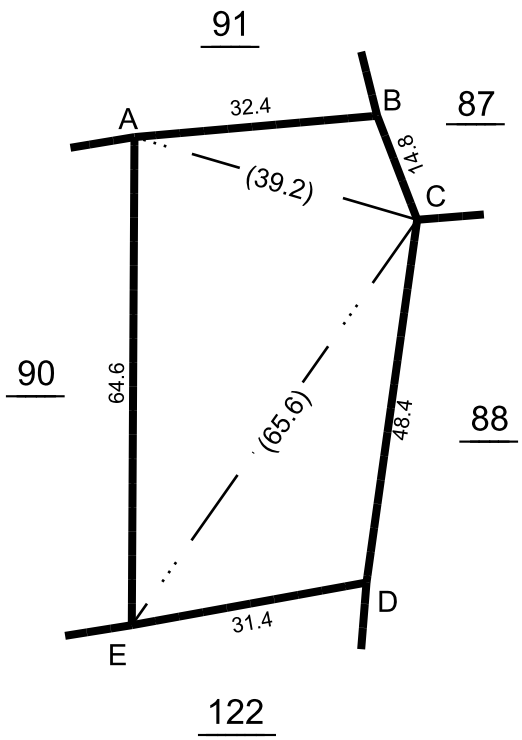
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 89

Area : Hect 00 Ares 21.00

Scale : 1 : 1000



Ladder

		E		
		65.6		
D	22.0	43.0		
		C		
		E		
		64.6		
C	37.6	11.4		
		A		
		39.2		
		8.8	12.0	B
		C		
		48.4		
		D		
		31.4		
		E		
		A		
		32.4		
		B		
		14.8		
		C		

NALLAH NUMBER – B7

District : Krishnagiri

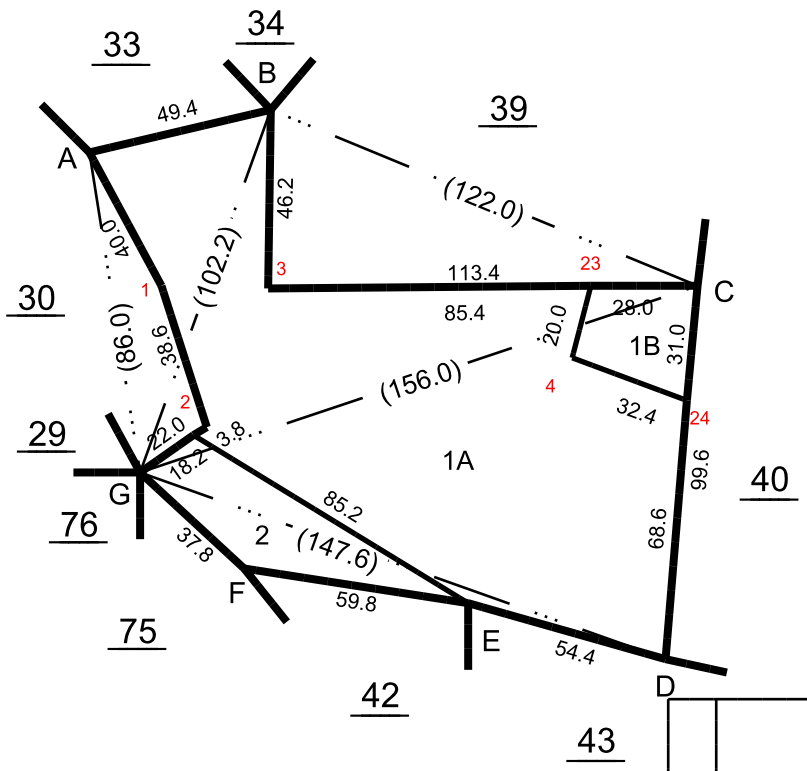
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 41

Area : Hect 01 Ares 26.98

Scale : 1 : 2000



Ladder

		D		
		147.6		
		93.6	3.0	E
		34.8	14.2	F
		G		
		102.2		
		27.2	42.2	
		B		
		122.0		
3	44.2	105.0		
		C		
		156.0		
	81.0	63.2		
		118.0	8.0	4
		G		
		86.0		
2	19.4	76.4		
1	13.6	38.0		
		A		
		49.4		
		B		
		C		
		99.6		
		D		
		54.4		
		E		
		59.8		
		F		
		37.8		
		G		

District : Krishnagiri

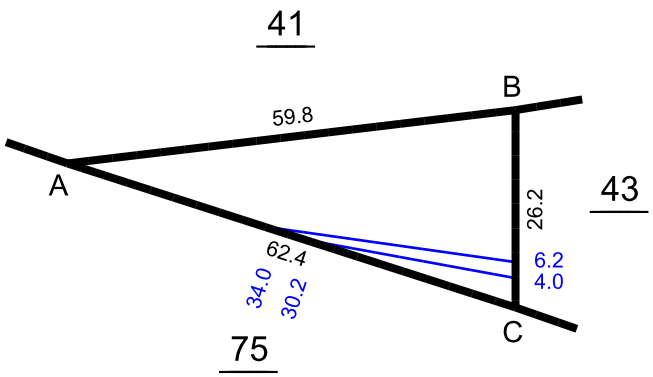
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 42

Area : Hect 00 Ares 7.50

Scale : 1 : 1000



Ladder

		A 59.8 B 26.2 C 62.4 A		

NALLAH NUMBER – B8

District : Krishnagiri

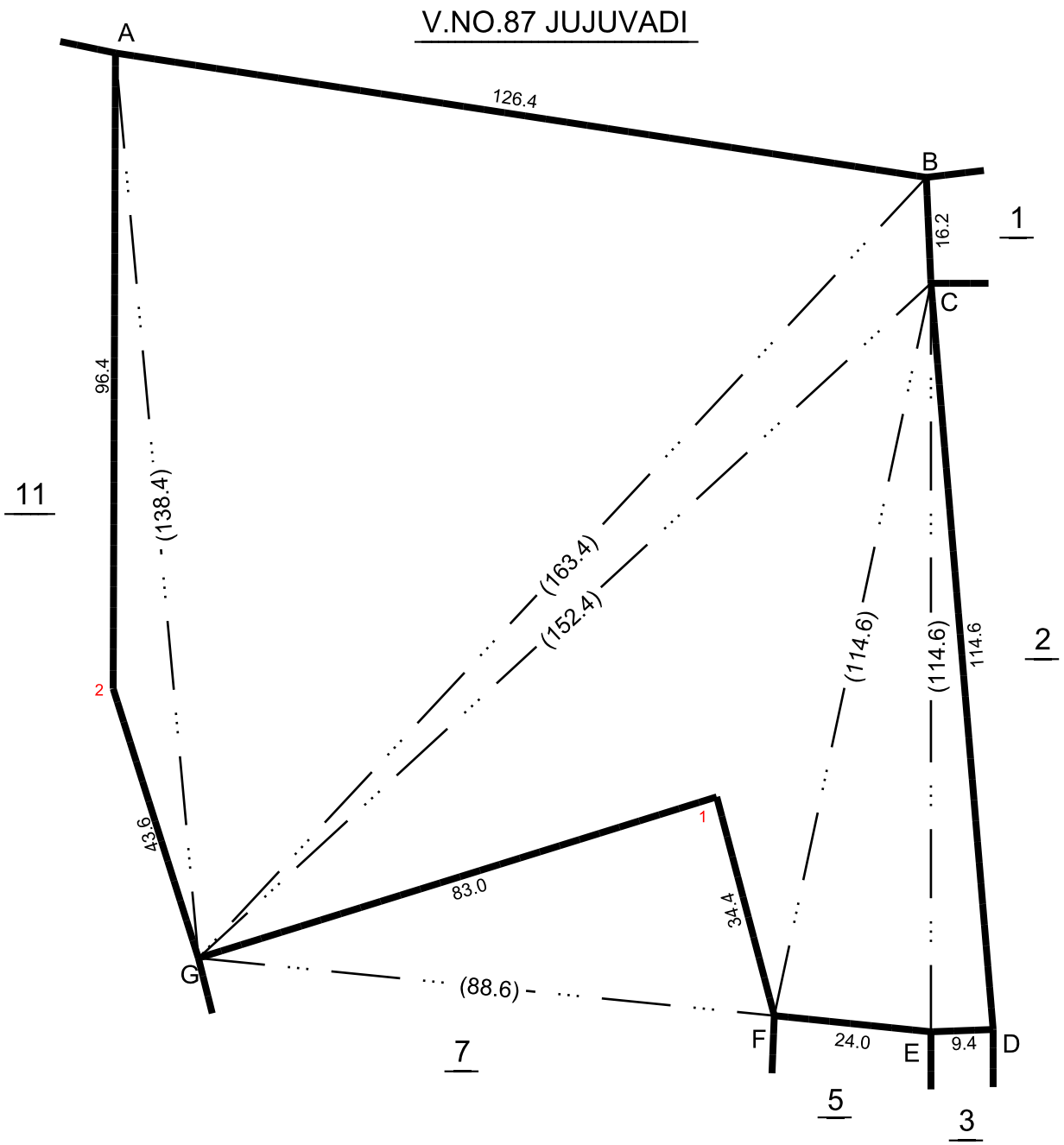
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 6

Area : Hect 01 Ares 55.50

Scale : 1 : 1000



Ladder

		F					B				9.4
		88.6					C				D
1	32.2	76.4					152.4				114.6
		G					58.0	66.4	F		C
		F					G				16.2
		114.6					A				B
E	23.8	112.2					138.4				126.4
		C			2	9.2	42.4				A
		G					G				F
		163.4					C				24.0
		70.8	103.8	A			114.6				E
C	11.2	11.8					E				

District : Krishnagiri

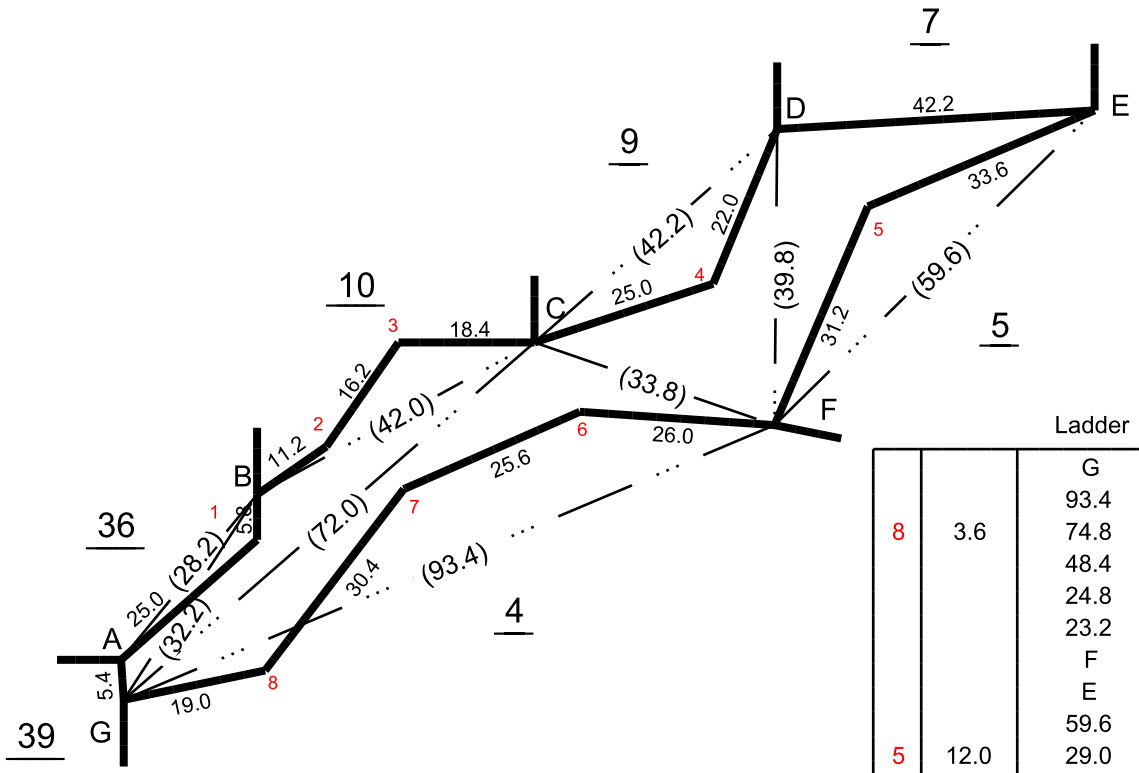
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 8

Area : Hect 00 Ares 18.50

Scale : 1 : 1000



Ladder

		G		
		93.4		
8	3.6	74.8		
		48.4	11.2	7
		24.8	22.8	C
		23.2	11.6	6
		F		
		E		
		59.6		
5	12.0	29.0		
		F		
		33.8		
D	37.2	21.0		
		C		
		D		
		42.2		
		22.8	10.0	4
		C		
		42.0		
3	8.4	26.2		
2	1.2	11.2		
		B		
		28.2		
		23.6	4.0	1
		A		
		B		
		32.2		
A	3.0	4.0		
		G		
		72.0		
		C		
		F		
		39.8		
		D		
		42.2		
		E		
		G		
		5.4		
		A		

District : Krishnagiri

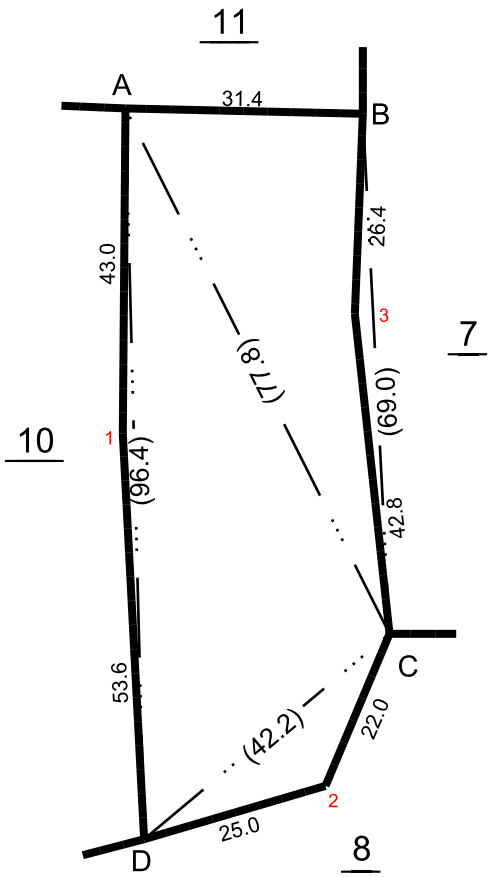
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 9

Area : Hect 00 Ares 28.50

Scale : 1 : 1000



		Ladder		
		C		
		69.0		
		26.4	2.4	3
		B		
		C		
		42.2		
		22.8	10.0	2
		D		
		96.4		
C	33.2	70.8		
		42.8	1.2	1
		A		
		77.8		
		62.8	27.6	B
		C		
		B		
		31.4		
		A		

District : Krishnagiri

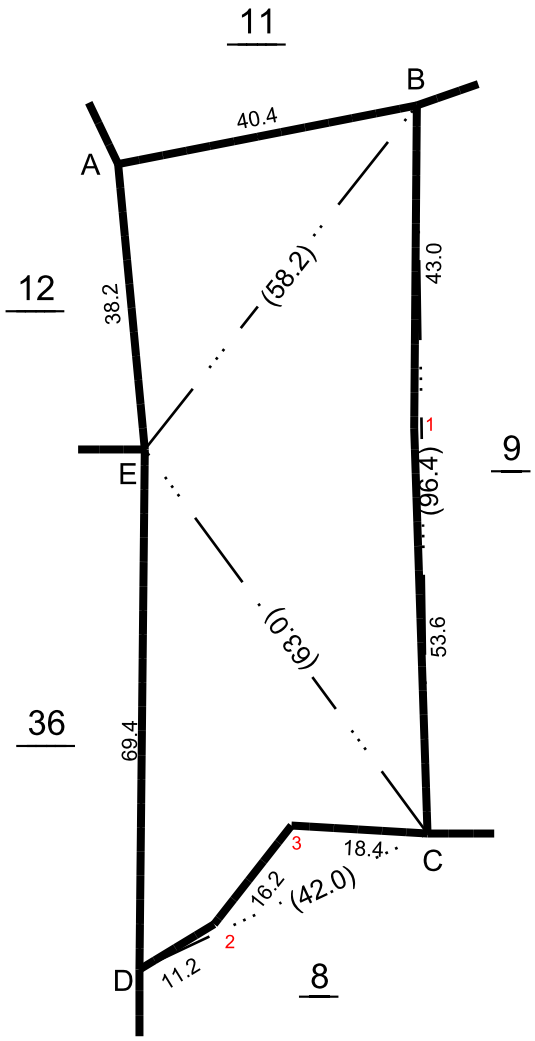
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 10

Area : Hect 00 Ares 35.50

Scale : 1 : 1000



Ladder

		C		
		42.0		
3	8.6	26.2		
2	1.2	11.2		
		D		
		C		
		96.4		
		44.4	36.6	E
		42.8	1.2	1
		B		
		58.2		
A	26.6	27.8		
		E		
		63.0		
D	41.4	8.2		
		C		
		D		
		69.4		
		E		
		38.2		
		A		
		40.4		
		B		

District : Krishnagiri

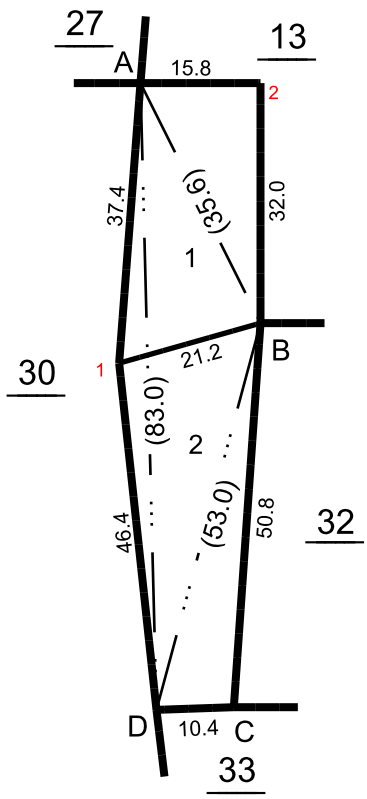
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 31

Area : Hect 00 Ares 13.50

Scale : 1 : 1000



Ladder

		B		
		35.6		
2	14.0	7.2		
		A		
		B		
		53.0		
		3.8	8.8	C
		D		
		83.0		
		37.0	3.8	1
B	15.8	32.4		
		A		
		D		
		10.4		
		C		
		50.8		
		B		

District : Krishnagiri

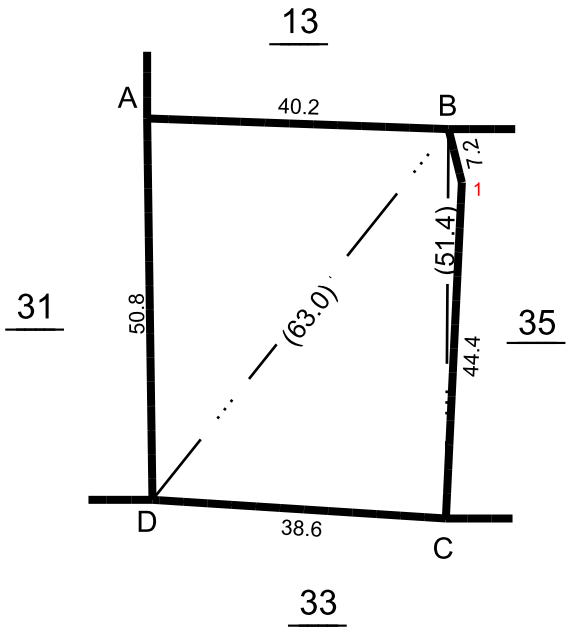
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 32

Area : Hect 00 Ares 20.00

Scale : 1 : 1000



		Ladder		
		B		
		51.4		
		44.2	1.8	1
		C		
		B		
		63.0		
A	32.4	39.0		
		22.4	31.6	C
		D		
		38.6		
		C		
		B		
		40.2		
		A		
		50.8		
		D		

District : Krishnagiri

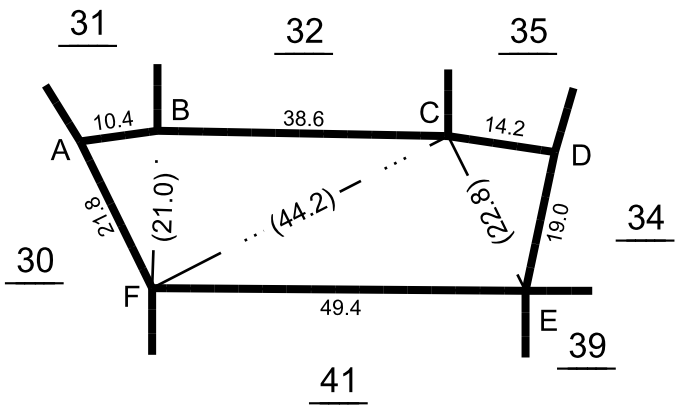
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 33

Area : Hect 00 Ares 11.50

Scale : 1 : 1000



		Ladder		
		E		
		22.8		
D	11.8	8.0		
		C		
		44.2		
B	19.2	10.8		
		F		
		B		
		21.0		
A	10.0	19.2		
		F		
		49.4		
		E		
		19.0		
		D		
		14.2		
		C		
		38.6		
		B		
		10.4		
		A		
		21.8		
		F		

District : Krishnagiri

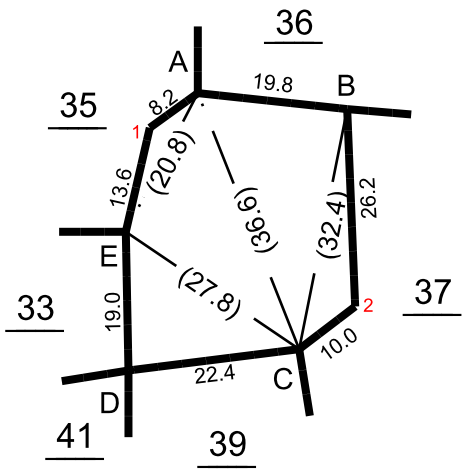
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 34

Area : Hect 00 Ares 9.50

Scale : 1 : 1000



		Ladder		
		B		
		32.4		
		7.2	6.6	2
		C		
		27.8		
		10.8	15.0	D
		E		
		20.8		
		7.4	3.6	1
		A		
		36.6		
		C		
		22.4		
		D		
		19.0		
		E		
		A		
		19.8		
		B		

District : Krishnagiri

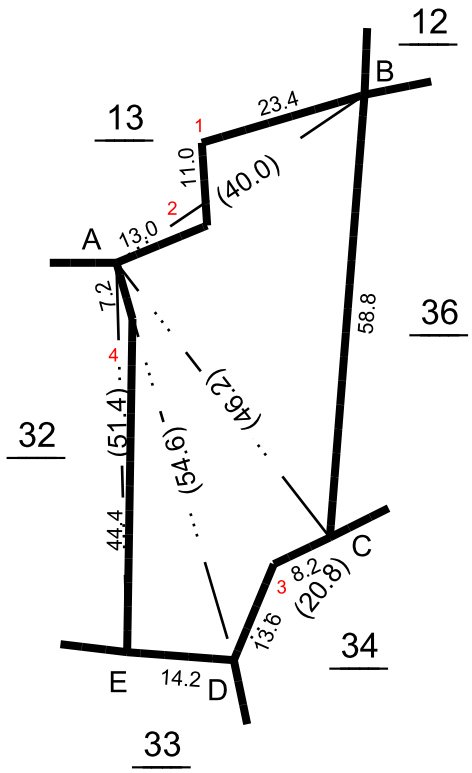
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 35

Area : Hect 00 Ares 17.00

Scale : 1 : 1000



Ladder

		A		
		51.4		
		44.2	1.8	4
		E		
		D		
		20.8		
		7.4	3.6	3
		C		
		D		
		54.6		
C	17.0	42.8		
		A		
		40.0		
2	2.4	27.2		
		22.0	7.0	1
		B		
		A		
		46.2		
		C		
		58.8		
		B		
		E		
		14.2		
		D		

District : Krishnagiri

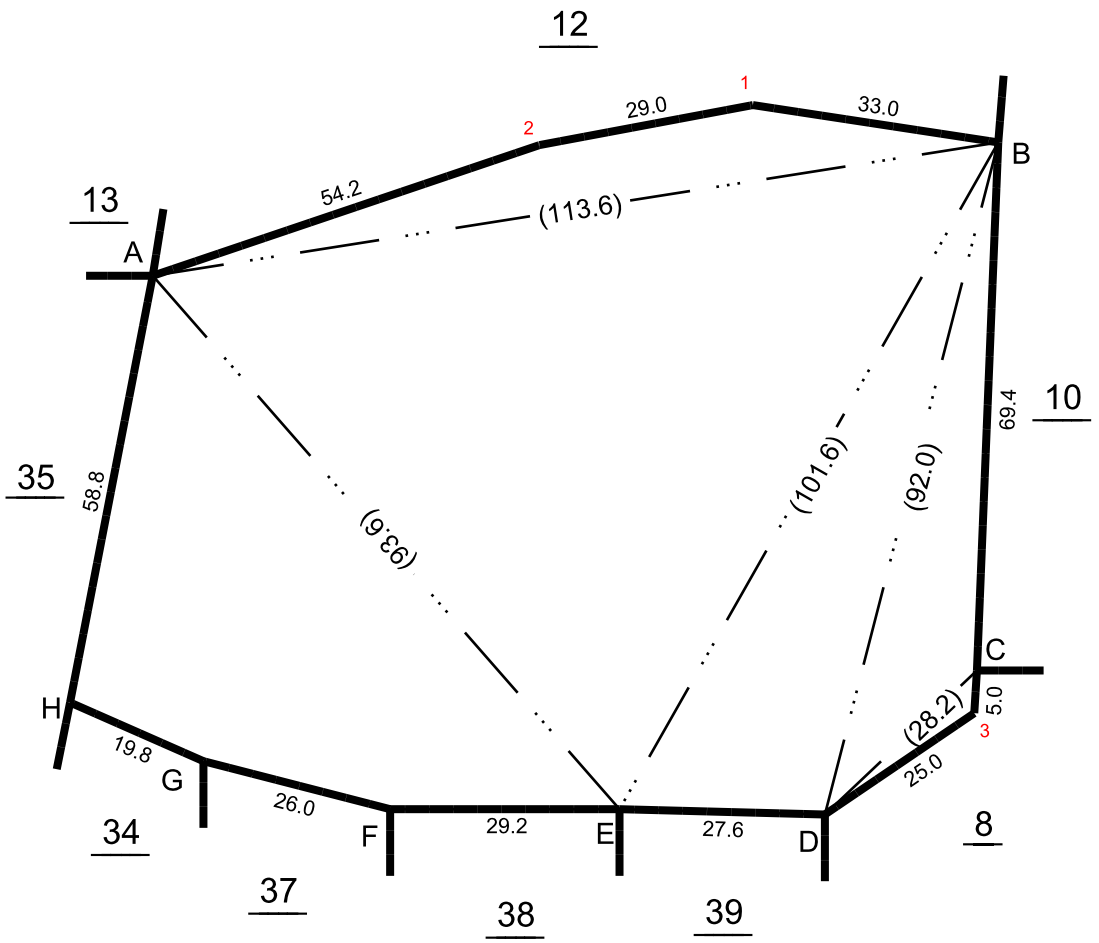
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 36

Area : Hect 00 Ares 94.50

Scale : 1 : 1000



Ladder

		A					D	
		113.6					E	
		60.6	9.0	2			101.6	
		31.2	10.0	1	D	23.6	88.4	
		B					B	
		A					69.4	
		93.6					C	
H	45.6	58.4					D	
G	37.2	41.0					27.6	
F	22.8	20.0					E	
		E					29.2	
		C					F	
		28.2					26.0	
		23.6	4.0	3			G	
		D					19.8	
		B					H	
		92.0					58.8	
		23.6	14.6	C			A	

NALLAH NUMBER – B9

District : Krishnagiri

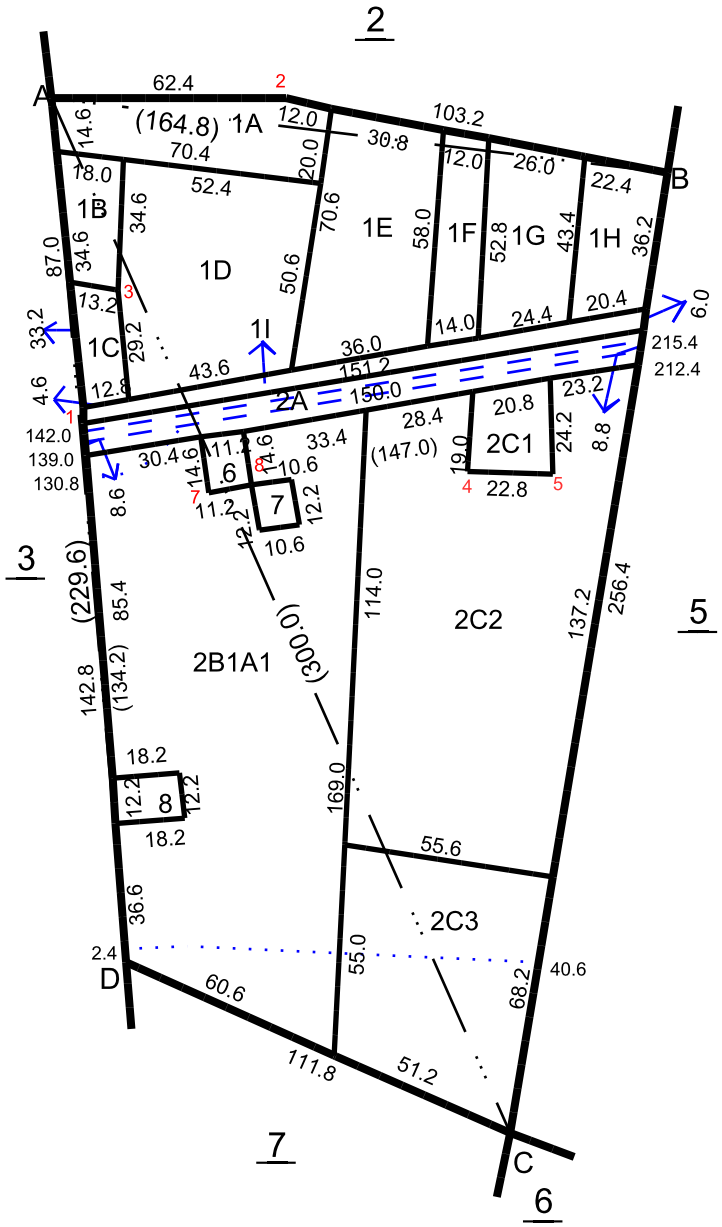
Taluk : Hosur [9]

Village : PUNAKANDODDI [106]

Survey No : 4

Area : Hect 03 Ares 7.40

Scale : 1 : 2000



District : Krishnagiri

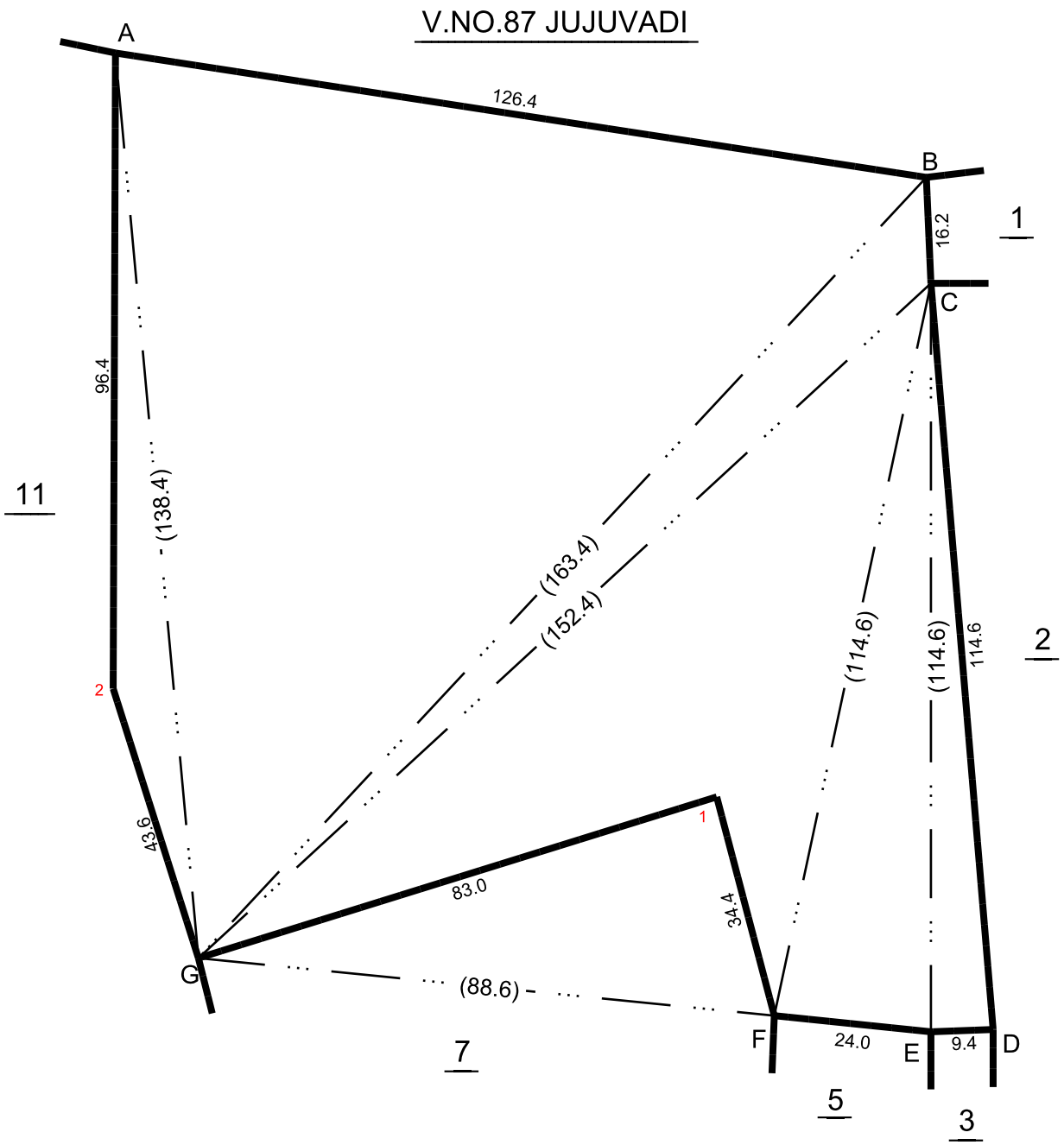
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 6

Area : Hect 01 Ares 55.50

Scale : 1 : 1000



Ladder

		F					B				9.4
		88.6					C				D
1	32.2	76.4					152.4				114.6
		G					58.0	66.4	F		C
		F					G				16.2
		114.6					A				B
E	23.8	112.2					138.4				126.4
		C			2	9.2	42.4				A
		G					G				F
		163.4					C				24.0
		70.8	103.8	A			114.6				E
C	11.2	11.8					E				

District : Krishnagiri

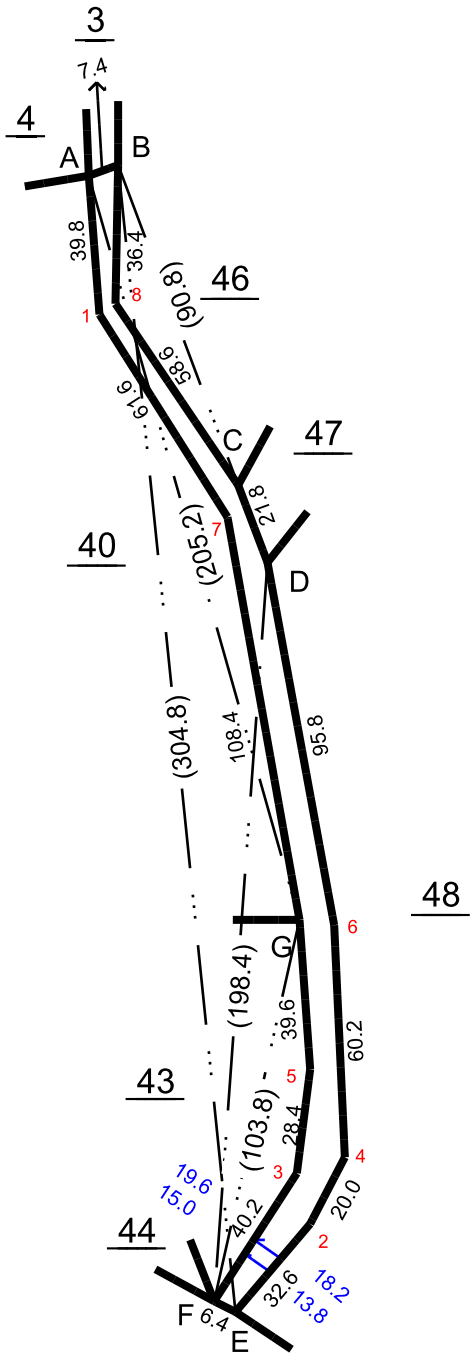
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 45

Area : Hect 00 Ares 27.50

Scale : 1 : 2000



Ladder

		C		
		90.8		
		33.6	13.6	8
		B		
		G		
		205.2		
7	10.8	97.2		
		A		
		104.4	19.2	6
		G		
		103.8		
		65.6	11.4	5
		44.6	26.0	4
		37.8	14.2	3
		25.8	20.6	2
		F		
		E		
		304.8		
		301.4	5.4	F
G	27.6	203.4		
D	29.0	108.4		
C	23.8	87.4		
		38.8	8.8	1
		1.4	7.4	A
		B		
		A		
		7.4		
		B		
		C		
		21.8		
		D		
		E		
		6.4		
		F		
		198.4		
		D		

NALLAH NUMBER – B10

District : Krishnagiri

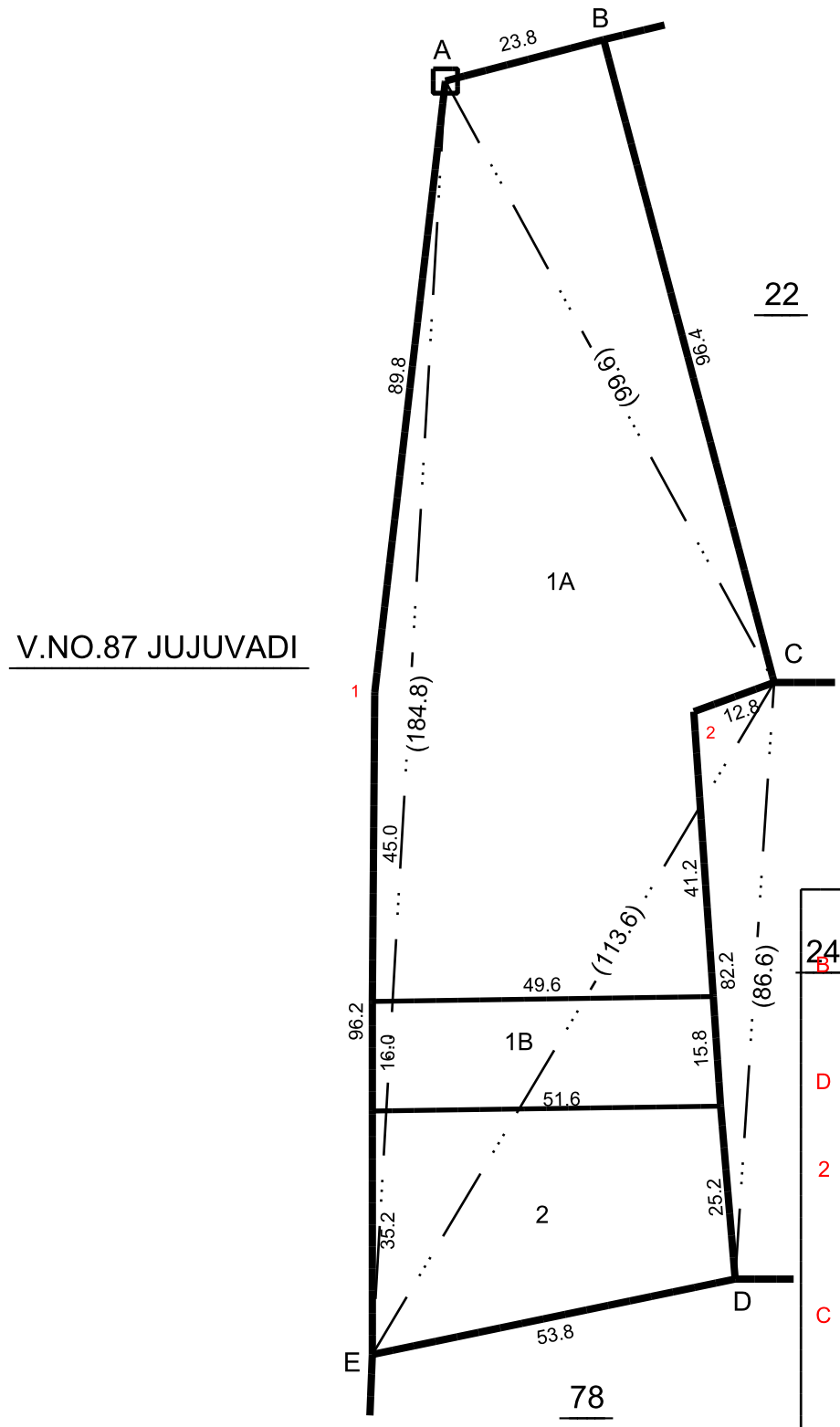
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 23

Area : Hect 00 Ares 82.00

Scale : 1 : 1000



		Ladder		
		C		
		99.6		
24		6.0		
B	23.0	A		
		E		
		113.6		
D	39.4	77.2		
		C		
		86.6		
2	11.8	81.6		
		D		
		E		
		184.8		
		89.0	5.0	1
C	52.8	84.6		
		A		
		23.8		
		B		
		D		
		53.8		
		E		
		C		
		96.4		
		B		

District : Krishnagiri

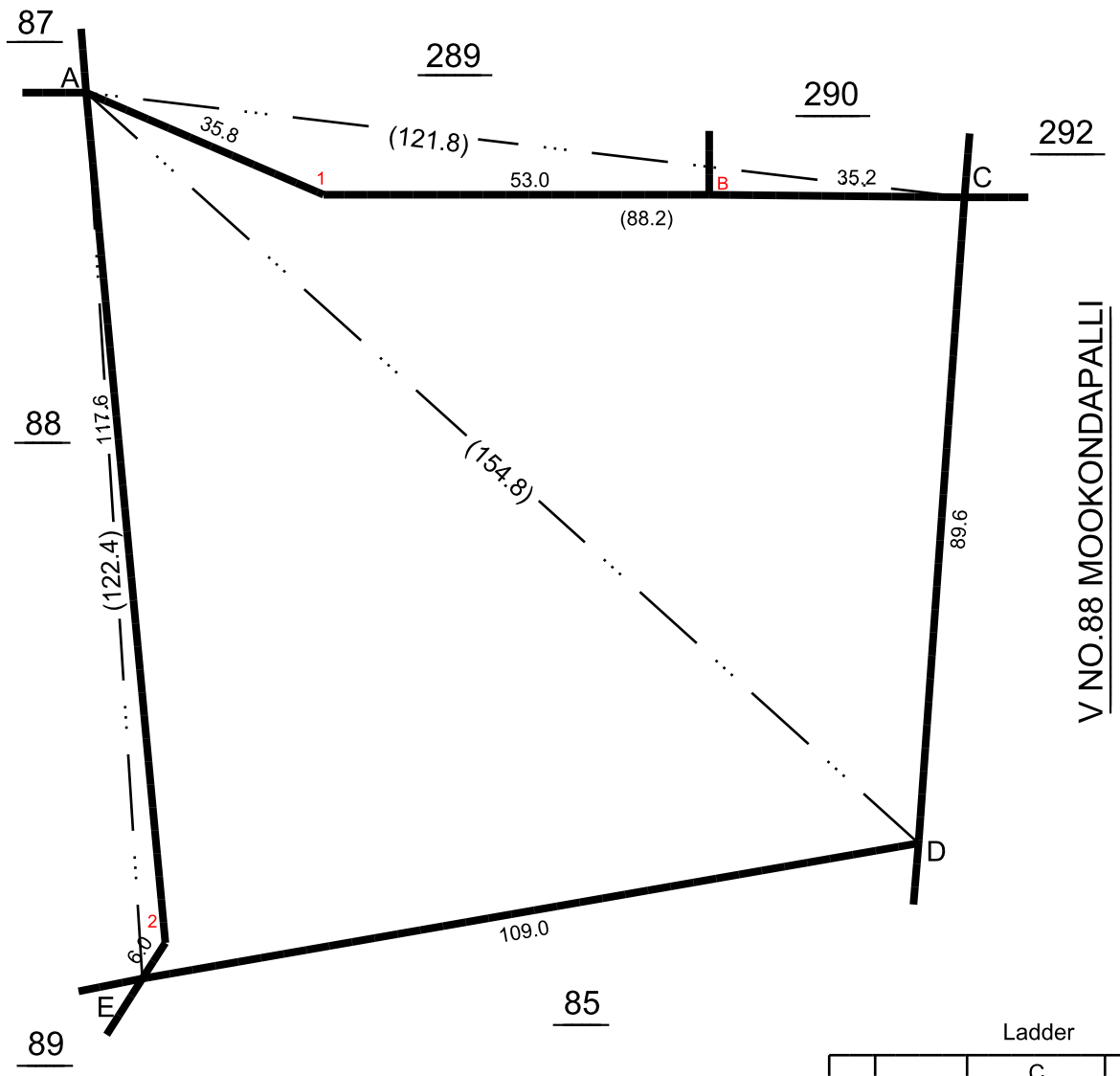
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 86

Area : Hect 01 Ares 13.50

Scale : 1 : 1000



Ladder

		C		
		88.2		
		53.0	LINE	B
		1		
		A		
		122.4		
		4.8	3.8	2
		E		
		A		
		121.8		
1	10.0	87.8		
		C		
		A		
		154.8		
E	86.0	67.2		
		55.0	70.4	C
		D		

District : Krishnagiri

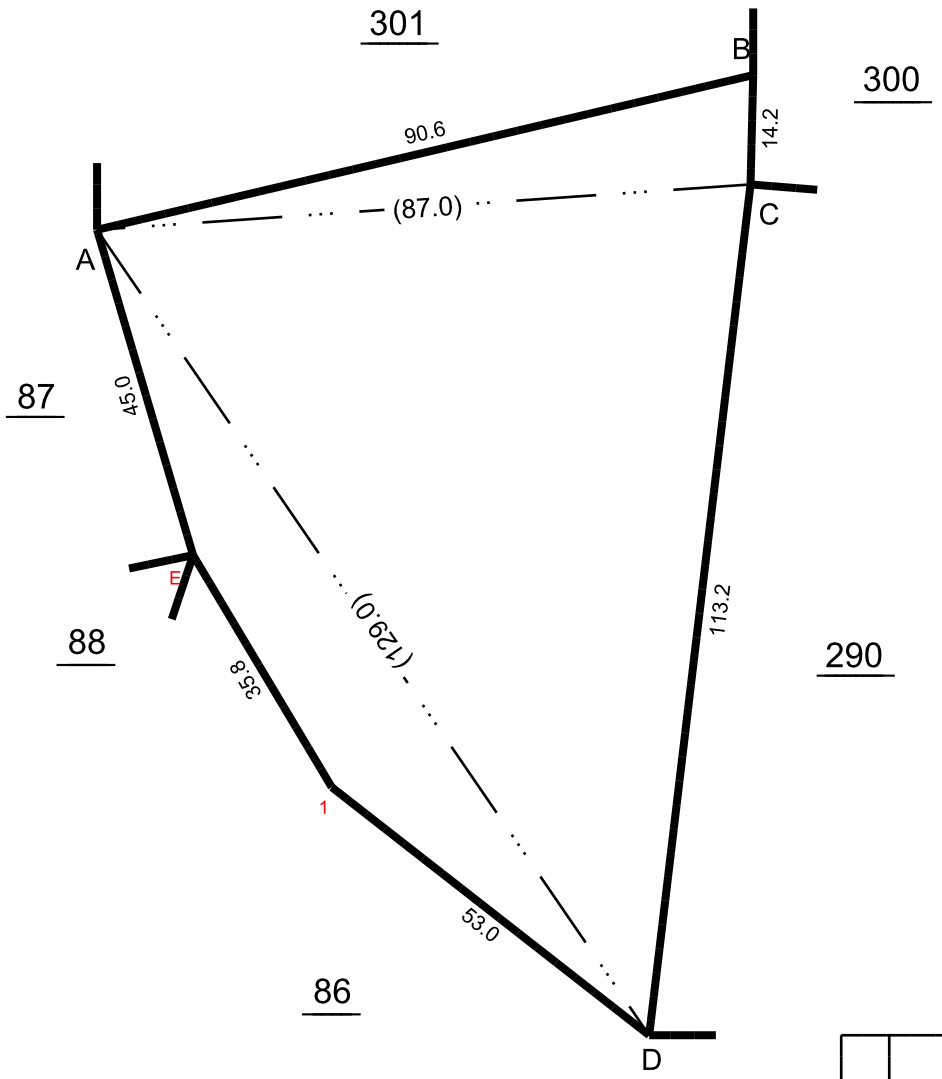
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 289

Area : Hect 00 Ares 66.50

Scale : 1 : 1000



Ladder

		D		
		129.0		
		78.2	16.0	1
C	74.2	43.0		
		42.6	13.8	E
B	83.4	32.2		
		A		
		A		
		87.0		
		C		
		A		
		90.6		
		B		
		14.2		
		C		
		113.2		
		D		

District : Krishnagiri

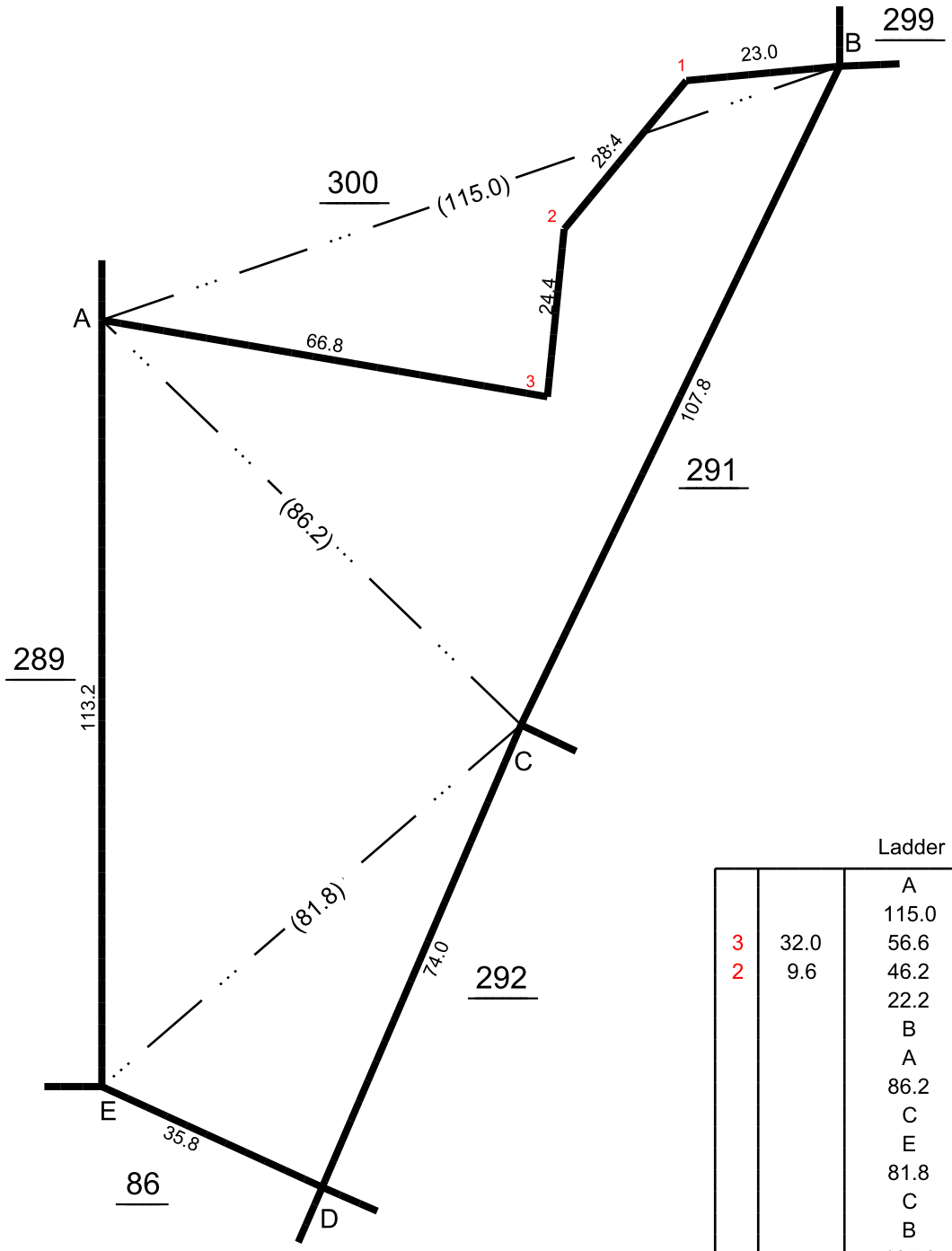
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 290

Area : Hect 00 Ares 78.50

Scale : 1 : 1000



V NO:88 MUKKONDAPPALLI

		Ladder		
		A		
		115.0		
3	32.0	56.6		
2	9.6	46.2		
		22.2	5.2	1
		B		
		A		
		86.2		
		C		
		E		
		81.8		
		C		
		B		
		107.8		
		C		
		74.0		
		D		
		35.8		
		E		
		113.2		
		A		

District : Krishnagiri

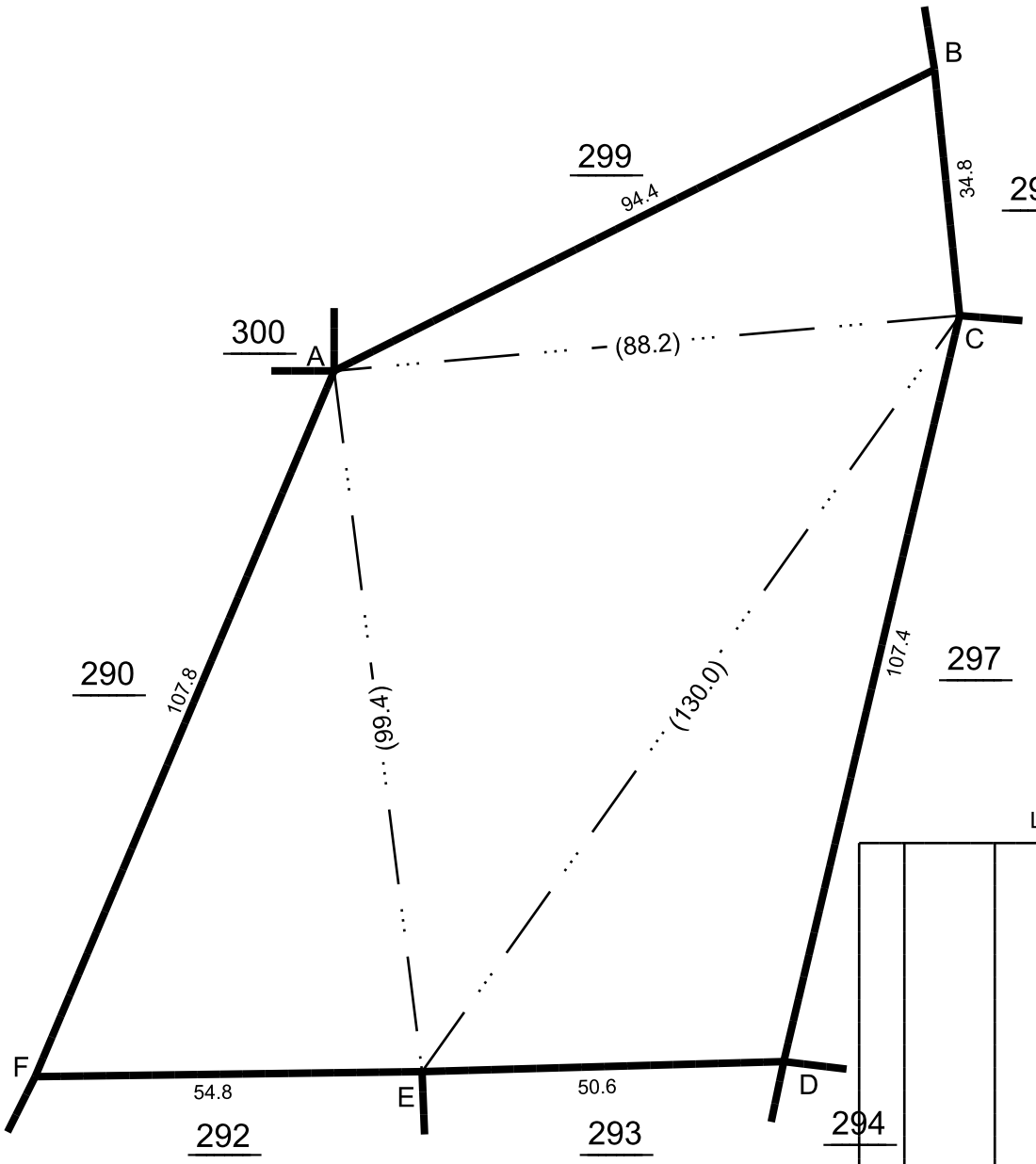
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 291

Area : Hect 01 Ares 12.50

Scale : 1 : 1000



Ladder				
E				
99.4				
92.0			54.4	F
A				
88.2				
C				
130.0				
E				
A				
94.4				
B				
34.8				
C				
107.4				
D				
50.6				
E				
54.8				
F				
107.8				
A				

District : Krishnagiri

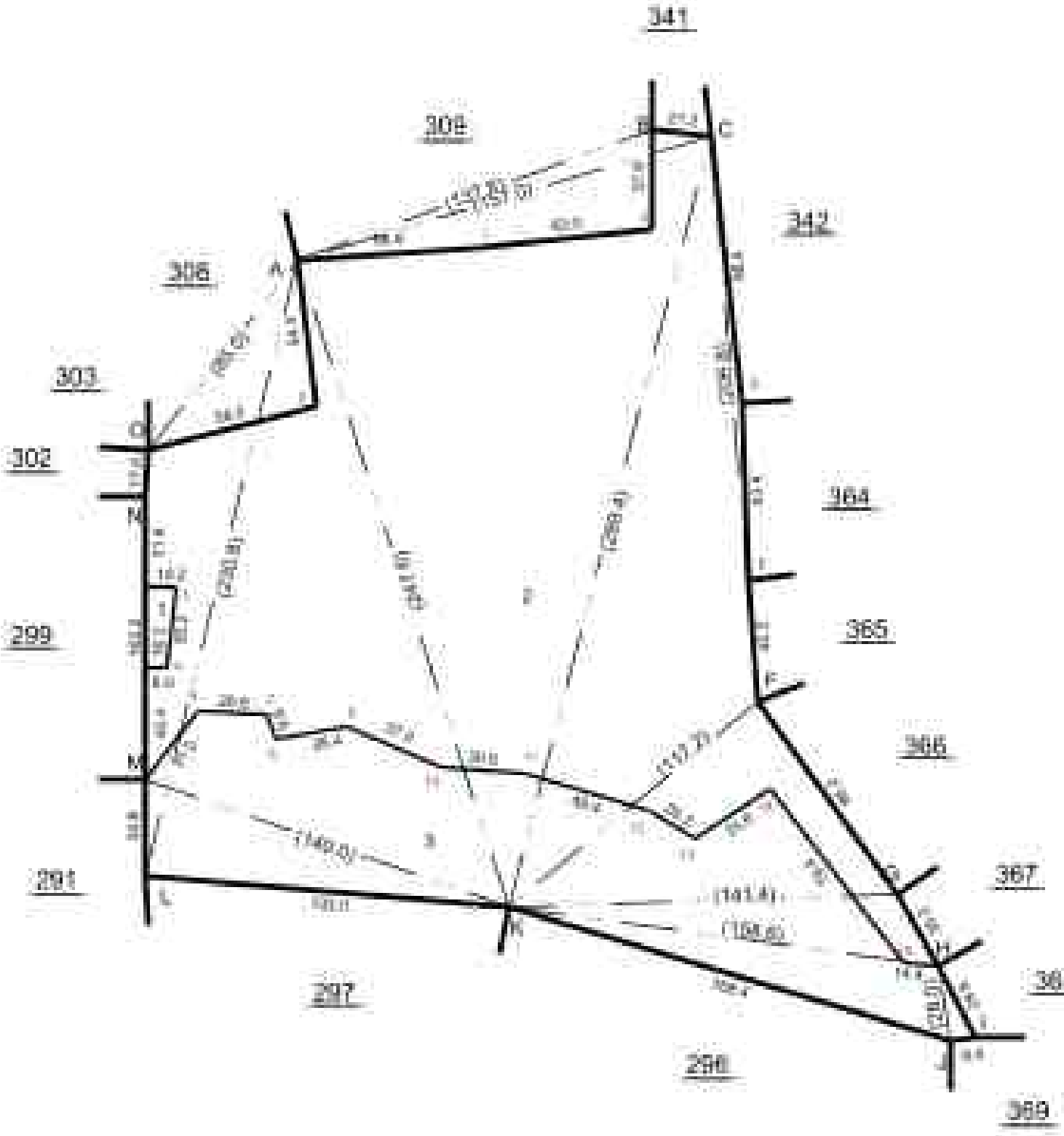
Taluk : Hosur [5]

Village : ZUZUVADI [87]

Survey No : 296

Area : Hect 05 Ares 46.00

Scale : 1 : 2000



		Layout		
		Pt		
		156.6		
		144.6	0.6	15
14	65.2	69.4		
13	39.8	83.4		
12	41.2	85.2		
		B		
		140.0		
11	47.4	126.4		
10	39.8	89.2		
9	42.8	82.0		
8	28.8	38.6		
7	36.4	33.4		
6	30.8	9.2		
		M		
		A		
		85.8		
		45.8	38.8	3
		O		
		L		
		230.8		
		197.0	9.4	84
		188.8	10.8	4
		125.8	14.8	3
		87.8	33.4	16
		80.2	39.8	0
		A		
		C		
		208.8		
		166.4	3.6	0
11	0.8	40.0		
		F		
		B		
		157.8		
		125.0	34.4	2
		63.6	15.8	1
		A		
		157.0		
		C		
		269.4		
		E		
		A		
		247.8		
		K		
		117.2		
		F		
		K		
		141.4		
		G		
		B		
		21.2		
		C		
		F		
		86.2		
		G		
		30.2		
		H		
		29.6		
		I		
		9.4		
		J		
		190.4		
		K		
		152.0		
		L		
		96.8		
		M		
		H		
		38.0		
		J		
		M		
		102.2		
		N		
		17.8		
		O		

District : Krishnagiri

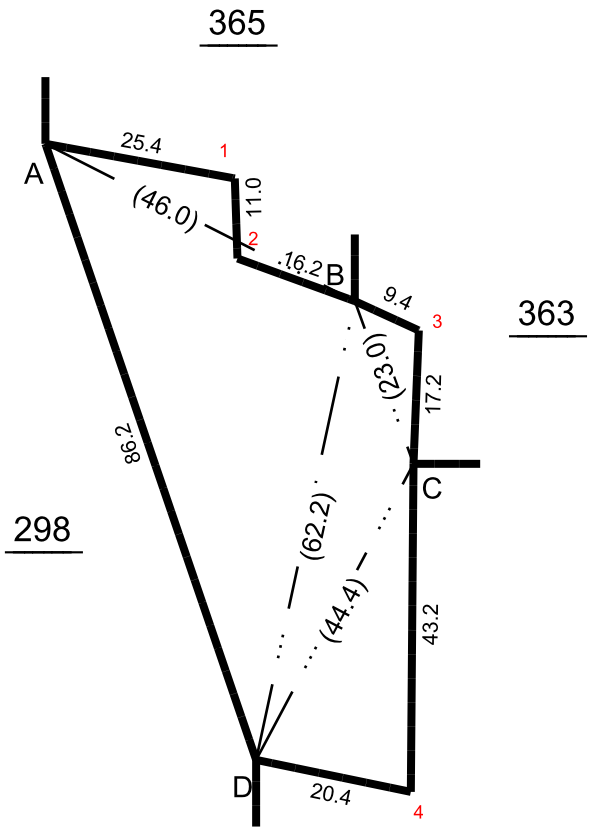
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 366

Area : Hect 00 Ares 23.50

Scale : 1 : 1000



Ladder

4	17.8	10.6	PRO	
		D		
		86.2		
		A		
		C		
		23.0		
3	6.4	6.6		
		B		
		46.0		
		29.6	2.2	2
1	7.2	24.6		
		A		
		B		
		62.2		
		43.2	12.4	C
		D		
		C		
		44.4		
		D		

District : Krishnagiri

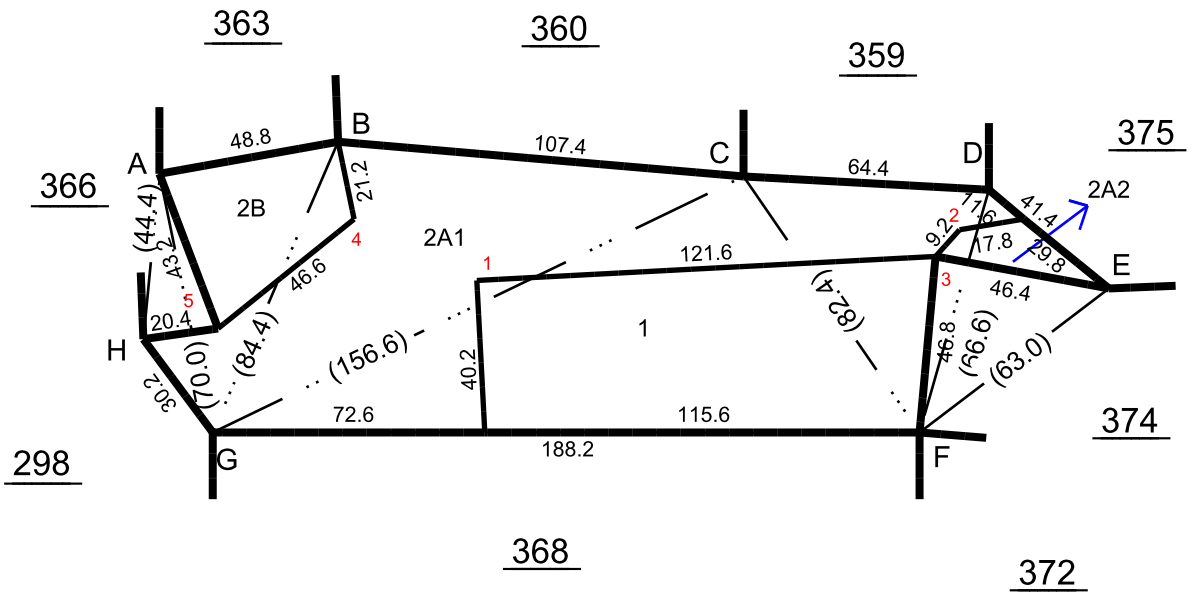
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 367

Area : Hect 01 Ares 48.50

Scale : 1 : 2000



Ladder

		G					G		
		84.4					188.2		
		58.8	9.8	5			46.6	67.8	C
		26.8	39.6	A			F		
4	12.0	17.4					A		
		B					48.8		
		F					B		
		63.0					107.4		
		31.4	34.6	3			C		
		E					64.4		
		F					D		
		66.6					41.4		
		12.0	5.0	2			E		
		D					G		
		F					70.0		
		82.4					A		
D	51.4	39.8					44.4		
		C					H		
		156.6					30.2		
1	6.0	81.0					G		

District : Krishnagiri

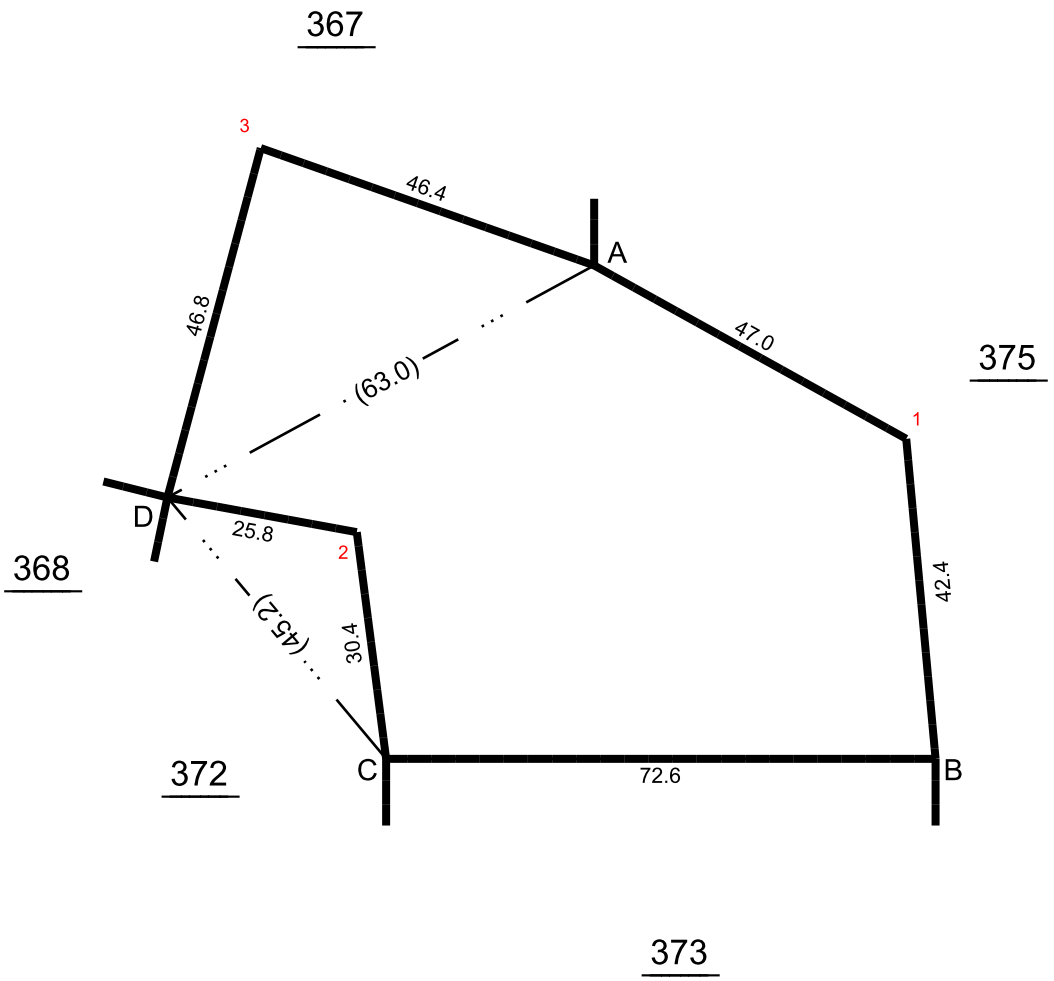
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 374

Area : Hect 00 Ares 53.50

Scale : 1 : 1000



		Ladder		
		D		
		45.2		
		25.8	15.8	
		C		
		D		
		63.0		
		31.4	34.6	3
		A		
	PRO	29.0	34.6	D
	PRO	4.2	30.0	2
		C		
		72.6		
		45.2	65.0	A
		4.0	42.2	1
		B		

NALLAH NUMBER – B11

District : Krishnagiri

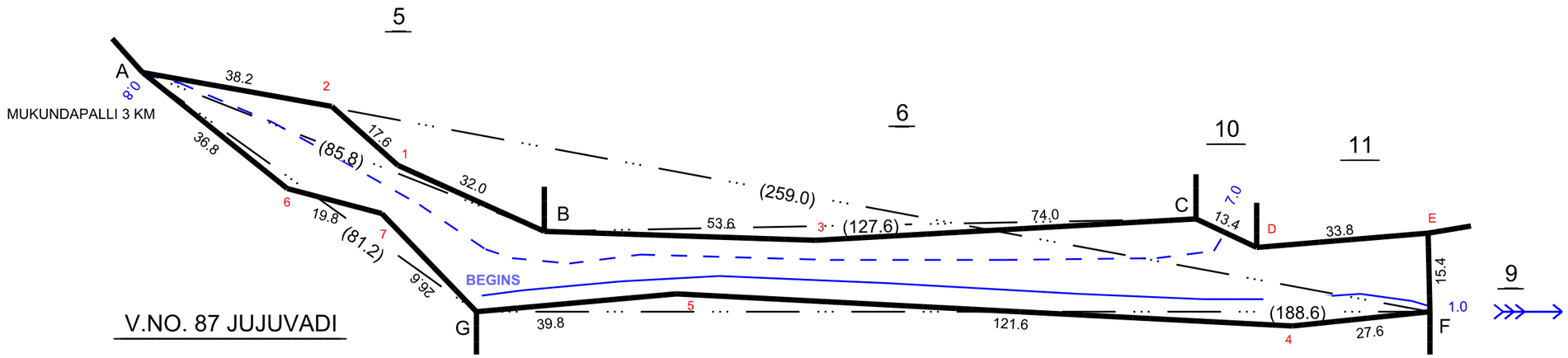
Taluk : Hosur [9]

Village : SANTHAPURAM [84]

Survey No : 7

Area : Hect 00 Ares 38.00

Scale : 1 : 1000



Ladder

		G						
		81.2						
7	4.8	54.8						
		36.6	2.0	6				
		A						
		F						
		259.0						
E	15.0	255.8						
D	6.0	223.0						
		212.0	LINE					
C	9.4	210.0						
		84.0	16.6	B			C	
		73.8	34.0	G			127.6	
		A					53.6	2.8
		G					B	
		188.6					A	
		187.0	2.0				85.8	
		149.0	3.4	5			48.2	7.6
4	3.0	27.4					31.8	1.4
		F					B	

District : Krishnagiri

Survey No : 8

Taluk : Hosur [0]

Area : Hect 01 Ares 47.00

Village : SANTHAPURAM [84]

Scale : 1 : 1000

V.NO. 87 JUJUVADI

Ladder

		A					E		
		173.2					D		
		52.6	19.0	22			54.5		
		44.0	33.0	21			20.0	0.4	4
		43.8	28.0	20			C		
		57.2	39.0	19			E		
		25.0	6.0	18			106.2		
		D					58.2	5.0	16
		E					44.8	3.6	14
		108.2					39.0	13.8	13
9	3.0	40.0					13.8	19.8	12
		D					B		
		A							
		173.2					198.0		
8	59.8	86.8					44.8	00.0	10
		D					44.2	3.0	11
		B					35.6	3.6	10
		95.0					108.8	27.8	28
6	14.2	86.2					121.0	27.8	29
17	28.6	46.0					A		
		43.2	32.8	C			B		
27	20.0	43.6					81.4		
16	25.0	55.4					19.4	3.6	1
26	22.2	25.2					C		
		41.4	0.8	1			A		
3	14.2	30.2					188.8		
		D					149.0	3.4	2
		A			33	19.2	84.2		
		104.6			11	56.8	33.6		
32	1.2	86.8			31	21.0	40.0		

1	3.0	27.4		
		B		

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District : Krishnagiri

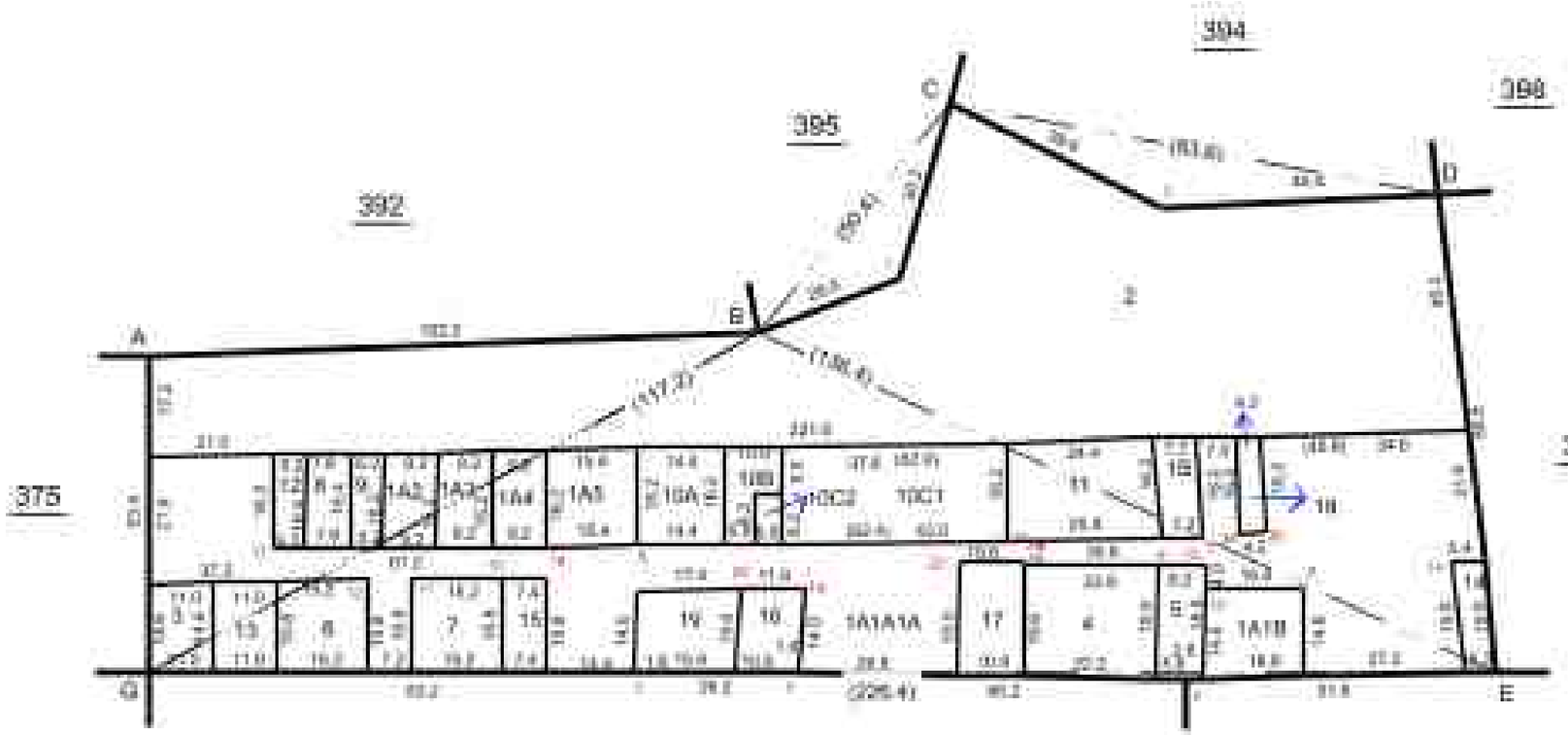
Taluk : Hosur [9]

Village : ZUZUVADI [67]

Survey No : 393

Area : Hect 01 Area 48.70

Scale : 1 : 1000



		B		
		117.2		
		92.2	21.2	A
		40.2	0.2	B
		C		
		B		
		136.4		
10	5.4	49.6		
		123.0	88.6	C
		42.0	88.2	D
4	0.8	35.0		
5	3.0	80.4		
6	LINE	54.0		
		40.0	5.4	17
		40.6	3.2	16
		E		
		220.4		
17	20.8	21.0		
14	19.8	218.8		
12	15.0	37.2		
13	15.8	39.6		
11	15.8	44.4		
13	18.0	177.8		
		174.8	0.8	1
		188.8	0.2	2
8	18.8	102.8		
19	15.8	67.0		
		83.2	0.2	1
19	18.0	110.8		
20	14.8	39.4		
21	18.0	147.2		
		C		
		117.2		
		91.2	46.2	A
		B		
		C		
		93.8		
3	15.8	45.8		
		D		
		C		
		50.4		
		22.8	12.4	1
		B		
		D		
		53.4		
		A		
		102.2		
		B		

District : Krishnagiri

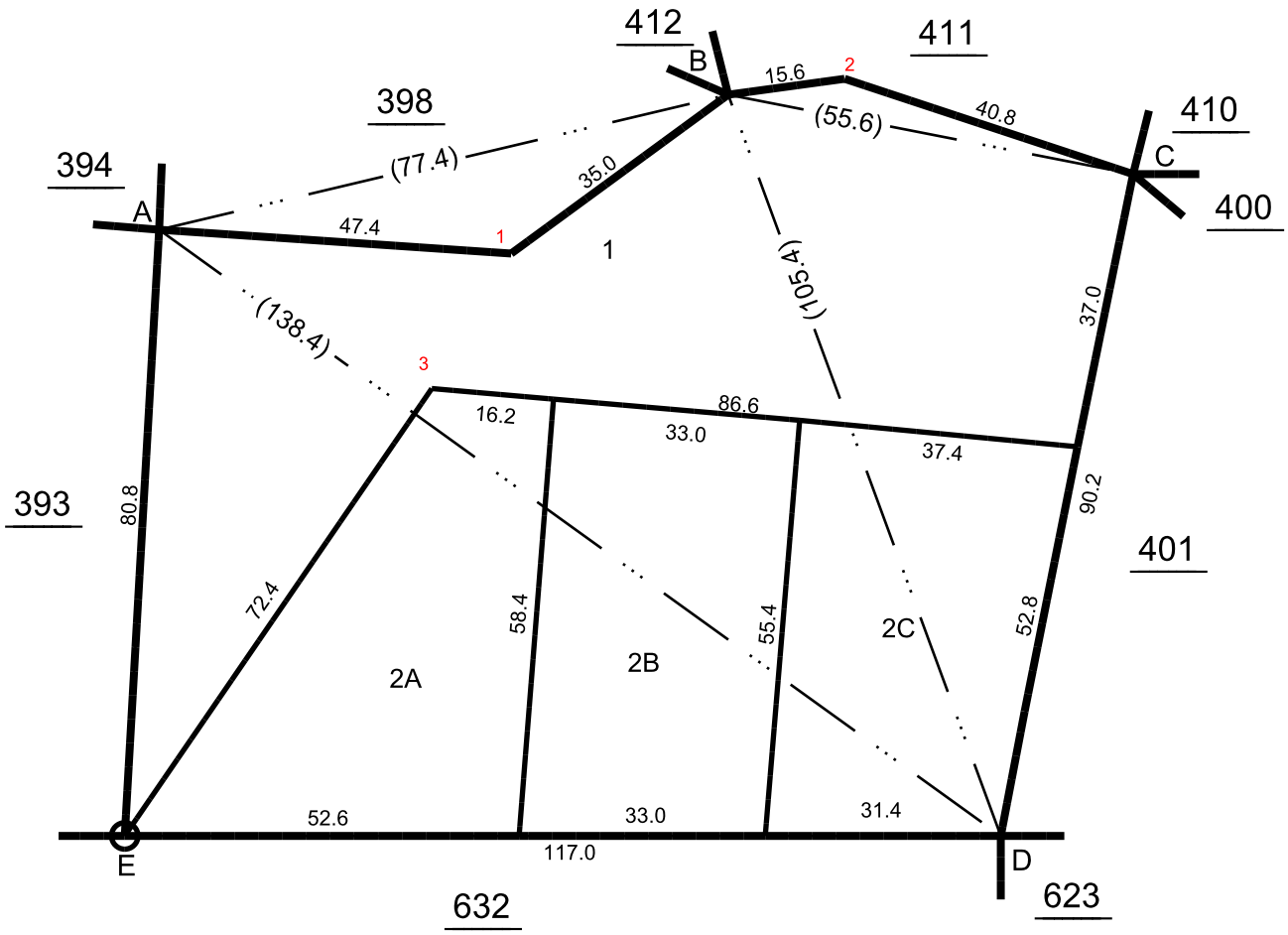
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 399

Area : Hect 01 Ares 8.69

Scale : 1 : 1000



Ladder

		B		
		105.4		
		76.2	47.2	C
		D		
		138.4		
B	58.8	51.2		
3	4.0	41.8		
		A		
		C		
		55.6		
2	5.2	14.8		
		B		
		77.4		
		45.0	14.0	1
		A		
		C		
		90.2		
		D		
		A		
		80.8		
		E		
		117.0		
		D		

District : Krishnagiri

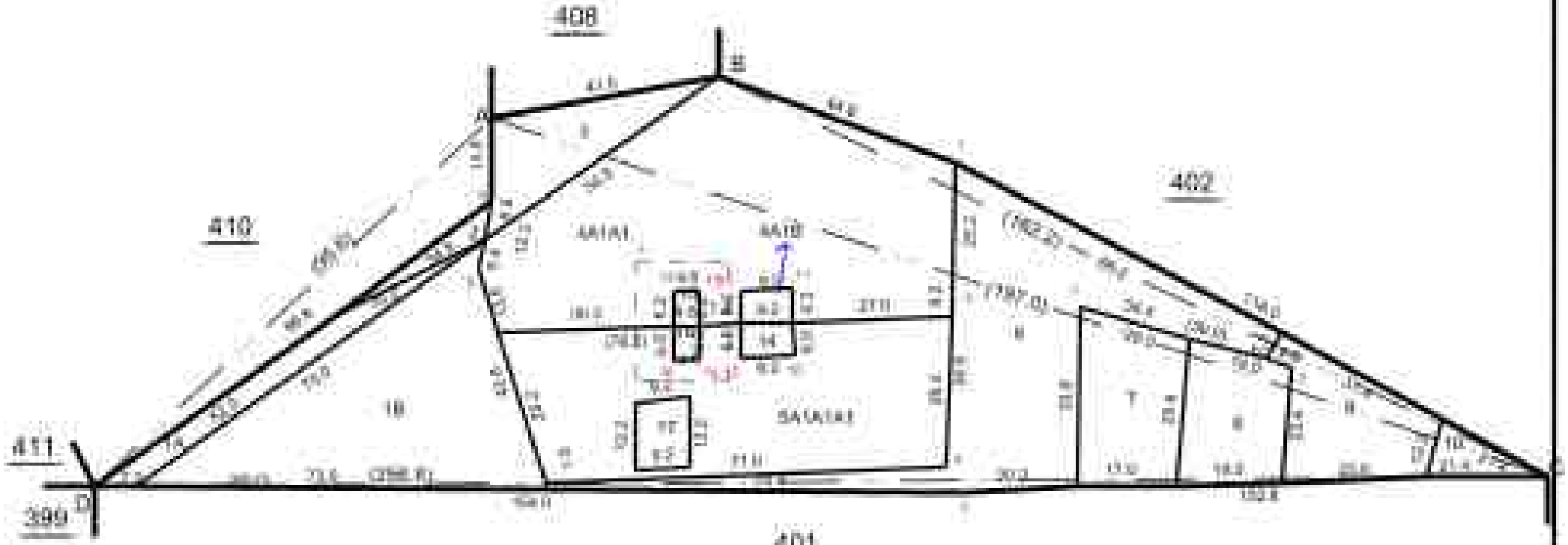
Survey No : 400

Taluk : Hosur [9]

Area : Hect 01 Ares 4.49

Village : ZUZUVADI [67]

Scale : 1 : 1000



Ladder

Created and : National Informatics Centre

District : Krishnagiri

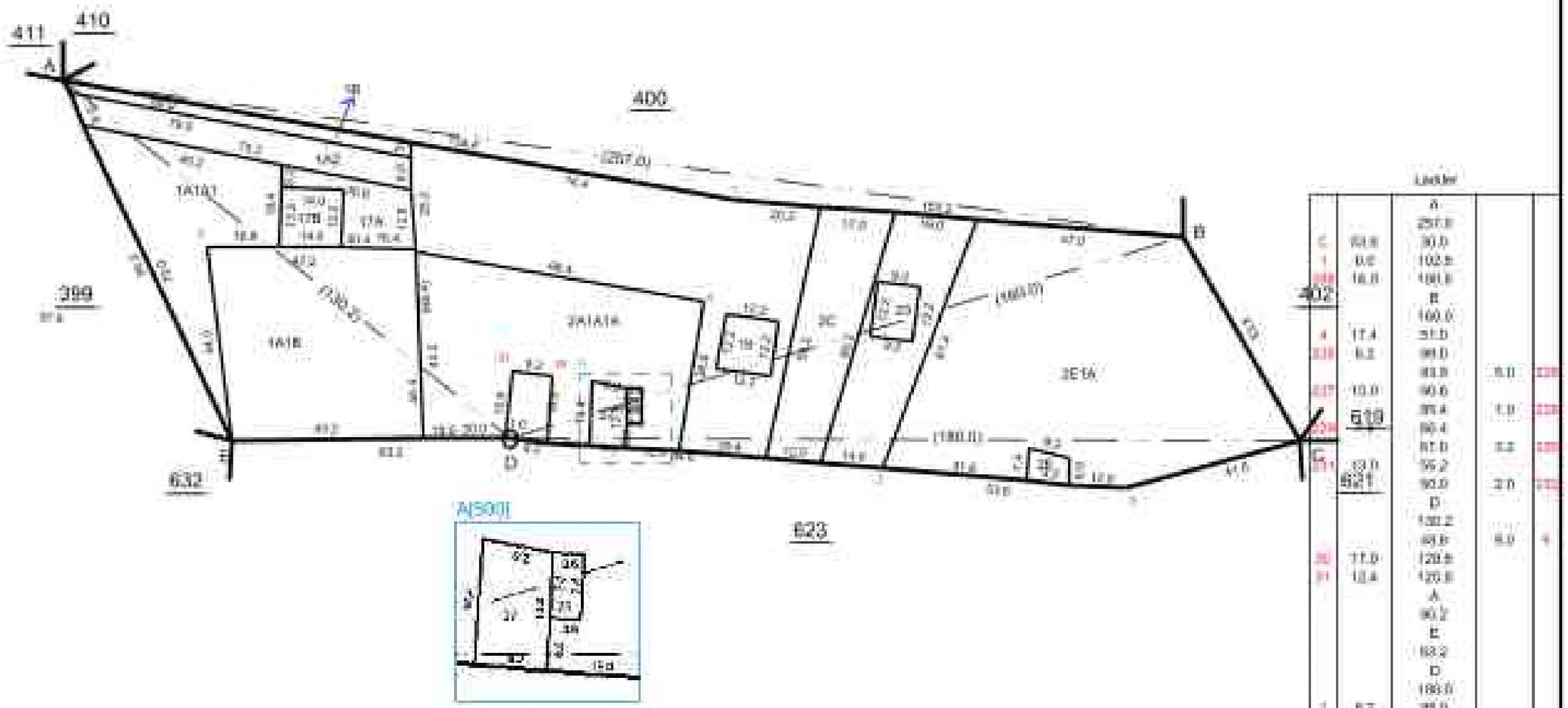
Taluk : Hosur [9]

Village : ZUZUVADI [67]

Survey No : 401

Area : Hect 01 Ares 24.33

Scale : 1 : 1000



District : Krishnagiri

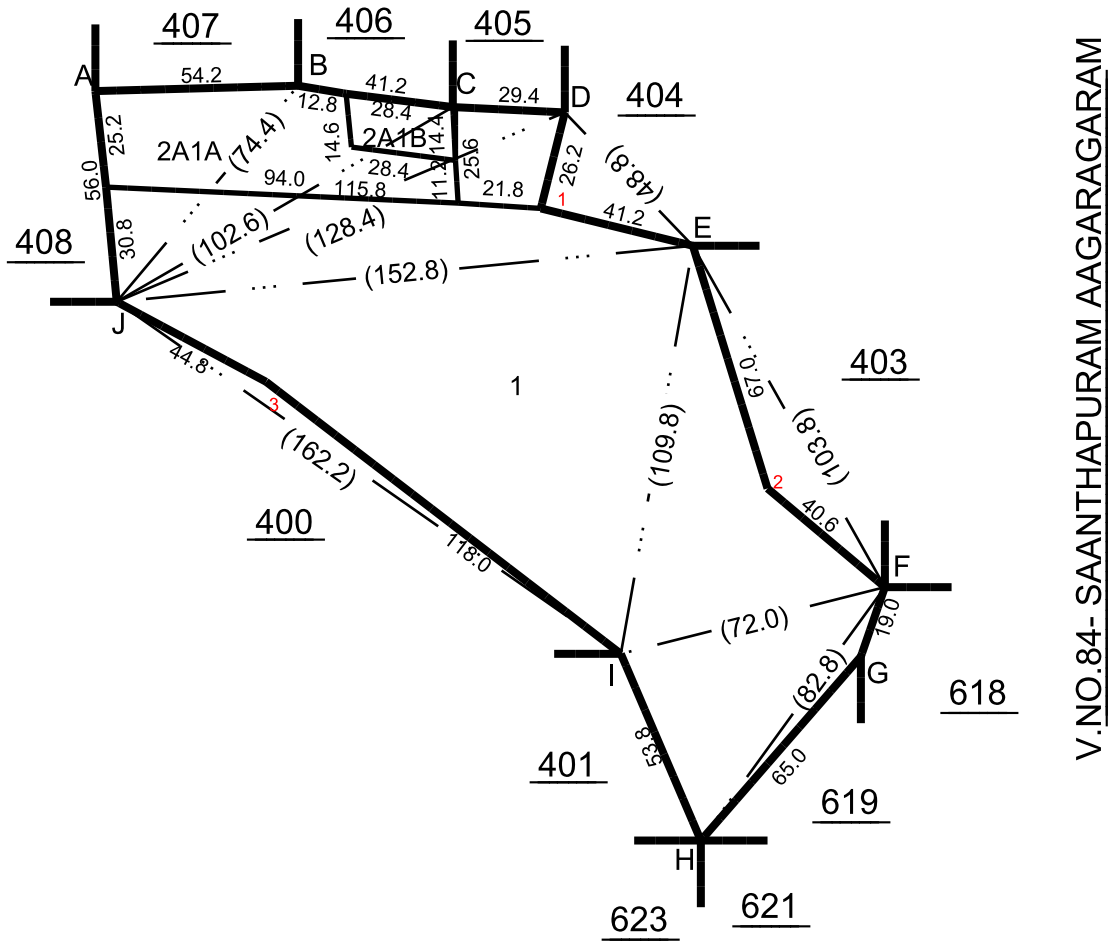
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 402

Area : Hect 01 Ares 83.00

Scale : 1 : 2000



Ladder

		I			1	22.0	35.0					B	
		162.2					E					41.2	
3	4.8	44.2					D					C	
		J					128.4					29.4	
		152.8			C	13.0	102.2					D	
		30.8	38.4	D			J					E	
I	105.4	29.4					102.6					109.8	
		E					33.0	24.8	B			I	
		H					29.0	4.4	308			72.0	
		82.8					C					F	
G	6.0	18.2					B					I	
		F					74.4					53.8	
		103.8			A	40.6	38.2					H	
		65.6	14.2	2			J					65.0	
		E					56.0					G	
		D					A					19.0	
		48.8					54.2					F	

District : Krishnagiri

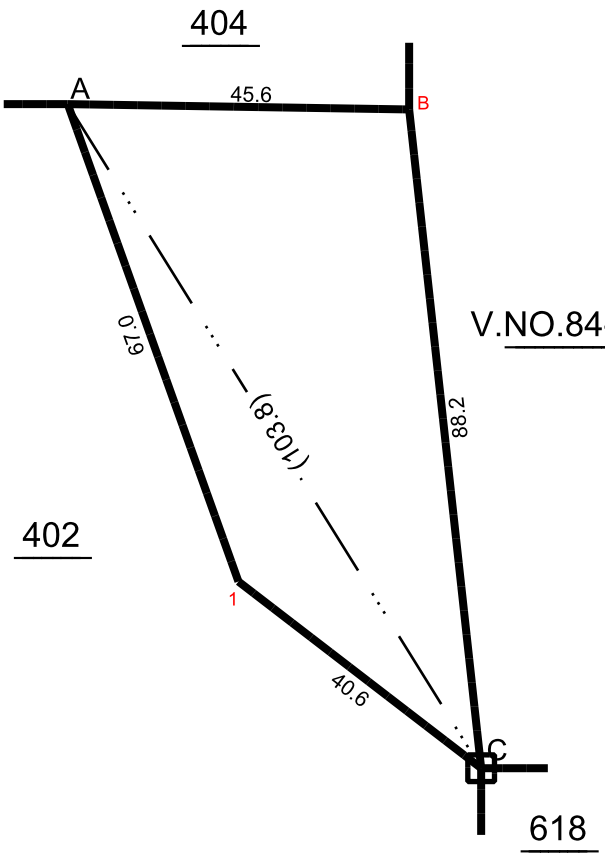
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 403

Area : Hect 00 Ares 28.00

Scale : 1 : 1000



V.NO.84- SAANTHAPURAM AAGARAGARAM

Ladder

B	38.0	C 103.8 65.6 24.6 A	14.2	1

District : Krishnagiri

Taluk : Hosur [9]

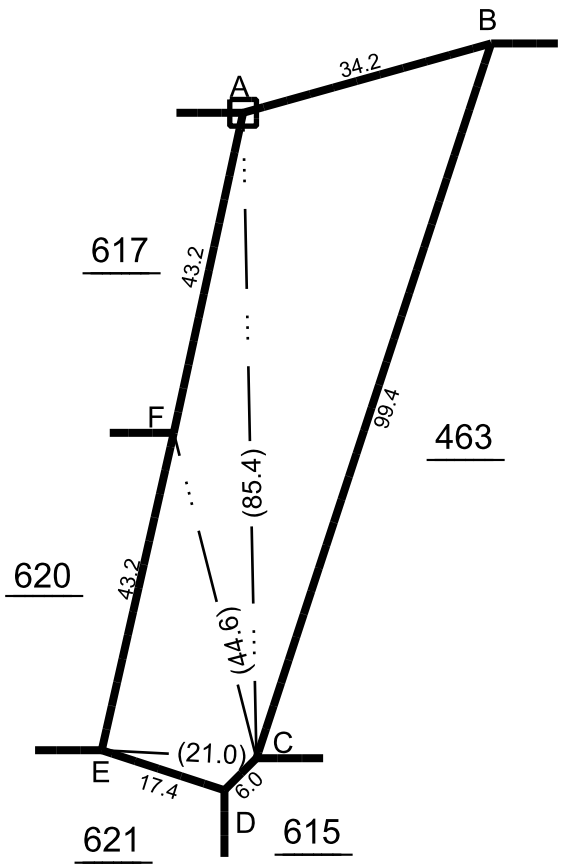
Village : ZUZUVADI [87]

Survey No : 616

Area : Hect 00 Ares 24.00

Scale : 1 : 1000

V NO:84 SANDHAAPURAM



Ladder

F	9.6	A 85.4 43.6 C A 34.2 B 99.4 C 6.0 D 17.4 E 43.2 F 43.2 A F 44.6 C 21.0 E		

NALLAH NUMBER – B12

District : Krishnagiri

Taluk : Hosur [9]

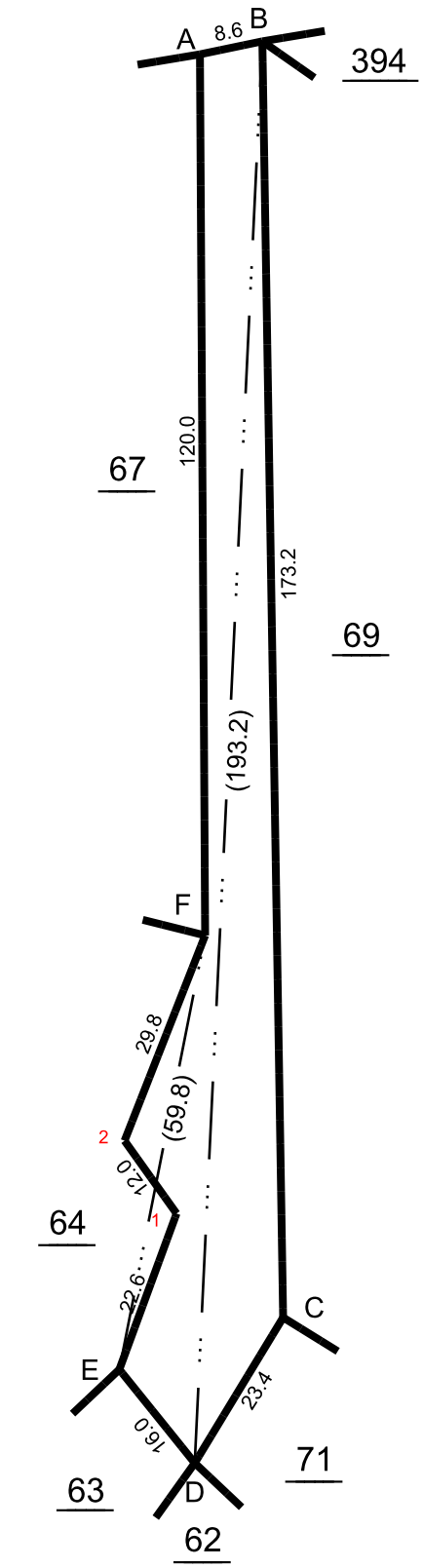
Village : MUKONDAPALLI [88]

Survey No : 68

Area : Hect 00 Ares 23.50

Scale : 1 : 1000

V.NO.87 JUJUVADI



District : Krishnagiri

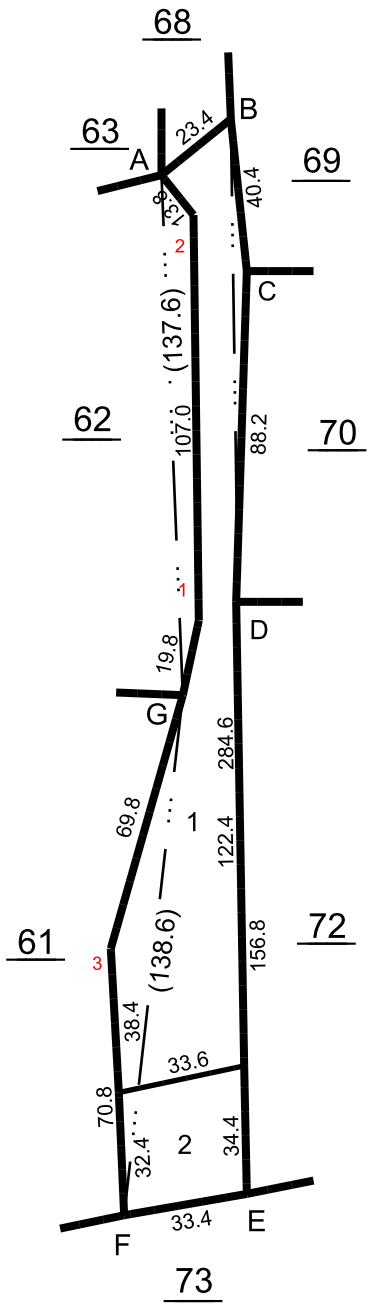
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 71

Area : Hect 00 Ares 57.40

Scale : 1 : 2000



District : Krishnagiri

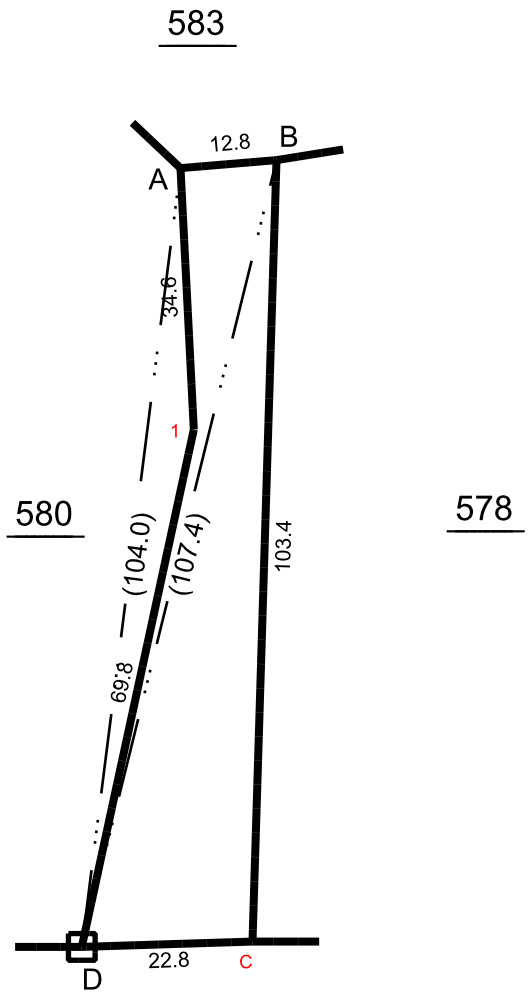
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 579

Area : Hect 00 Ares 15.50

Scale : 1 : 1000



V NO 88 MOOKANDAPALLI

District : Krishnagiri

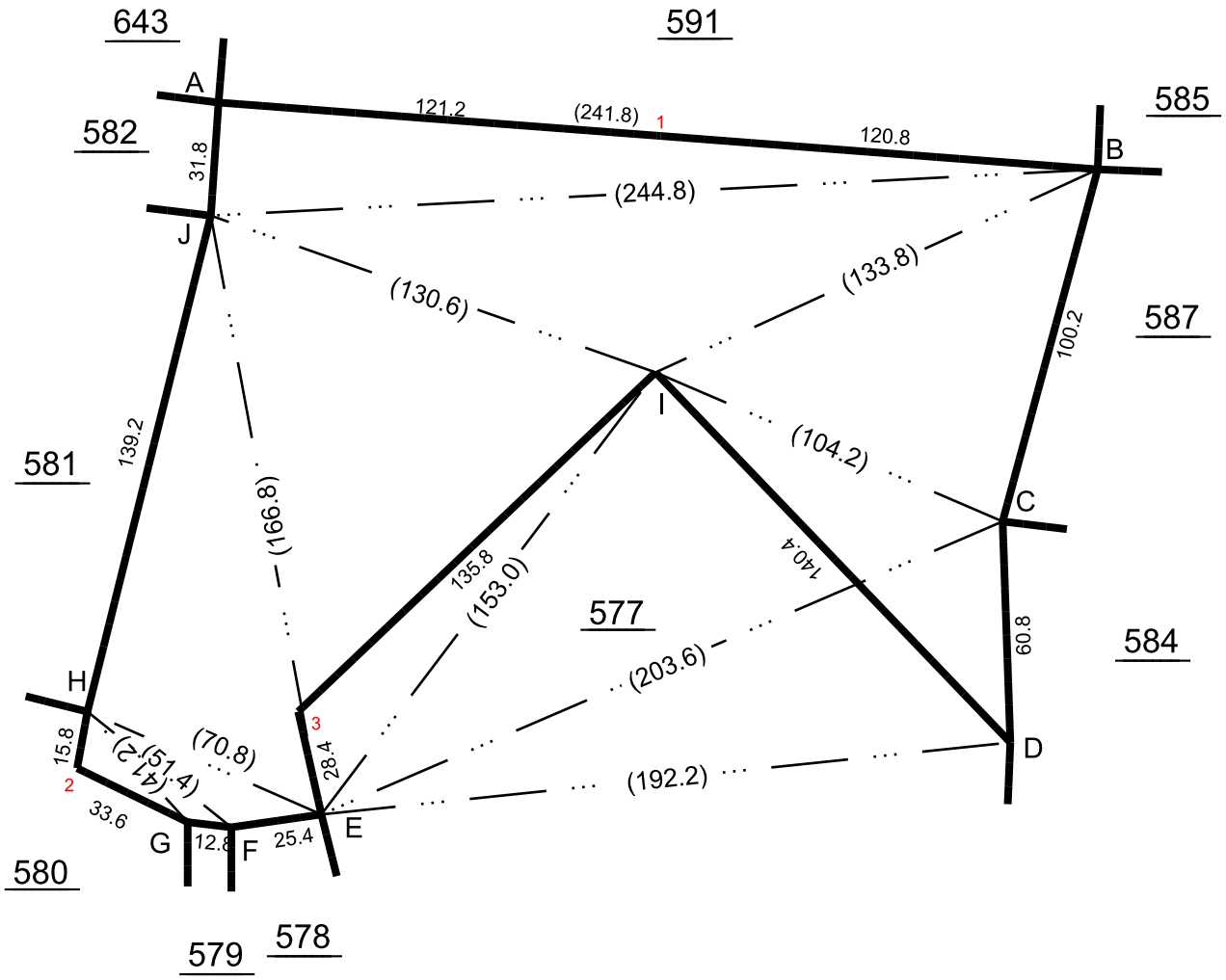
Taluk : Hosur [9]

Village : ZUZUVADI [87]

Survey No : 583

Area : Hect 03 Ares 13.50

Scale : 1 : 2000



NALLAH NUMBER – B15

District : Krishnagiri

Taluk : Hosur [0]

Village : SANTHAPURAM [84]

Survey No : 44

Area : Hect 01 Ares 8.45

Scale : 1 : 1000

Ladder

		F			E	3.4	8.8					132.4			
		109.2					D					61.2	10.4	12	
(2)	6.0	65.8					112.0					47.4	16.6	11	
		A					95.0	42.6	F			51.4	20.6	10	
		F			59	5.6	82.0			E	10.4	26.6			
		38.0					A					16.2	2.4	9	
		9.0	9.0	(2)			G					B			
		E					105.4					148.0			
		D			58	8.4	92.4					106.6	6.0	8	
		33.6			57	19.8	79.4			T	1.2	91.8			
		18.2	2.4	(2)	56	10.2	48.0					81.8	17.6	6	
		15.2	9.4	(2)	55	18.4	38.4					70.0	11.2	5	
		B			54	14.0	20.4					58.8	18.0	4	
		F			53	1.0	14.8					76.4	10.4	3	
		44.8					D			E	18.8	72.0			

		94.8	3.8	1
		A		
		77.4		
		G		
		91.2		
		F		

Land Net | Tamil Nilam Information Centre

District : Krishnagiri

Taluk : Hosur [9]

Village : SANTHAPURAM [84]

Survey No : 51

Area : Hect 00 Ares 67.00

Scale : 1 : 1000

Ladder

		A			17	3.4	70.8					B		
		140.6			16	2.6	68.4					74.4		
		65.6	6.8	25	15	1.4	32.0							
		53.4	60.4	8	14	2.6	27.4							
24	10.8	20.0			13	1.4	23.8							
11	59.4	14.4			12	2.0	9.8							
		C					D							
		A					A			5	16.4	69.2		
		126.2					62.8			4	6.8	46.8		
23	5.2	110.8					61.6	2.0	11			C		
22	3.4	107.8			10	1.4	39.2					36.0		
21	0.8	101.4			9	0.8	33.4			3	0.0	36.0		
		100.0	1.8	23			32.8	3.0	8	2	6.0	37.8		
		99.0	6.6	19			12.6	8.6	7	1	1.4	24.8		
	2.0	74.8			8	2.4	10.8					C		

Collector and : National Informatics Centre

District : Krishnagiri

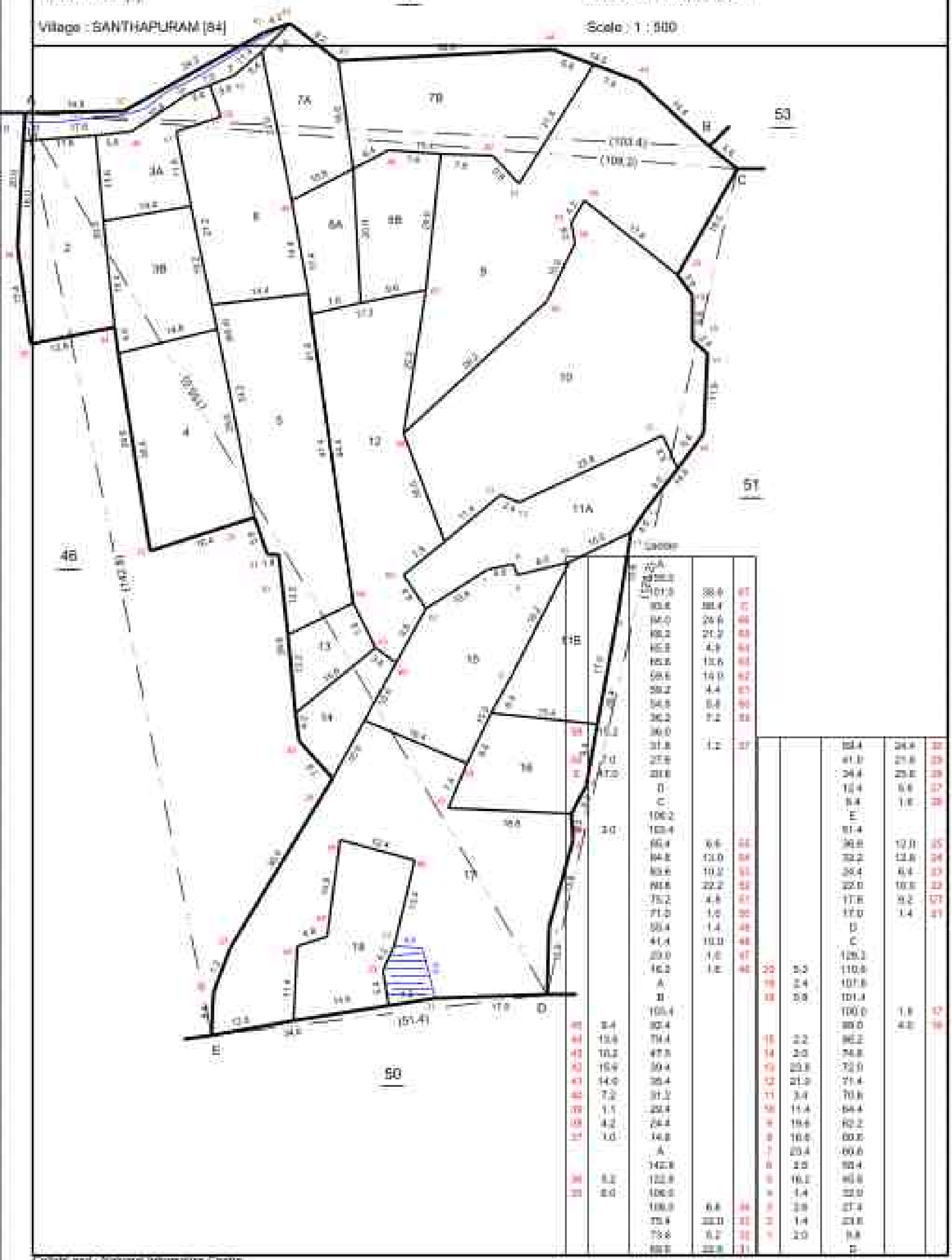
Taluk : Hosur [0]

Village : SANTHAPURAM [84]

Survey No : 52

Area : Hect 00 Area 99.50

Scale : 1 : 500



				67A						88.4	26.4
				101.9	38.6	67				61.0	21.6
				80.6	88.4	66				39.4	25.8
				84.0	26.6	65				10.4	6.6
				68.2	21.2	64				5.4	1.8
				65.8	4.9	63				E	
				65.6	13.6	62				61.4	
				58.6	14.0	61				36.8	12.0
				58.2	4.4	60				32.2	13.8
				54.8	5.8	59				30.4	6.4
				36.2	7.2	58				22.8	10.8
				36.0						17.6	6.2
				31.8	1.2	57				17.0	1.4
				27.6						D	
				23.8						C	
				C						126.2	
				106.2						110.8	
				103.4						107.8	
				66.4	9.6	56				101.4	
				64.8	13.0	55				100.0	1.8
				63.6	10.2	54				89.0	4.0
				60.8	22.2	53				86.2	
				75.2	4.8	52				74.8	
				71.0	1.6	50				72.0	
				55.4	1.4	49				71.4	
				41.4	10.0	48				70.6	
				20.0	1.6	47				64.4	
				18.2	1.6	46	22	5.3	110.8	62.2	
				A			19	2.4	107.8	60.0	
				B			18	5.9	101.4	60.4	
				105.4					100.0	1.8	57
45	3.4			92.4					89.0	4.0	56
44	13.6			79.4			15	2.2	86.2		
43	10.2			47.8			14	2.0	74.8		
42	15.6			30.4			13	23.8	72.0		
41	14.0			25.4			12	21.2	71.4		
40	7.2			21.2			11	3.4	70.6		
39	1.1			20.4			10	11.4	64.4		
38	4.2			24.4			9	19.6	62.2		
37	1.0			14.8			8	18.6	60.0		
				A			7	23.4	60.6		
				142.8			6	2.5	59.4		
36	5.2			122.8			5	16.2	46.6		
35	8.0			106.0			4	1.4	32.0		
				106.0	6.8	44	3	2.9	27.4		
				75.8	222.0	43	2	1.4	23.8		
				73.6	5.2	42	1	2.0	5.8		
				68.6	22.8	41			E		

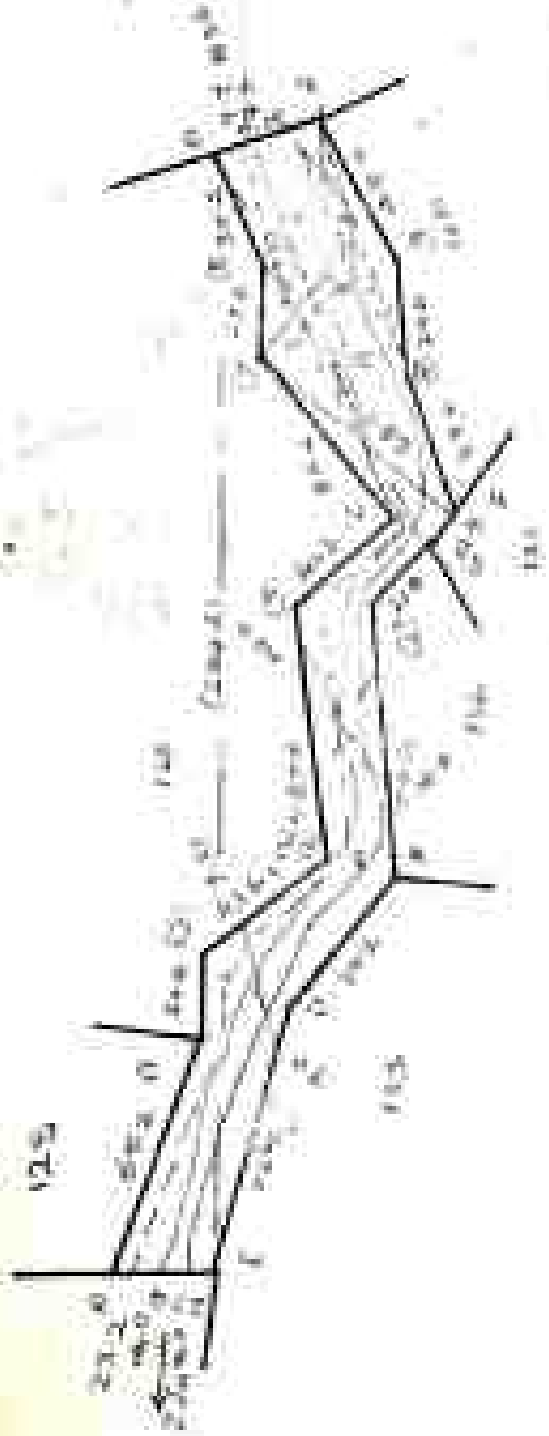
Collected : National Informatics Centre

District : Krishnagiri
Taluk : Hosur [9]
Village : SANTHAPURAM [84]

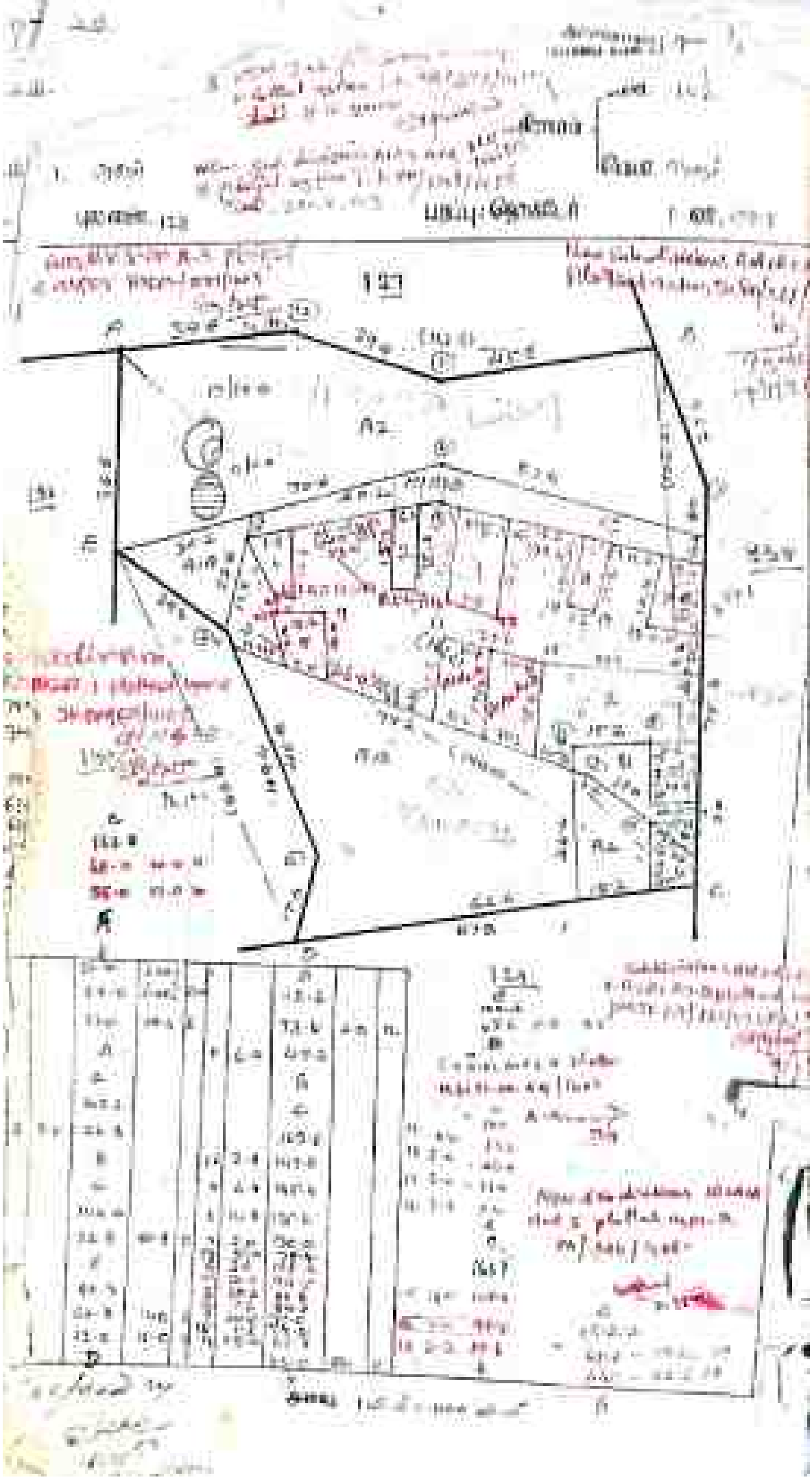
Survey No : 53
Area : Hect 01 Ares 58.00
Scale : 1 : 1000

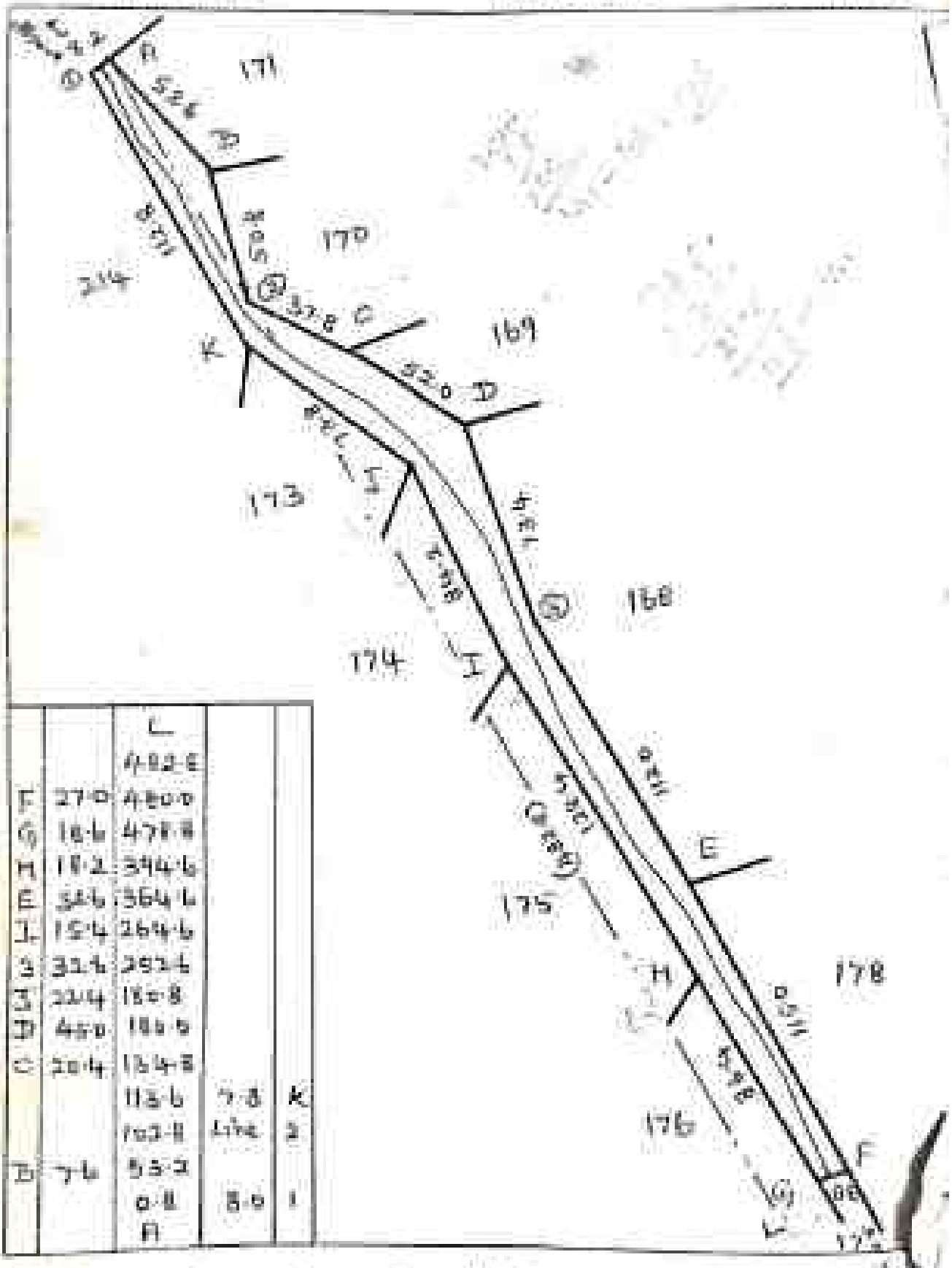
Ladder

		E					130.0					A							
		82.4					93.8	13.0	38			20.8							
		81.4	2.0	66			65.2	11.0	39	10	5.0	28.8							
		60.0	6.8	45	34	4.4	82.2					15.2	2.4	21					
		32.4	3.0	44	33	3.6	81.8					15.2	0.4	20					
		12.8	4.87	43	32	2.4	81.8					B							
		F			31	5.0	61.6					48.2							
		C					58.8	8.0	30	19	3.2	25.0							
		161.8			29	11.8	54.8					C							
		60.2	5.2	40			52.0	5.8	28			107.4			10	18.4	80.4		
	32.0	66.0			27	17.8	47.0			18	11.9	72.9			9	23.8	64.2		
	33.0	57.0					46.4	24.0	26	17	20.8	69.2					49.0	15.2	5
41	33.0	59.8			25	17.4	40.8					D					47.0	0.2	7
40	35.8	46.8					31.0	8.2	24			123.4			8	4.4	46.2		
		F			23	1.8	29.0					102.0	0.8	16	5	17.4	44.8		
		158.8					25.8	17.0	22			98.4	14.8	15	4	21.8	44.2		
		137.0	5.4	39			G			14	18.4	98.2					43.0	0.2	3
		90.0	8.0	38			75.8			13	30.0	89.8			2	2.4	38.0		
		19.0	8.0	37	9	1.0	28.2					89.4	18.4	12	1	1.2	38.0		
		E					G			11	24.8	88.0					E		

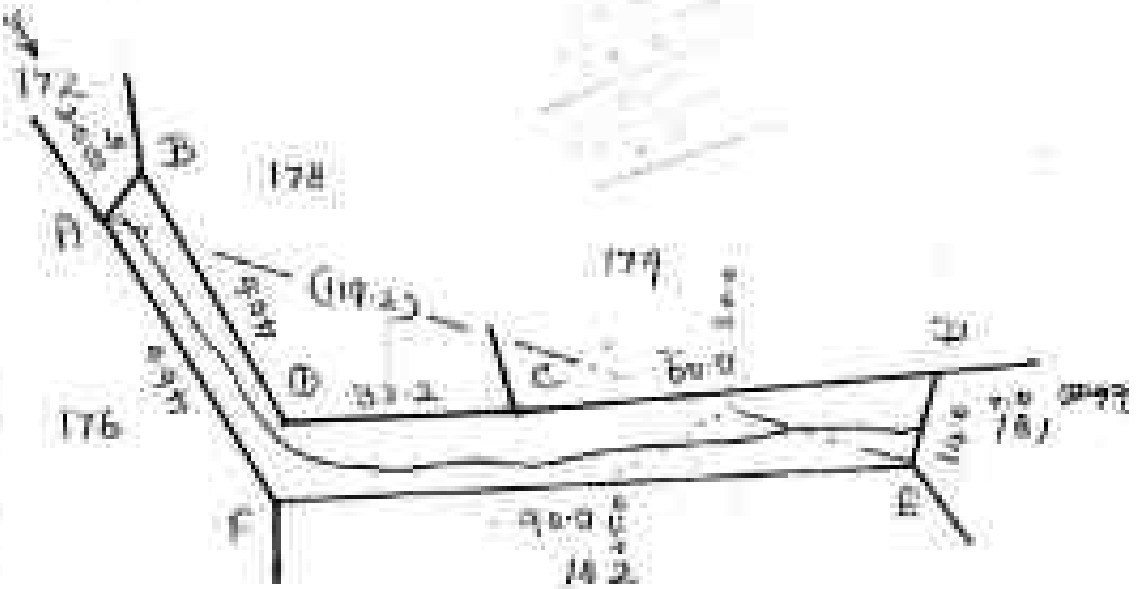


Village Administrative Officer
102. Hosur (R)
Krishnagiri - Dt - T.N.

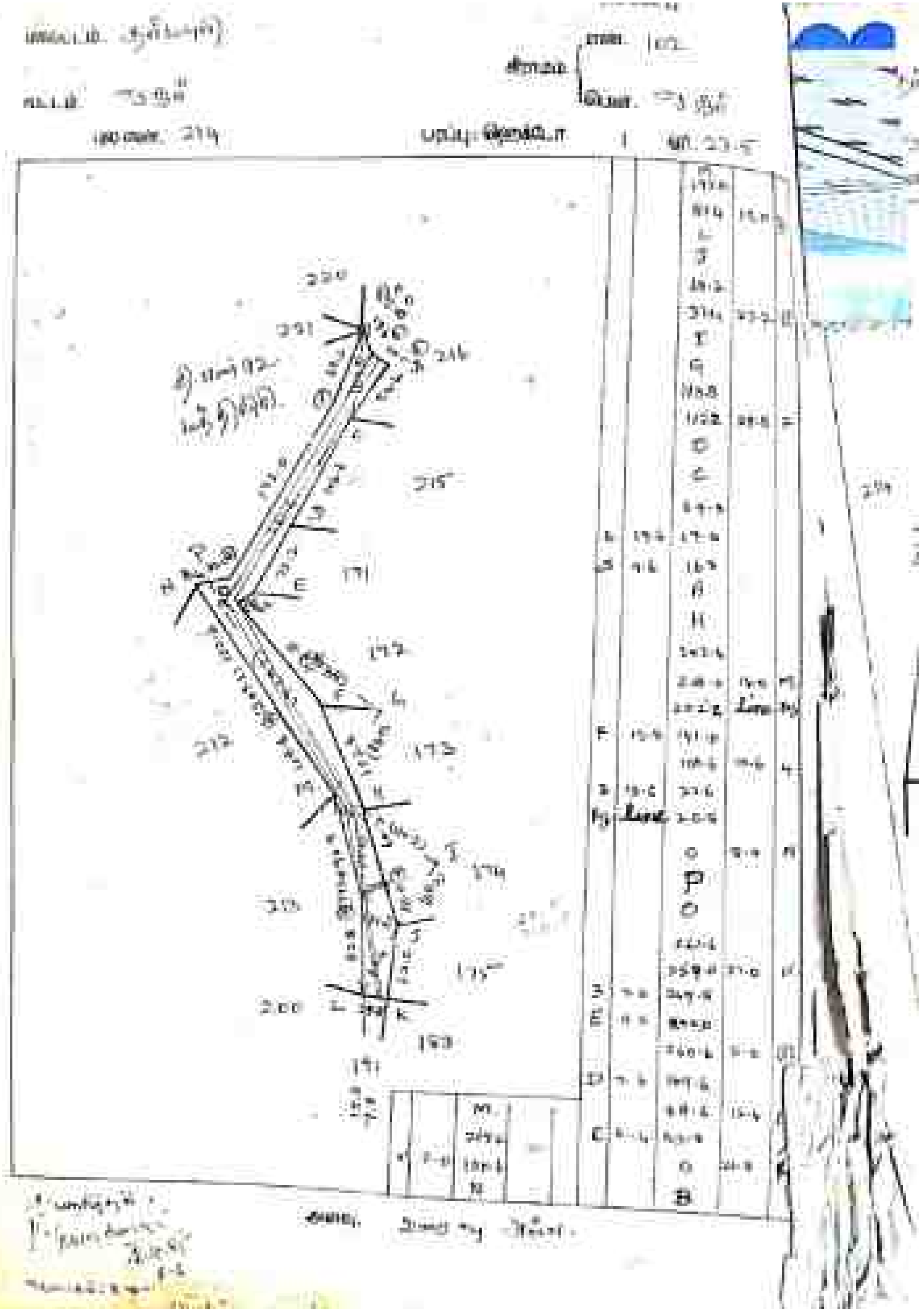




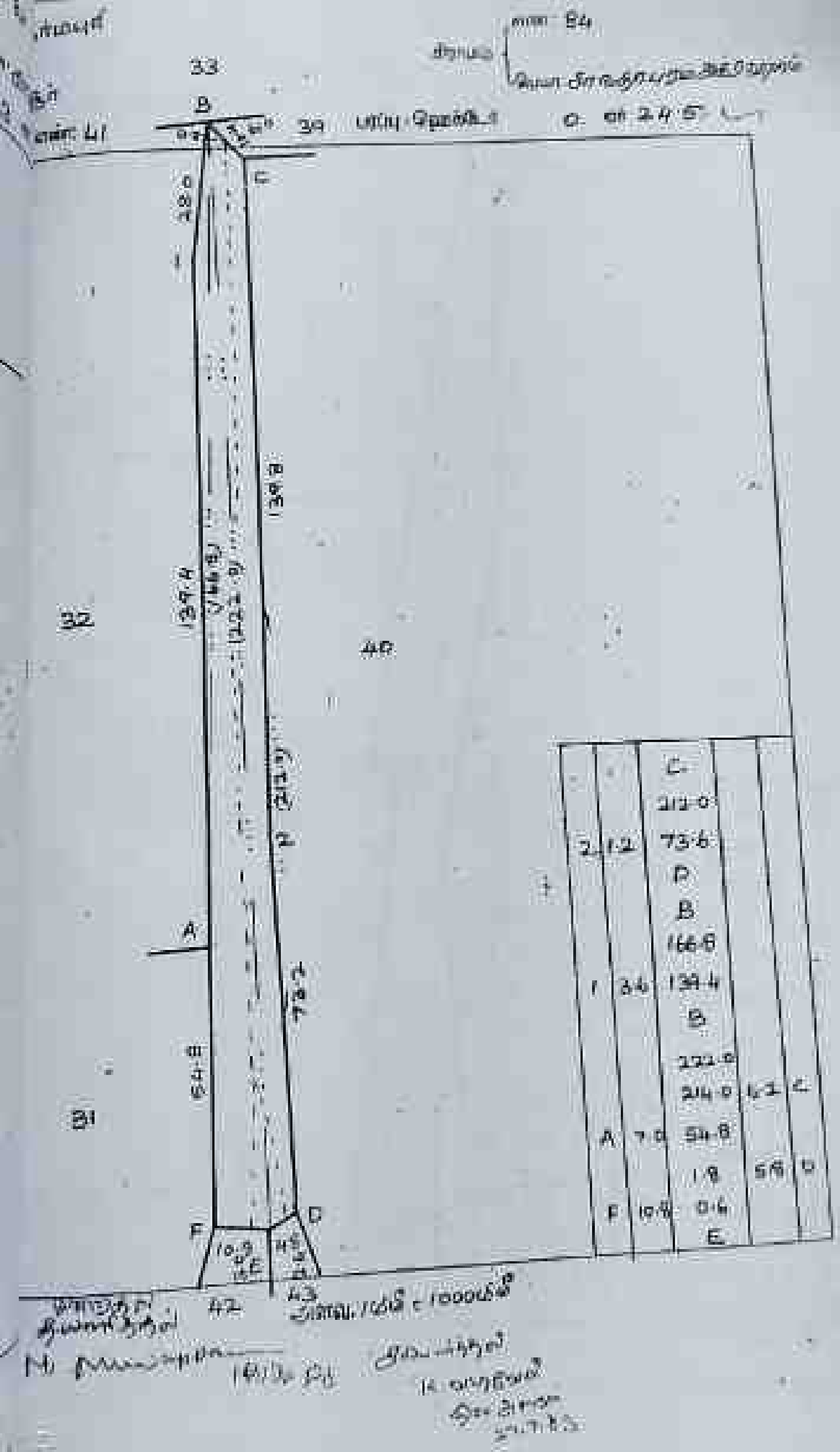
		L
		482.8
F	27.0	480.0
G	18.6	478.8
H	18.2	394.6
E	52.6	364.6
J	15.4	264.6
I	32.4	252.4
J	22.4	188.8
D	45.0	186.6
C	20.4	154.8
		113.6
		103.8
B	7.6	53.2
		0.8
		A



		A		
		119.2		
		115.4	7.5	2
I	20.0	95.8		
F	3.4	84.5		
C	9.6	50.6		
		3.8	14.0	2
		E		



NALLAH NUMBER – B16


33
B
39
C
32
40
A
F
D
E
C
212.0
2 1.2 73.6
B
166.6
1 3.4 139.4
D
222.0
214.0 1.2 C
A 7.0 54.8
1.8 5.6 D
F 10.8 0.4
E

District : Krishnagiri

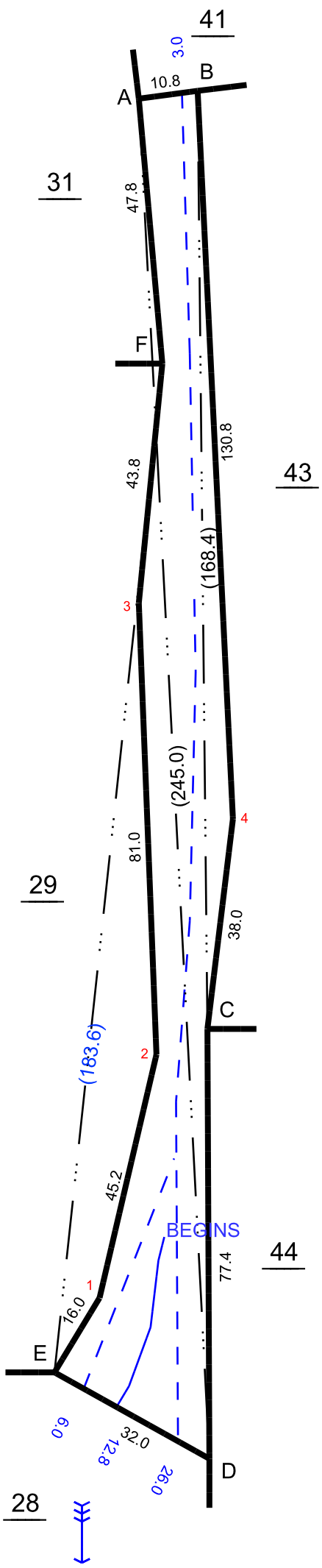
Taluk : Hosur [9]

Village : SANTHAPURAM [84]

Survey No : 42

Area : Hect 00 Ares 32.50

Scale : 1 : 1000



Ladder

		B		
		168.4		
		37.6	5.0	4
		C		
		F		
		183.6		
		139.0	LINE	3
		59.0	12.4	2
		14.4	6.8	1
		E		
		D		
		245.0		
		228.0	27.4	E
C	3.8	167.8		
F	2.0	47.8		

		A		
B	10.8	0.6	BACK	

NALLAH NUMBER – B17

District : Krishnagiri

Survey No : 57

Taluk : Hosur [0]

Area : Hect 01 Area 9.00

Village : SANTHAPURAM [84]

Scale : 1 : 1000

V.NO. 87 JUJUVADI

Ladder

		A					A			
		139.6					123.4			
21	2.8	21.0					102.0	8.8	19	
20	33.4	17.4					88.4	14.8	18	
		F					68.4	14.4	17	
		112.6					48.8	15.2	17	
E	19.0	87.8					G			
		93.4	10.8	20			28.8			
		79.4	9.2	19	10	2.0	22.2			
		72.8	14.4	18			F			
		49.4	16.2	17			E			
		D					87.8			
		96.8					38.8	11.8	3	
C	59.2	76.8			9	2.4	34.0			
19	8.8	74.6					G			
		E					C			
		D					82.8			
		137.4			7	2.0	47.4			
15	8.8	62.0					16.8	1.2	5	
14	8.8	9.0					H			

		B		
		85.2		
		62.8	1.8	6
		15.8	5.2	4
		54.8	8.2	3
		93.8	4.4	2
		27.2	7.4	1
		C		

District : Krishnagiri

Taluk : Hosur [9]

Village : SANTHAPURAM [84]

Survey No : 58

Area : Hect 00 Ares 93.50

Scale : 1 : 1000

V.NO: 67 JUJUVADI

Linear

		C							
		90.0							
		20.4	5.4	5					
		D							
		B							
		126.5							
A	1.0	35.5							
B	5.8	54.0							
C	5.3	91.6			A	16.4	24.0		
D	2.6	12.0					F		
		A					E		
		67.6					102.5		
E	4.4	30.0					81.6	22.2	11
		E			C	5.4	7.0		
		F					B		
		67.6					D		
		30.0	11.6	8			96.0		
F	7.8	34.0					48.0	8.0	10
		A					28.4	43.0	12
		E					C		

Content and Website Information Centre

District : Krishnagiri

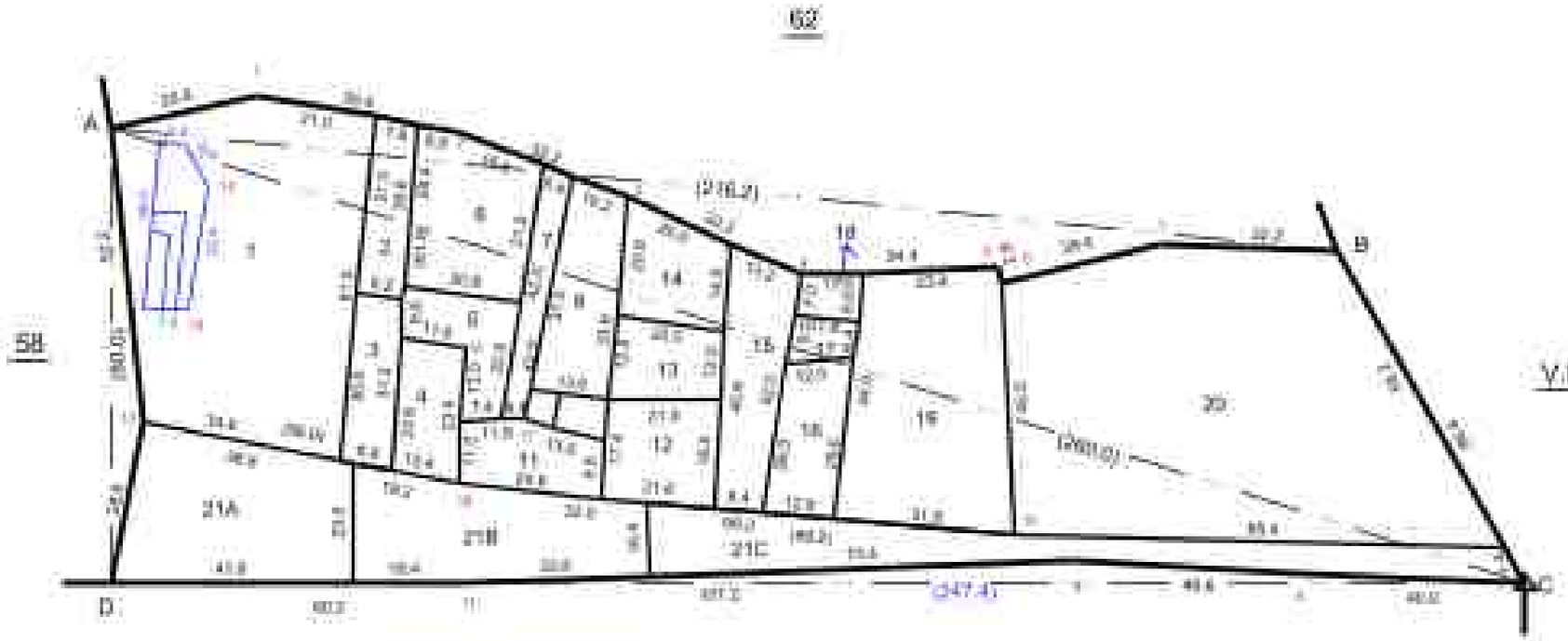
Taluk : Hosur [9]

Village : SANTHAPURAM [84]

Survey No : 63

Area : Hect 01 Area 47.50

Scale : 1 : 1000



Station	Offset	Length	Bearing	
C				
		260.0		
B	40.4	210.8		
		68.6	26.4	17
		77.0	41.0	16
		70.6	18.2	15
		26.8	28.2	14
		18.4	5.0	13
N	0.8	13.0		
		8.8	LINE	12
		A		
		80.0		
		47.8	13.4	10
		26.4	0.4	10
		D		
		247.4		
		187.2	LINE	11
		99.4	9.2	10
		79.6	4.0	9
		39.6	2.0	8
		C		
		B		
		216.2		
		199.2	2.2	7
		157.8	21.4	6
		106.6	8.0	5
		122.4	13.6	4
		90.6	5.4	3
2	6.0	39.8		
1	6.0	20.4		
		A		

NALLAH NUMBER – C1

District : Krishnagiri

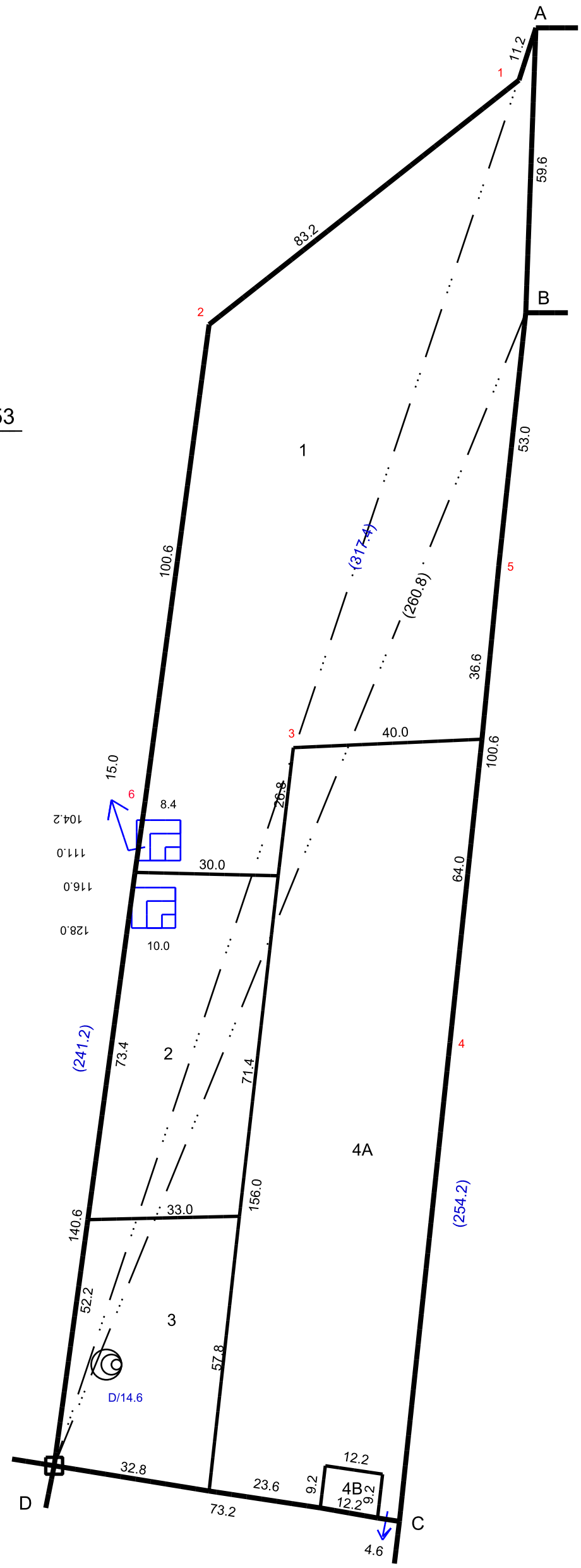
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 748

Area : Hect 01 Ares 89.50

Scale : 1 : 1000



V.NO.90:

KOTHAKONDAPALLI

Ladder

		D		
		241.2		
W	0.4	210.0		
		100.6	LINE	6
		2		
		B		
		254.2		
		201.2	LINE	5
		100.6	LINE	4
		C		
		D		
		317.4		
		158.8	0.4	3
		80.6	45.2	2
B	17.4	57.4		
		11.2	LINE	1
		A		
		59.6		
		B		
		260.8		
		D		
		73.2		
		C		

NALLAH NUMBER – C2

District : Krishnagiri

Survey No : 887

Taluk : Hosur [9]

Area : Hect 00 Aree 85.56

Village : MUKONDAPALLI [88]

Scale : 1 : 1000

District : Krishnagiri

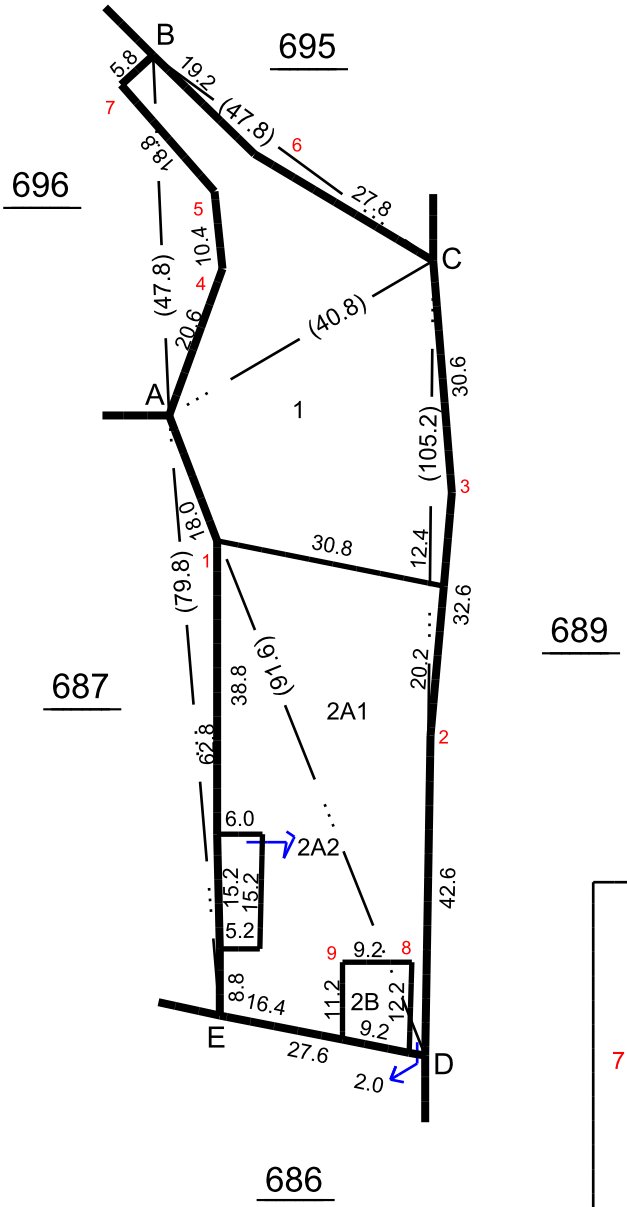
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 688

Area : Hect 00 Ares 34.73

Scale : 1 : 1000



		Ladder		
		C		
		47.8		
		19.0	2.4	6
		B		
		47.8		
7	4.2	43.8		
		29.2	7.4	5
		19.0	8.4	4
		A		
		40.8		
		19.0	42.4	B
		C		
		105.2		
A	35.6	84.4		
		74.6	2.6	3
		42.6	0.4	2
9	11.2	12.4		
8	2.0	12.4		
		D		
		91.6		
		76.4	23.0	E
		A		
		79.8		
		62.6	4.8	1
		E		

District : Krishnagiri

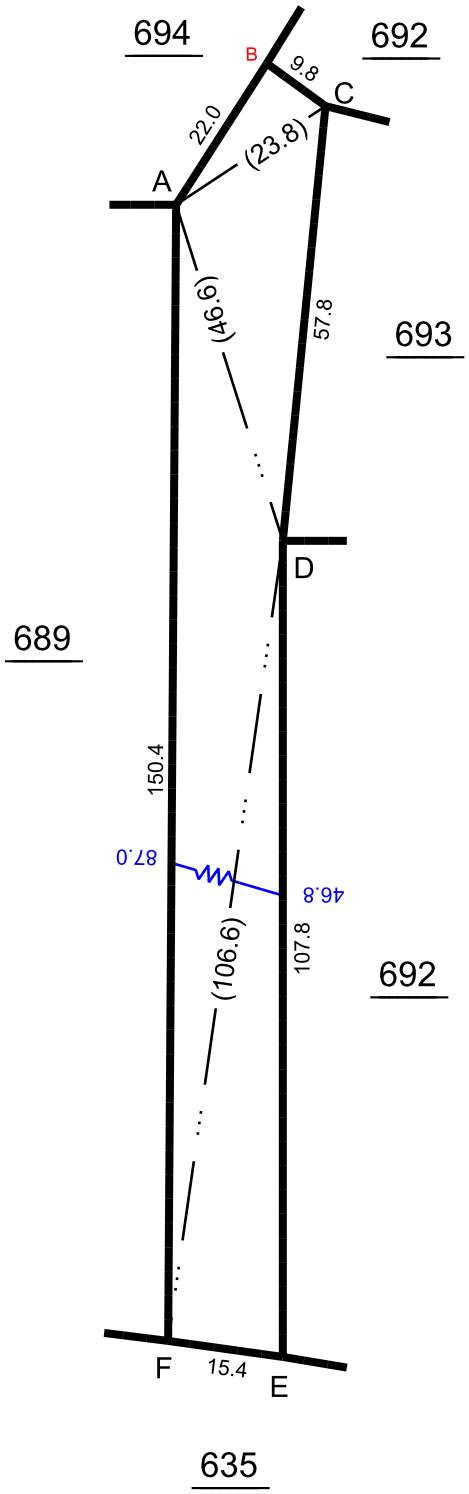
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 690

Area : Hect 00 Ares 26.00

Scale : 1 : 1000



		Ladder		
		D		
		107.8		
F	15.2	1.8		
		E		
		D		
		57.8		
		14.8	18.4	A
		C		
		23.8		
B	9.0	20.2		
		A		
		150.4		
		106.0	14.6	D
		F		
		106.6		
		D		
		46.6		
		A		

District : Krishnagiri

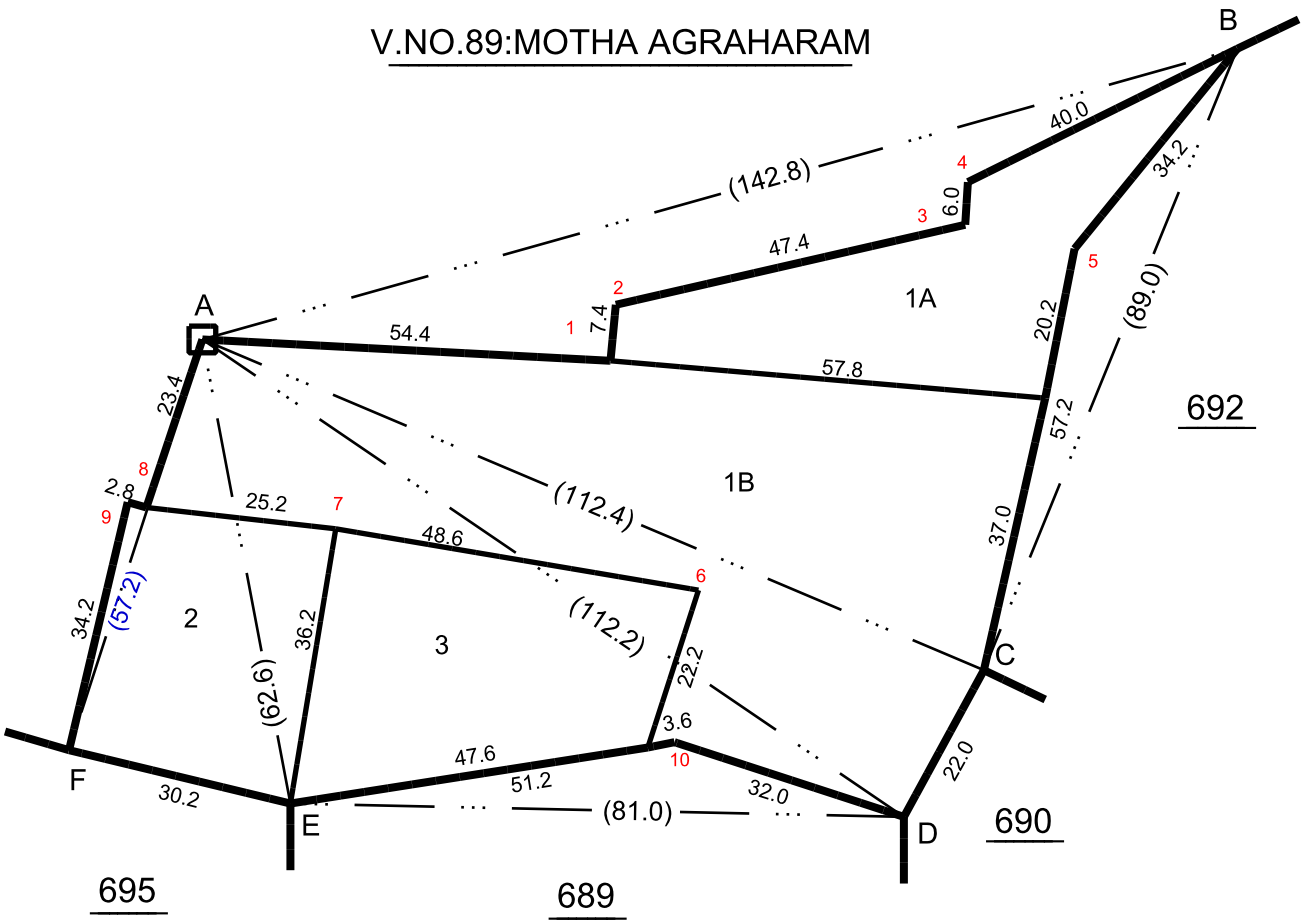
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 694

Area : Hect 00 Ares 77.00

Scale : 1 : 1000



Ladder

		E		
		81.0		
		30.6	9.0	10
		D		
		A		
		62.6		
F	27.6	12.8		
		E		
		F		
		57.2		
		23.4	2.8	9
		23.4	LINE	8
		A		
		112.2		
7	10.6	83.4		
		39.2	9.4	6

		D		
		C		
		89.0		
		32.8	9.8	5
		B		
		142.8		
		103.4	7.2	4
		101.4	12.8	3
		54.0	10.2	2
		51.4	17.4	1
		A		
		112.4		
		C		
		22.0		
		D		

District : Krishnagiri

Taluk : Hosur [9]

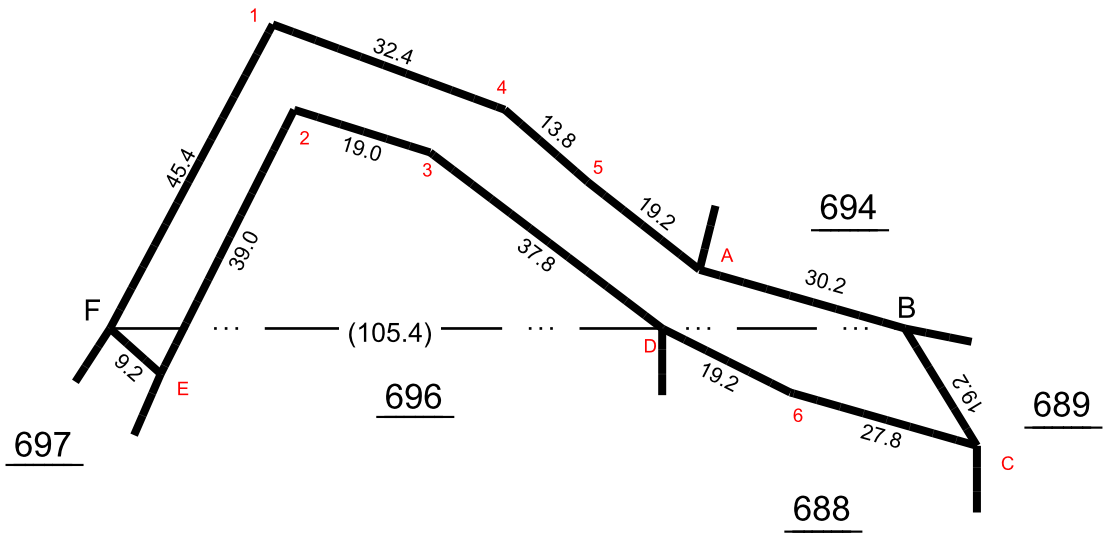
Village : MUKONDAPALLI [88]

Survey No : 695

Area : Hect 00 Ares 15.00

Scale : 1 : 1000

V.NO.89:MOTHA AGRAHARAM



		Ladder		
	PRO	9.4	15.6	C
		B		
		105.4		
		90.2	8.8	6
A	7.6	78.2		
		73.2	0.2	D
5	19.4	63.2		
4	28.6	52.4		
3	23.0	42.6		
2	28.6	24.6		
1	40.0	21.6		
		7.0	6.2	E
		F		

District : Krishnagiri

Taluk : Hosur [9]

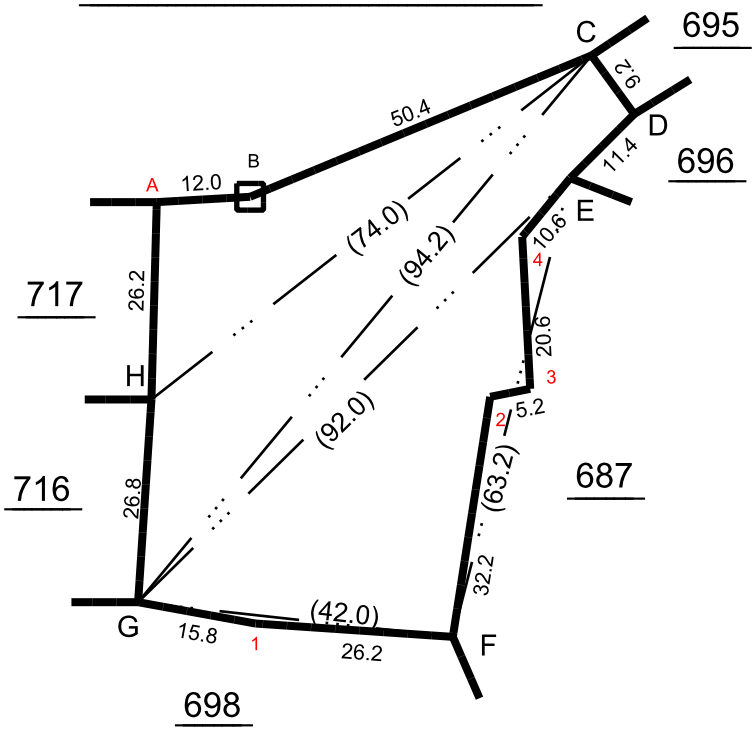
Village : MUKONDAPALLI [88]

Survey No : 697

Area : Hect 00 Ares 29.50

Scale : 1 : 1000

V.NO.89:MOTHA AGRAHARAM



		Ladder		
		E		
		63.2		
4	4.6	53.6		
		34.2	1.4	3
2	3.2	32.0		
		F		
		G		
		42.0		
1	1.0	26.2		
		F		
		D		
		92.0		
		80.4	0.2	E
		26.6	32.6	F
		G		
		94.2		
		72.6	15.6	H
D	9.0	2.4		
		C		
		74.0		
B	13.4	26.8		
A	20.4	16.6		
		H		

District : Krishnagiri

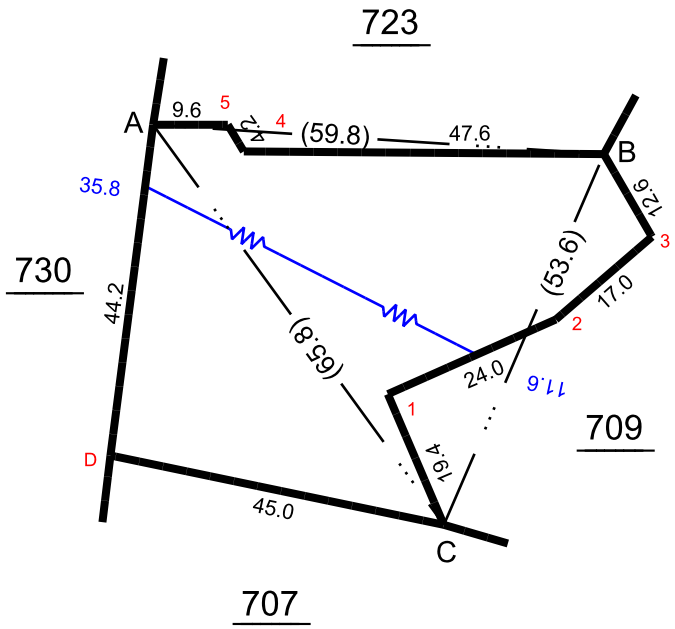
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 708

Area : Hect 00 Ares 23.50

Scale : 1 : 1000



		Ladder		
		A		
		59.8		
		50.0	0.4	5
4	2.8	47.4		
		B		
		53.6		
		46.0	10.0	3
		30.8	2.8	2
1	13.8	13.2		
		C		
		65.8		
B	46.0	38.4		
		32.2	30.4	D
		A		

District : Krishnagiri

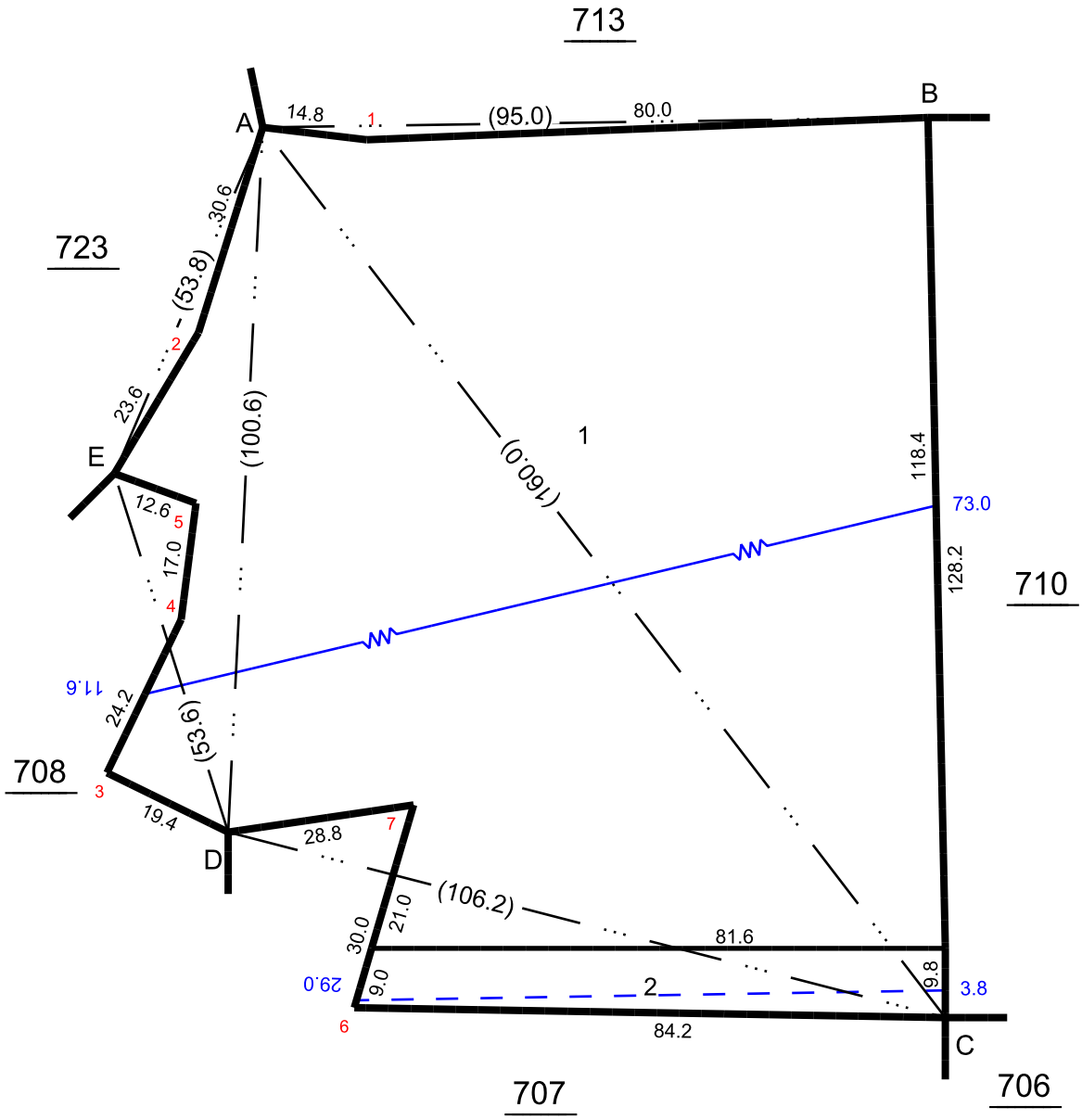
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 709

Area : Hect 01 Ares 25.50

Scale : 1 : 1000



District : Krishnagiri

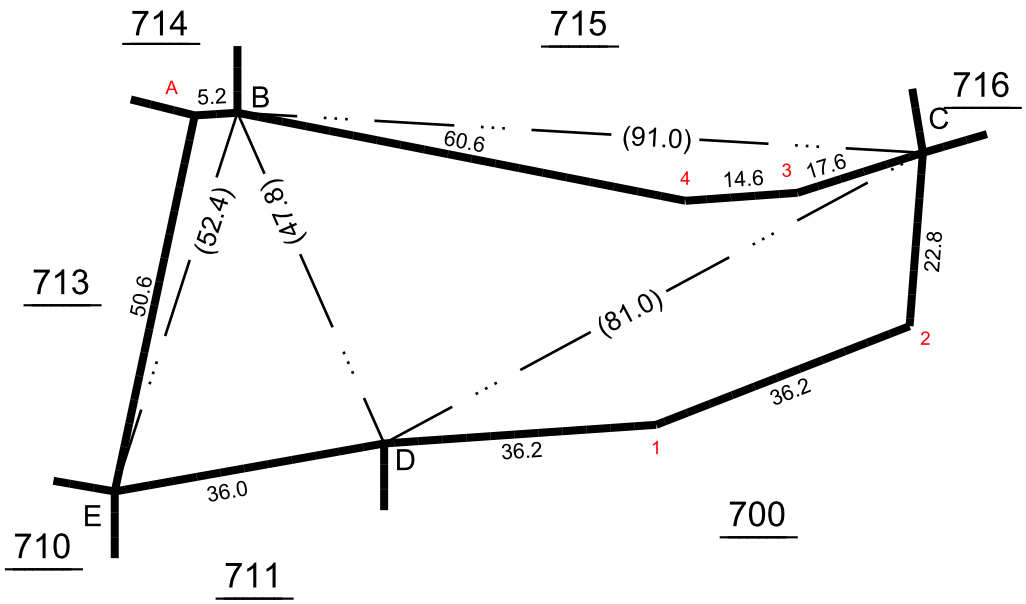
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 712

Area : Hect 00 Ares 35.50

Scale : 1 : 1000



District : Krishnagiri

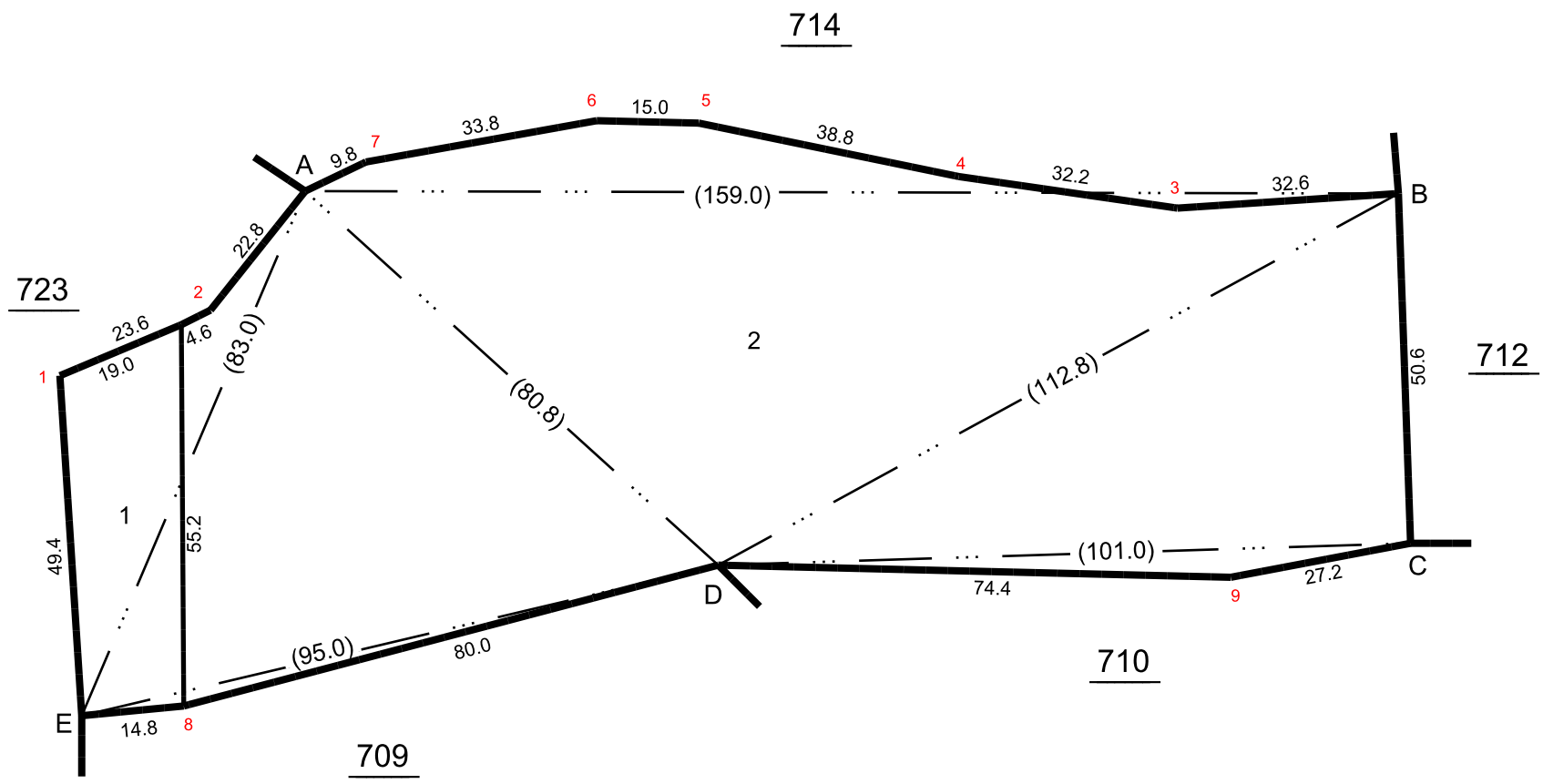
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 713

Area : Hect 01 Ares 16.50

Scale : 1 : 1000



District : Krishnagiri

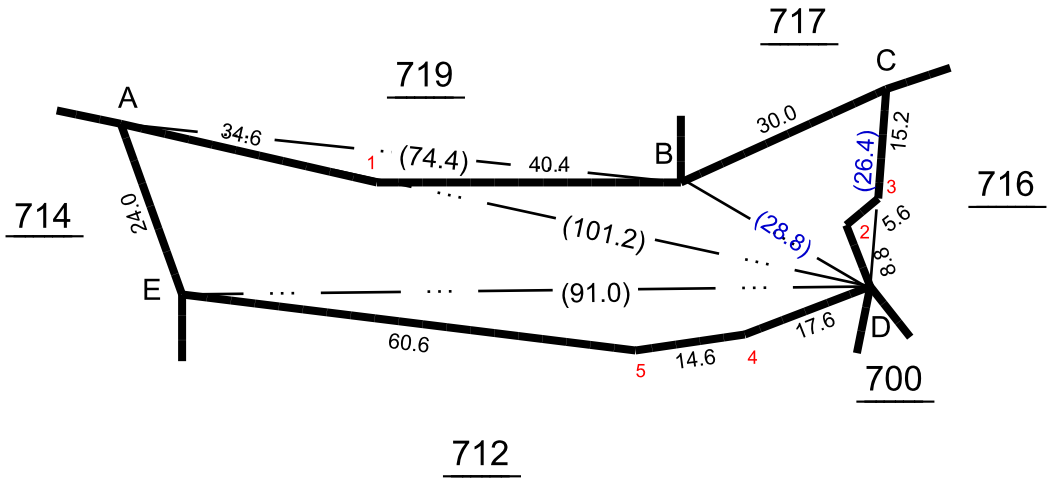
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 715

Area : Hect 00 Ares 20.50

Scale : 1 : 1000



Ladder

		E		
		91.0		
5	8.0	31.0		
4	6.2	16.4		
		D		
		A		
		101.2		
E	20.4	88.6		
		27.2	8.8	B
		D		
		C		
		26.4		
		11.6	LINE	3
B	26.2	11.0		
2	4.0	7.8		
		D		
		B		
		74.4		
		34.2	4.2	1
		A		
		B		
		28.8		
		D		

District : Krishnagiri

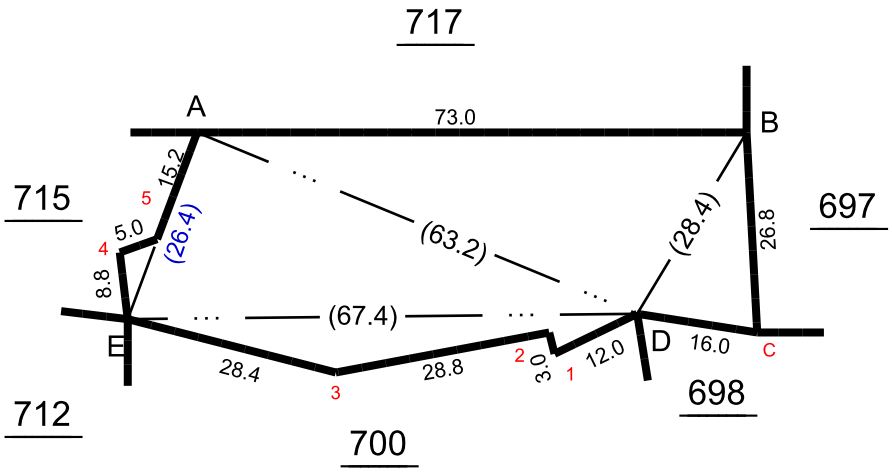
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 716

Area : Hect 00 Ares 22.00

Scale : 1 : 1000



Ladder

		B		
		28.4		
		6.4	15.0	C
		D		
		A		
		26.4		
5	LINE	11.0		
4	4.0	7.8		
		E		
		67.4		
3	7.4	40.0		
2	2.4	11.6		
1	5.2	10.8		
		D		
		63.2		
		A		
		73.0		
		B		

District : Krishnagiri

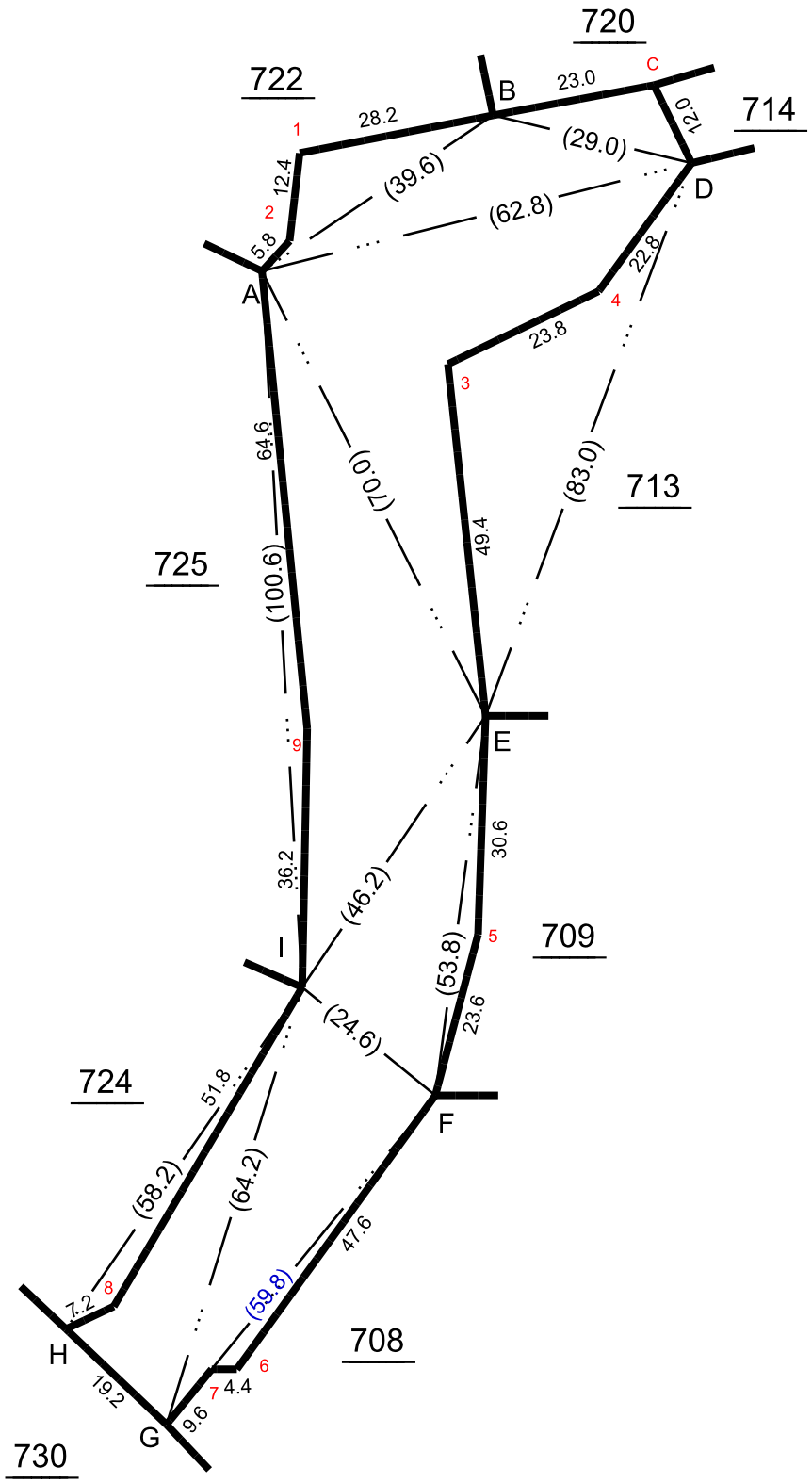
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 723

Area : Hect 00 Ares 52.00

Scale : 1 : 1000



District : Krishnagiri

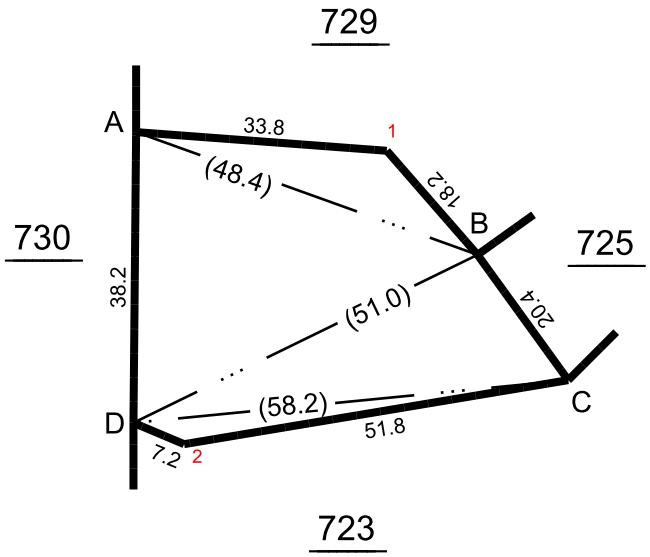
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 724

Area : Hect 00 Ares 16.50

Scale : 1 : 1000



District : Krishnagiri

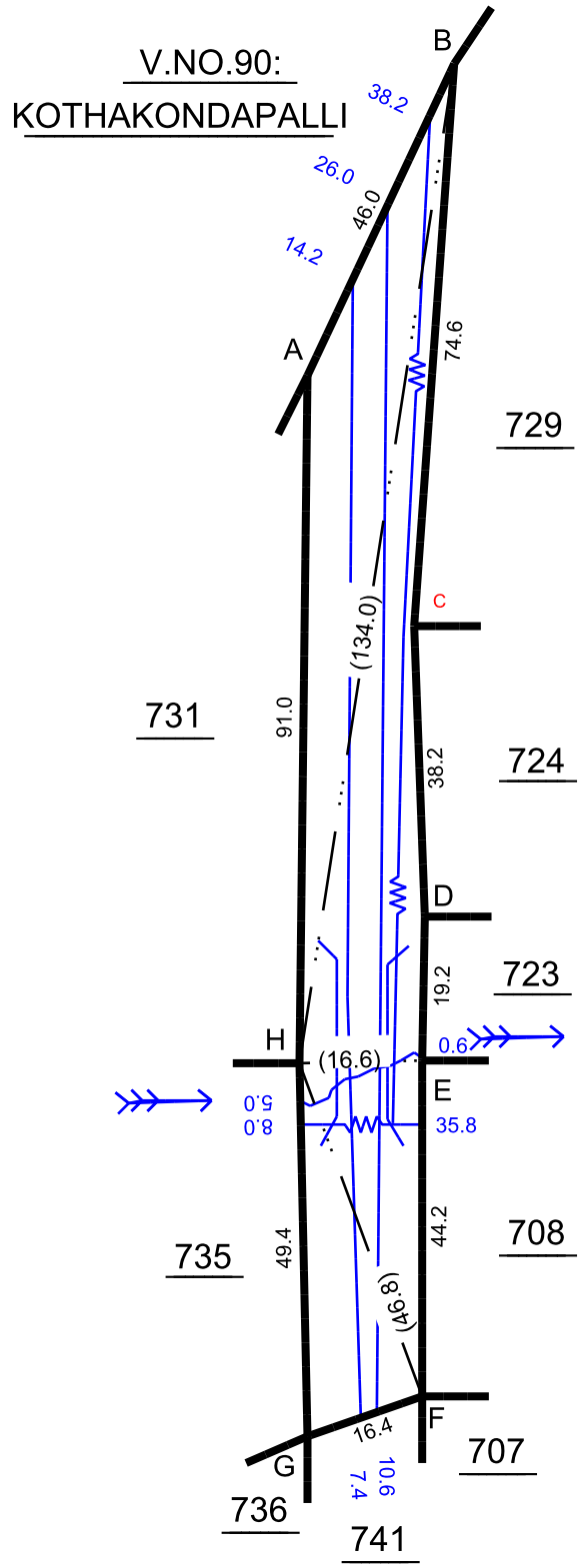
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 730

Area : Hect 00 Ares 25.50

Scale : 1 : 1000



District : Krishnagiri

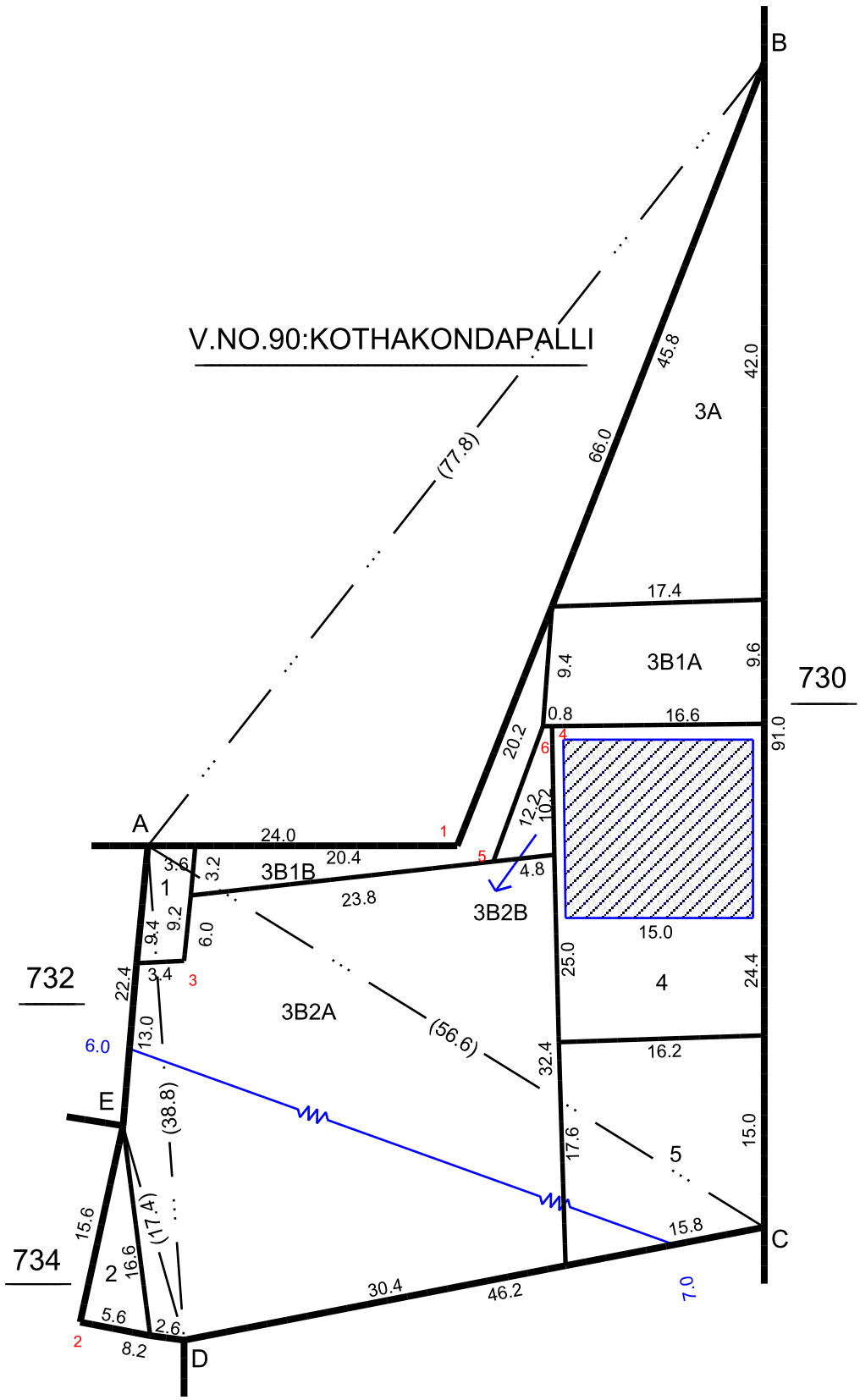
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 731

Area : Hect 00 Ares 25.00

Scale : 1 : 500



District : Krishnagiri

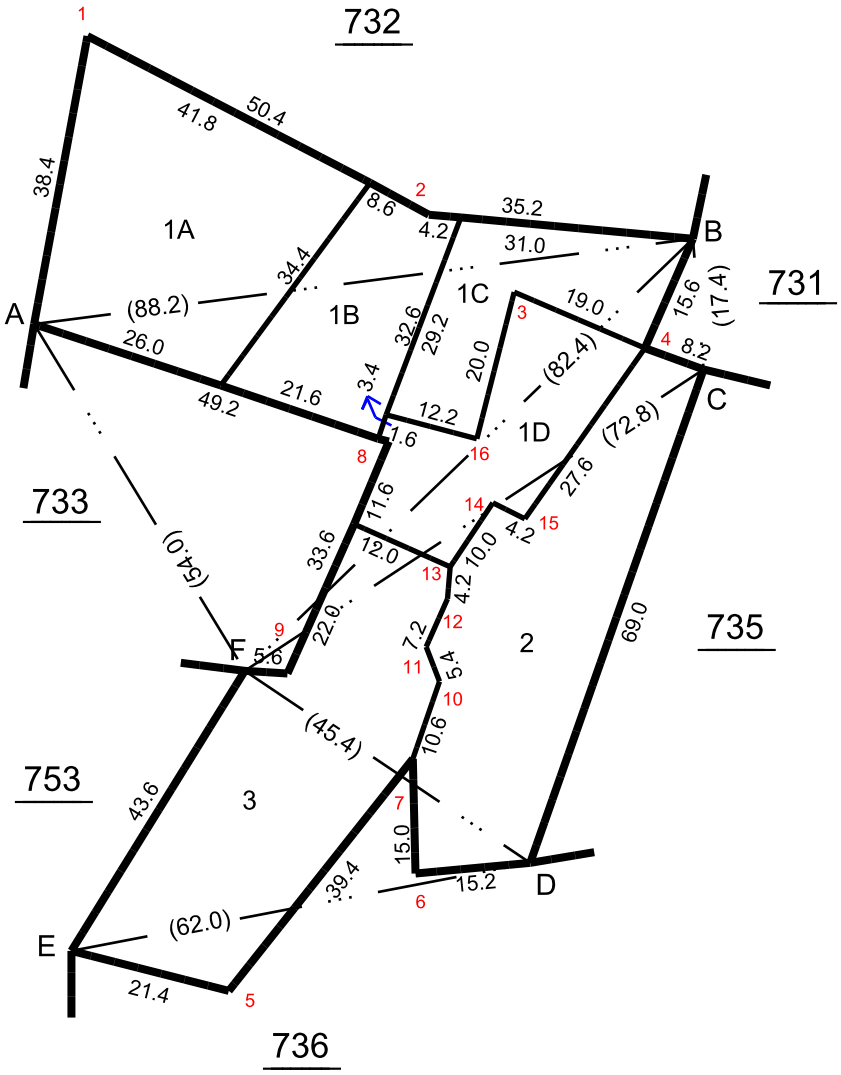
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 734

Area : Hect 00 Ares 53.50

Scale : 1 : 1000



District : Krishnagiri

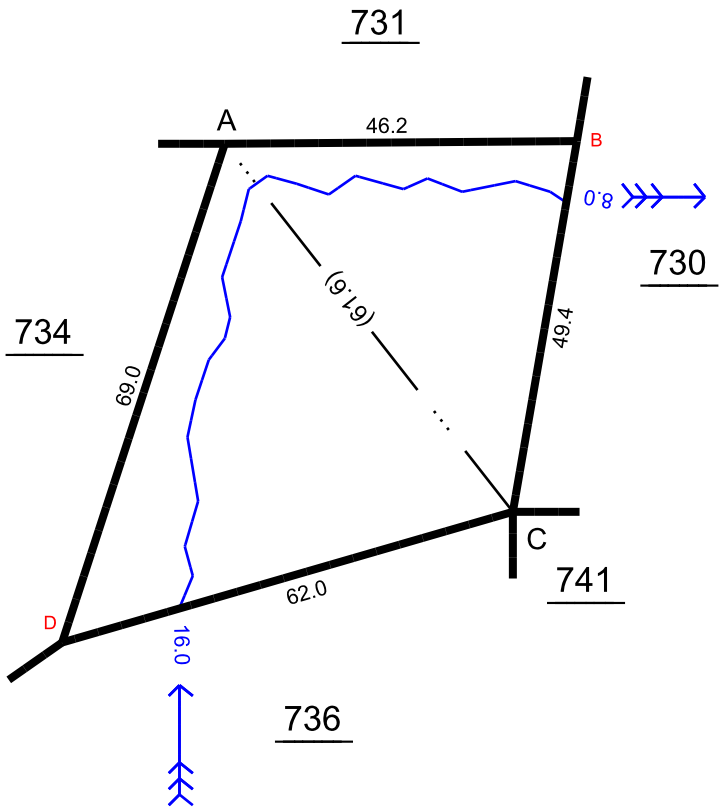
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 735

Area : Hect 00 Ares 28.50

Scale : 1 : 1000



District : Krishnagiri

Taluk : Hosur [9]

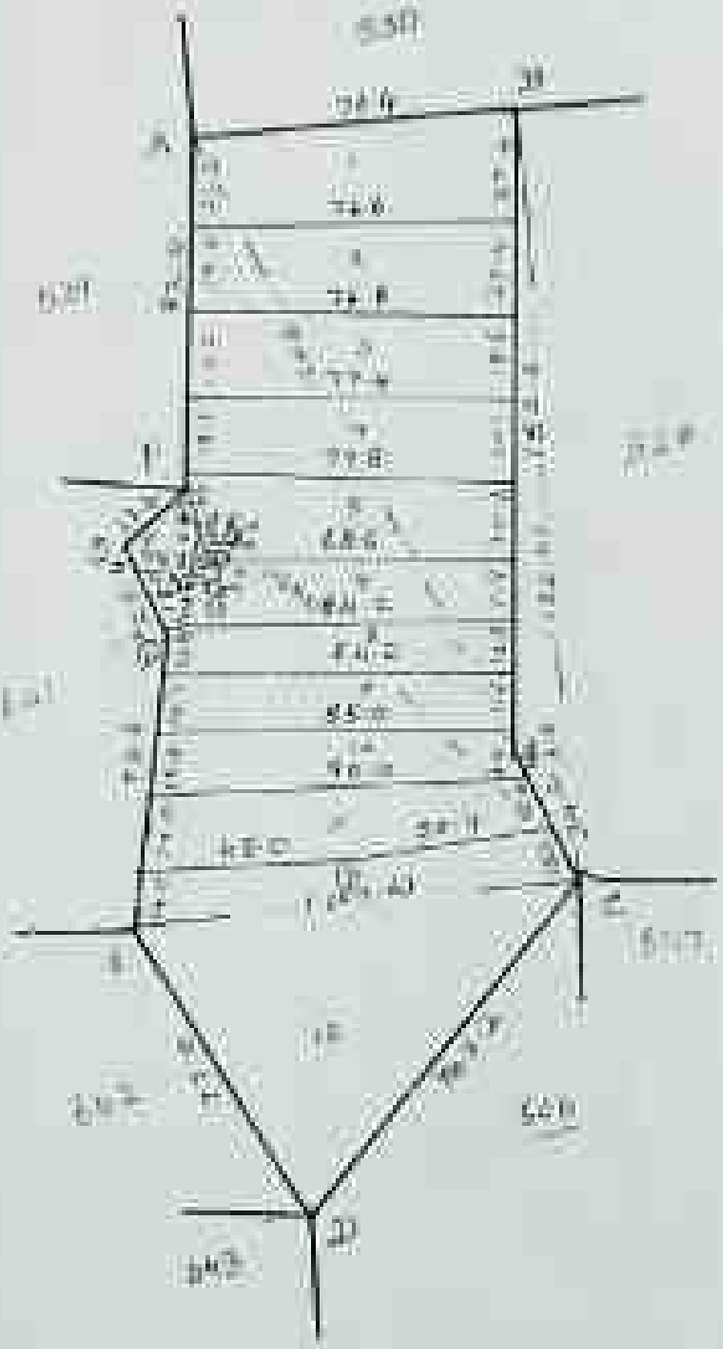
Village : MUKONDAPALLI [88]

Survey No : 736

Area : Hect 01 Ares 62.43

Scale : 1 : 1000

NALLAH NUMBER – C3



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[illegible] 529

[illegible] 96 5

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[illegible]

District : Krishnagiri

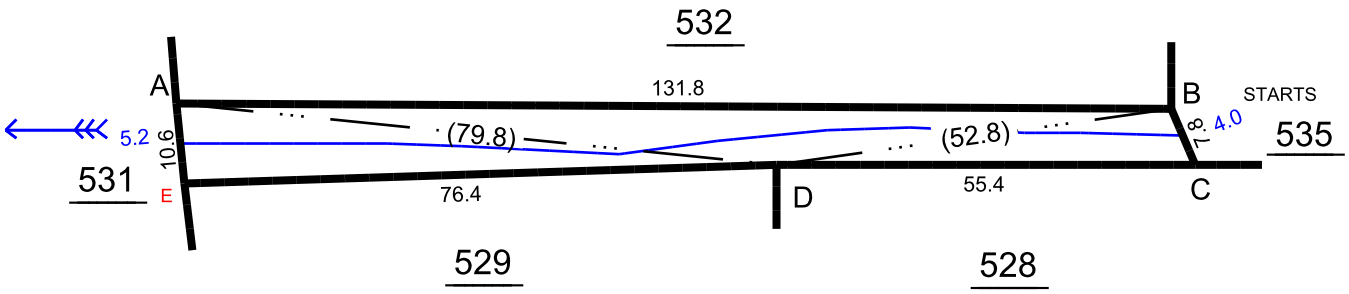
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 530

Area : Hect 00 Ares 12.00

Scale : 1 : 1000



Ladder

		C		
		55.4		
B	7.2	52.4		
		D		
		79.8		
		2.0	10.4	E
		A		
		B		
		131.8		
		79.2	8.6	D
		A		
		D		
		52.8		
		B		

District : Krishnagiri

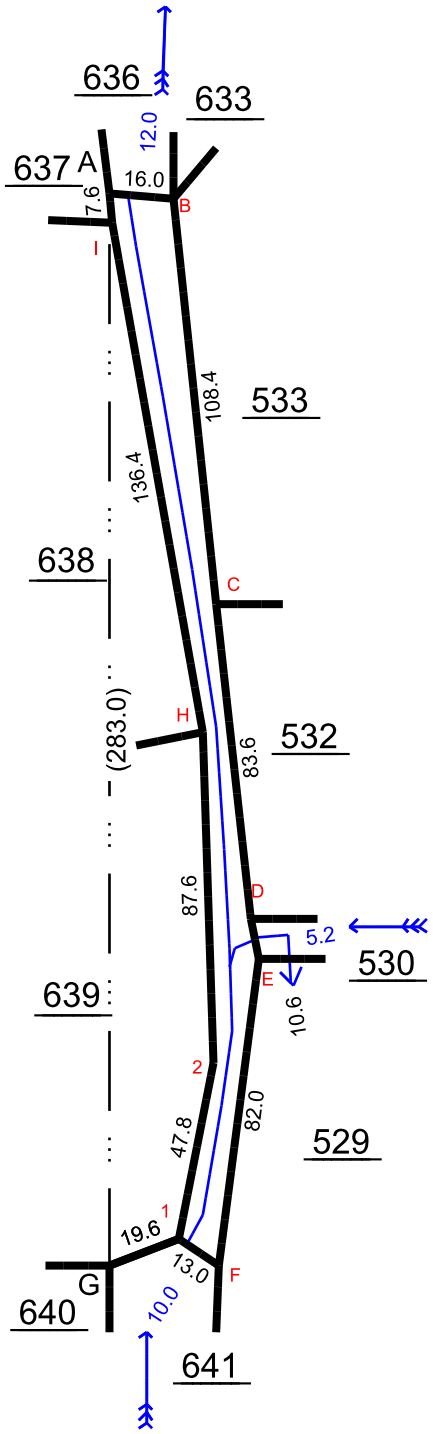
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 531

Area : Hect 00 Ares 31.00

Scale : 1 : 2000



Ladder

		A		
		283.0		
		282.2	17.2	B
		275.4	0.8	I
		174.8	28.8	C
		140.8	25.0	H
		91.6	37.8	D
		80.8	39.6	E
		53.4	28.0	2
		6.4	18.6	1
		G		
	BACK	0.2	29.0	F

District : Krishnagiri

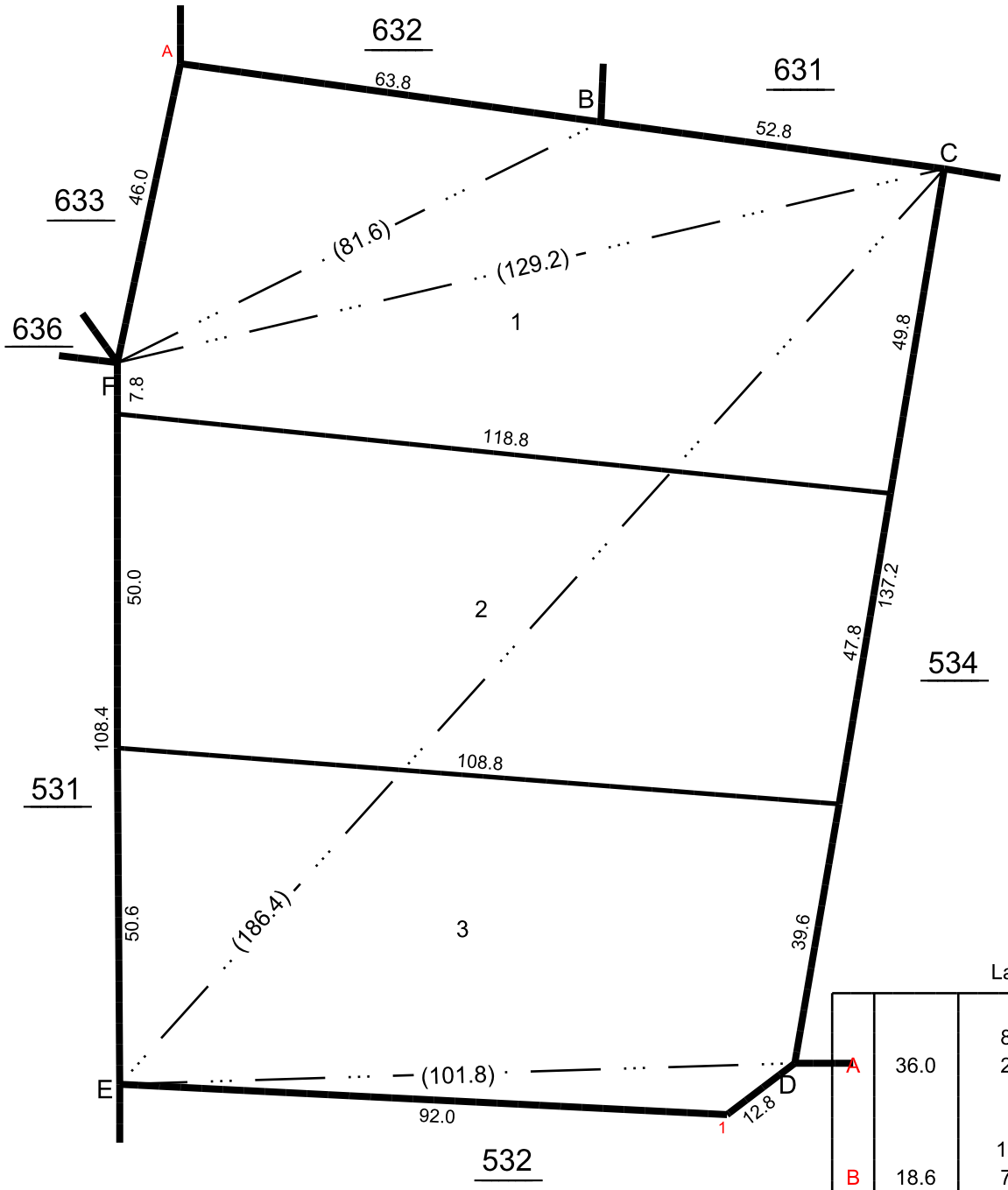
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 533

Area : Hect 01 Ares 67.00

Scale : 1 : 1000



Ladder

		B		
		81.6		
A	36.0	28.8		
		F		
		C		
		129.2		
B	18.6	79.6		
		F		
		D		
		101.8		
		91.6	7.4	1
		E		
		186.4		
D	73.6	115.8		
		105.6	73.4	F
		C		

District : Krishnagiri

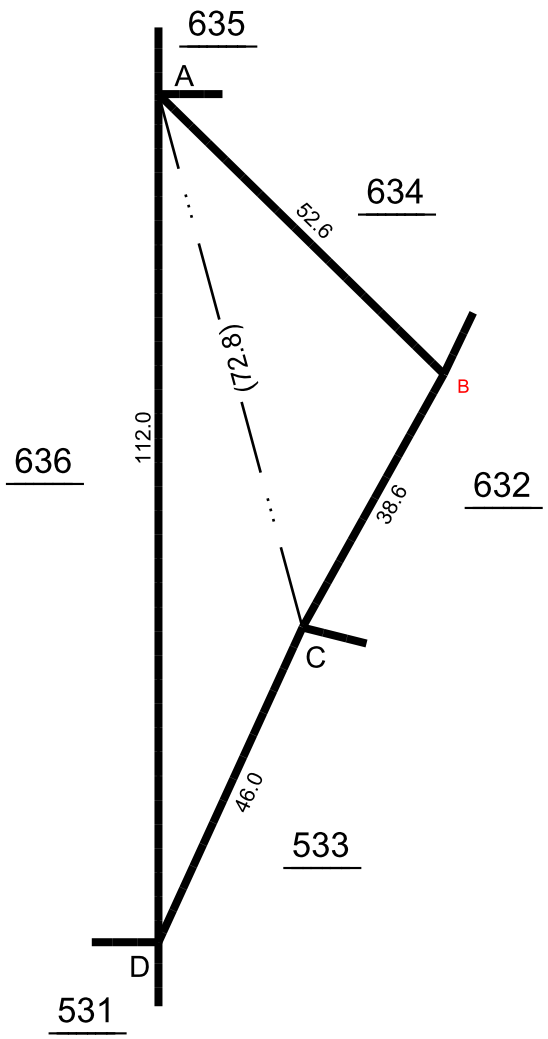
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 633

Area : Hect 00 Ares 21.00

Scale : 1 : 1000



Ladder

B	27.0	C 72.8 45.6 A 112.0 41.4 D	19.2	C

District : Krishnagiri

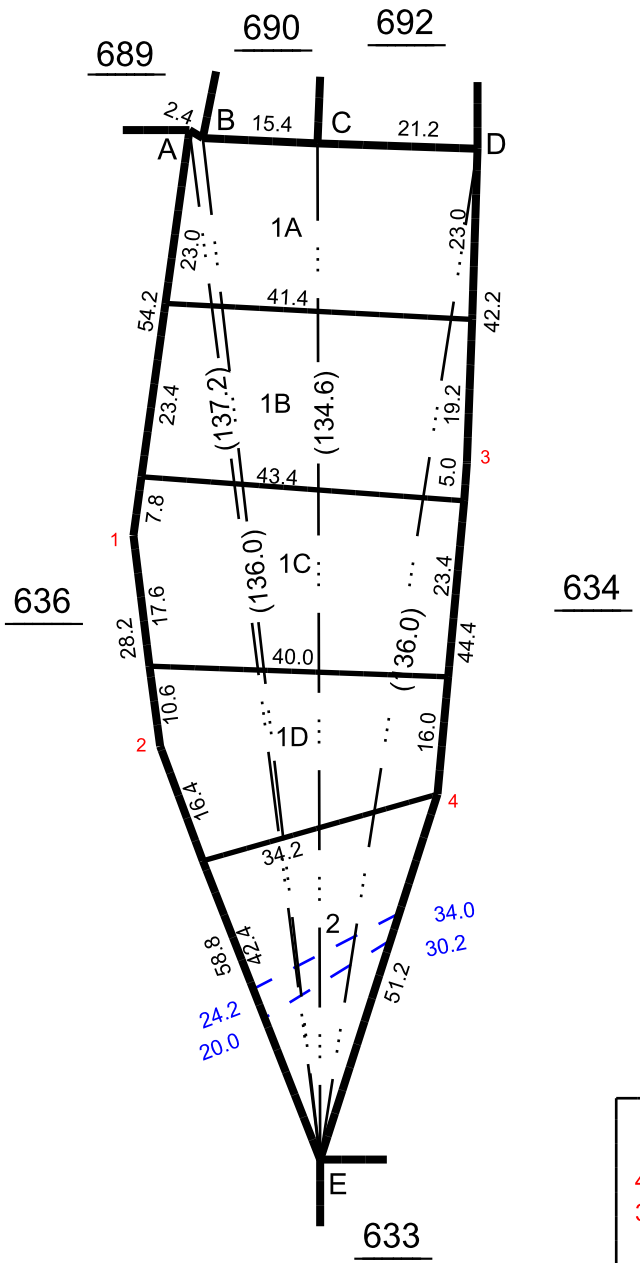
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 635

Area : Hect 00 Ares 45.50

Scale : 1 : 1000



Ladder

		E		
		136.0		
4	7.8	85.4		
3	5.0	41.6		
		D		
		E		
		134.6		
D	21.2	0.8		
		C		
		E		
		136.0		
C	15.0	2.4		
		B		
		E		
		137.2		
		80.2	14.4	2
		52.2	14.2	1
		A		
		2.4		
		B		

District : Krishnagiri

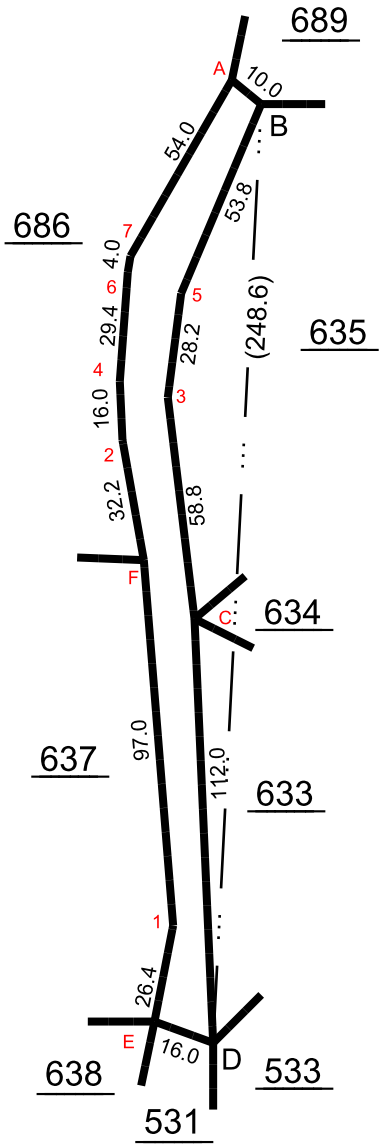
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 636

Area : Hect 00 Ares 31.00

Scale : 1 : 2000



		Ladder		
A	8.4	5.6	PRO	
		B		
		248.6		
7	32.6	206.2		
6	32.8	202.2		
5	18.4	197.6		
4	33.6	173.0		
3	20.8	169.4		
2	32.0	157.6		
F	24.8	126.2		
C	10.8	111.6		
1	11.6	30.4		
E	15.2	4.6		
		D		

District : Krishnagiri

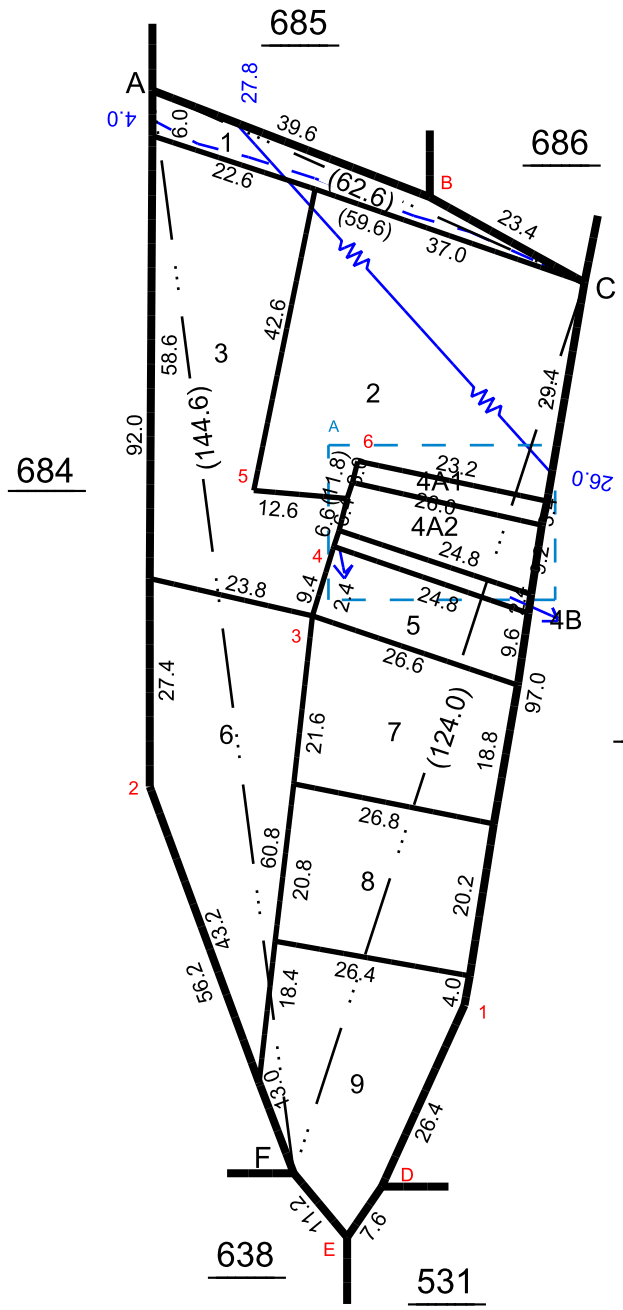
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 637

Area : Hect 00 Ares 59.00

Scale : 1 : 1000



A[500]

Ladder

		A		
		144.6		
		92.2	20.6	6
		90.2	6.4	5
		81.4	16.2	4
		72.6	12.2	3
2	12.6	53.2		
		F		
E	9.4	6.0	PRO	
		F		
		124.0		
D	11.8	122.0		
1	14.6	95.8		
		36.0	7.0	W
		C		
		62.6		
B	2.0	39.6		
		A		

District : Krishnagiri

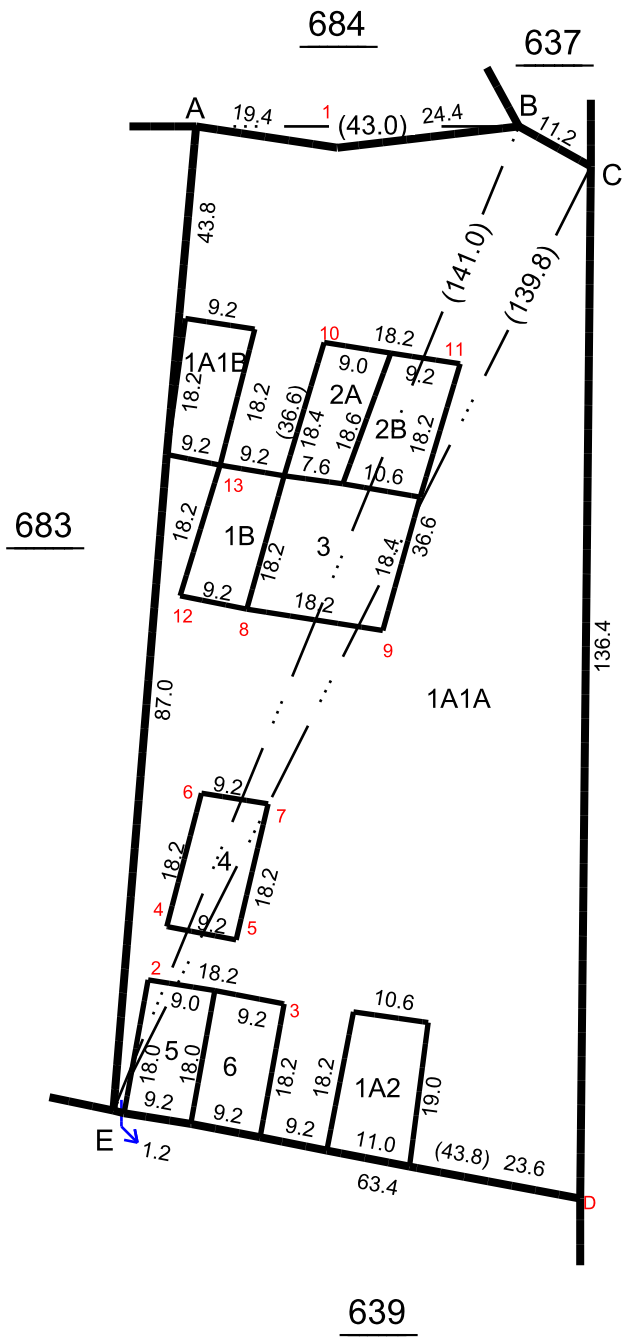
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 638

Area : Hect 00 Ares 79.17

Scale : 1 : 1000



Ladder

		A		
		130.8		
		86.4	7.0	13
		68.6	3.2	12
		E		
		B		
		141.0		
		139.6	11.0	C
A	39.4	124.0		
		108.6	4.6	11
10	13.2	104.6		
		72.2	8.6	9
8	9.0	68.2		
		45.2	3.6	7
6	5.4	43.2		
		27.0	6.2	5
4	2.8	25.0		
		21.8	15.4	3
2	2.6	17.8		
		E		
		139.8		
D	60.6	122.4		
		C		
		A		
		43.0		
1	3.0	24.0		
		B		

District : Krishnagiri

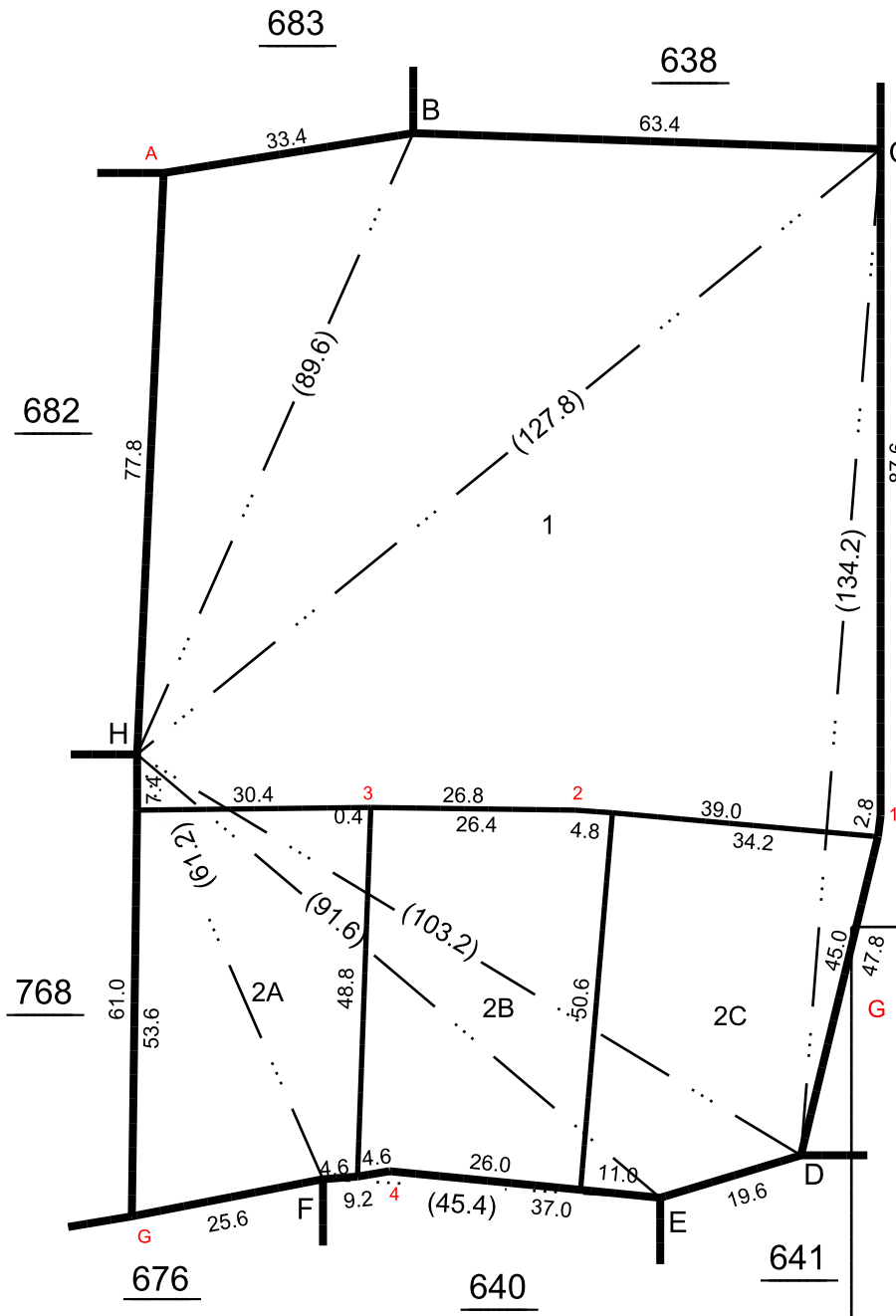
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 639

Area : Hect 01 Ares 32.50

Scale : 1 : 1000



Ladder

		H		
		61.2		
G	25.2	5.8		
		F		
		45.4		
		36.2	1.4	4
		E		
		91.6		
		55.4	27.0	F
		H		
		103.2		
		73.4	9.8	3
		49.6	23.6	2
E	14.6	13.0		
		D		
		134.2		
1	7.0	88.4		
		87.0	92.6	H
		C		
		B		
		89.6		
A	28.2	72.0		
		H		
		127.8		
		47.4	41.0	B
		C		

District : Krishnagiri

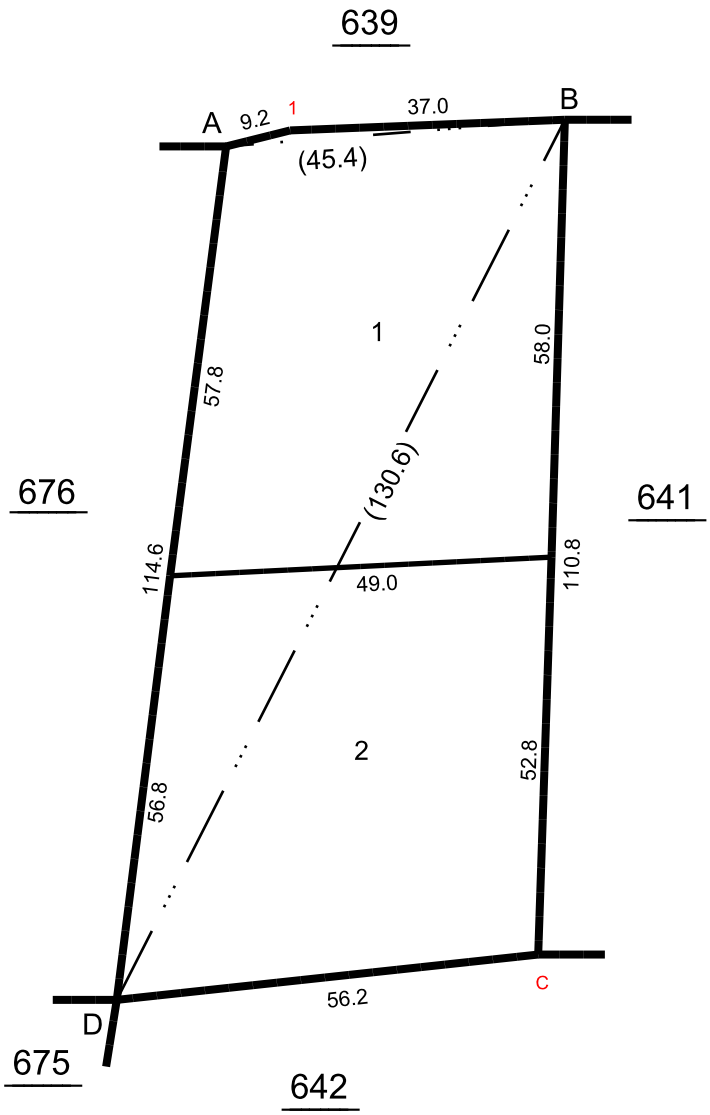
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 640

Area : Hect 00 Ares 58.50

Scale : 1 : 1000



		Ladder		
		A		
		45.4		
		36.6	1.4	1
		B		
		130.6		
A	38.6	107.2		
		30.6	46.8	C
		D		

District : Krishnagiri

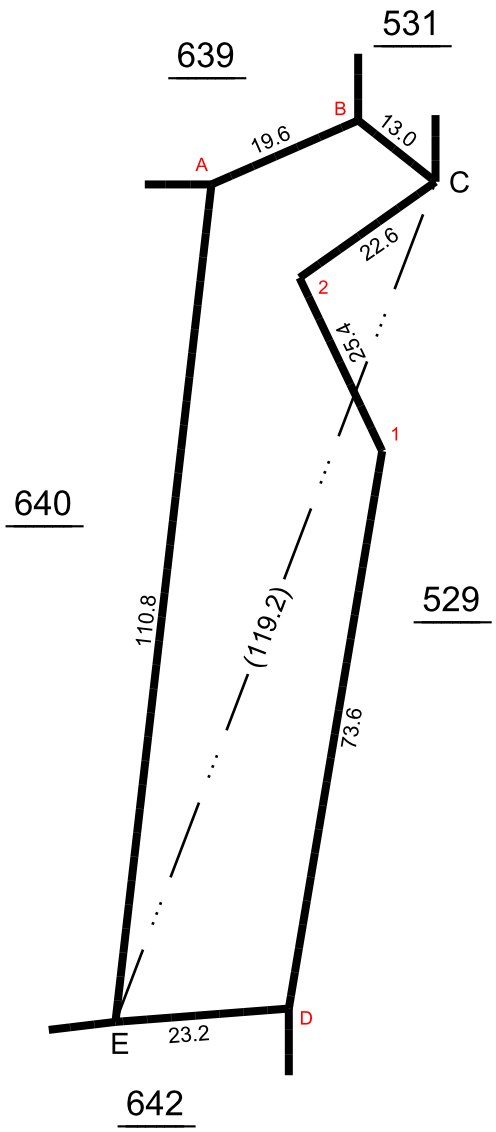
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 641

Area : Hect 00 Ares 26.50

Scale : 1 : 1000



		Ladder		
B	12.8	3.8	PRO	
		C		
		119.2		
A	27.8	108.0		
2	12.6	100.8		
		83.4	5.8	1
		10.0	21.0	D
		E		

District : Krishnagiri

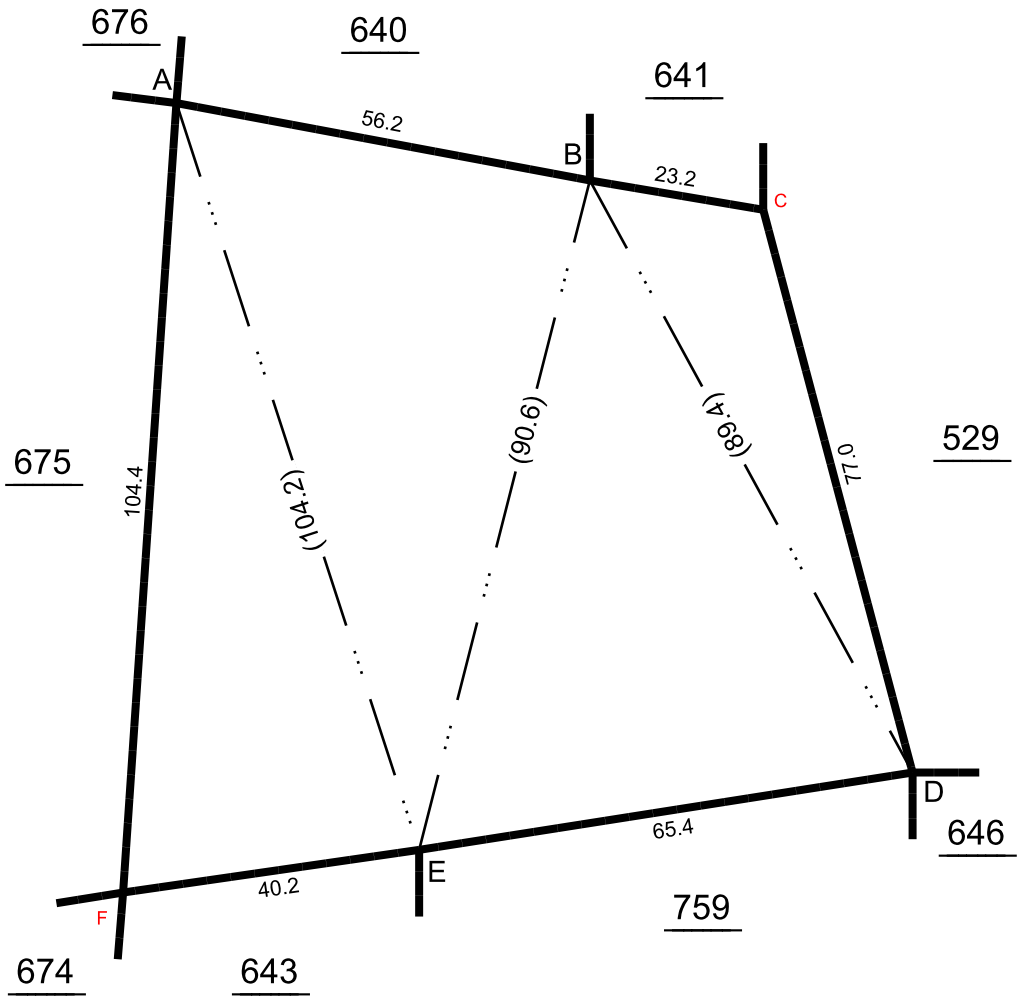
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 642

Area : Hect 00 Ares 83.50

Scale : 1 : 1000



Ladder

		D		
		89.4		
C	18.2	14.0		
		B		
		90.6		
		26.2	60.8	D
		E		
		104.2		
		97.4	39.2	F
B	49.0	27.0		
		A		

District : Krishnagiri

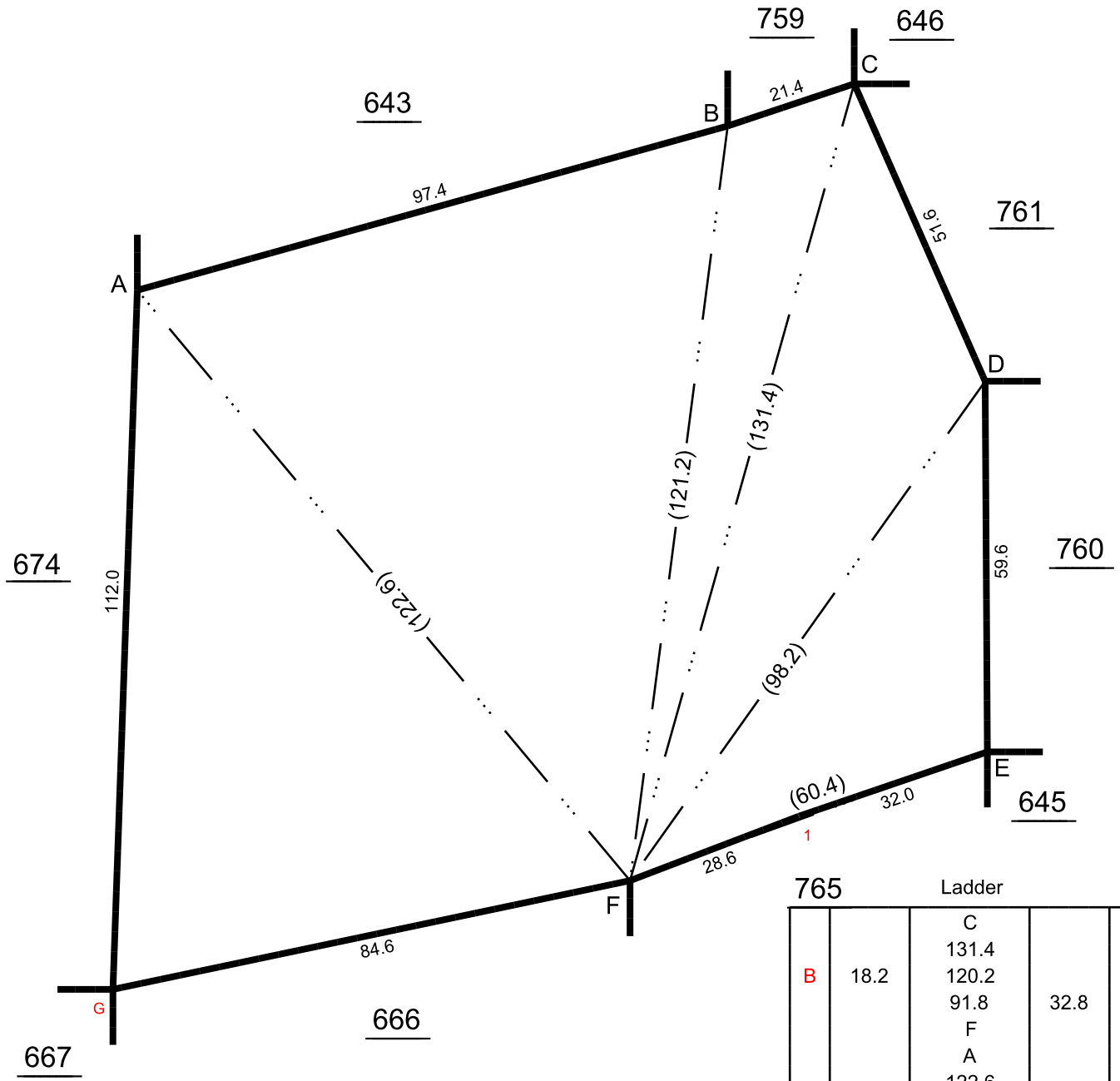
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 644

Area : Hect 01 Ares 49.50

Scale : 1 : 1000



Ladder

		C		
		131.4		
B	18.2	120.2		
		91.8	32.8	D
		F		
		A		
		122.6		
		82.0	88.8	B
G	74.6	39.8		
		F		
		E		
		60.4		
1	0.4	28.6		
		F		
		98.2		
E	34.4	48.2		
		D		
		F		
		121.2		
		B		
		21.4		
		C		

[illegible] 21

[illegible] [illegible]

[illegible] 60

[illegible] [illegible]

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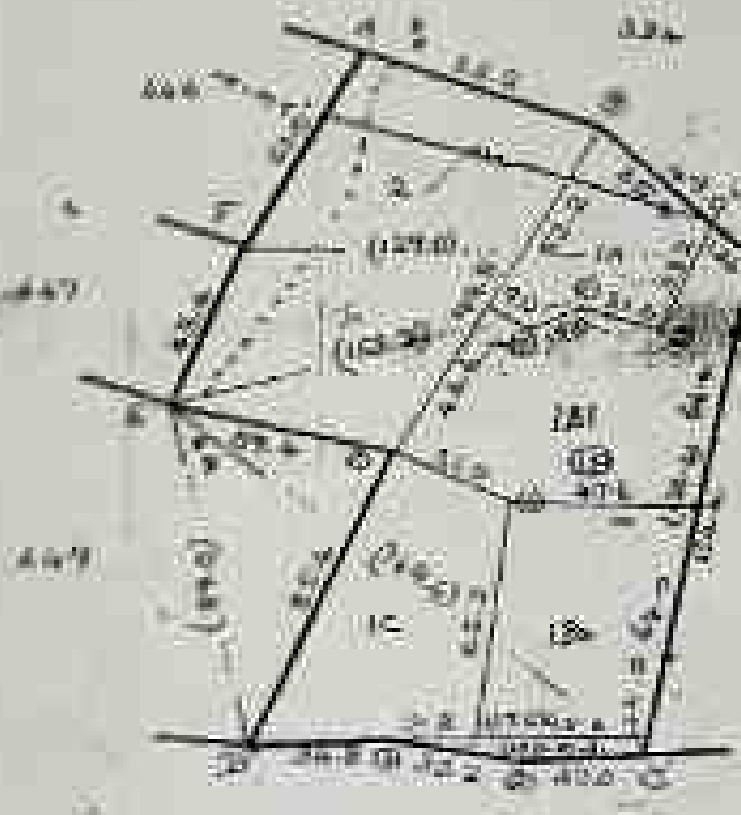


		ட		
		199.6		
8	33.6	92.6		
4	21.8	32.4		
		F		
		159.2		
		125.6	33.6	F
7	4.4	59.6		
6	19	65.6		
5	4.4	28.0		
		ட		
		149.6		
		66.6	36.8	6
		85.6	19.6	
		C		
		ட		
		100.0		
		67.6	22.8	
2	4.6	32.6		
		C		
		89.0		
		65.2	25.6	
		ட		

[illegible]

[illegible]

[illegible] 2000 [illegible]

District : Krishnagiri

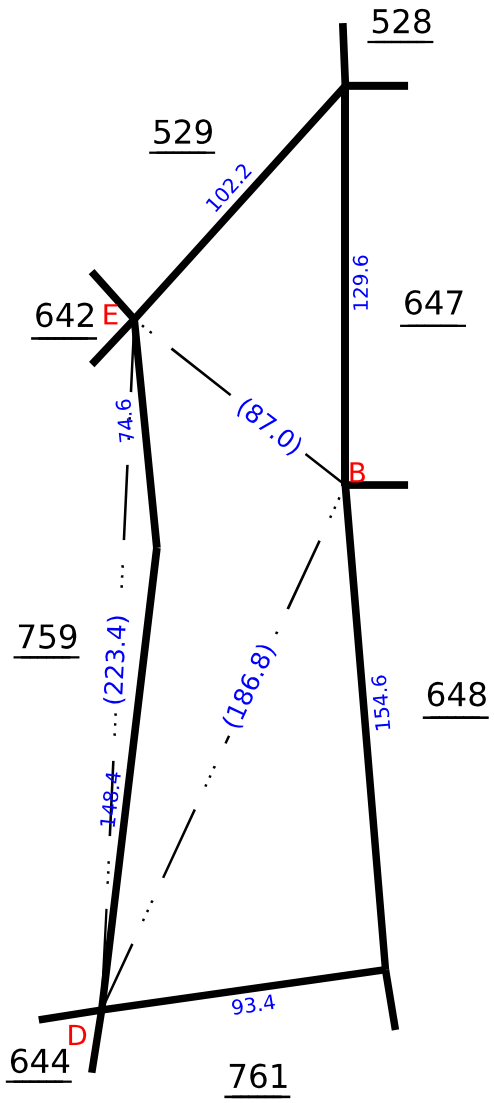
Taluk : Hosur

Village : Mookondapalli [88]

Survey No : 646

Area : Hect 01 Ares 86.00

Scale : 1 : 2296



Signed By Tahsildar

Name of approver : tahsi

Date of Approval : 29-07-2017

Date of Issue: 13-05-2025 11:26:20

Survey and Settlement Department, Government of TamilNadu

240 fv.1

District : Krishnagiri

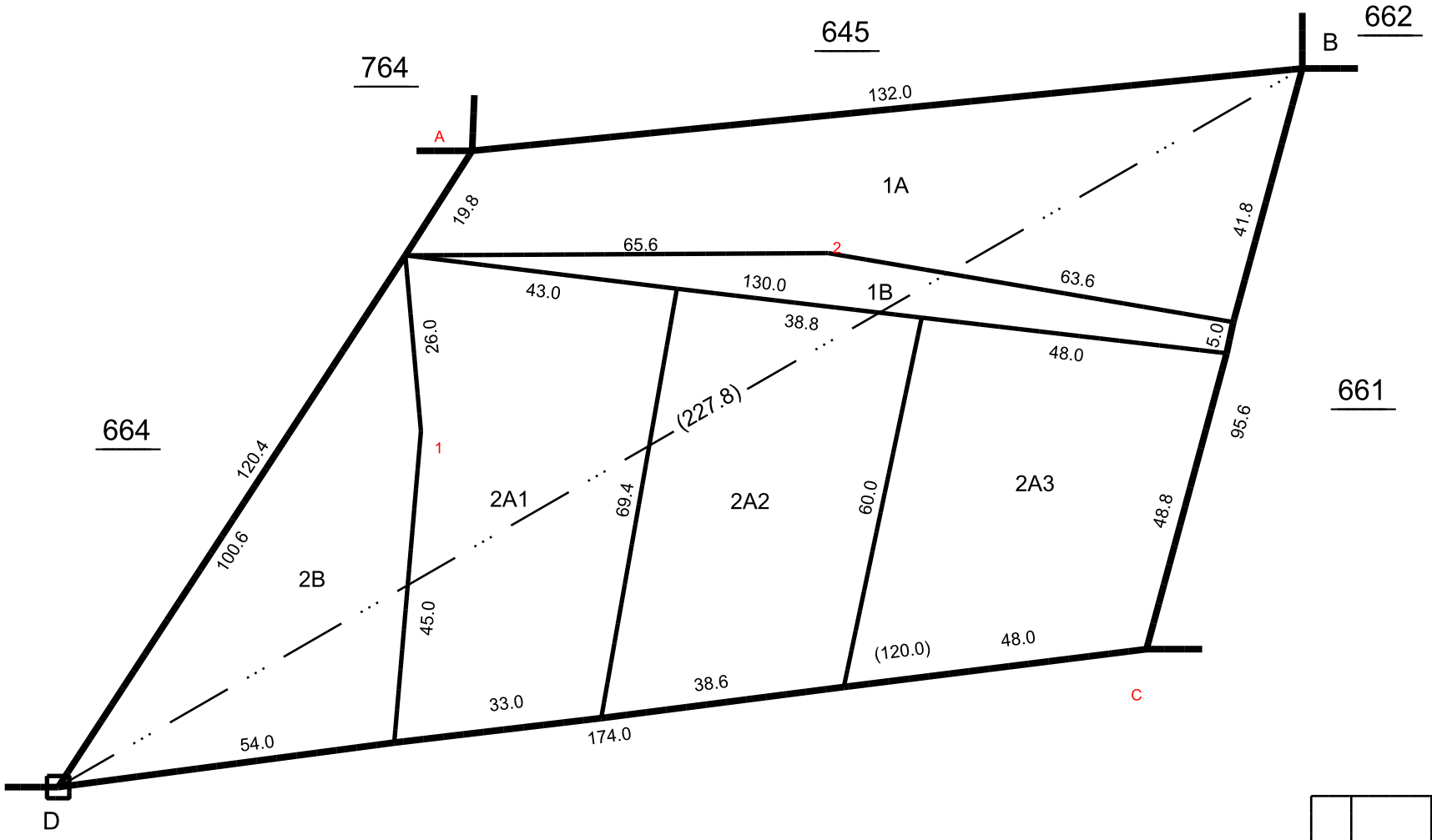
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 663

Area : Hect 01 Ares 40.00

Scale : 1 : 1000



V.NO.90:KOTHA KONDAPALLI

Ladder

		B		
		227.8		
		160.4	67.6	C
2	12.0	148.0		
A	54.2	107.4		
1	20.0	78.2		
		D		

District : Krishnagiri

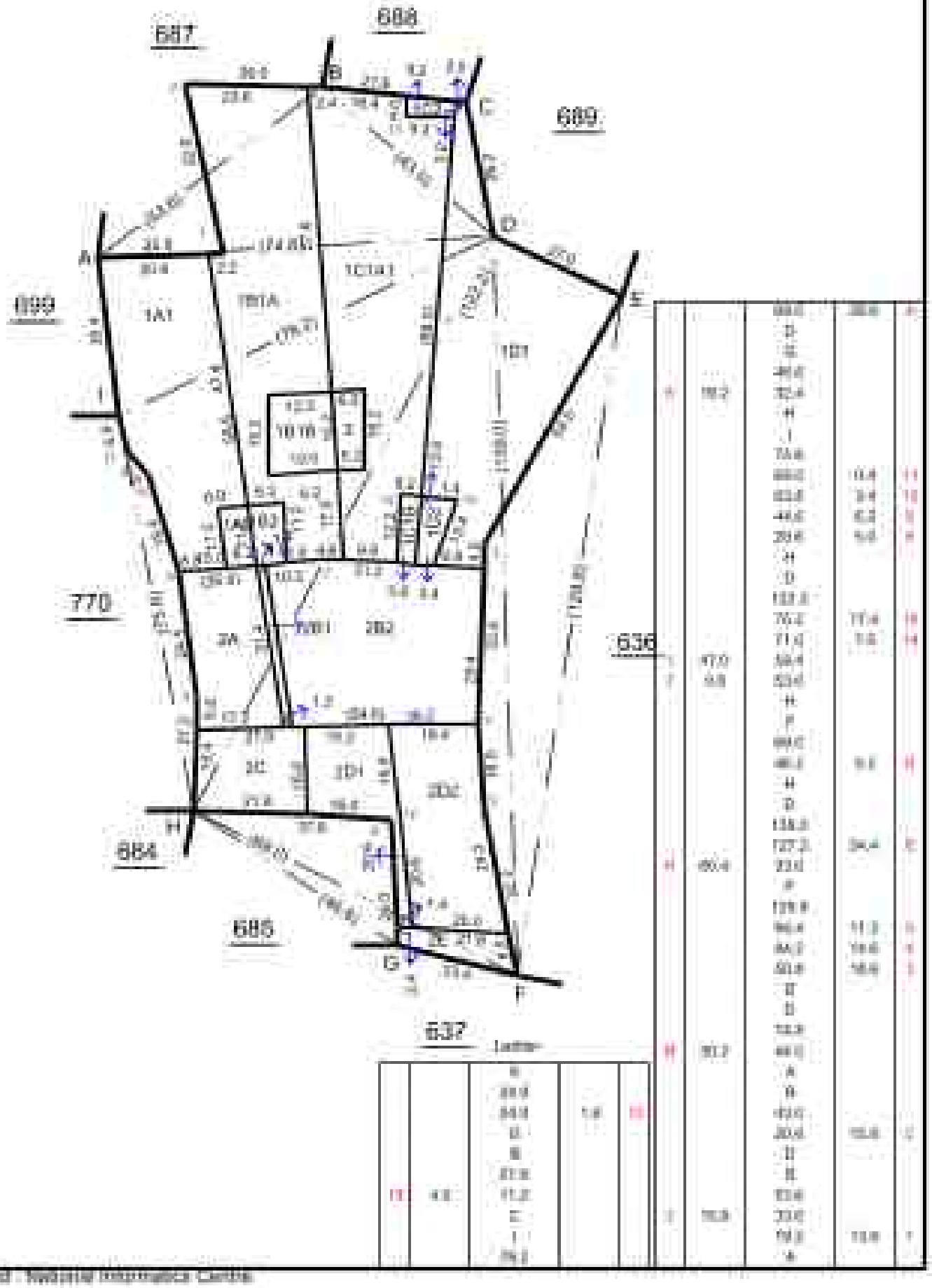
Survey No : 886

Taluk : Hosur [9]

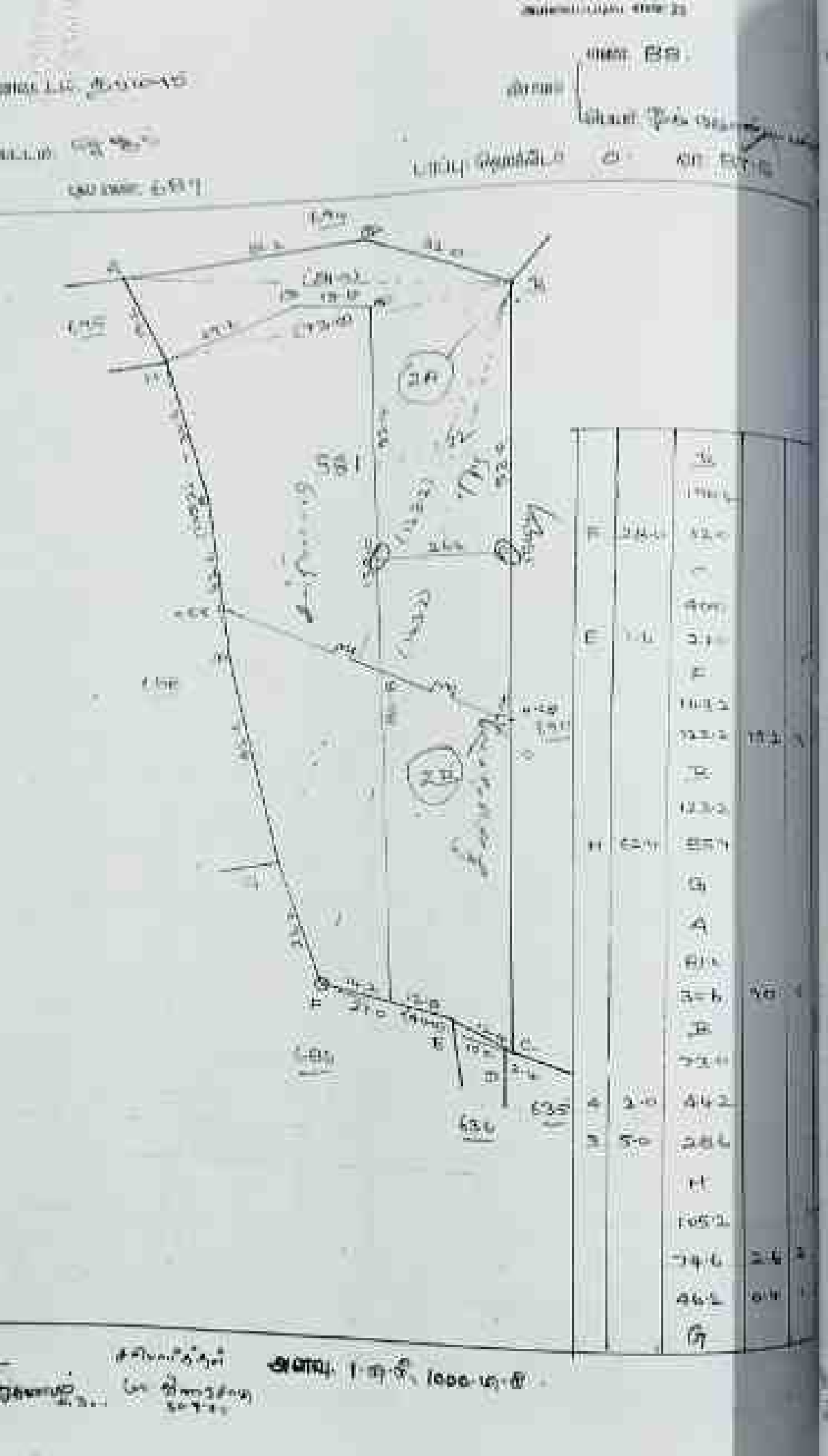
Area : Hect 00 Acre 04.46

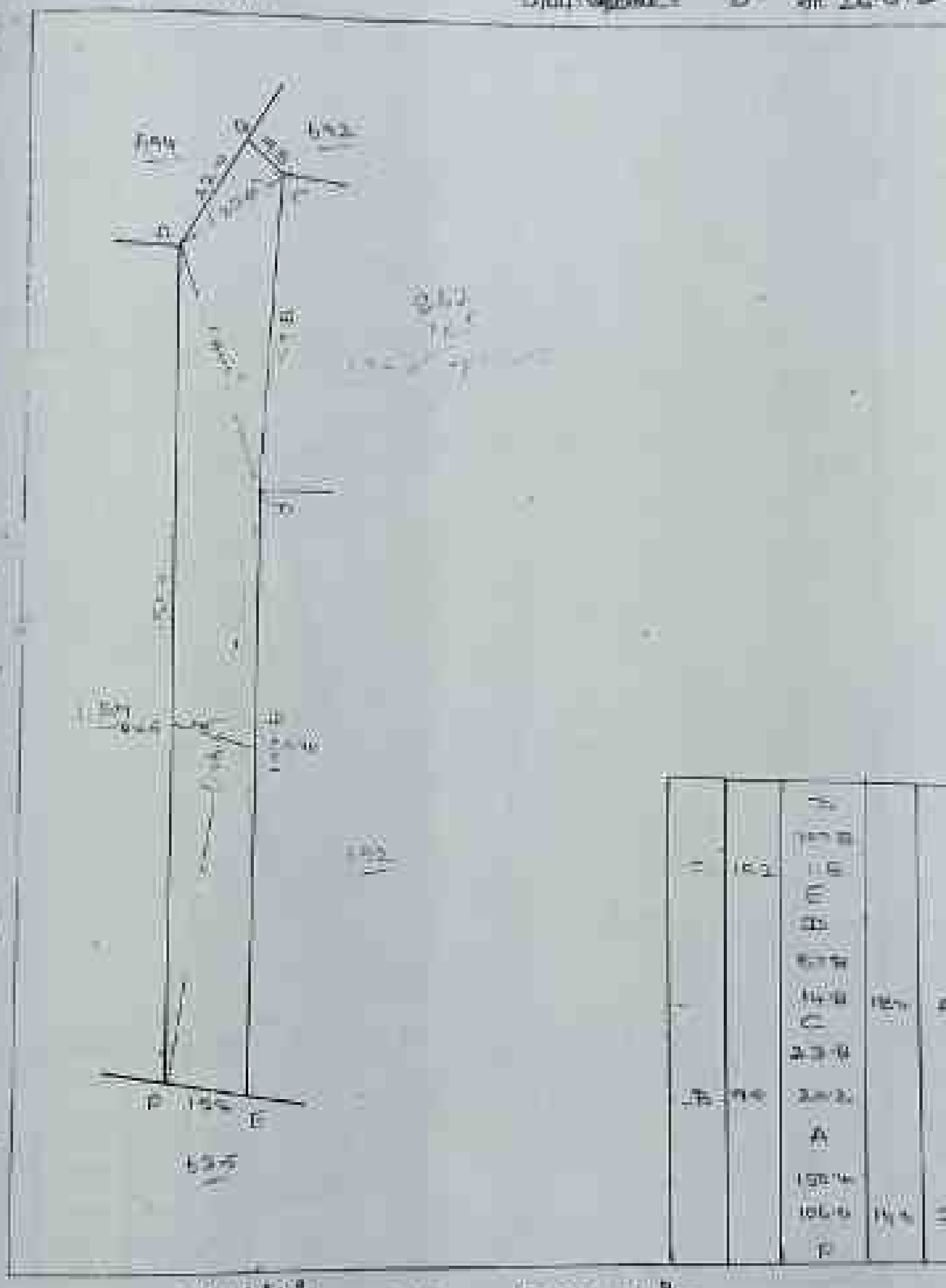
Village : MUKONDAPALLI [88]

Scale : 1 : 1000



Compiled and Published by Geoinformatics Centre





District : Krishnagiri

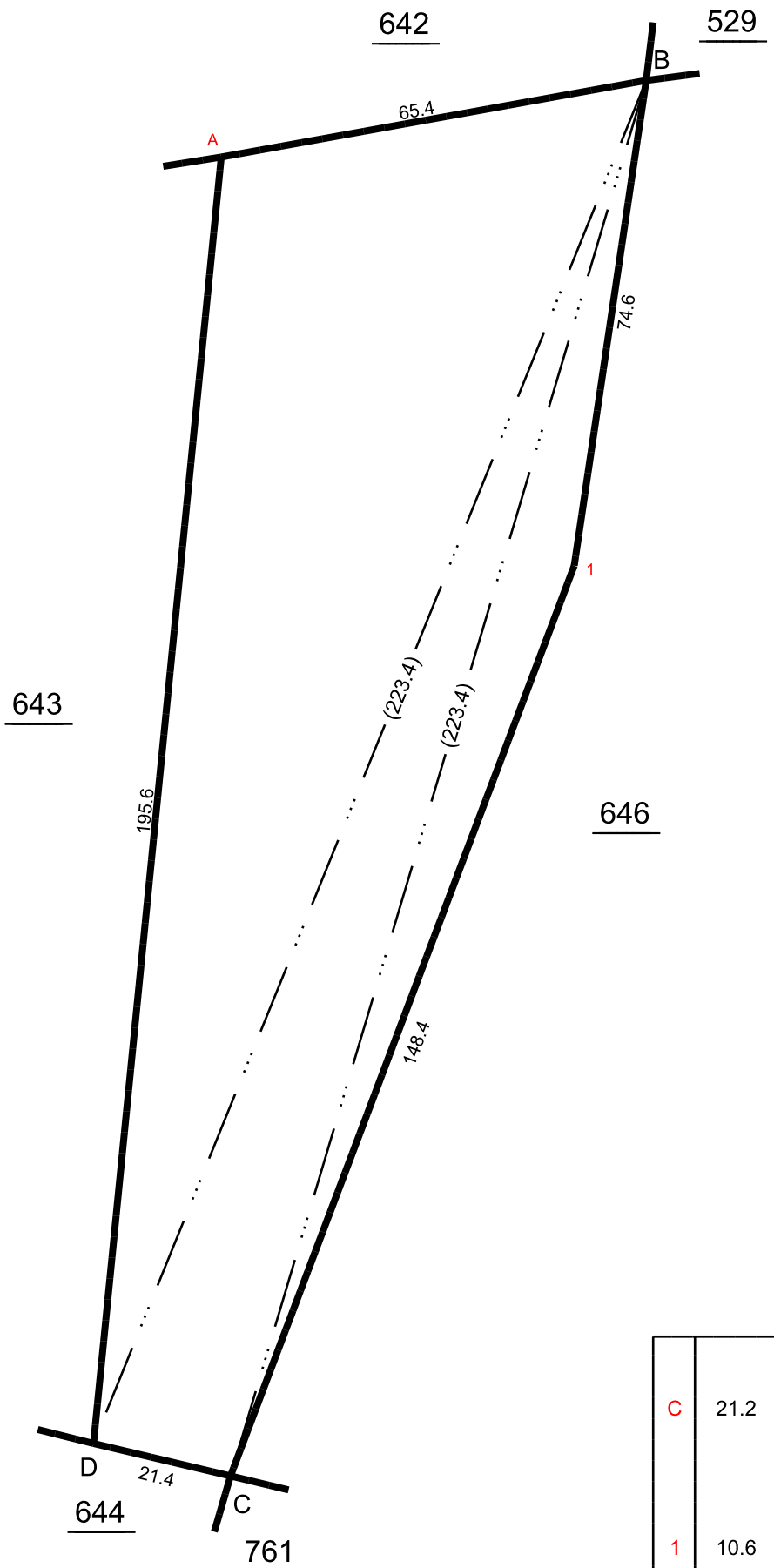
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 759

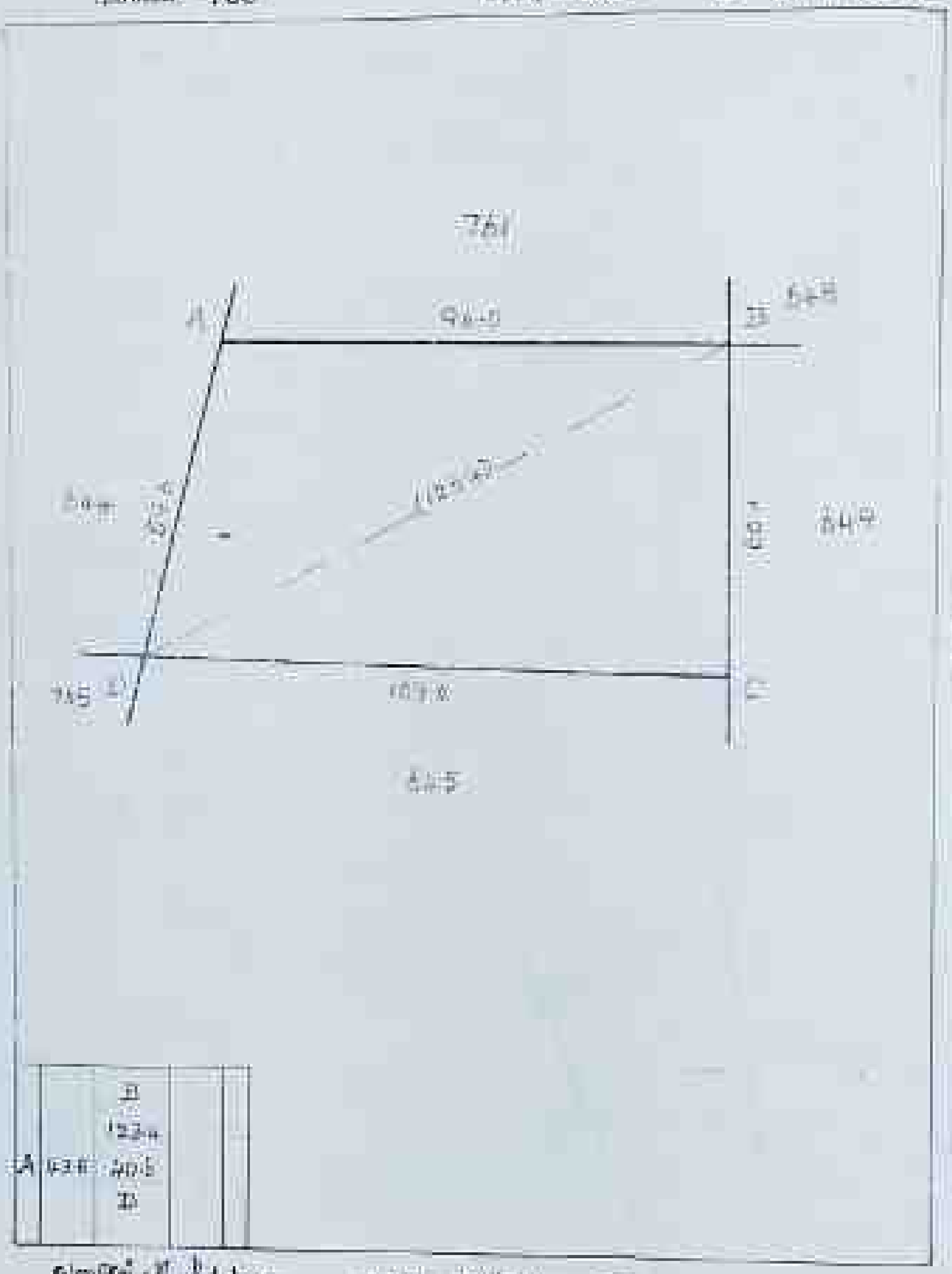
Area : Hect 00 Ares 98.50

Scale : 1 : 1000



Ladder

		D		
		223.4		
C	21.2	220.4		
		35.2	55.4	A
		B		
		C		
		223.4		
1	10.6	73.8		
		B		



District : Krishnagiri

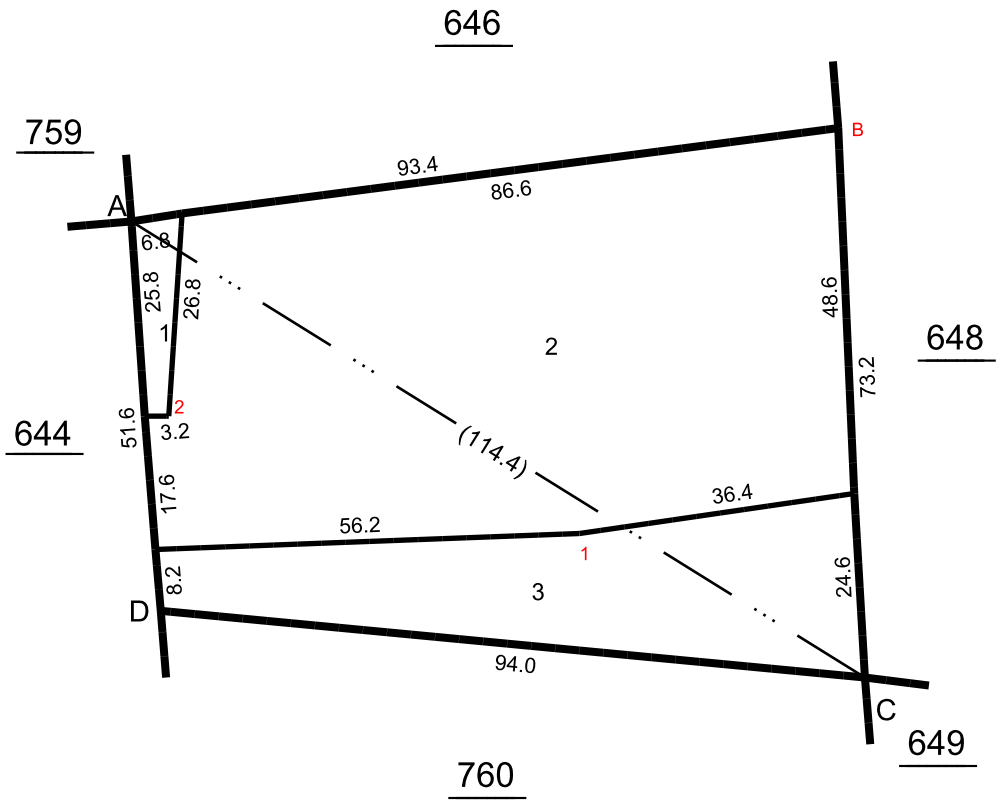
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 761

Area : Hect 00 Ares 58.50

Scale : 1 : 1000



		Ladder		
		A		
		51.6		
		25.8	3.2	2
		D		
		C		
		114.4		
B	60.0	72.8		
		72.2	3.6	1
		30.8	41.8	D
		A		

District : Krishnagiri

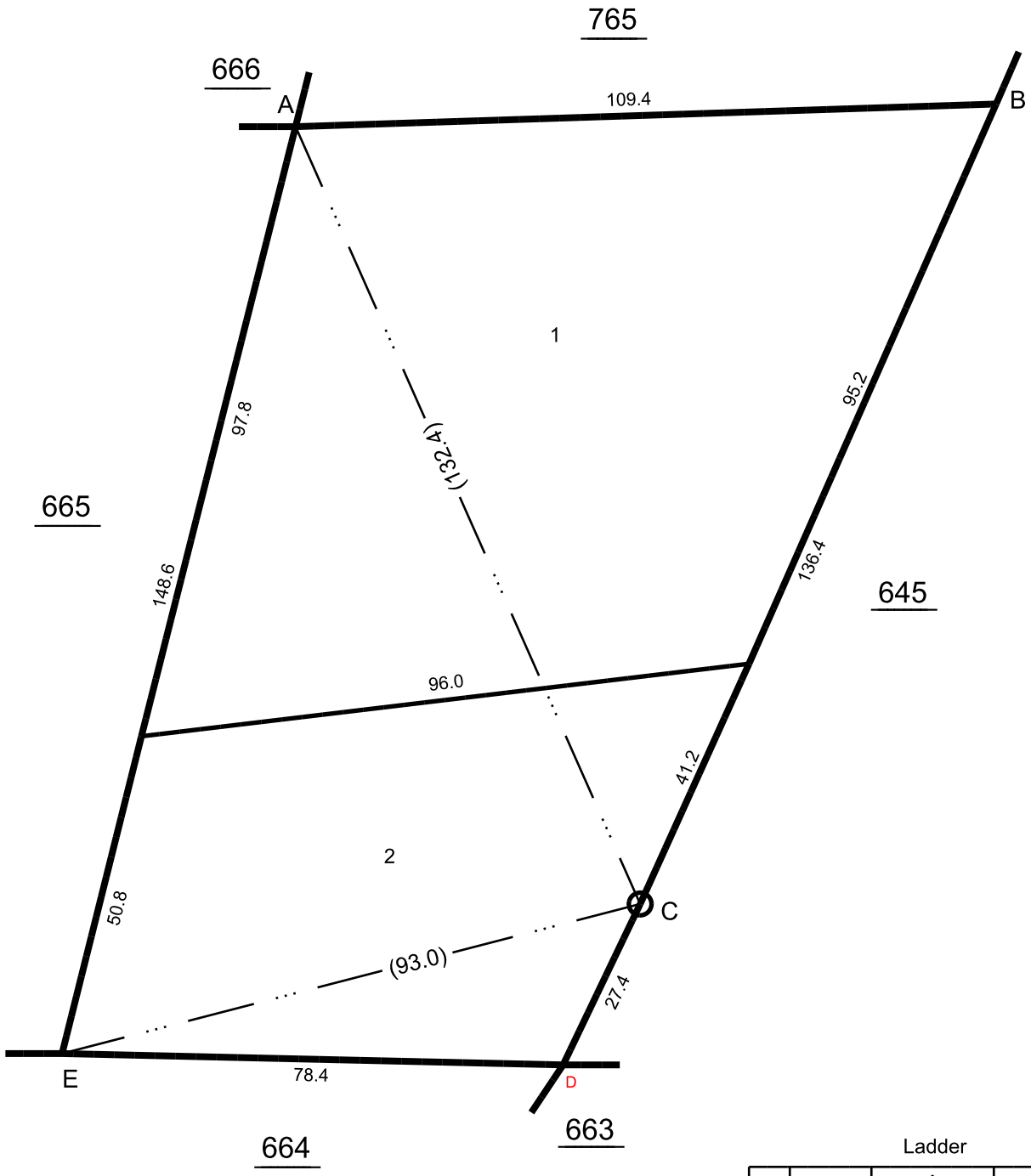
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 764

Area : Hect 01 Ares 36.00

Scale : 1 : 1000



Ladder

D	21.2	A 148.6 44.2 E 93.0 17.8 C 132.4 A 109.4 B 136.4 C	81.2	C

மாவட்டம்- தருமபுரி

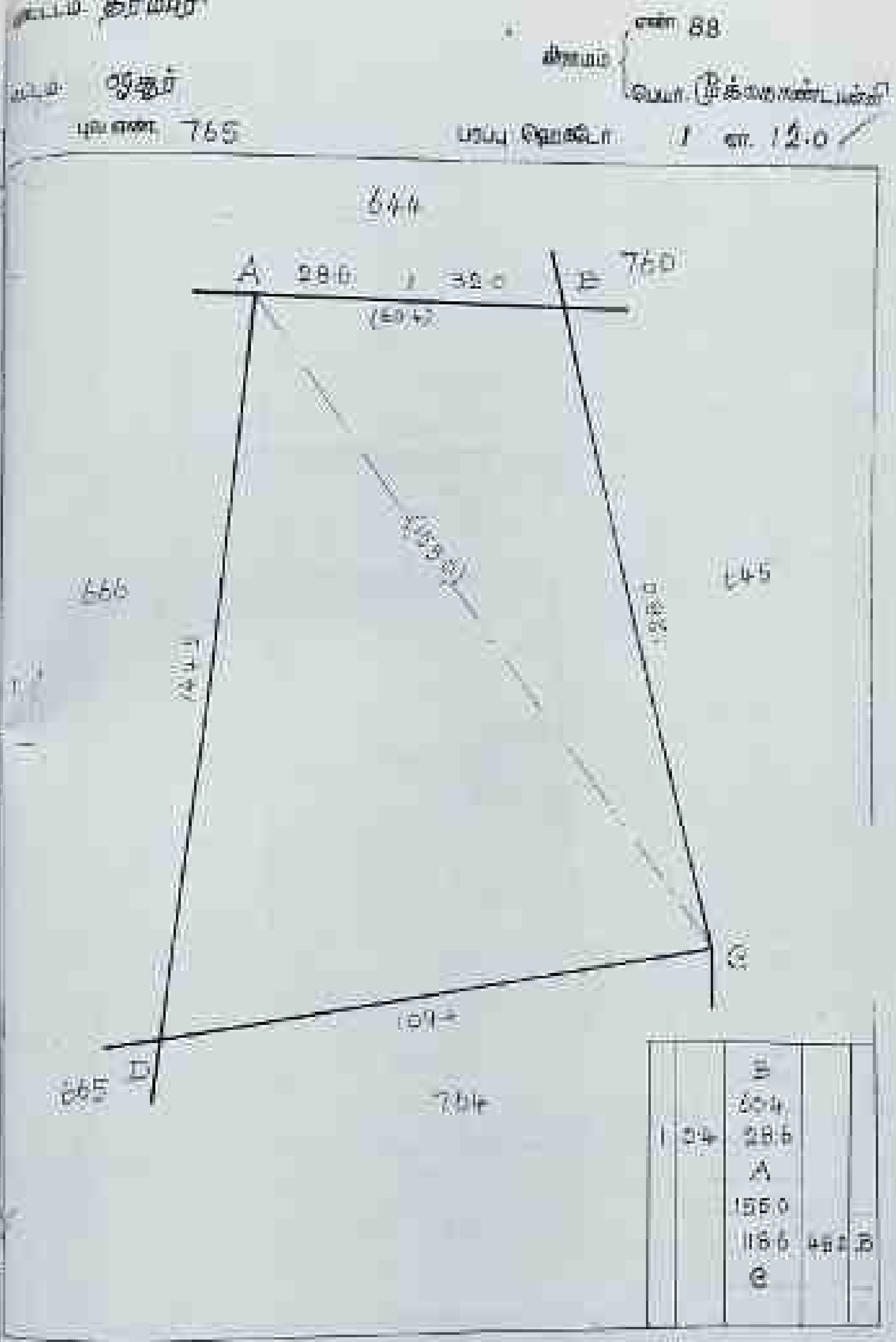
வட்டம்: ஒசூர்

கிராமம் எண் 88

பெயர் பிக்கனகொண்டபள்ளி

புல எண் 765

பரப்பு தொகை 1 ஏ. 12.0



தயாரித்தவர்

அளவை 1 ச.மீ- 1000 ச.மீ

சரிபார்த்தவர்

NALLAH NUMBER – C4

District : Krishnagiri

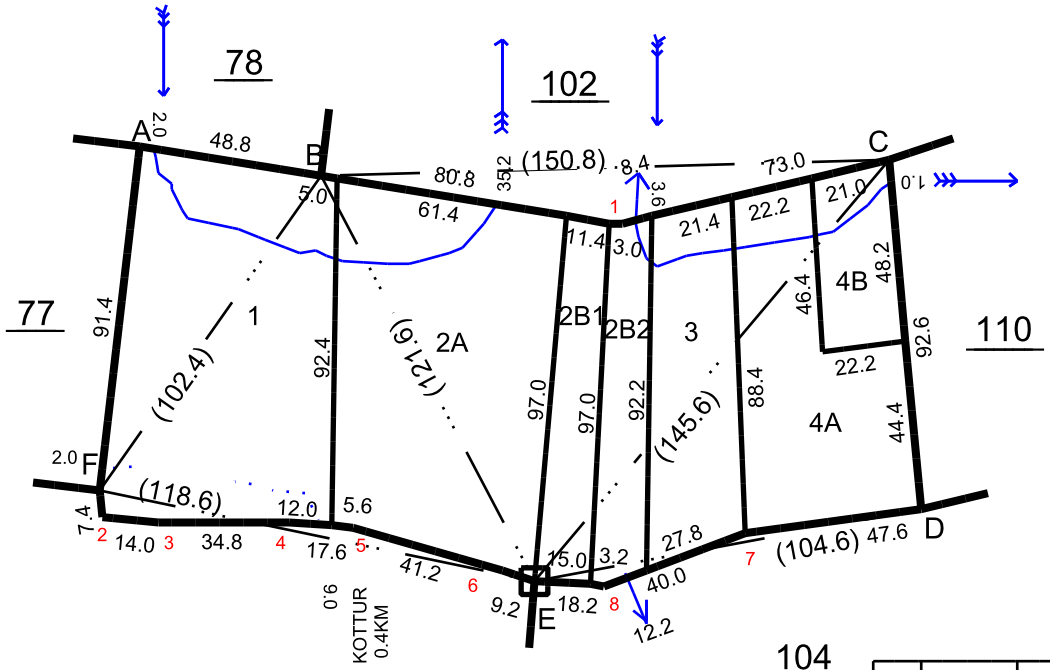
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 103

Area : Hect 01 Ares 94.73

Scale : 1 : 2000



V NO.88 MOOKONDAPALLI

Ladder

		E		
		104.6		
8	4.6	86.8		
		47.2	2.0	7
		D		
		C		
		145.6		
		80.4	66.0	D
		E		
		118.6		
6	0.6	109.4		
5	4.0	68.2		
4	1.6	51.0		
		17.2	5.2	3
		2.6	6.8	2
		F		
		102.4		
		22.0	43.4	A
		B		
		150.8		
1	15.4	71.4		
		C		
		F		
		91.4		
		A		
		48.8		
		B		
		E		
		121.6		
		B		

District : Krishnagiri

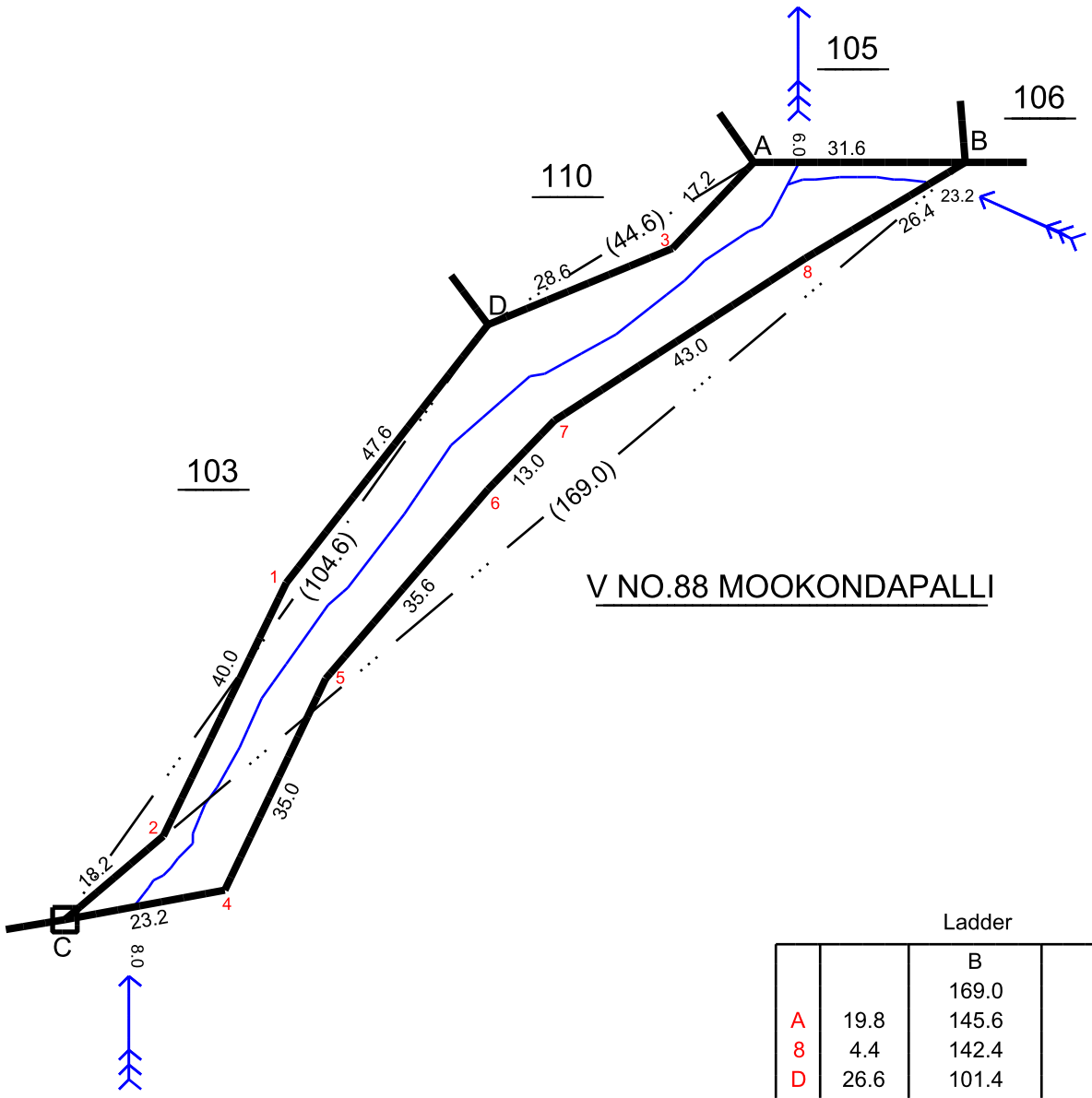
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 104

Area : Hect 00 Ares 20.00

Scale : 1 : 1000



		Ladder		
		B		
		169.0		
A	19.8	145.6		
8	4.4	142.4		
D	26.6	101.4		
7	10.0	99.8		
6	8.4	86.0		
5	2.4	50.8		
		20.2	11.6	4
		C		
		D		
		44.6		
3	4.6	16.4		
		A		
		C		
		104.6		
2	4.6	86.8		
		47.2	2.0	1
		D		

District : Krishnagiri

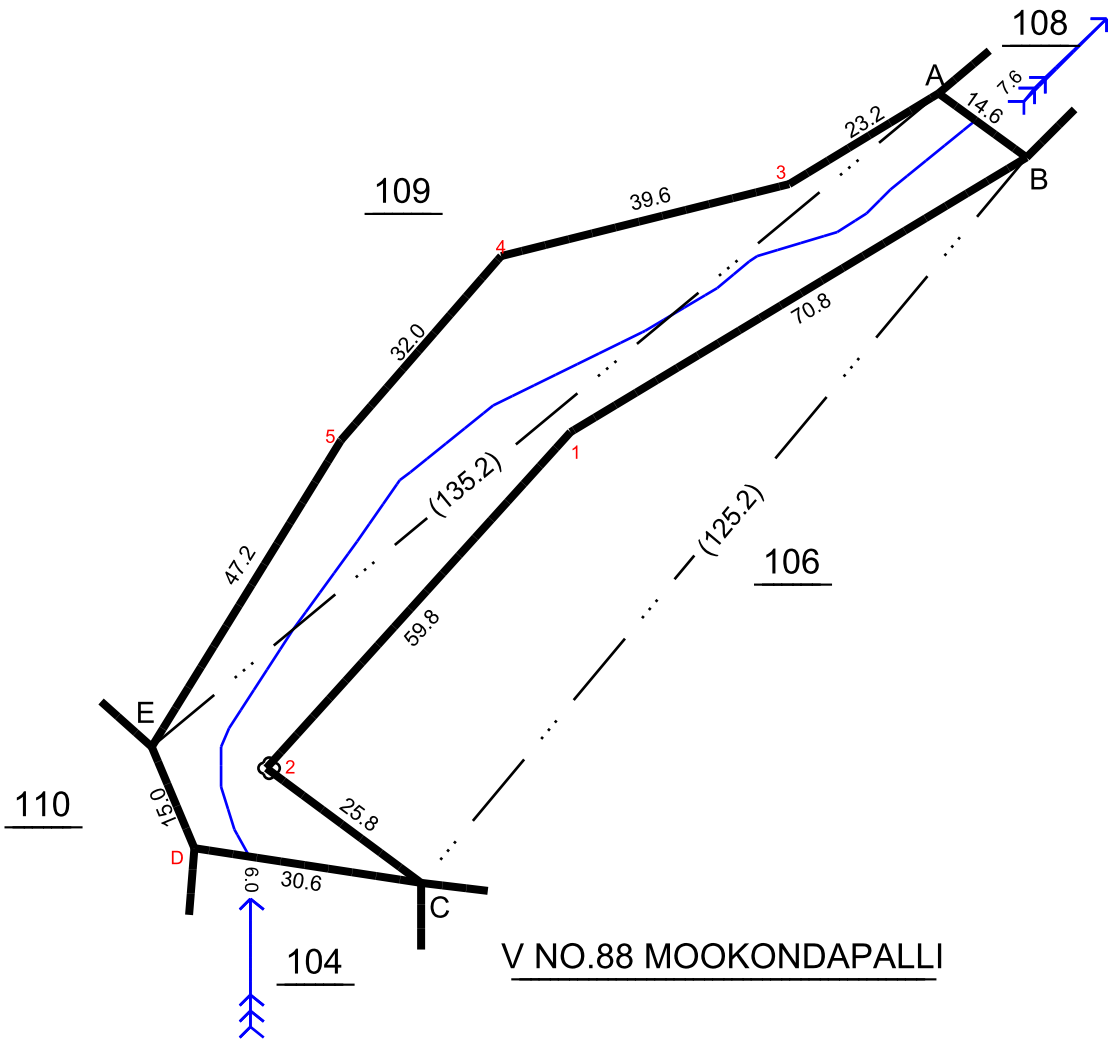
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 105

Area : Hect 00 Ares 26.50

Scale : 1 : 1000



		Ladder		
		E		
		135.2		
		90.4	15.0	5
		58.4	20.4	4
		23.0	3.2	3
		A		
	PRO	16.0	25.8	D
	PRO	9.2	39.0	E
	PRO	1.6	25.4	2
		C		
		125.2		
		67.0	23.2	1
		1.2	14.6	A
		B		

District : Krishnagiri

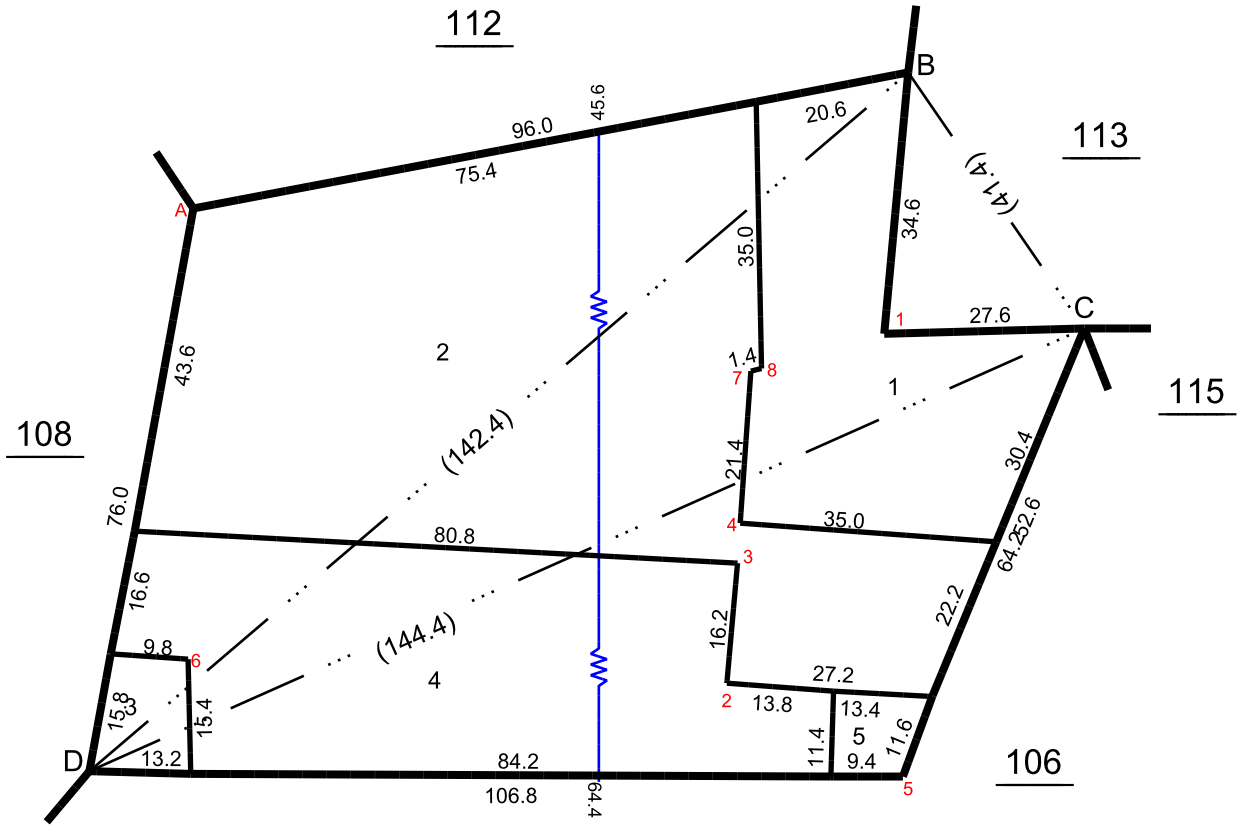
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 107

Area : Hect 00 Ares 91.50

Scale : 1 : 1000



Ladder

		B		
		142.4		
		102.2	17.0	8
		101.0	16.4	7
A	47.8	59.0		
6	2.8	19.6		
		D		
		C		
		144.4		
B	39.6	136.8		
		97.8	44.2	5
		92.0	4.8	4
		89.6	9.4	3
		81.8	23.6	2
		D		
		C		
		41.4		
		26.4	22.6	1
		B		

District : Krishnagiri

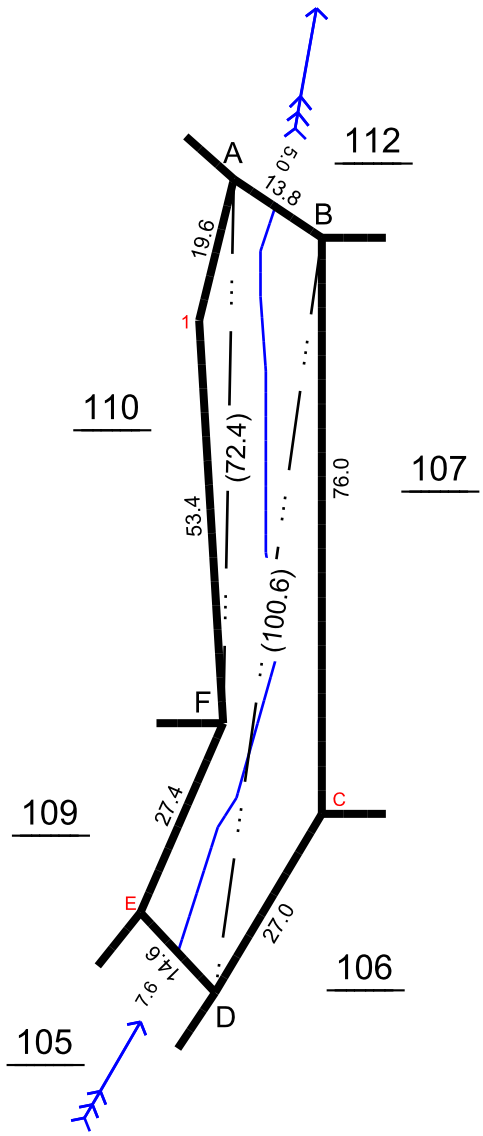
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 108

Area : Hect 00 Ares 15.50

Scale : 1 : 1000



Ladder

		A		
		72.4		
1	4.4	53.2		
		F		
		D		
		100.6		
		91.8	11.4	E
C	10.8	75.4		
		65.2	4.0	F
		B		
	BACK	6.0	12.4	A

District : Krishnagiri

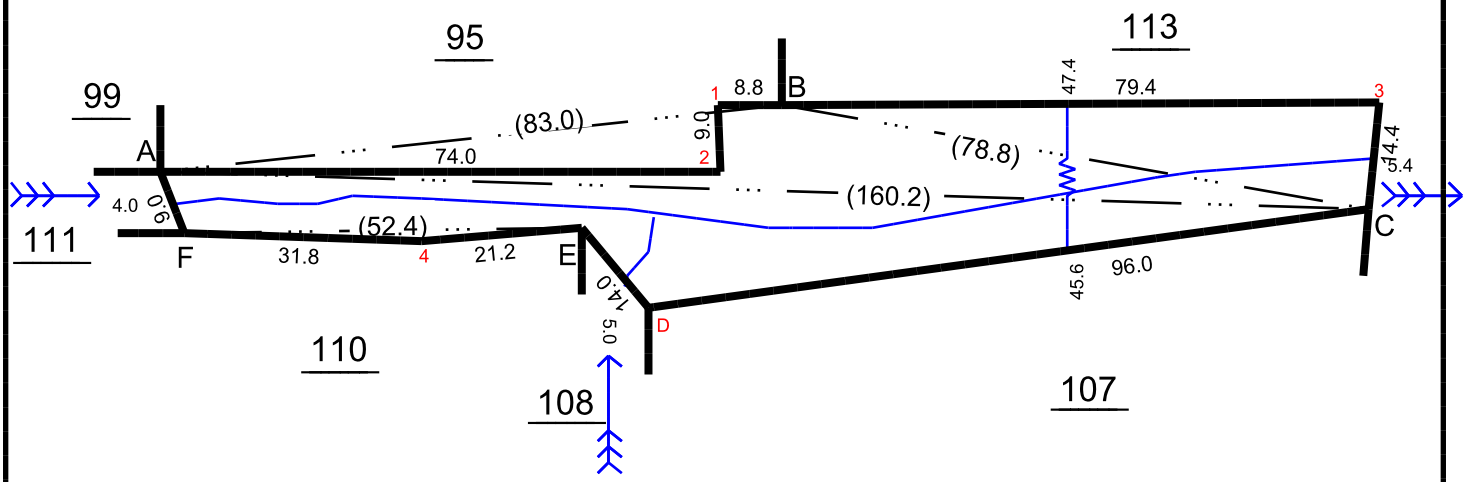
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 112

Area : Hect 00 Ares 21.50

Scale : 1 : 1000



		Ladder		
		E		
		52.4		
		31.4	1.8	4
		F		
		C		
		78.8		
3	14.4	77.8		
		B		
		C		
		160.2		
B	11.2	82.0		
		65.2	16.0	D
		56.0	5.6	E
		3.6	8.0	F
		A		
		83.0		
2	8.0	9.2		
		8.6	1.0	1
		B		

District : Krishnagiri

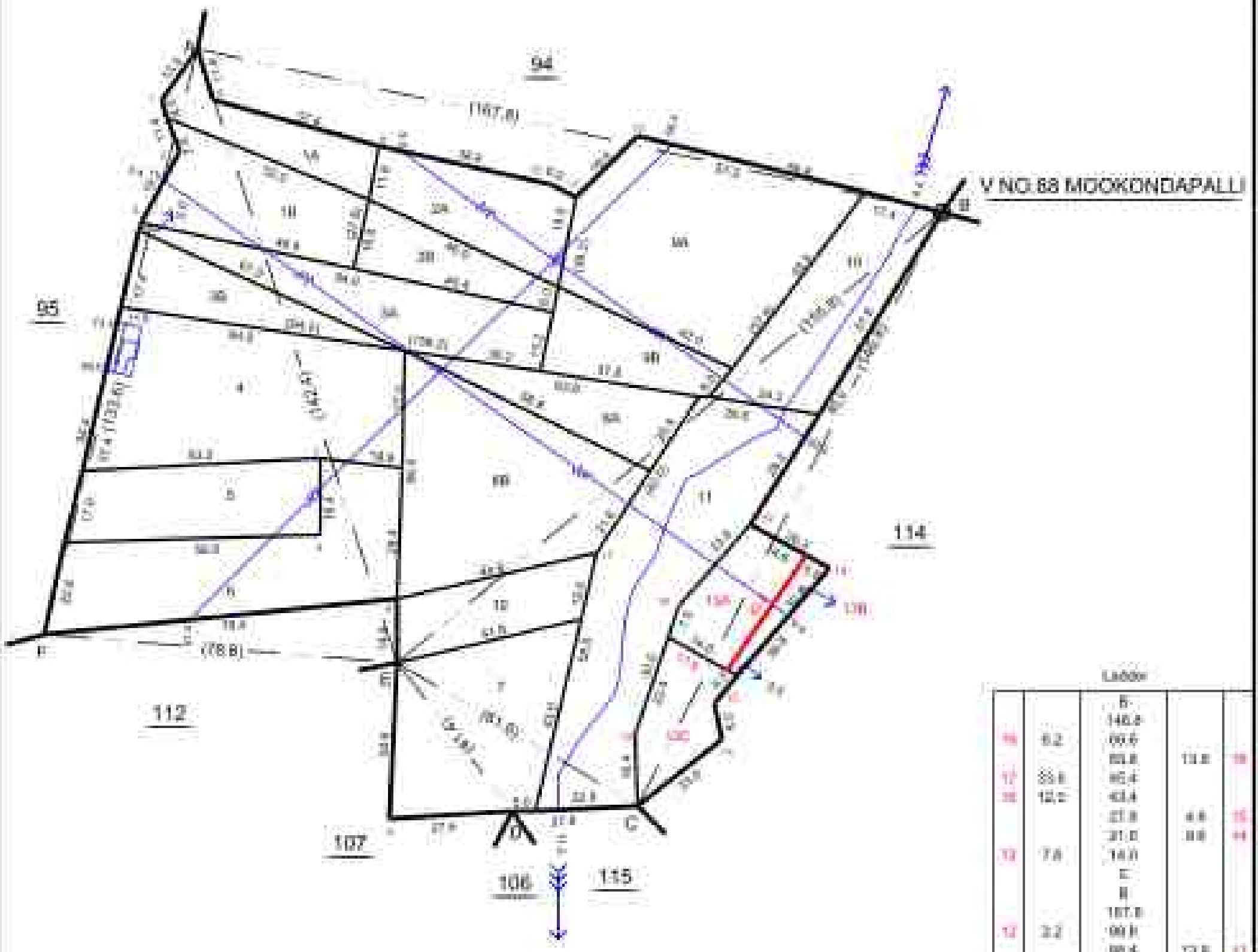
Survey No : 113

Taluk : Hosur [9]

Area : Hect 02 Area 0.50

Village : MOTHAM AGRAHARAM [89]

Scale : 1 : 1000



Ladder

		E 148.8		
16	9.2	89.6		
		89.8	13.8	16
17	33.8	86.4		
18	12.2	43.4		
		27.8	4.6	15
		31.0	8.8	14
13	7.8	14.0		
		E		
		B		
		187.8		
12	3.2	89.8		
		88.4	13.8	11
		82.2	12.8	10
		43.8	12.4	9
		5.8	10.4	8
		A		
		142.4		
7	3.8	46.2		
6	7.8	32.8		
		E		
		B		
		186.8		
		20.8	68.8	5
		E		
		C		
		81.8		
		39.6	10.2	3
		E		
		D		
		41.4		
		26.4	22.8	2
		E		
		19.8		
1	14.4	77.8		
		F		
		152.8		
		40.2	2.8	1
0	1.2	22.8		
		13.0	0.8	
		A		

District : Krishnagiri

Taluk : Hosur [9]

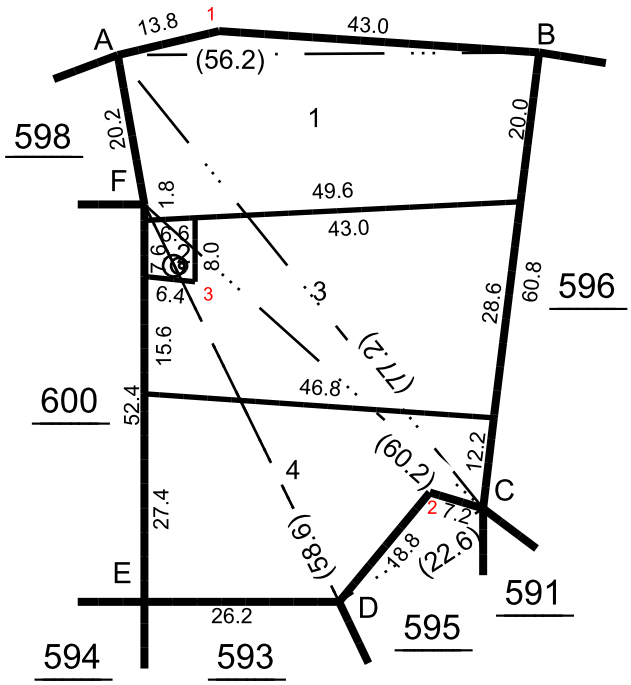
Village : MUKONDAPALLI [88]

Survey No : 597

Area : Hect 00 Ares 36.50

Scale : 1 : 1000

V.NO.89 MOTHA ARAGHARAM



Ladder

		D		
		58.6		
3	1.6	12.2		
	2.0	8.0		
		8.0	2.0	RW
		F		
		58.6		
E	23.4	12.0		
		2.6	22.6	C
		D		
		22.6		
		4.8	5.6	2
		C		
		A		
		56.2		
		42.8	3.2	1
		B		
		60.8		
		C		
		60.2		
		F		
		20.2		
		A		
		77.2		
		C		
		D		
		26.2		
		E		
		52.4		
		F		

District : Krishnagiri

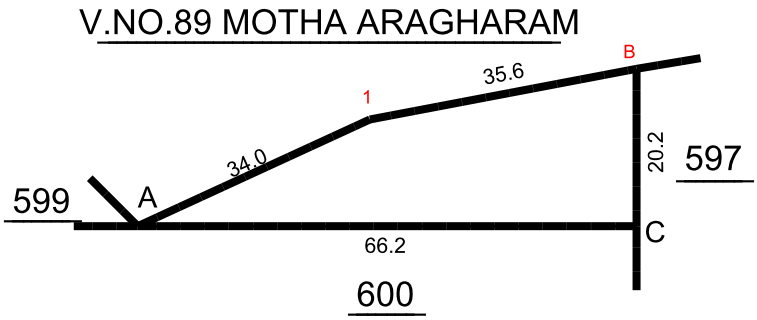
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 598

Area : Hect 00 Ares 8.00

Scale : 1 : 1000



Ladder

		C		
		66.2		
B	20.8	66.0		
1	14.0	31.0		
		A		

District : Krishnagiri

Taluk : Hosur [9]

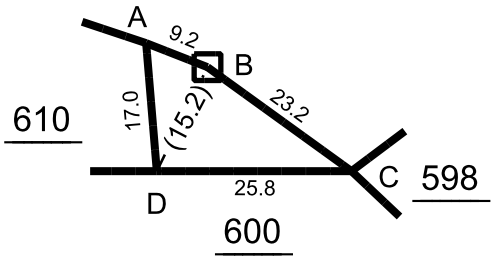
Village : MUKONDAPALLI [88]

Survey No : 599

Area : Hect 00 Ares 2.00

Scale : 1 : 1000

V.NO.89 MOTHA ARAGHARAM



Ladder

D	15.2	A 9.2 1.6 B 23.2 C 25.8 D 17.0 A B 15.2 D		

District : Krishnagiri

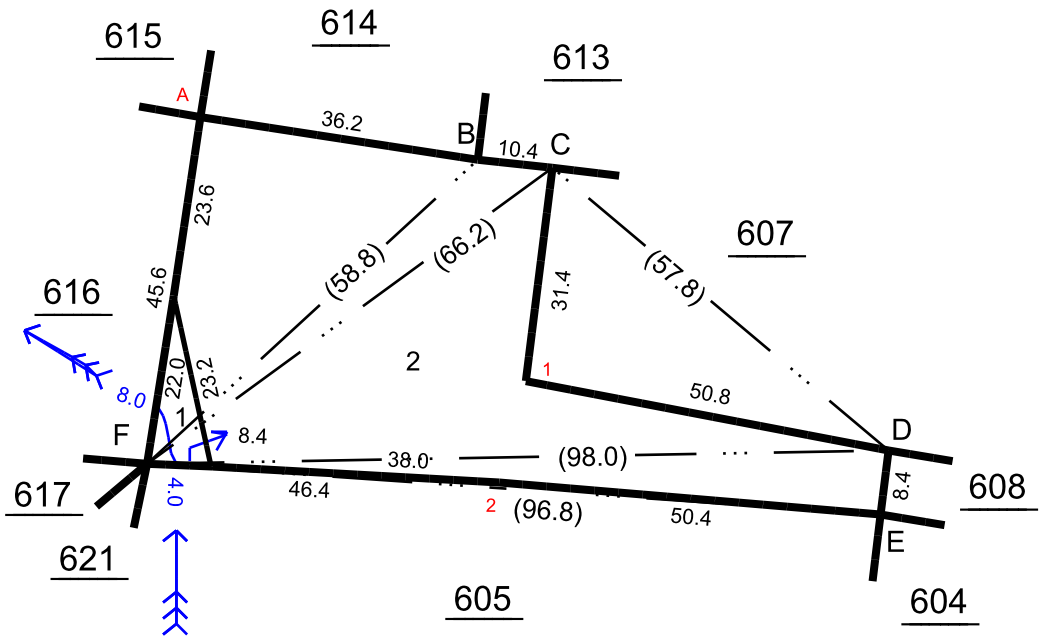
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 606

Area : Hect 00 Ares 25.00

Scale : 1 : 1000



		Ladder		
		F		
		96.8		
		50.6	0.8	2
		E		
		B		
		58.8		
A	29.0	36.4		
		F		
		66.2		
		7.4	6.8	B
		C		
		57.8		
1	23.6	42.4		
		D		
		98.0		
		96.8	8.4	E
C	38.0	54.4		
		F		

District : Krishnagiri

Taluk : Hosur [9]

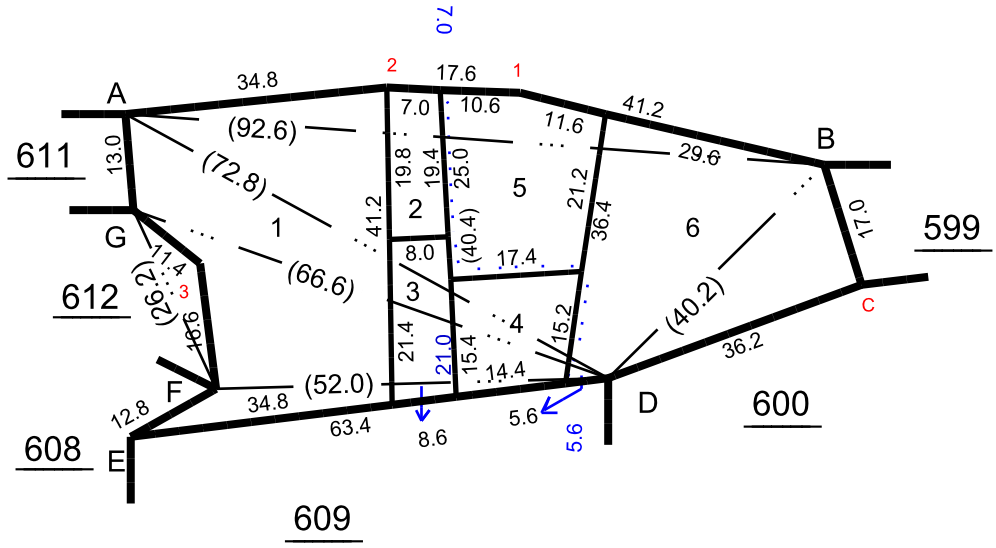
Village : MUKONDAPALLI [88]

Survey No : 610

Area : Hect 00 Ares 31.50

Scale : 1 : 1000

V.NO.89:MOTHA AGRAHARAM



Ladder

		A					72.8		
		72.8					7.0	11.0	G
		25.0	5.0	DT			A		
		10.4	11.0	DT			92.6		
		D					58.2	5.8	2
		63.4					40.6	6.4	1
F	4.8	12.0			D	30.2	26.4		
		E					B		
		G					40.2		
		26.2					32.8	14.8	C
		16.0	5.2	3			D		
		F					52.0		
		G					F		
		66.6					A		
F	18.8	48.2					13.0		
		D					G		

District : Krishnagiri

Taluk : Hosur [9]

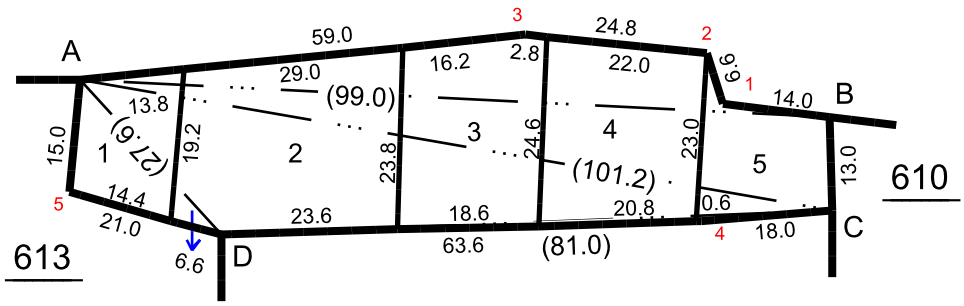
Village : MUKONDAPALLI [88]

Survey No : 611

Area : Hect 00 Ares 22.00

Scale : 1 : 1000

V.NO.89:MOTHA AGRAHARAM



Ladder

		D		
		27.6		
		10.0	11.2	5
		A		
		C		
		81.0		
		63.6	0.8	4
		D		
		C		
		101.2		
B	12.4	98.8		
		22.0	17.0	D
		A		
		99.0		
		40.8	8.6	3
		16.6	7.4	2
		14.2	1.0	1
		B		

District : Krishnagiri

Taluk : Hosur [9]

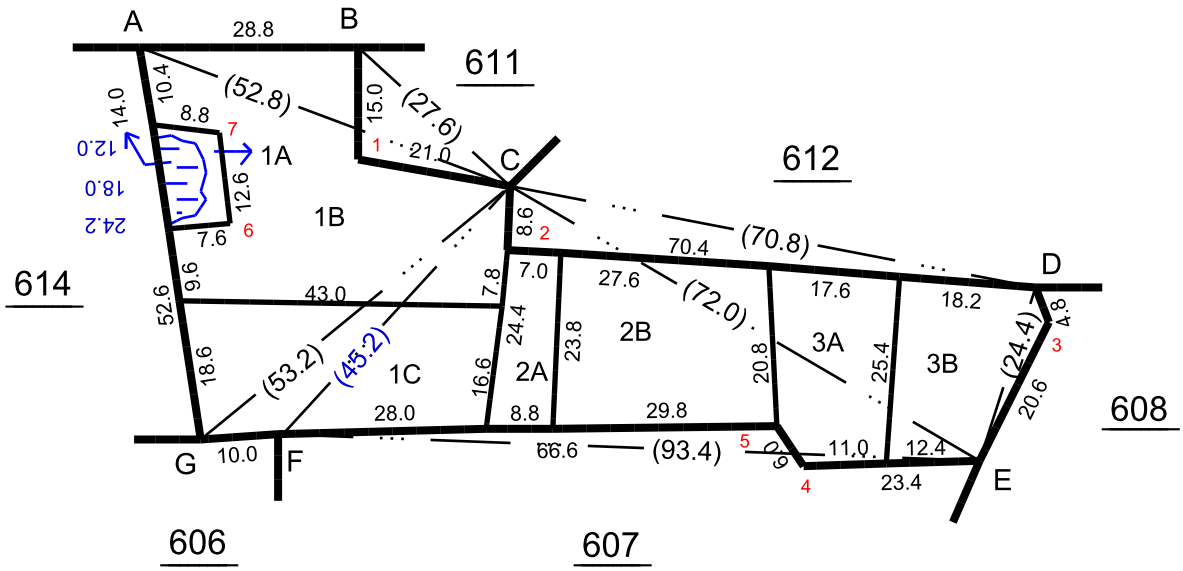
Village : MUKONDAPALLI [88]

Survey No : 613

Area : Hect 00 Ares 35.50

Scale : 1 : 1000

V.NO.89:MOTHA AGRAHARAM



Ladder

		A					63.4	34.8	C
		52.8					27.0	3.8	5
7	7.0	38.8			4	1.4	23.4		
		C					E		
		72.0					D		
		5.4	23.8	D			24.4		
		E					20.4	3.0	3
		C					E		
		52.8					D		
		32.6	4.4	1			70.8		
B	9.8	27.0					1.2	8.4	2
		A					C		
		C					27.6		
		53.2					10.0	11.2	1
A	45.2	26.2					B		
6	19.8	20.8					28.8		
		8.2	5.8	F			A		
		G					F		
		F					45.2		
		93.4					C		

District : Krishnagiri

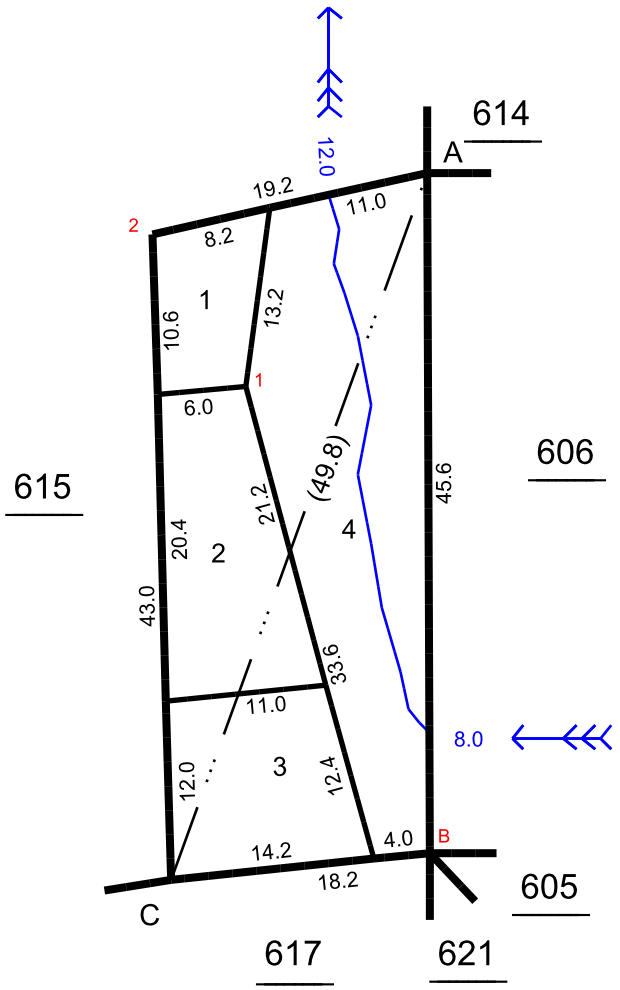
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 616

Area : Hect 00 Ares 8.50

Scale : 1 : 500



		Ladder		
		A		
		49.8		
2	15.8	39.8		
1	6.6	32.4		
		7.6	15.6	B
		C		

District : Krishnagiri

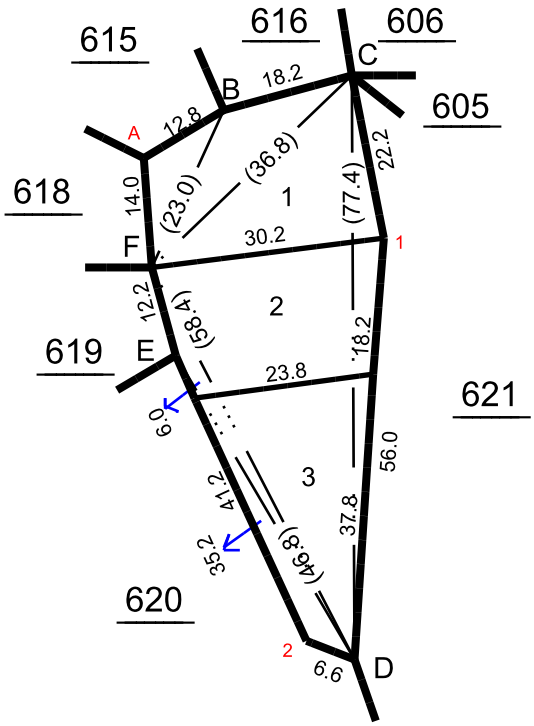
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 617

Area : Hect 00 Ares 16.50

Scale : 1 : 1000



Ladder

		F		
		58.4		
E	2.6	46.6		
		D		
		E		
		46.8		
2	4.2	5.4		
		D		
		77.4		
		25.6	26.6	F
1	4.4	21.6		
		C		
		F		
		36.8		
		15.4	8.4	B
		C		
		F		
		23.0		
		10.4	7.0	A
		B		

District : Krishnagiri

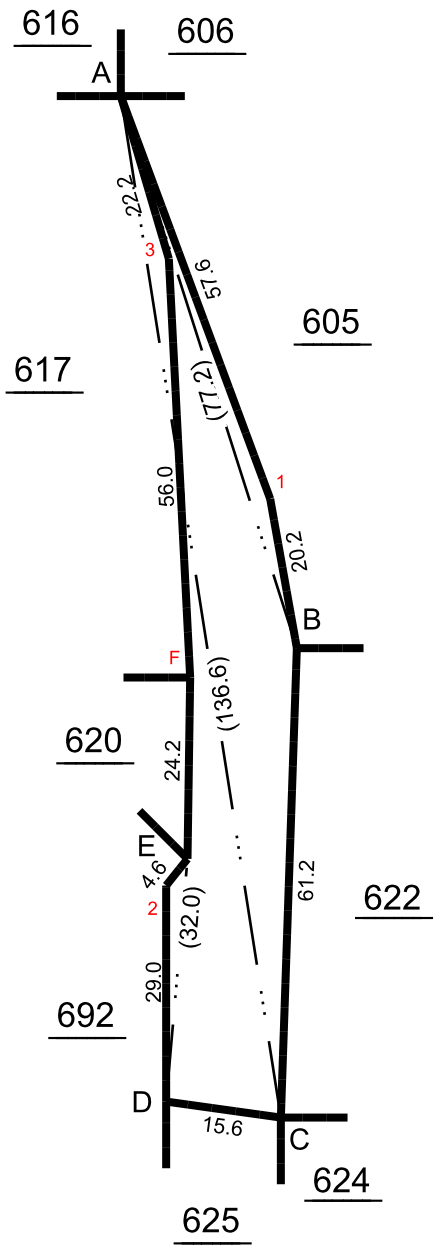
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 621

Area : Hect 00 Ares 15.00

Scale : 1 : 1000



Ladder

		A		
		136.6		
		114.6	3.0	3
		60.8	11.8	B
F	2.8	59.4		
E	7.0	35.8		
D	14.8	4.4		
		C		
		E		
		32.0		
2	2.4	28.6		
		D		
		A		
		77.2		
		20.0	2.6	1
		B		

District : Krishnagiri

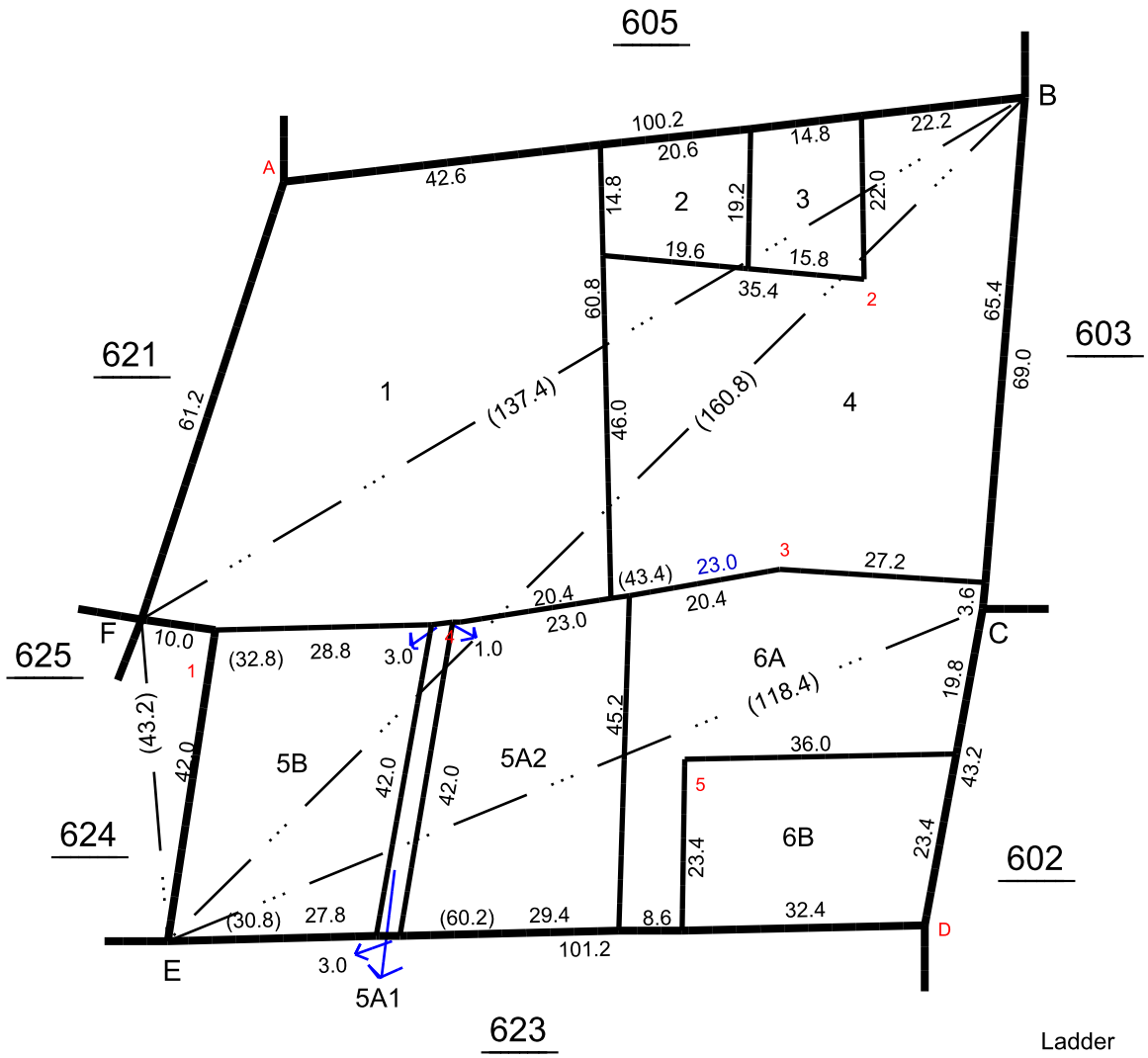
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 622

Area : Hect 01 Ares 12.50

Scale : 1 : 1000



Ladder

		E		
		160.8		
		133.0	33.4	F
		103.2	3.0	4
3	22.0	67.8		
C	44.8	52.2		
2	2.0	32.4		
		B		
		C		
		118.4		
		94.4	36.2	D
		73.2	3.4	5
		E		
		B		
		137.4		
A	40.8	46.2		
		F		
		E		
		43.2		
1	9.8	2.4		
		F		

NALLAH NUMBER – C5

District : Krishnagiri

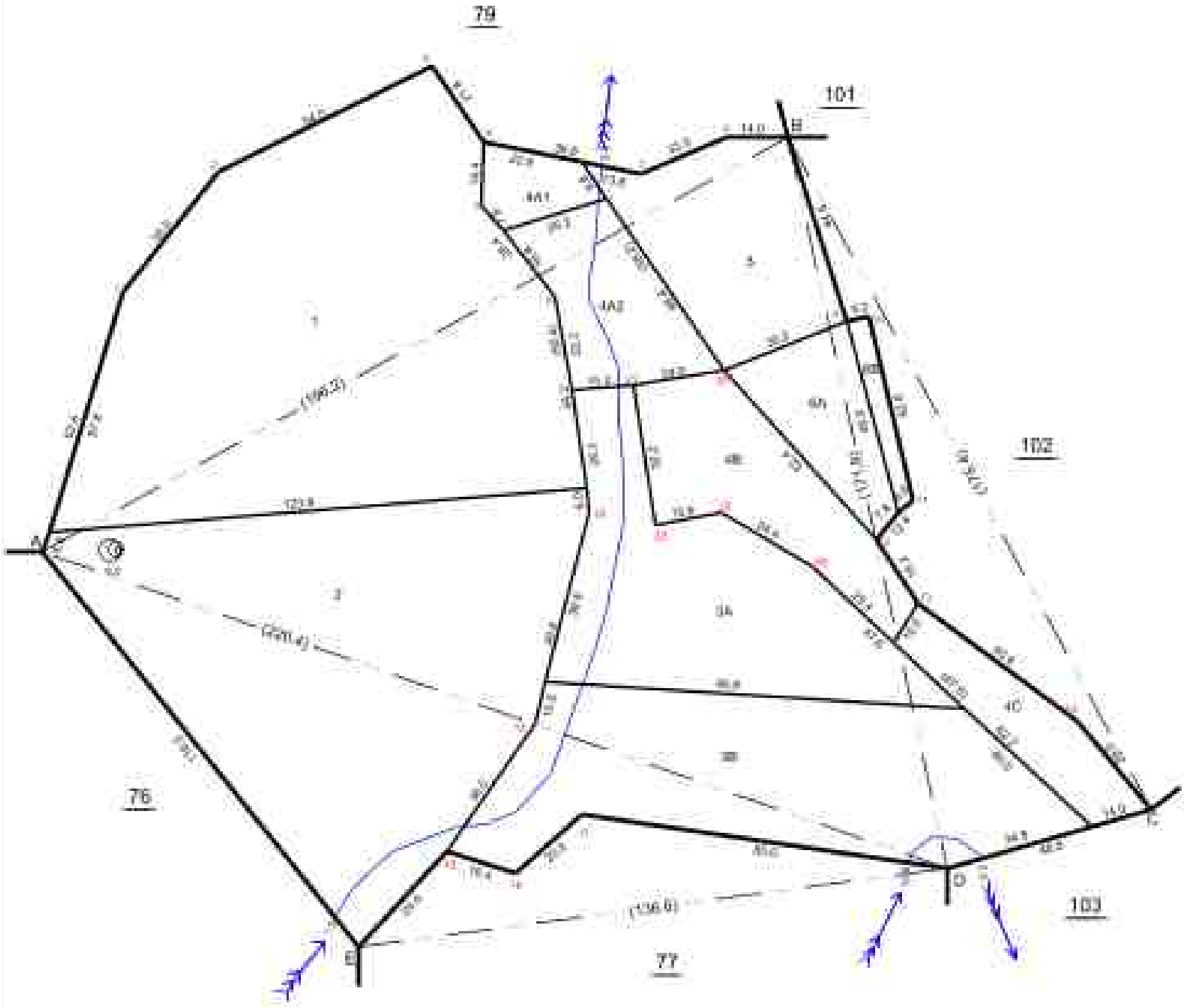
Survey No : 78

Taluk : Hosur [9]

Area : Hect 03 Ares 2.00

Village : MOTHAM AGRAHARAM [89]

Scale : 1 : 1000



Ladder

		D					E		
		171.8					C		
17	46.4	168.4					175.4		
		97.8	15.4	24			148.8	5.4	44
		91.0	33.2	23			186.2	28.4	43
		90.2	46.8	22			90.8	26.2	32
		49.9	47.2	21			99.6	14.8	31
		49.0	26.4	20			44.6	5.2	10
		B					49.4	6.6	9
		A					B		
		225.4					194.2		
		202.0	4.2		8	7.0	163.6		
2	61.6	121.6			7	8.0	162.4		
		104.2	48.8	19	6	23.2	134.6		
		100.6	LINE	18	5	54.0	132.4		
		D					121.8	5.6	4
		136.6			3	20.8	126.8		
17	23.0	33.0			2	67.2	37.8		
16	12.2	37.8			1	49.6	80.2		
15	16.8	23.2					A		

District : Krishnagiri

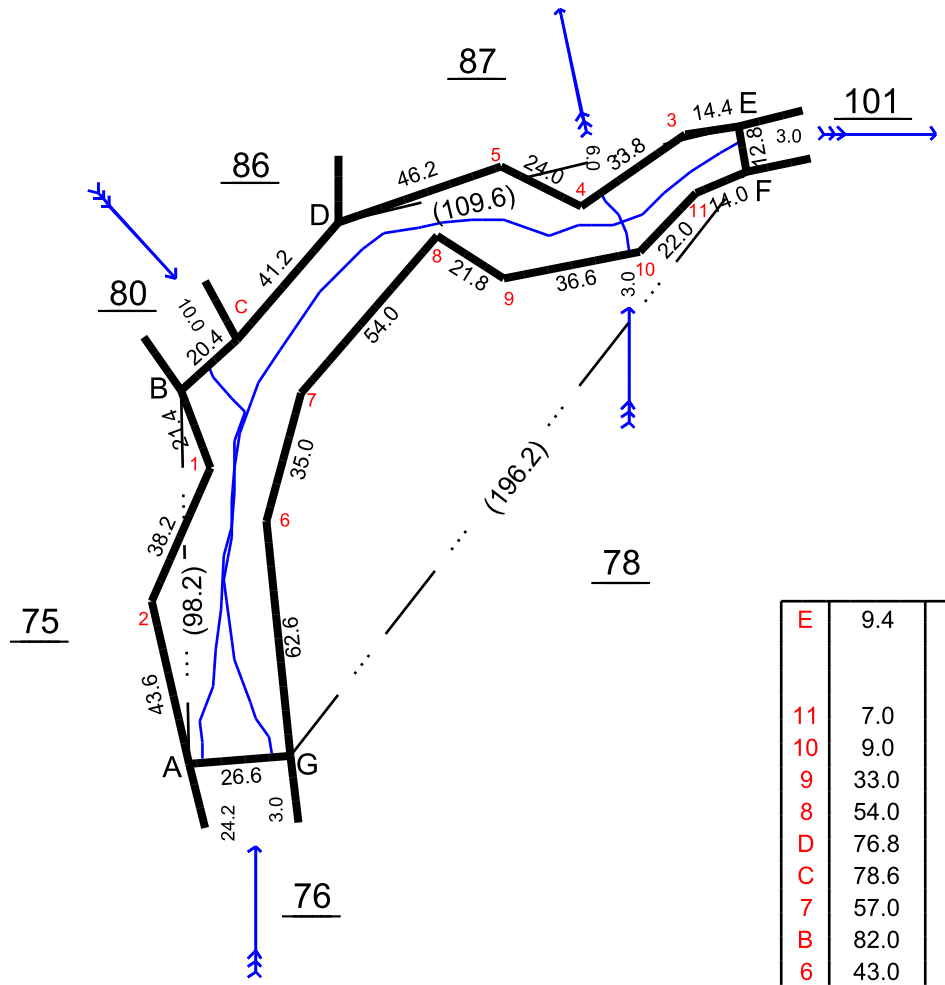
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 79

Area : Hect 00 Ares 57.00

Scale : 1 : 2000



Ladder

E	9.4	8.4	PRO	
		F		
		196.2		
11	7.0	183.8		
10	9.0	162.4		
9	33.0	134.6		
8	54.0	132.4		
D	76.8	119.6		
C	78.6	78.4		
7	57.0	77.8		
B	82.0	58.4		
6	43.0	45.2		
		G		
A	19.6	17.8	BACK	
		D		
		109.6		
		63.2	4.4	5
4	11.2	45.4		
		14.0	0.8	3
		E		
		A		
		98.2		
G	26.2	97.6		
		55.4	9.2	2
1	7.0	20.6		
		B		

240

A

District : Krishnagiri

Survey No : 237

Taluk : Hosur [5]

Area : Hect.01 Ares.16.50

Village : MUKONDAPALLI [88]

Scale : 1 : 500

238

239

234

236

399

Collector : National Informatics Centre

District : Krishnagiri

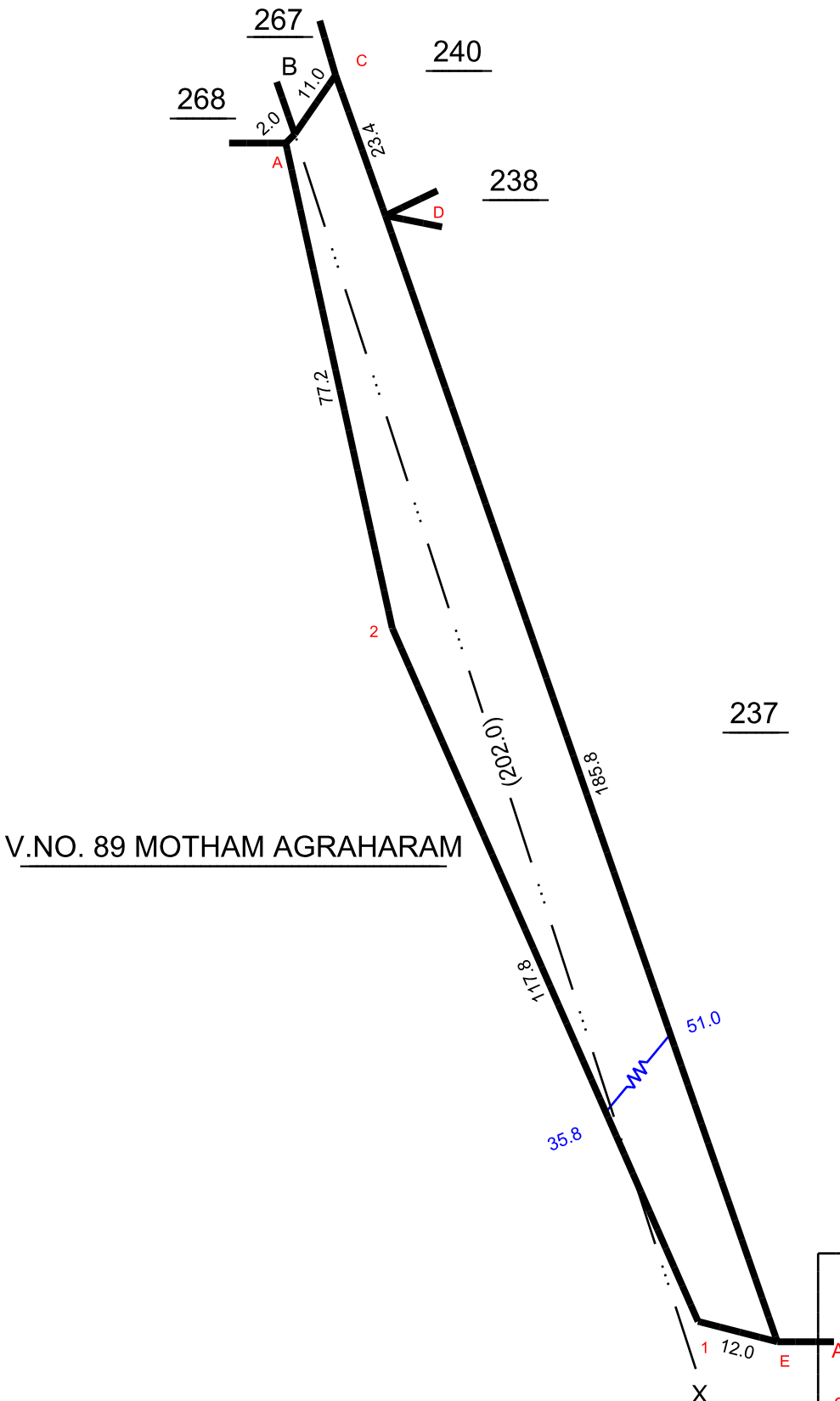
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 239

Area : Hect 00 Ares 31.50

Scale : 1 : 1000



Ladder

	PRO	6.8	8.8	C
		B		
		202.0		
A	1.8	201.2		
		185.8	9.6	D
2	9.4	124.4		
		6.8	2.6	1
		0.0	13.4	E
		X		

District : Krishnagiri

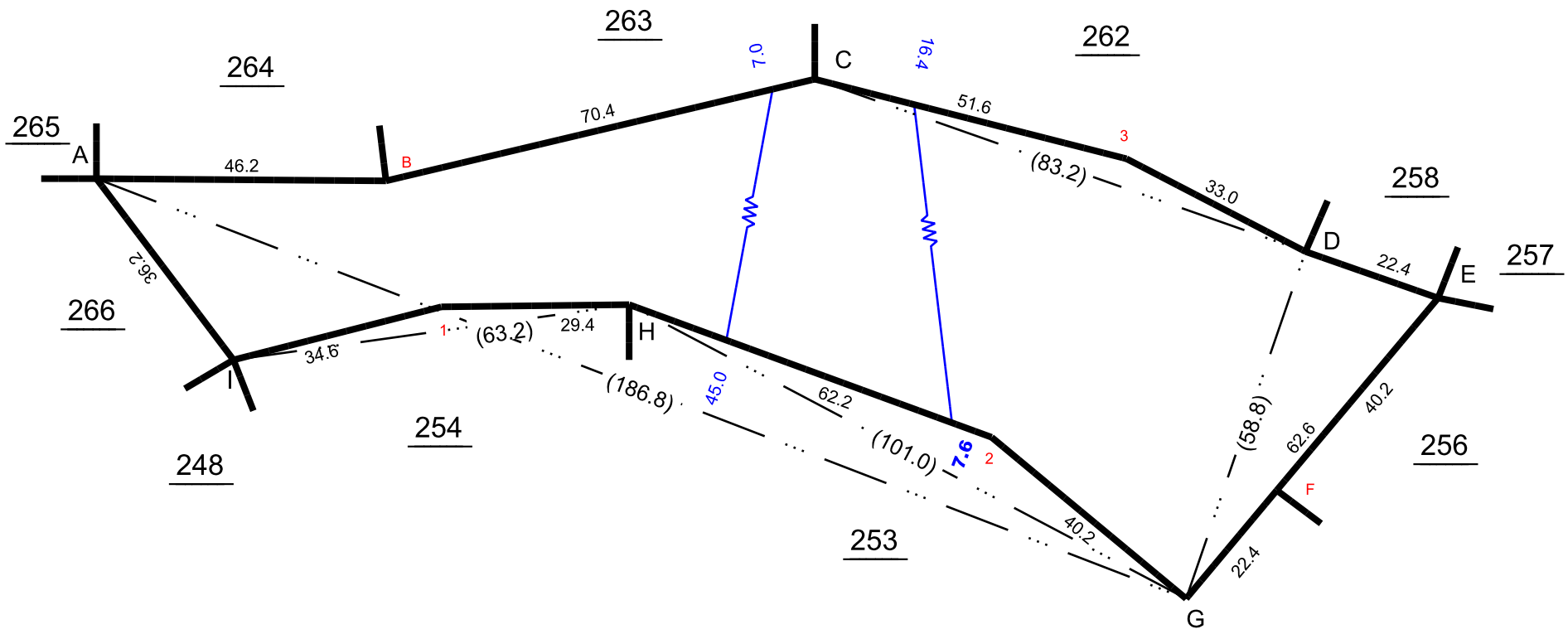
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 255

Area : Hect 00 Ares 76.00

Scale : 1 : 1000



Ladder

		D		
		83.2		
3	4.2	51.0		
		C		
		H		
		101.0		
		39.4	8.2	2
		G		
		62.6		
		40.2	LINE	F
		E		
		H		
		63.2		
1	3.8	34.2		
		I		
		D		
		58.8		
		58.4	22.4	E
		G		
		186.8		
D	58.6	184.8		
C	56.2	101.8		
H	12.0	86.8		
B	16.4	43.6		
		31.2	19.0	I
		A		

District : Krishnagiri

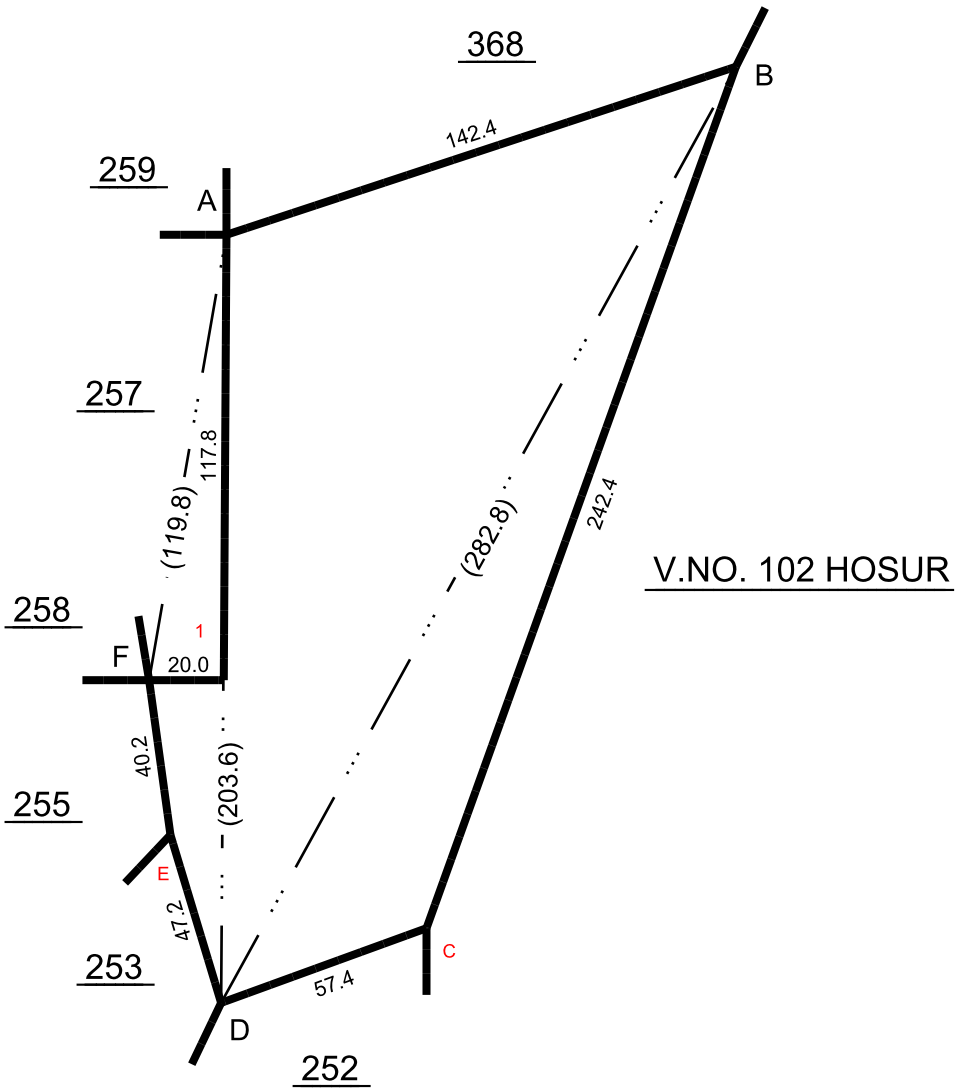
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 256

Area : Hect 01 Ares 93.00

Scale : 1 : 2000



Ladder

		B		
		282.8		
		43.6	37.6	C
		D		
		A		
		119.8		
		3.6	19.8	1
		F		
		A		
		203.6		
F	20.0	85.2		
E	13.8	45.0		
		D		
		A		
		142.4		
		B		

District : Krishnagiri

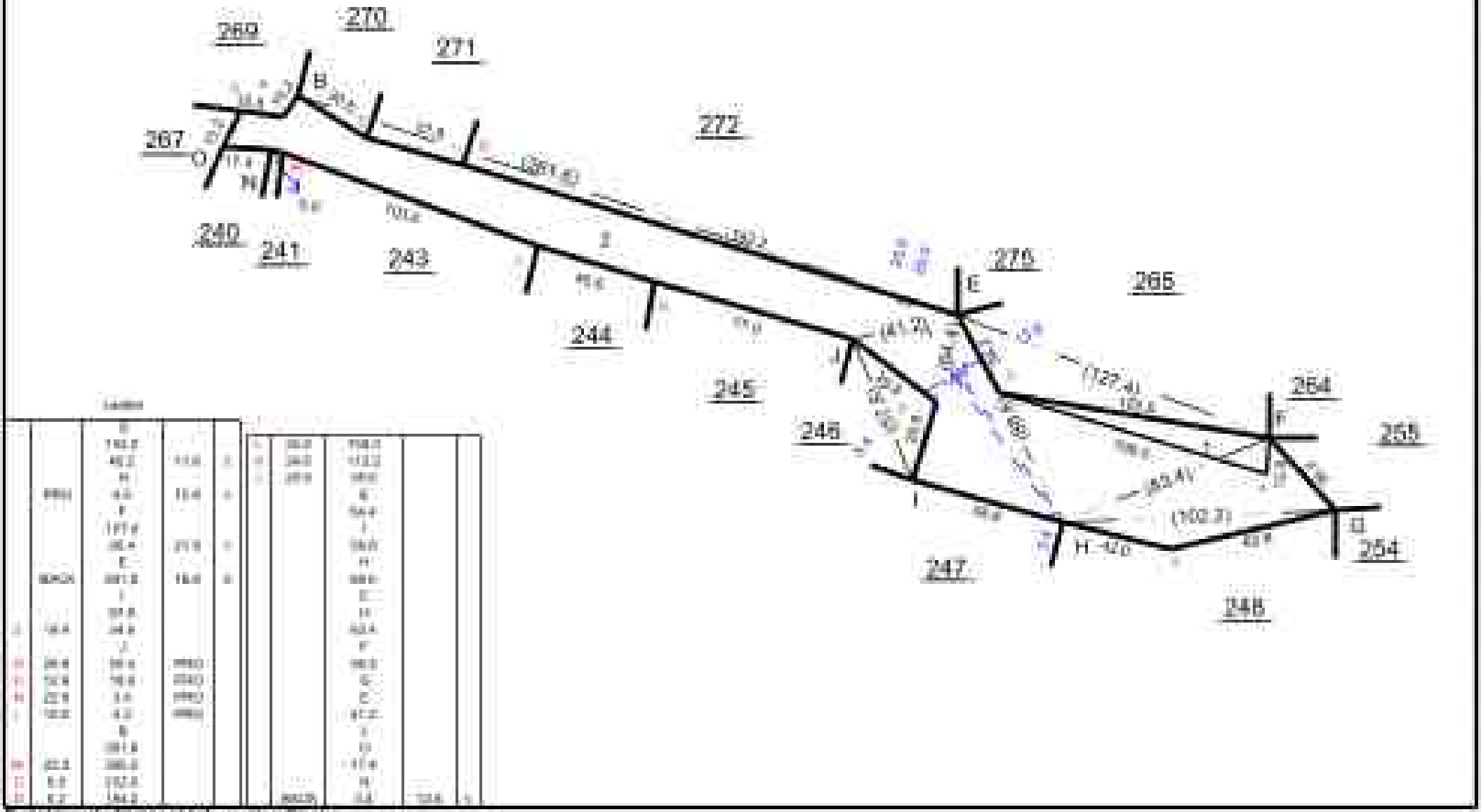
Survey No : 266

Taluk : Hosur [9]

Area : Hect 01 Ares 30.50

Village : MUKKONDAPALLI [88]

Scale : 1 : 2000



Cadastral : National Informatics Centre

District : Krishnagiri

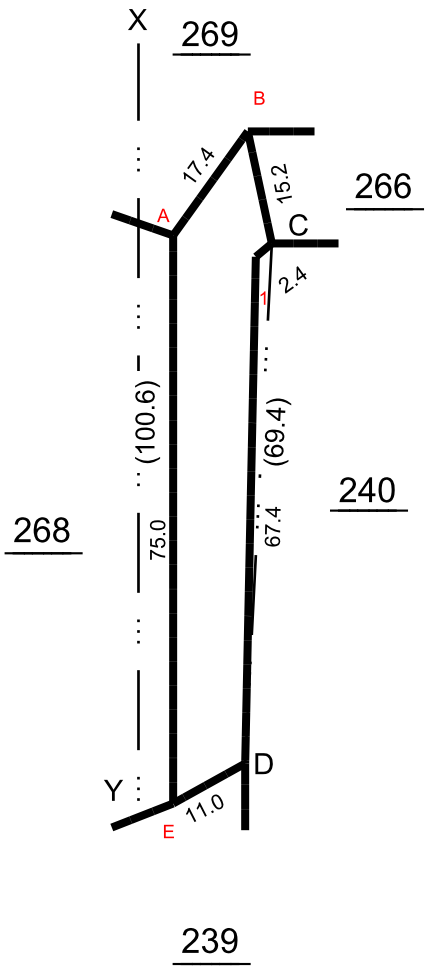
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 267

Area : Hect 00 Ares 8.50

Scale : 1 : 1000



Ladder

		Y		
		100.6		
E	4.6	100.6		
D	14.4	95.6		
C	17.8	26.8		
A	4.8	25.6		
B	14.8	11.8		
		X		
		D		
		69.4		
		1.6	2.0	1
		C		

NALLAH NUMBER – C6

District : Krishnagiri

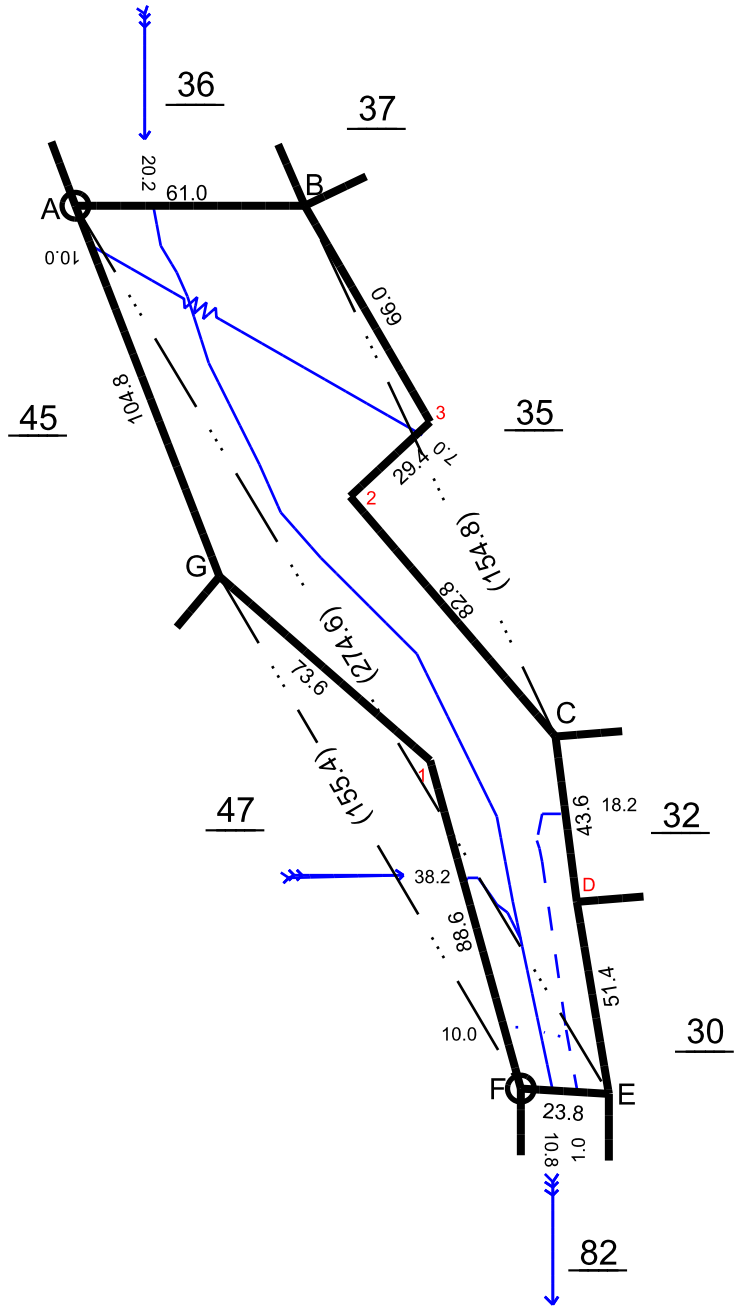
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 31

Area : Hect 01 Ares 5.00

Scale : 1 : 2000



Ladder

		B		
		154.8		
		89.0	5.6	3
2	22.2	80.4		
		C		
		E		
		274.6		
		261.2	18.8	F
D	19.0	226.8		
C	36.6	185.8		
		104.0	17.6	G
B	52.2	31.8		
		A		
		F		
		155.4		
1	23.0	70.2		
		G		

District : Krishnagiri

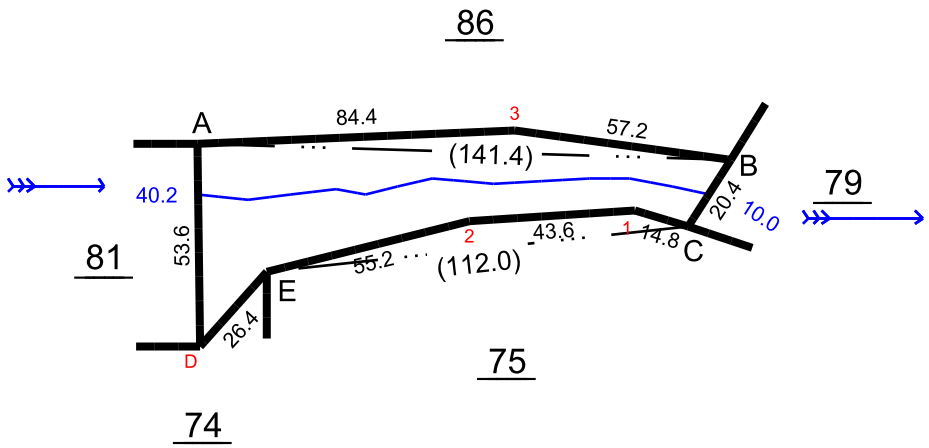
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 80

Area : Hect 00 Ares 39.00

Scale : 1 : 2000



Ladder

		B		
		141.4		
		130.8	17.4	C
3	6.0	84.4		
		20.0	33.4	E
		2.6	53.6	D
		A		
		E		
		112.0		
		57.2	7.2	2
		13.2	5.6	1
		C		

District : Krishnagiri

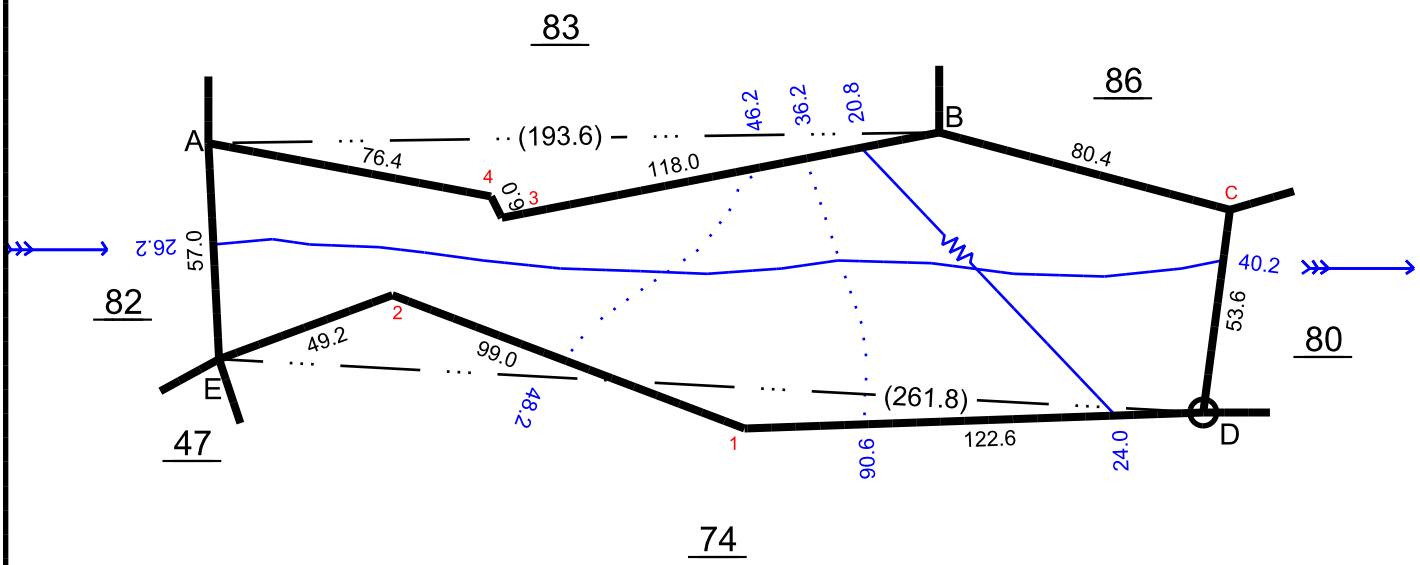
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 81

Area : Hect 01 Ares 49.00

Scale : 1 : 2000



Ladder

		A		
		193.6		
4	14.8	118.8		
3	20.6	116.4		
		B		
		E		
		261.8		
		216.6	19.2	2
1	11.2	122.0		
		74.4	70.0	B
		D		
	BACK	3.8	53.4	C
		E		
		57.0		
		A		

District : Krishnagiri

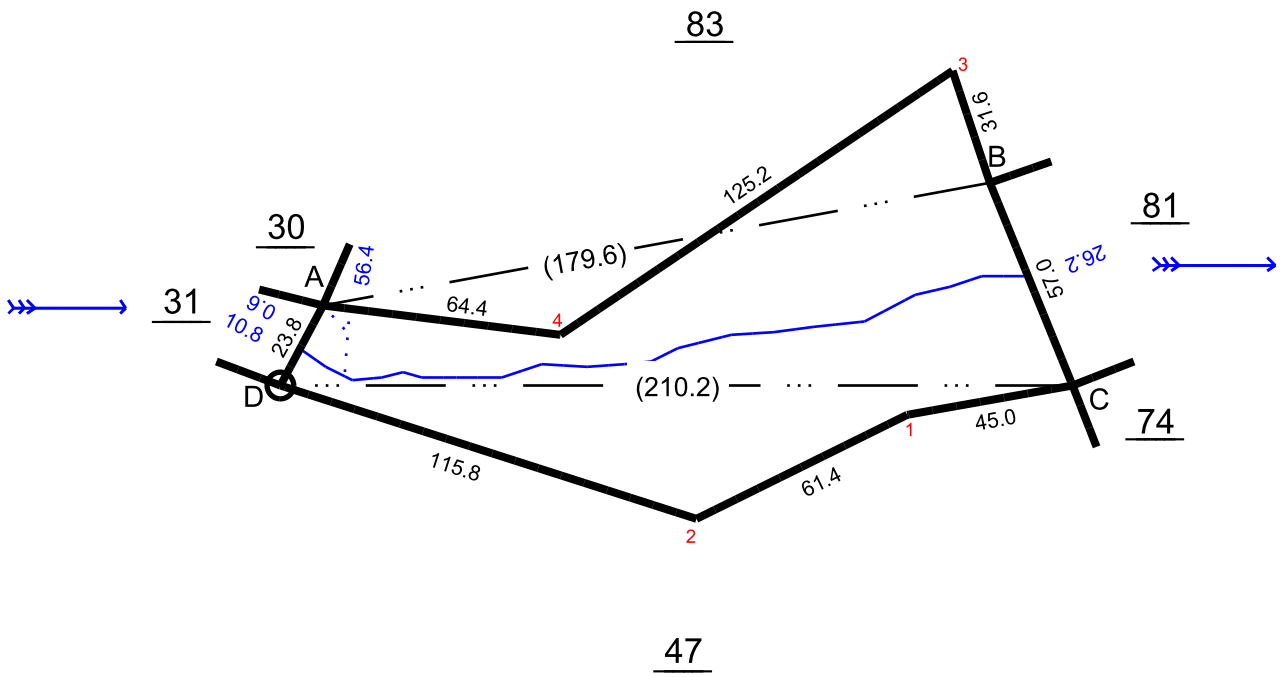
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 82

Area : Hect 01 Ares 4.50

Scale : 1 : 2000



Ladder

		A		
		179.6		
4	19.4	118.6		
		4.0	31.4	3
		B		
		D		
		210.2		
		198.6	21.0	A
2	35.4	99.8		
1	8.4	44.4		
		22.4	53.0	B
		C		

NALLAH NUMBER – C7

District : Krishnagiri

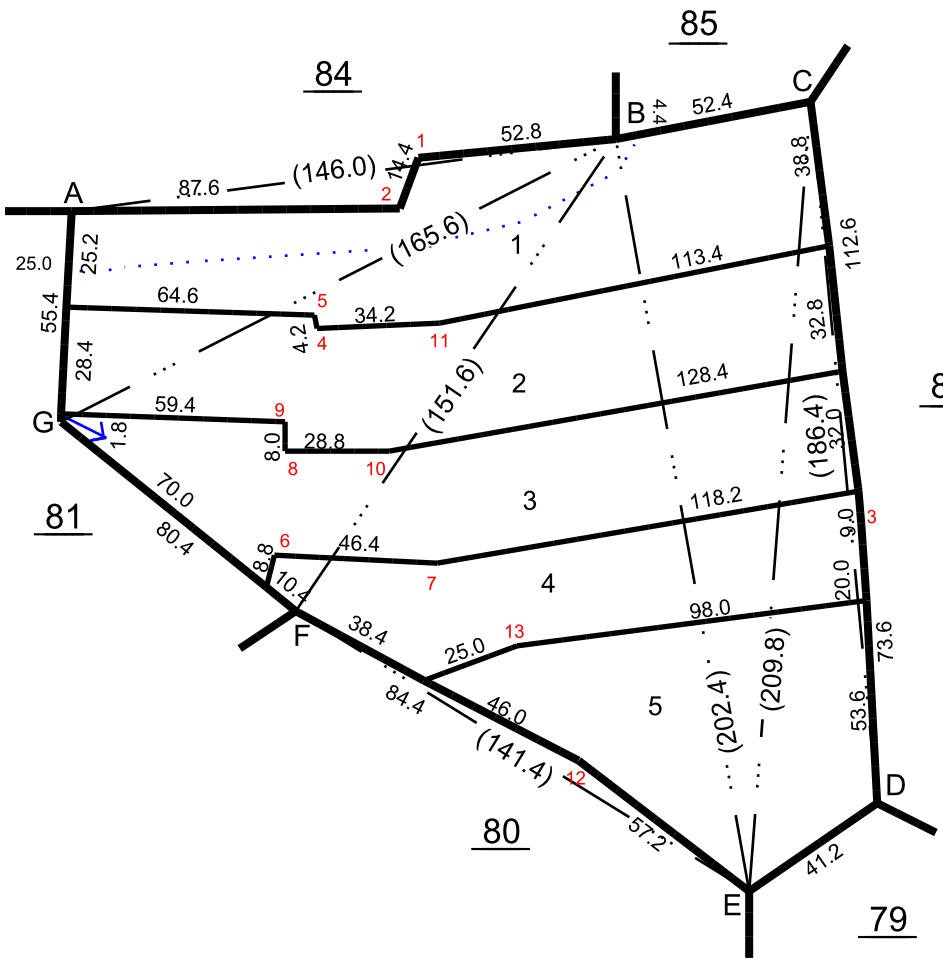
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 86

Area : Hect 02 Ares 92.00

Scale : 1 : 2000



		Ladder		
		B		
		202.4		
13	49.0	74.8		
		E		
		B		
		151.6		
11	11.0	84.8		
10	3.0	49.4		
9	31.2	40.0		
8	26.8	33.6		
		32.2	24.2	7
6	13.2	9.0		
		F		
		E		
		141.4		
12	6.0	84.4		
		F		
		C		
		209.8		
	61.2	195.0		
		26.2	32.0	
		E		
		B		
		165.6		
		72.8	5.4	5
		71.6	9.2	4
	48.2	28.2		
		G		
		D		
		186.4		
3	3.0	112.6		
		C		
		A		
		146.0		
2	11.0	59.6		
		52.8	2.0	1
		B		
		A		
		55.4		
		G		
		D		
		41.2		
		E		
		B		
		52.4		
		C		
		G		
		80.4		
		F		

District : Krishnagiri

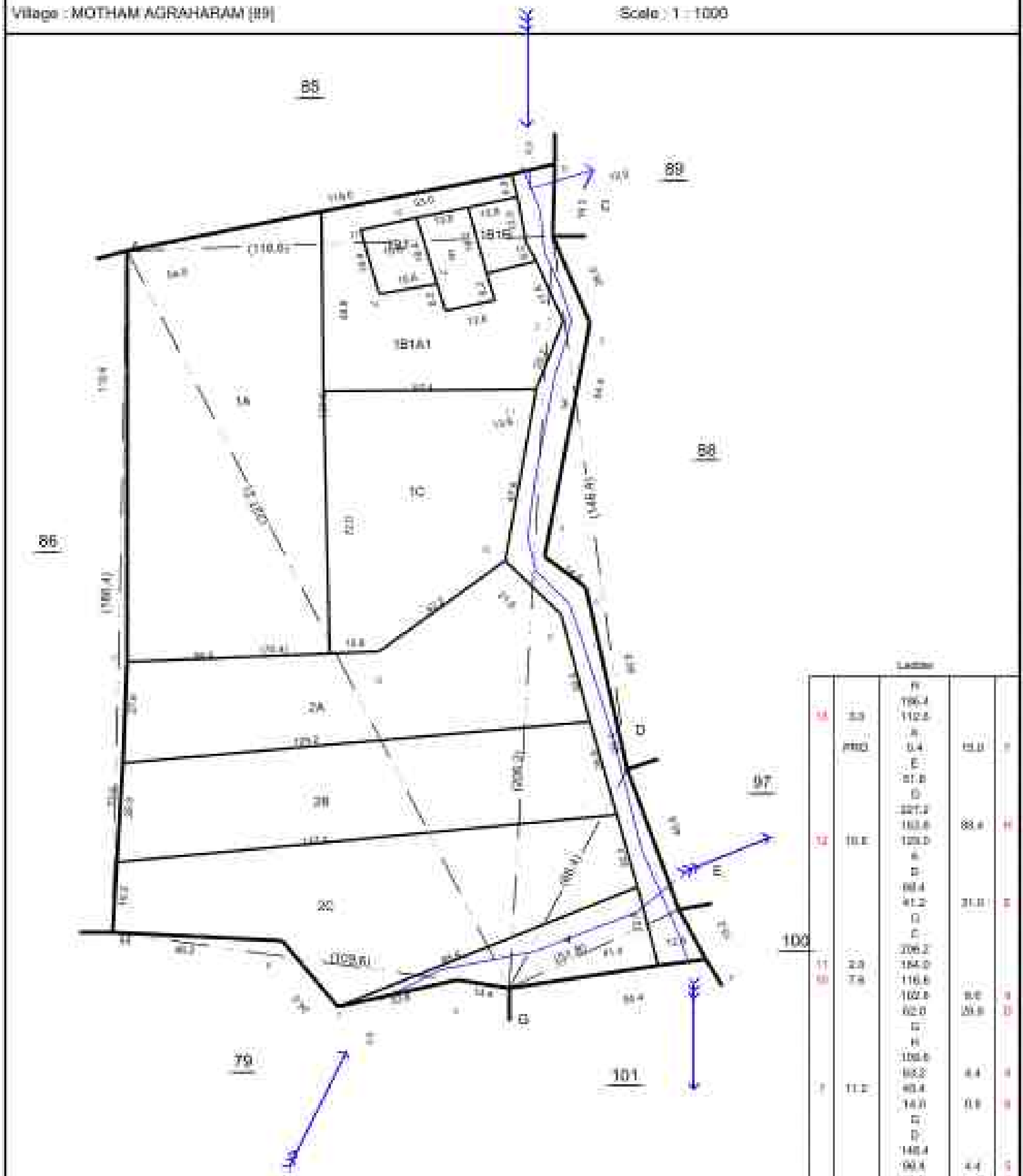
Survey No : 87

Taluk : Hosur [9]

Area : Hect 02 Area 68.54

Village : MOTHAM AGRAHARAM [89]

Scale : 1 : 1000



		Eastings		
13	3.9	N 190.4 112.8 A 0.4 E 61.8 D 227.2	15.0	F
	PRO			
12	19.6	163.6 129.0 A D 68.4	88.8	H
		41.2 D C 206.2	31.0	E
11	2.9	184.0		
10	7.6	116.6 102.8	8.6	B
		62.6	35.8	D
		G H 108.6		
		68.2	6.4	A
7	11.2	46.4 14.0 G D 148.4	0.8	B
		66.8	4.4	C
		86.2	14.6	A
5	9.6	35.0 23.4 C	9.2	J
4	19.2	1.2 C 116.6	PRO	
		109.2	1.4	I
		86.4	11.8	H
15	6.0	79.6 83.0	19.8	G
17	3.4	86.2 A		

Collected : Revenue Informatics Centre

NALLAH NUMBER – C8

District : Krishnagiri

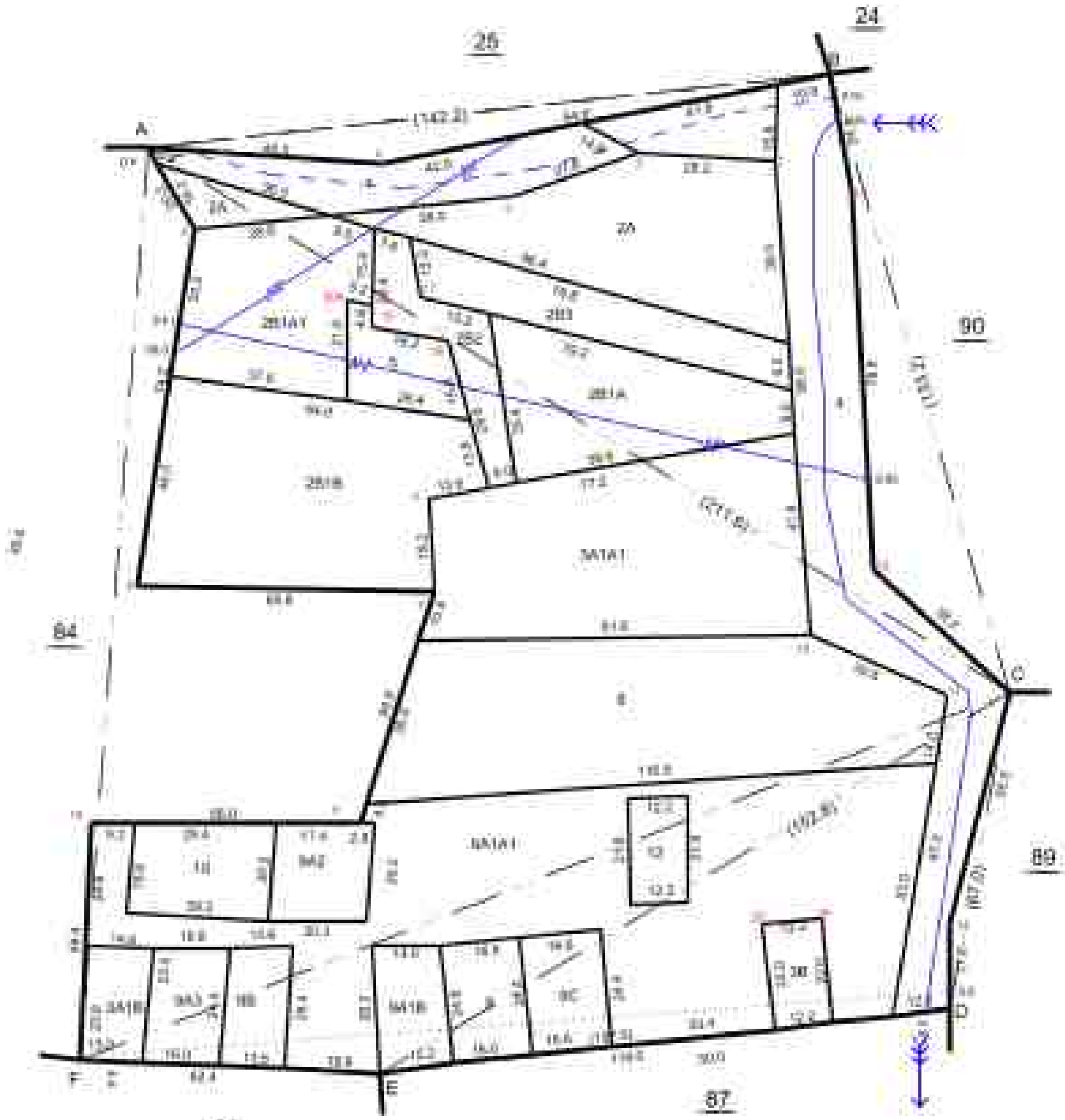
Survey No : 88

Taluk : Hosur [9]

Area : Hect 02 Ares 89.57

Village : MOTHAM AGRAHARAM [89]

Scale : 1 : 1000



Ladder

		D					E		
		142.2					152.8		
		97.8	46.6	16	D	65.0	44.6		
		52.5	38.8	17			E		
		42.2	42.0	18			F		
		A					188.8		
		211.8					140.8	1.4	49
21	13.5	124.8			8	54.4	136.8		
		100.4	88.0	9	4	4.8	91.2		
15	12.4	41.8			7	65.8	87.5		
20a	4.6	158.8			6	63.6	68.4		
		C			5	11.8	16.6		
		87.5					A		
14	5.4	17.2					142.2		
		D			9	8.8	56.2		
		B			3	16.4	67.5		
		153.2			2	12.0	41.4		
13	2.4	108.0			1	16.4	13.8		
12	20.8	32.2					B		
		C					E		
		207.4					116.0		
11	4.0	185.0					87.8	33.0	20
		36.8	25.2	1			24.8	32.0	19
		F					B		

District : Krishnagiri

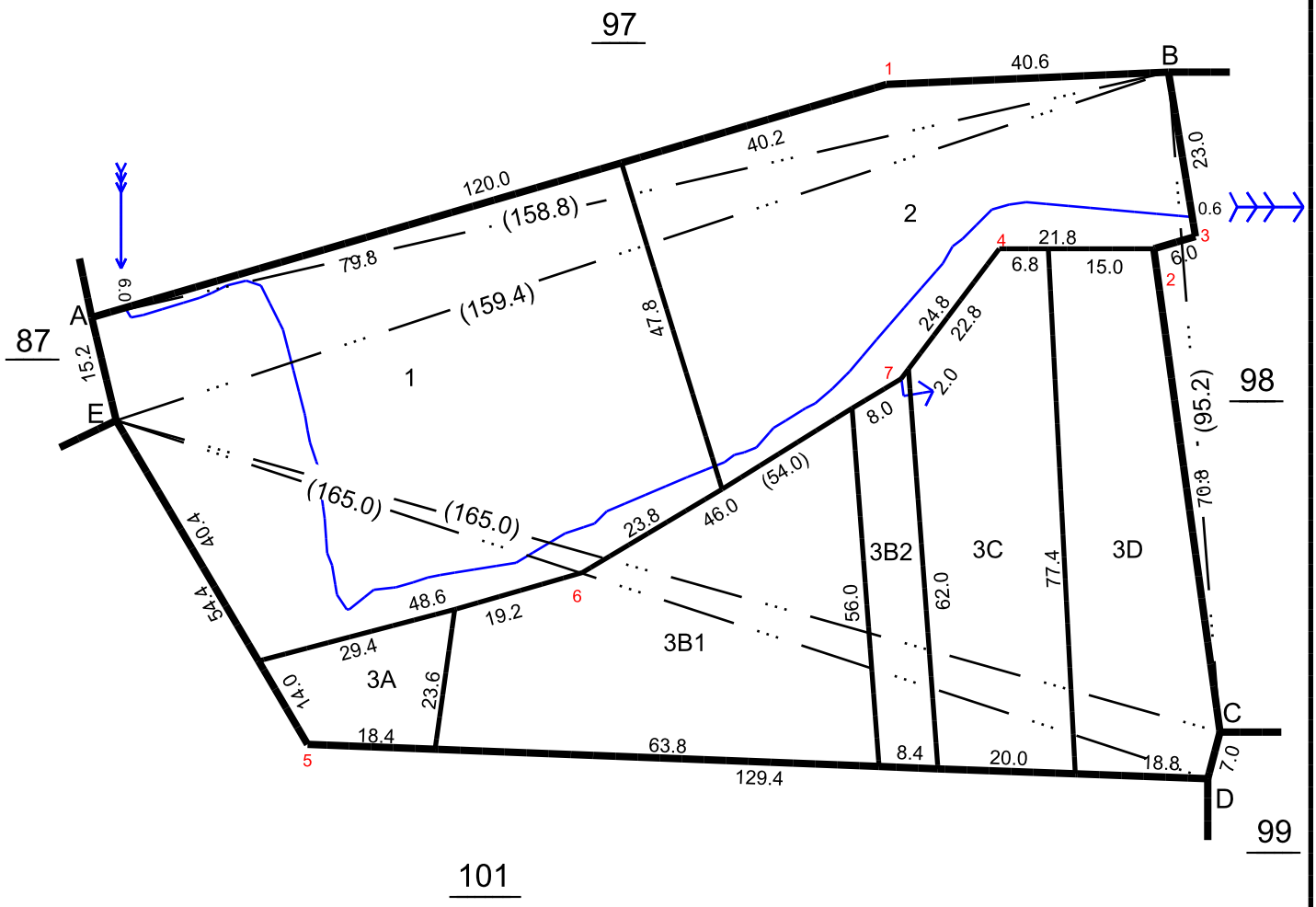
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 100

Area : Hect 01 Ares 25.50

Scale : 1 : 1000



Ladder

		B			2	4.2	70.0		
		159.4					C		
A	15.2	1.4					A		
		E					158.8		
		D					136.8	LINE	
		165.0					40.0	7.2	1
7	40.8	105.2					B		
		70.4	LINE	6			C		
		40.6	35.8	5			165.0		
		37.2	19.2				E		
		E					15.2		
		B					A		
		95.2					C		
4	26.2	72.0					7.0		
		71.6	2.0	3			D		

NALLAH NUMBER – C9

District : Krishnagiri

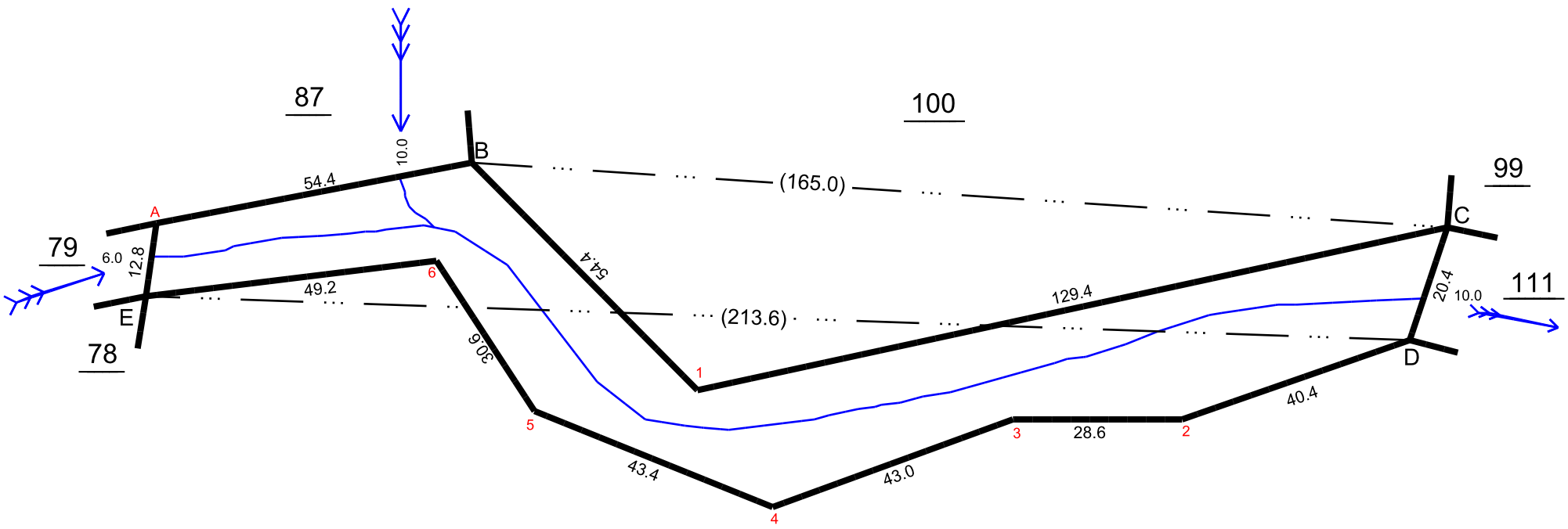
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 101

Area : Hect 00 Ares 39.50

Scale : 1 : 1000



Ladder

		E		
		213.6		
		212.2	12.6	A
		164.8	7.6	6
		159.2	24.4	B
5	17.2	147.2		
4	32.0	106.6		
3	15.6	66.6		
2	14.6	37.8		
		D		
	BACK	6.0	19.4	C
		C		
		165.0		
		40.6	35.8	1
		B		

District : Krishnagiri

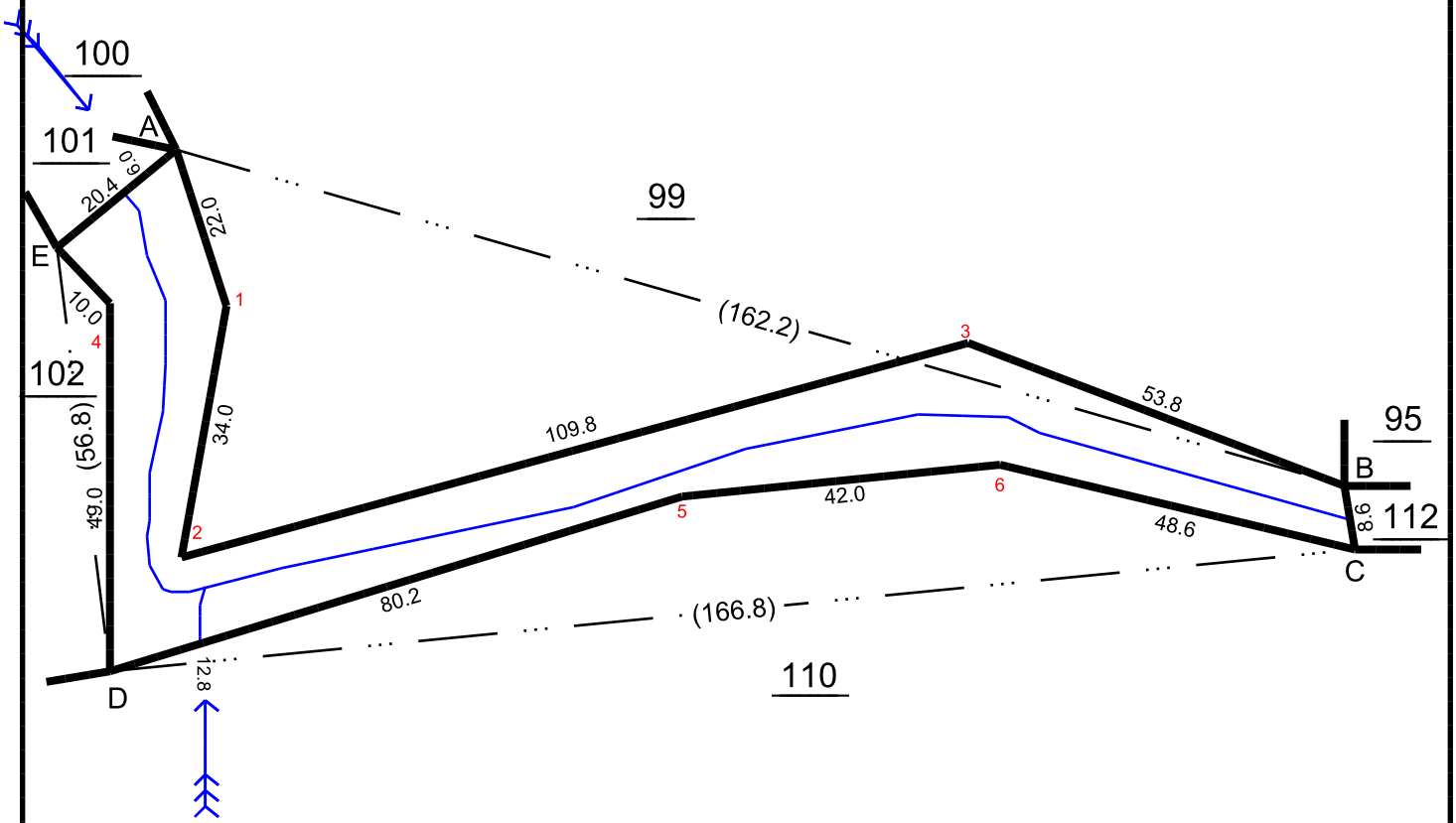
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 111

Area : Hect 00 Ares 21.00

Scale : 1 : 1000



District : Krishnagiri

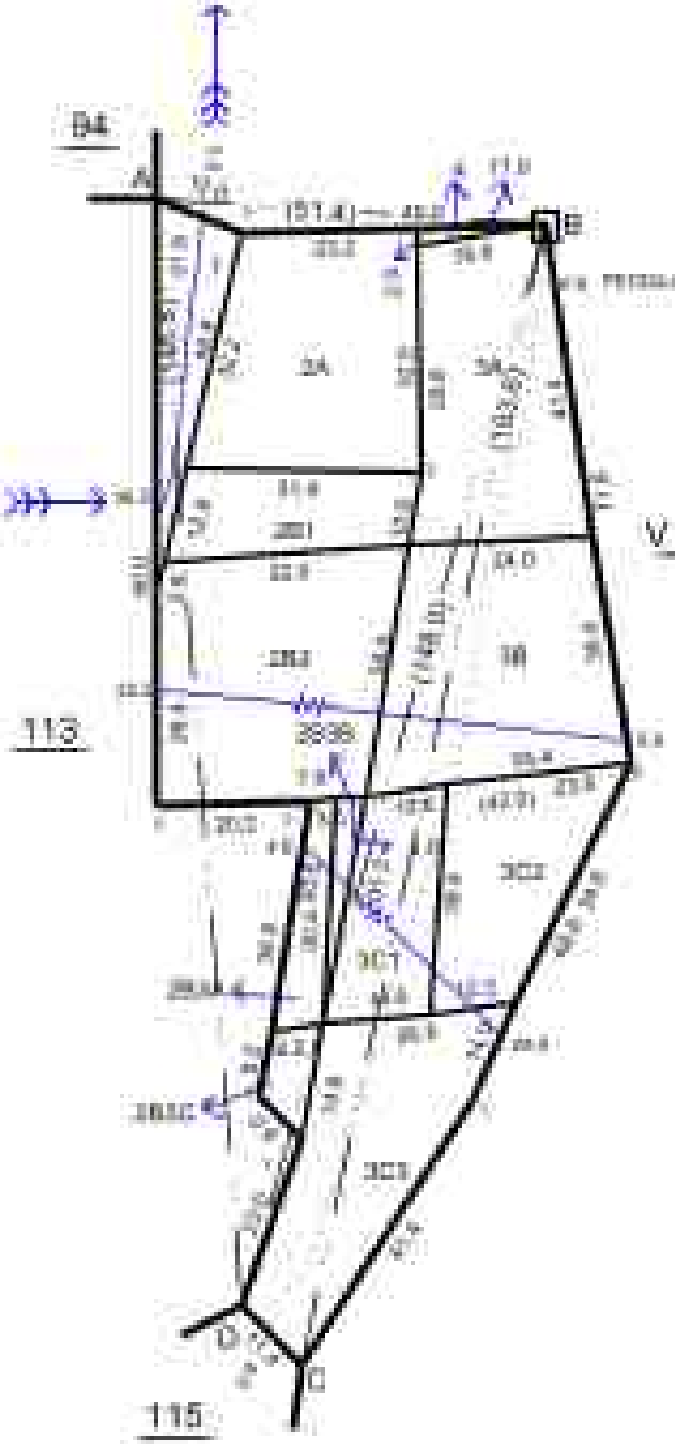
Survey No : 114

Taluk : Hosur [9]

Area : Hect 00 Aces 67.50

Village : MOTHAM AGRAHARAM [89]

Scale : 1 : 1000



Ladder

		B		
		153.0		
		88.0	22.0	8
		88.0	14.0	7
D	8.8	8.8		
		C		
		D		
		168.0		
		88.0	7.0	6
		B		
		81.4		
		11.4	3.8	5
		A		
		168.0		
		136.0	85.4	10
		120.0	0.4	
4	6.2	88.0		
		48.0	18.8	3
		27.8	4.8	2
		21.0	9.6	1
		D		

Created and : National Informatics Centre

NALLAH NUMBER – C11

District : Krishnagiri

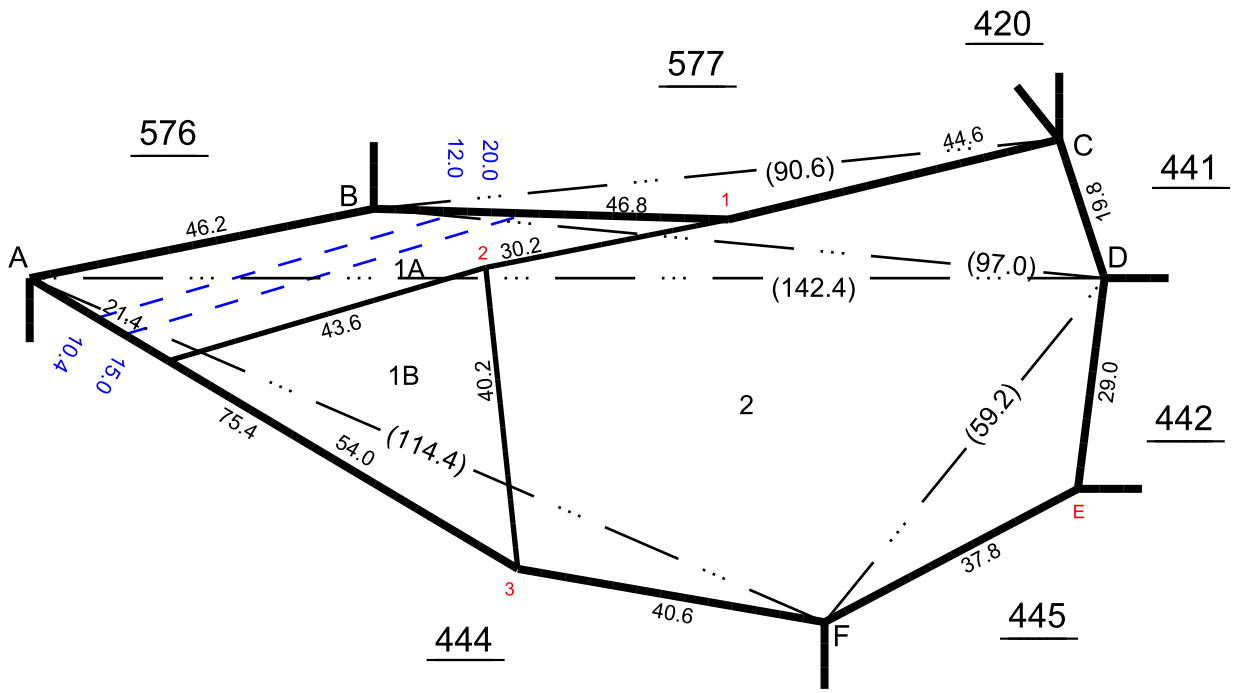
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 443

Area : Hect 00 Ares 57.00

Scale : 1 : 1000



		Ladder		
		D		
		59.2		
		34.8	14.8	E
		F		
		114.4		
		74.6	9.6	3
		A		
		142.4		
		96.8	9.0	B
		82.0	1.2	2
F	45.8	37.2		
		D		
		B		
		97.0		
		8.0	17.6	C
		D		
		C		
		90.6		
		46.4	6.2	1
		B		

District : Krishnagiri

Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 444

Area : Hect 01 Aces 32.04

Scale : 1 : 1000

Latitude

		F					103.4	12.0	C						
		154.0			6	13.2	31.2								
D	62.6	91.0					F								
		46.8	93.0	B			20.6								
		C					8.2	3.6	A				106.4	14.8	22
		B					A						88.8	23.8	23
		126.2					C						106.8	24.0	24
		9.6	1.8	3			113.6						A		
A	10.8	12.8			2	1.0	26.8						E		
		F					B						110.6		
		D					114.4			7	22.8		44.8		
		89.0					78.6	9.6	1	8	22.4		36.2		
		83.8	2.8	4			95.8	14.4	21				D		

District : Krishnagiri

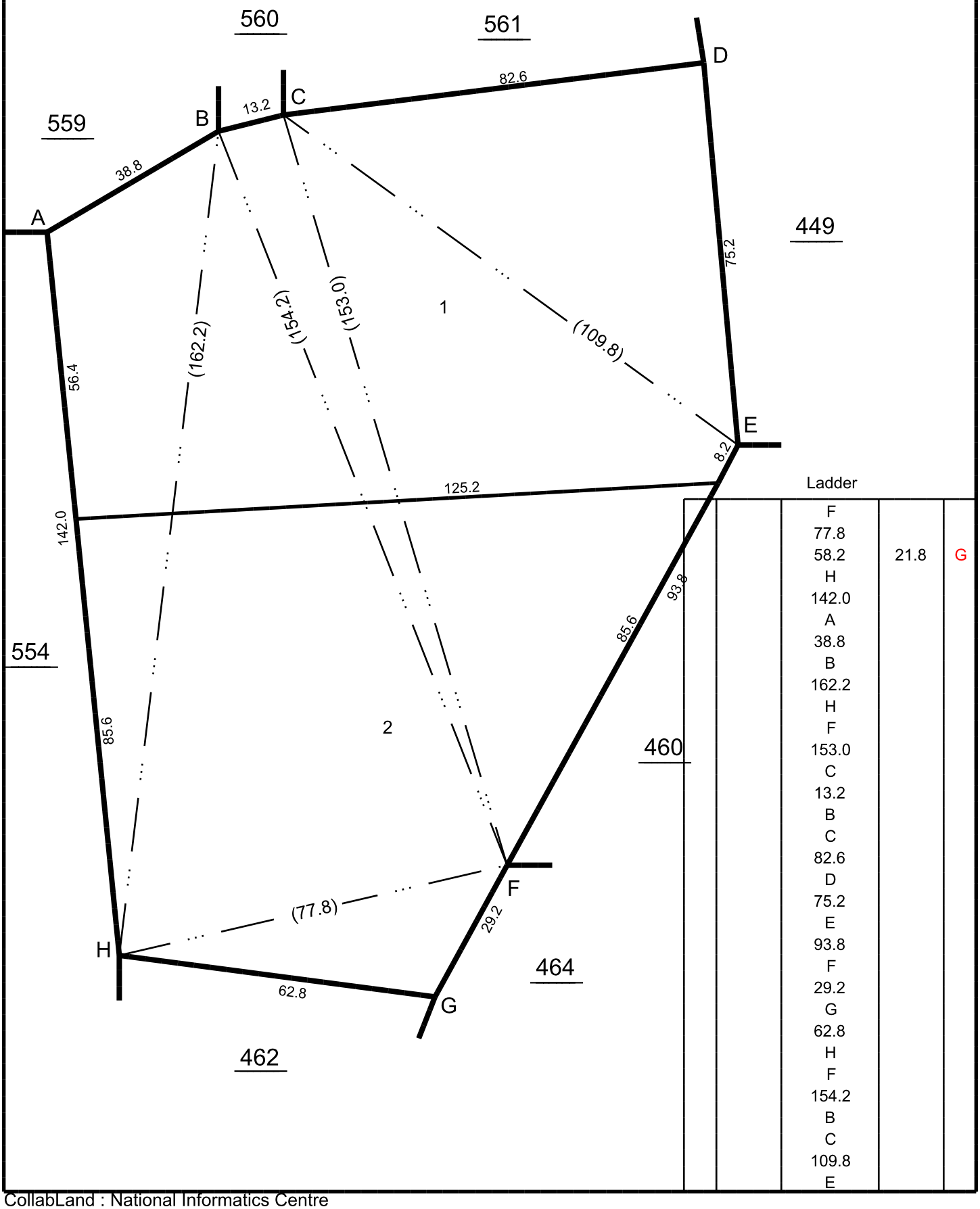
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 461

Area : Hect 01 Ares 86.00

Scale : 1 : 1000



District : Krishnagiri

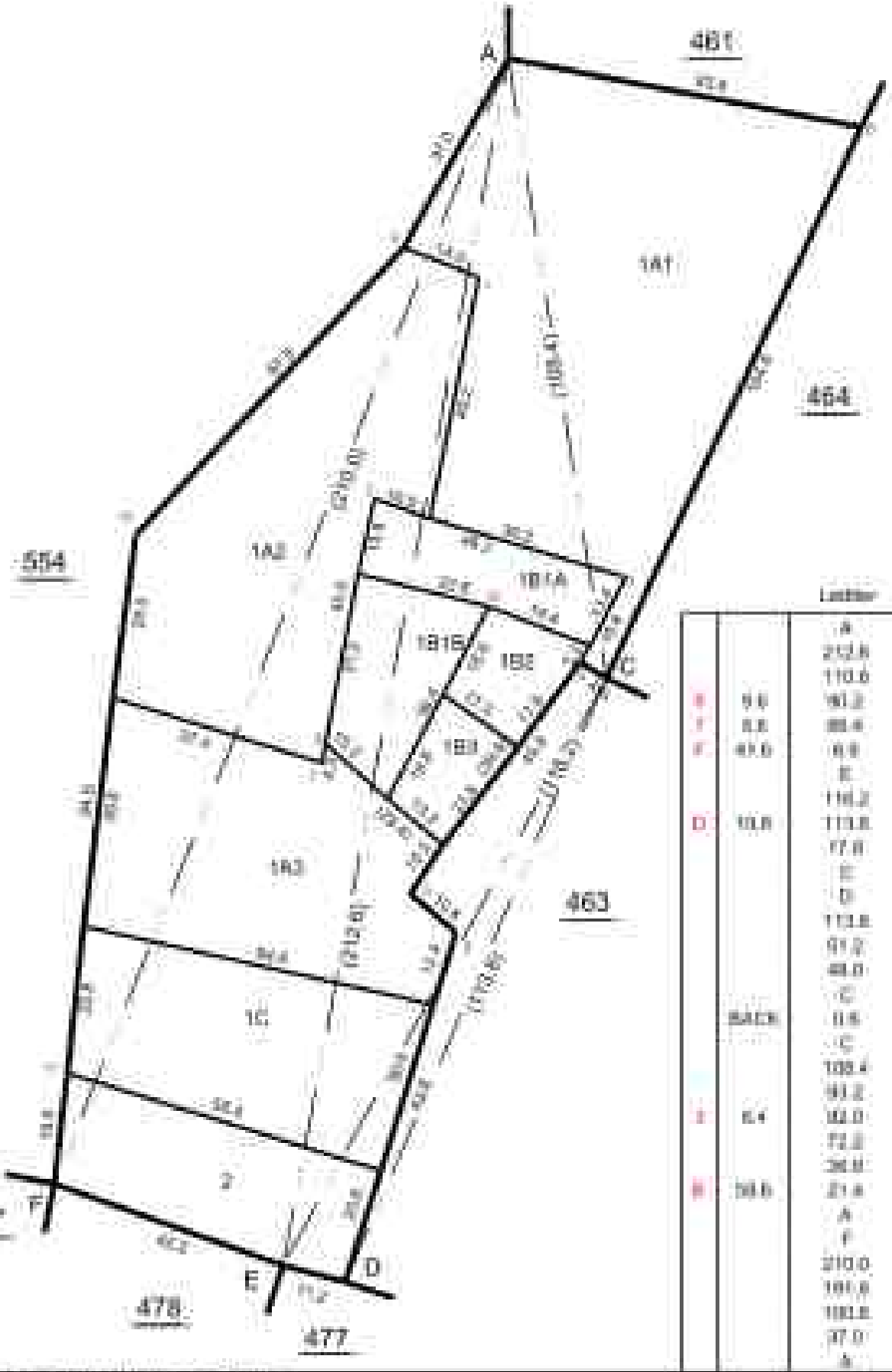
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 462

Area : Hect 01 Ares 42.00

Scale : 1 : 1000



Ladder

		A		
		212.6		
		110.6	37.6	C
8	9.6	90.2		
7	8.8	88.4		
6	41.6	8.8		
		E		
		116.2		
D	10.8	113.8		
		17.8	0.0	6
		E		
		D		
		113.8		
		91.2	9.0	5
		48.0	56.2	3
		C		
	BACK	11.6	4.8	4
		C		
		108.4		
		93.2	17.6	12
3	6.4	82.0		
		72.2	34.8	2
		36.8	10.4	1
B	56.6	21.4		
		A		
		F		
		210.0		
		191.8	5.6	11
		180.8	28.0	10
		37.0	4.0	9
		A		

District : Krishnagiri

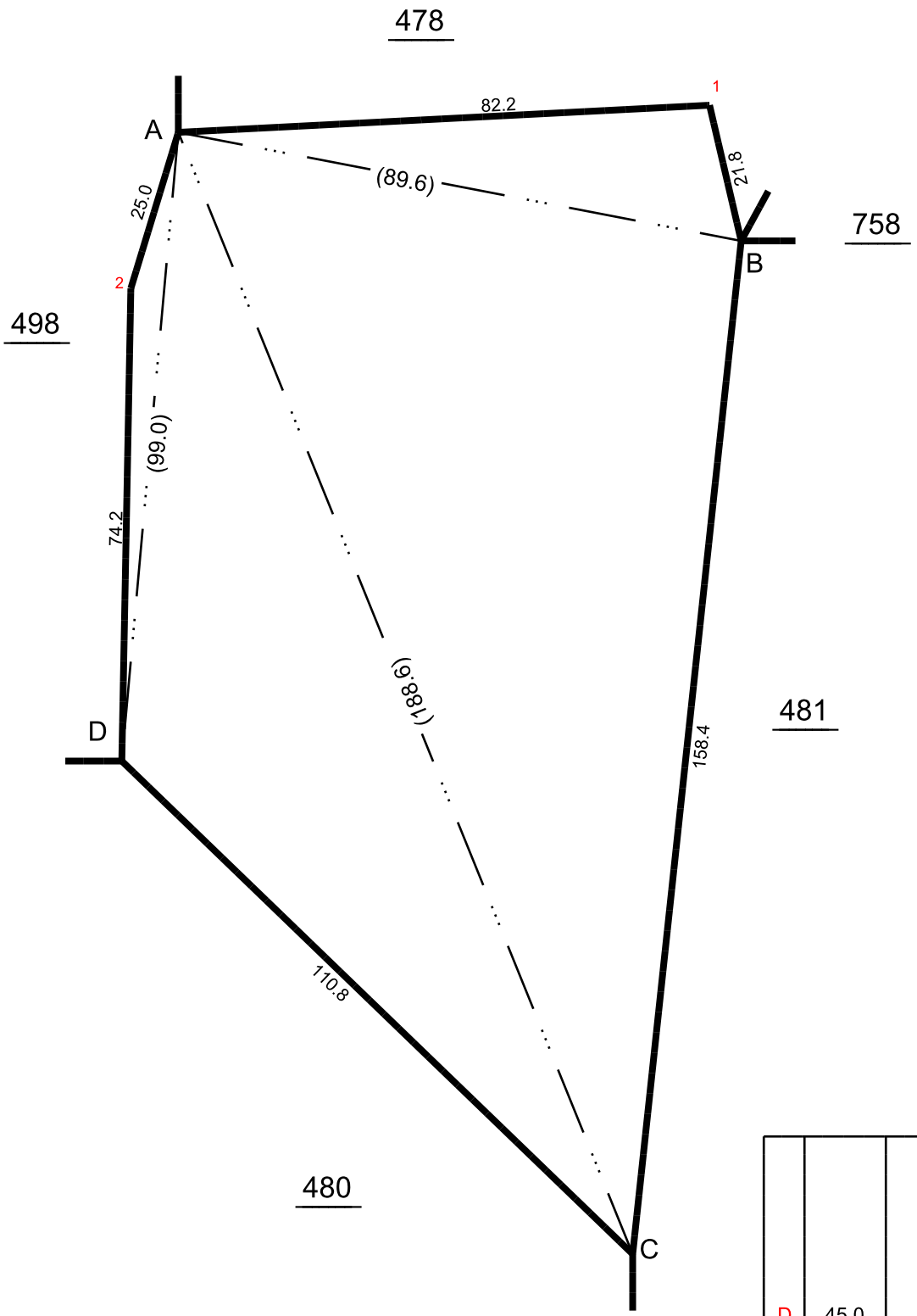
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 479

Area : Hect 01 Ares 26.50

Scale : 1 : 1000



Ladder

		D		
		99.0		
		24.6	5.4	2
		A		
		188.6		
		140.2	75.0	B
D	45.0	101.0		
		C		
		B		
		89.6		
1	19.8	80.4		
		A		

District : Krishnagiri

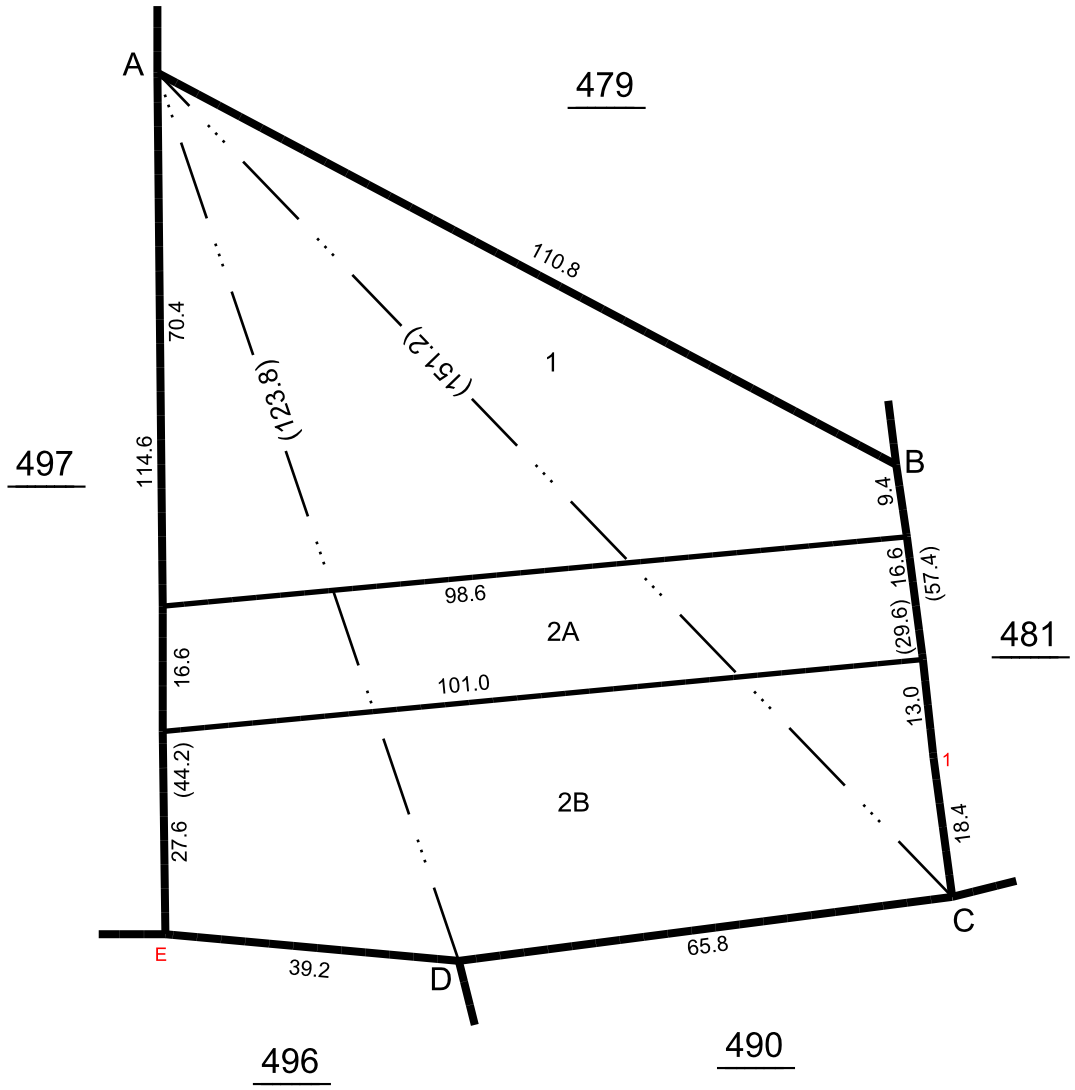
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 480

Area : Hect 00 Ares 89.50

Scale : 1 : 1000



Ladder

		B		
		57.4		
		18.4	LINE	1
		C		
		A		
		123.8		
E	35.6	15.8		
		D		
		A		
		151.2		
		46.0	34.2	B
D	53.0	39.2		
		C		

District : Krishnagiri

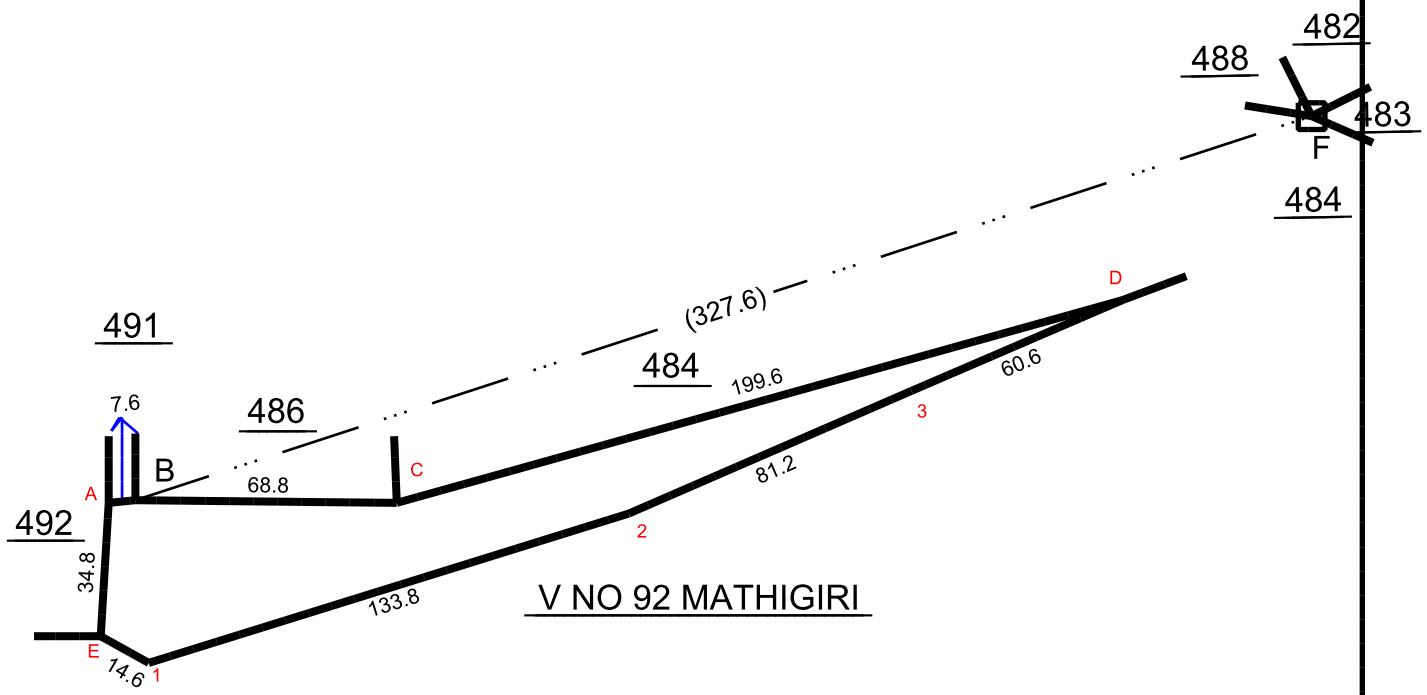
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 485

Area : Hect 00 Ares 53.00

Scale : 1 : 2000



Ladder

		F		
		327.6		
		265.0	30.4	D
		204.4	36.0	3
		123.6	43.8	2
		65.6	22.2	C
		B		
	BACK	20.0	31.2	E
	BACK	10.2	42.2	1
A	1.6	7.4	BACK	

District : Krishnagiri

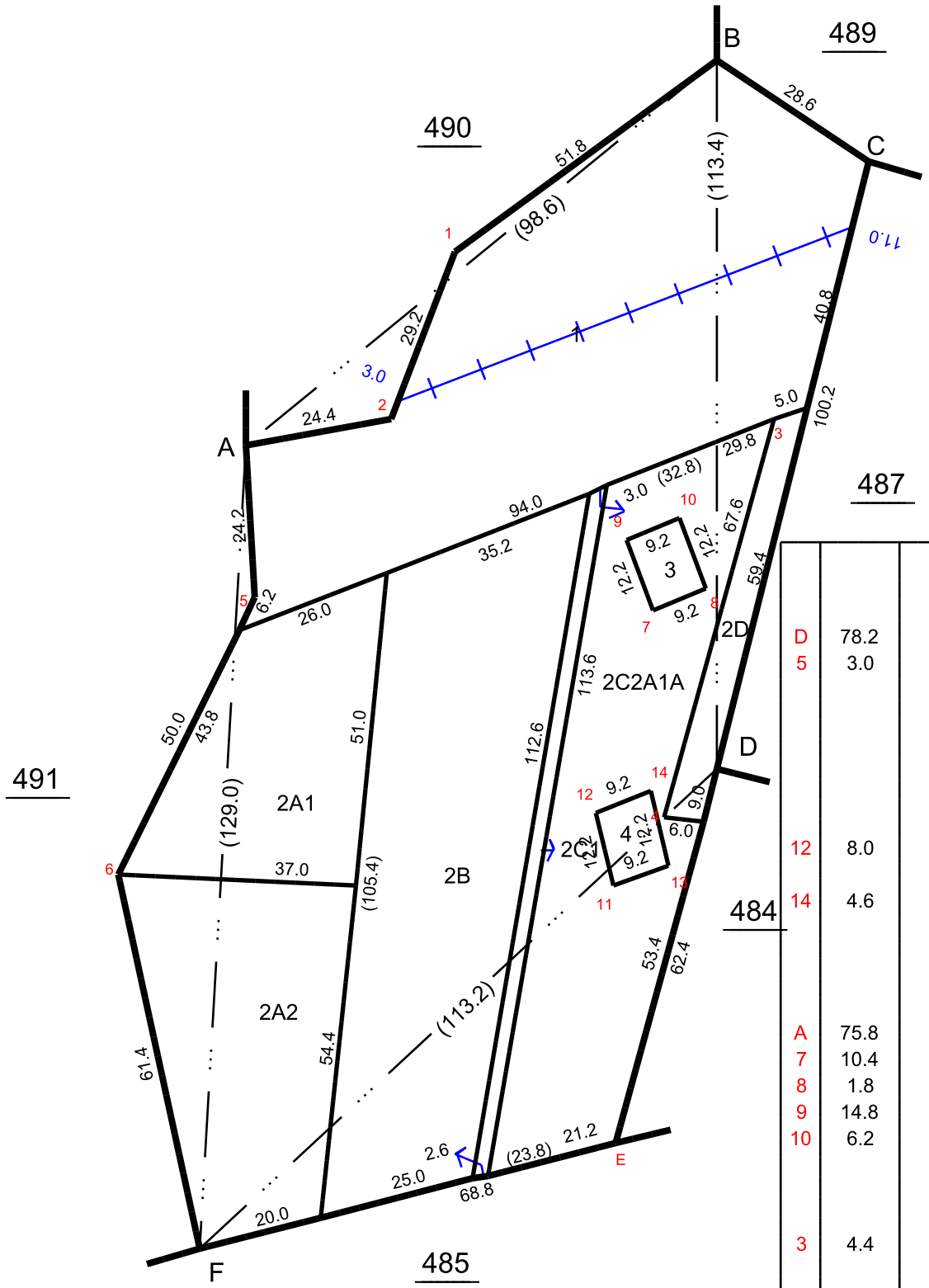
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 486

Area : Hect 01 Ares 31.22

Scale : 1 : 1000



Ladder

		F		
		129.0		
		70.0	16.4	6
D	78.2	47.4		
5	3.0	24.2		
		A		
		D		
		113.2		
		101.4	LINE	4
		60.4	33.0	E
		88.0	2.6	11
12	8.0	94.0		
		96.6	6.0	13
14	4.6	102.6		
		F		
		B		
		113.4		
		97.2	24.4	C
A	75.8	51.8		
7	10.4	25.2		
8	1.8	28.8		
9	14.8	36.6		
10	6.2	40.0		
		D		
		C		
		100.2		
3	4.4	56.6		
		D		
		A		
		98.6		
2	11.6	77.0		
		52.0	2.6	1
		B		

District : Krishnagiri

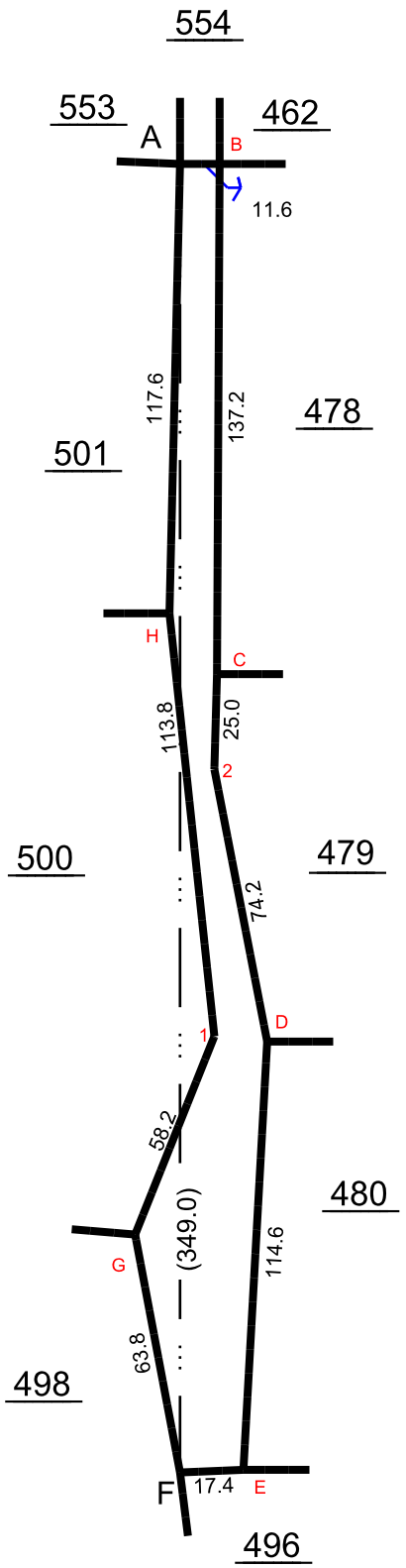
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 497

Area : Hect 00 Ares 59.00

Scale : 1 : 2000



Ladder

		A		
		349.0		
		349.0	11.2	B
H	3.4	229.2		
		212.4	10.0	C
		187.4	9.2	2
		116.2	9.4	1
		114.6	23.8	D
G	12.0	62.8		
		0.6	17.4	E
		F		

District : Krishnagiri

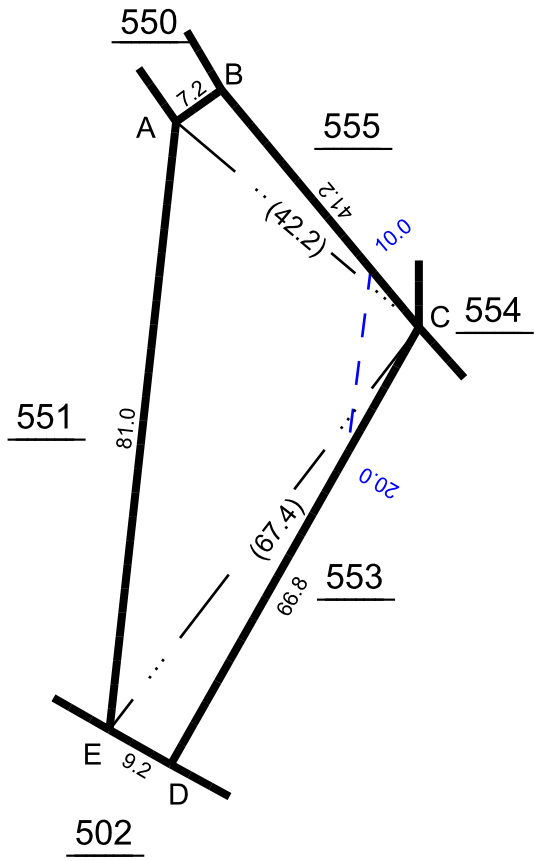
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 552

Area : Hect 00 Ares 19.00

Scale : 1 : 1000



Ladder

		A		
		7.2		
		B		
		41.2		
		C		
		42.2		
		A		
		81.0		
		E		
		67.4		
		C		
		66.8		
		D		
		9.2		
		E		

District : Krishnagiri

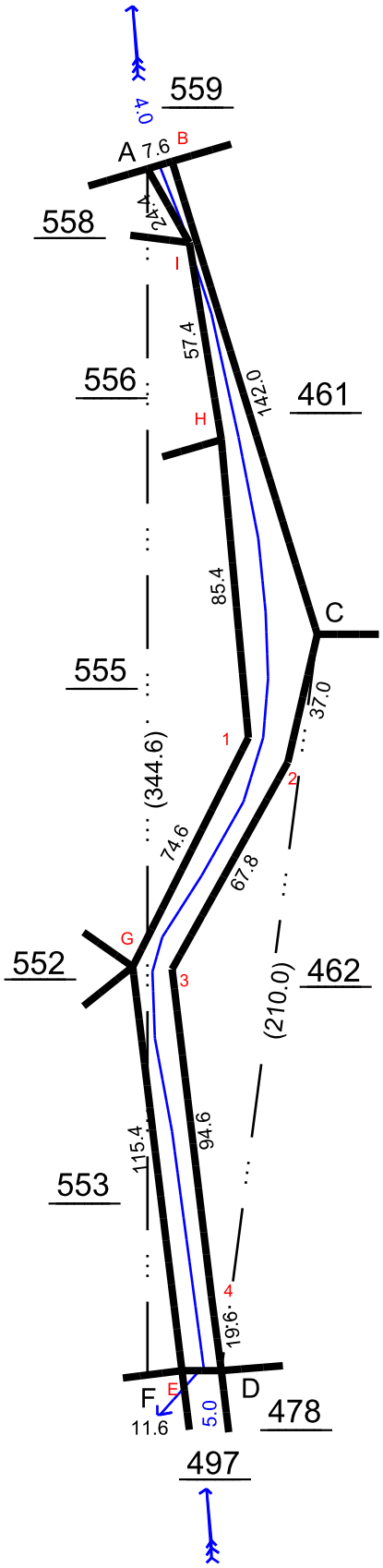
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 554

Area : Hect 00 Ares 41.00

Scale : 1 : 2000



Ladder

		D		
		210.0		
		191.6	5.4	4
		100.6	29.0	3
		37.0	4.0	2
		C		
	PRO	2.2	7.6	B
		A		
		344.6		
		323.6	12.4	I
		266.8	21.6	H
		211.0	49.2	C
		182.0	29.6	1
G	4.6	115.8		
		0.6	21.6	D
		0.6	10.0	E
		F		

District : Krishnagiri

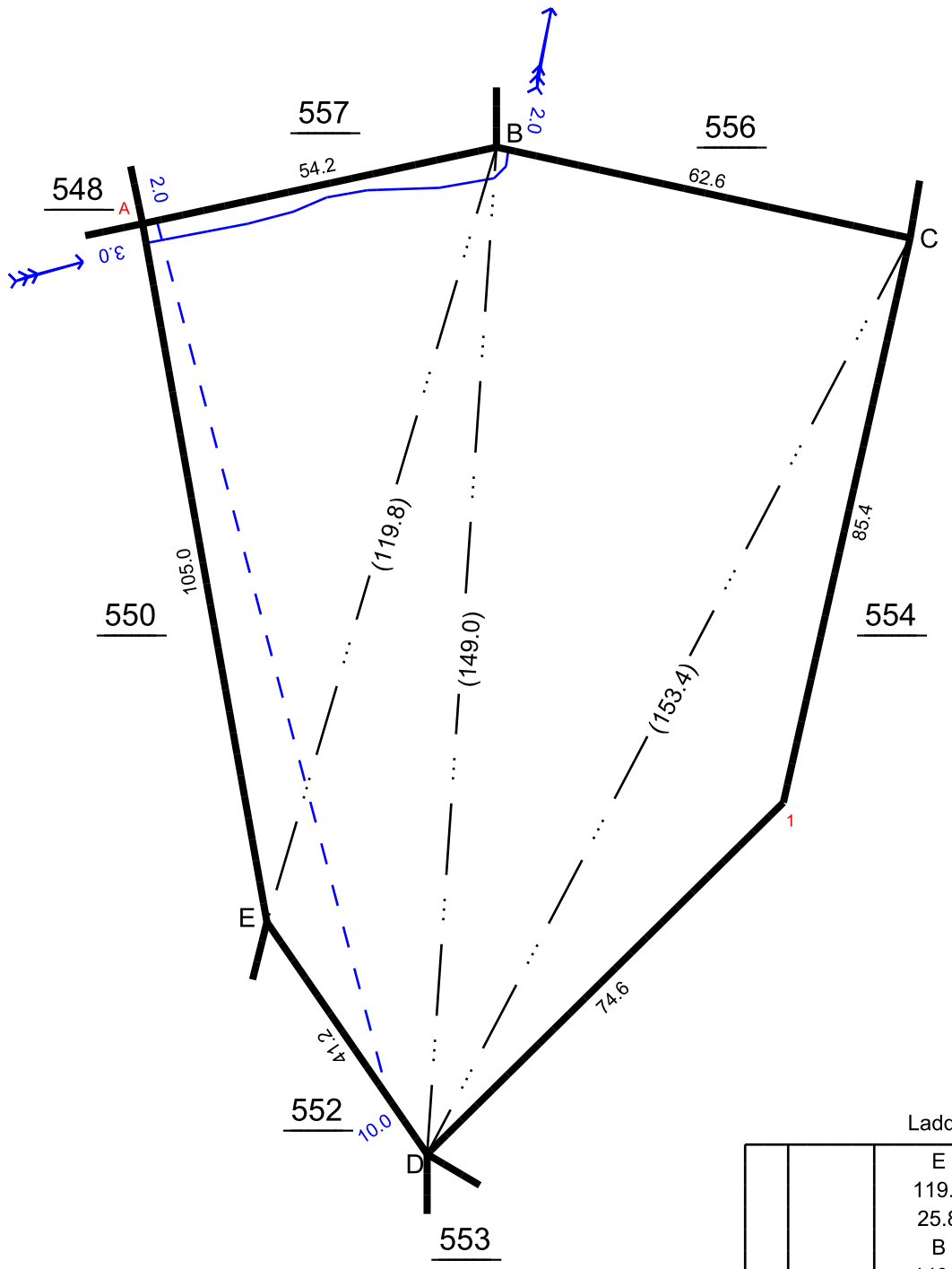
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 555

Area : Hect 01 Ares 11.50

Scale : 1 : 1000



Ladder

		E		
		119.8		
		25.8	47.0	A
		B		
		149.0		
		139.8	61.8	C
E	26.0	32.6		
		D		
		153.4		
1	22.4	82.4		
		C		

District : Krishnagiri

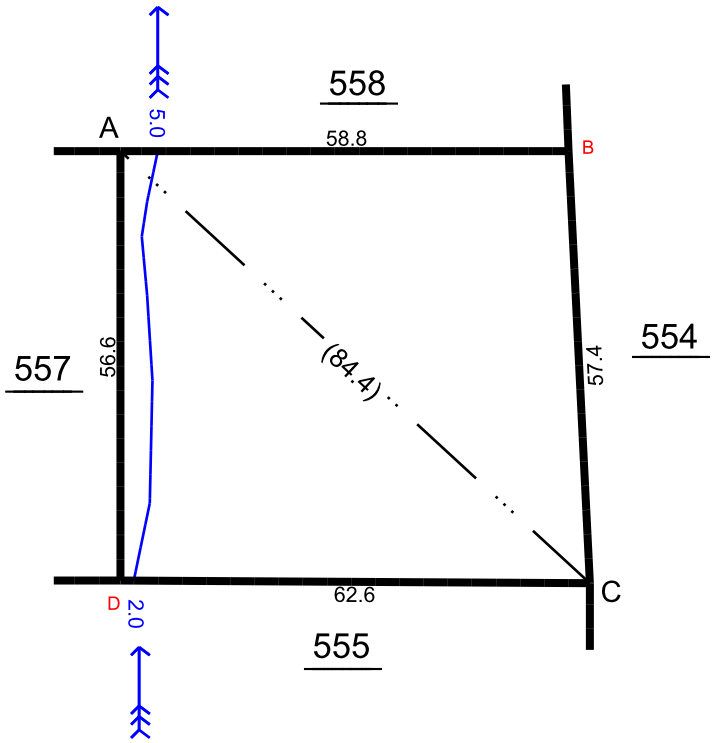
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 556

Area : Hect 00 Ares 35.00

Scale : 1 : 1000



Ladder

D	42.0	A 84.4 45.8 40.8 C	40.0	B

District : Krishnagiri

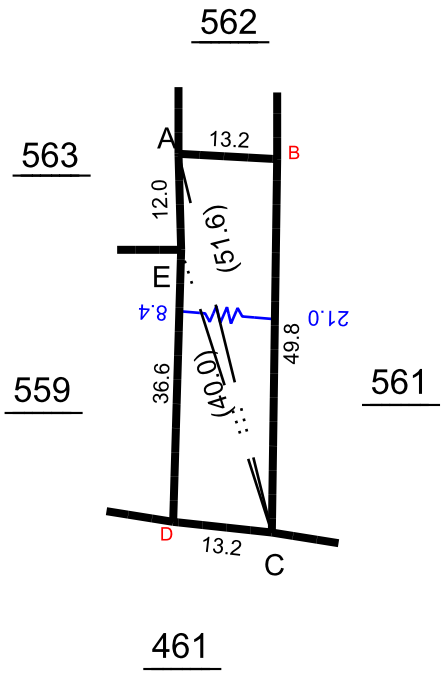
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 560

Area : Hect 00 Ares 6.50

Scale : 1 : 1000



Ladder

		E		
		40.0		
D	12.4	5.6		
		C		
		A		
		51.6		
		47.8	12.6	B
E	2.6	39.4		
		C		

District : Krishnagiri

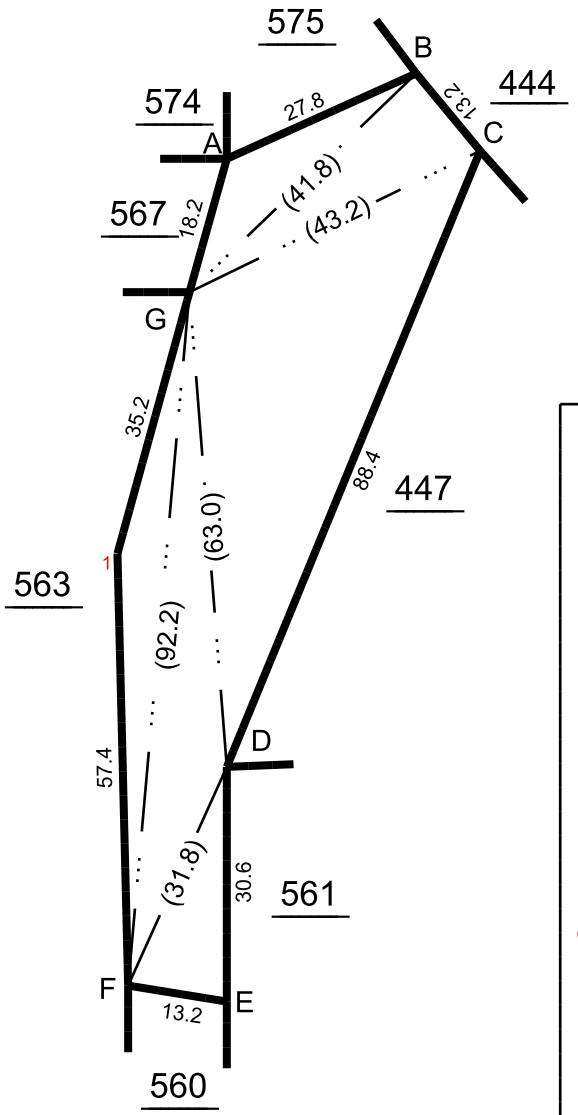
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 562

Area : Hect 00 Ares 27.00

Scale : 1 : 1000



Ladder

		G		
		92.2		
1	6.4	56.8		
		30.2	10.0	D
		F		
		D		
		31.8		
		3.6	12.6	E
		F		
		D		
		88.4		
		31.6	28.8	G
		C		
		G		
		41.8		
		26.4	9.2	A
C	13.2	0.8		
		B		
		13.2		
		C		
		43.2		
		G		
		63.0		
		D		
		30.6		
		E		
		13.2		
		F		
		G		
		18.2		
		A		
		27.8		
		B		

District : Krishnagiri

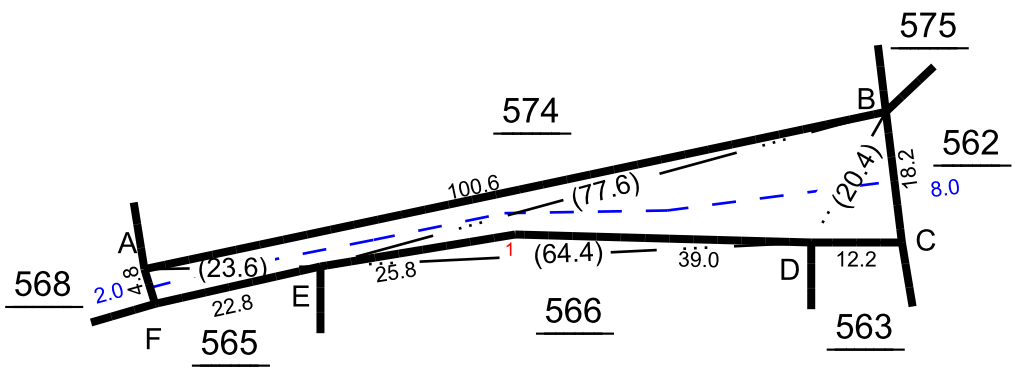
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 567

Area : Hect 00 Ares 9.50

Scale : 1 : 1000



Ladder

		E		
		64.4		
		38.8	2.8	1
		D		
		20.4		
C	10.6	13.8		
		B		
		E		
		77.6		
D	14.0	14.2		
		B		
		E		
		23.6		
		1.2	4.4	F
		A		
		100.6		
		B		
		18.2		
		C		
		12.2		
		D		
		E		
		22.8		
		F		
		4.8		
		A		

District : Krishnagiri

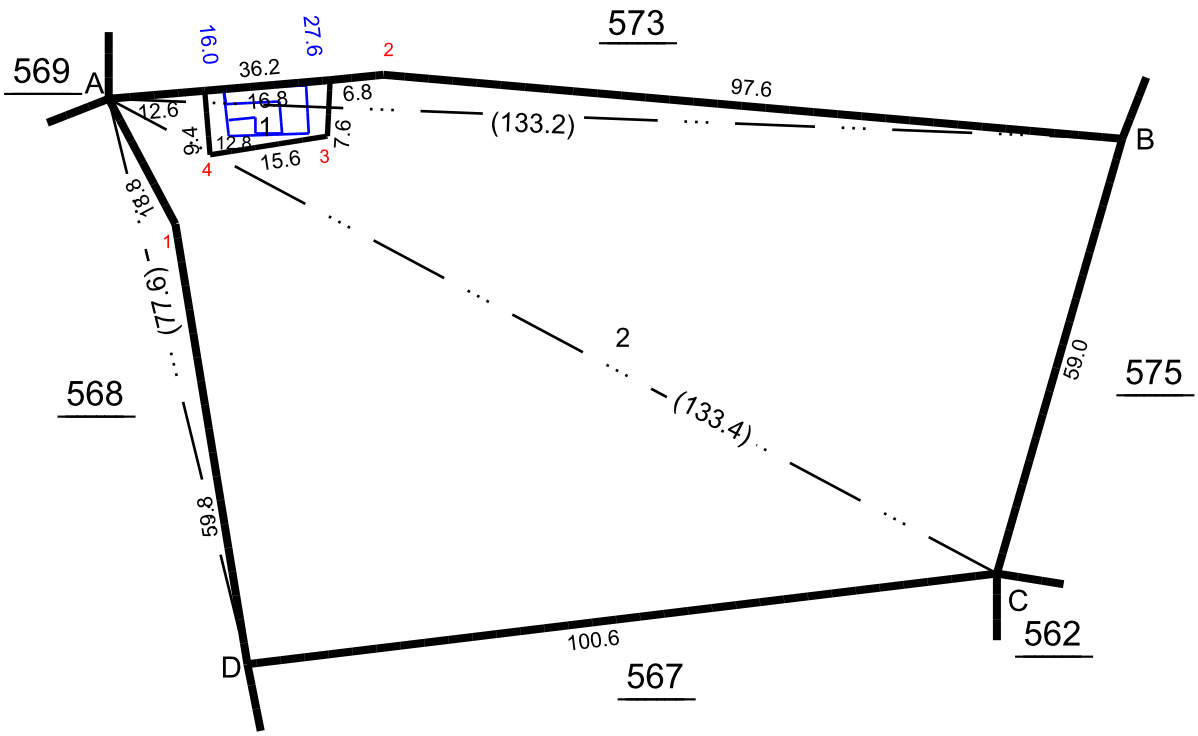
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 574

Area : Hect 00 Ares 78.50

Scale : 1 : 1000



Ladder

		A		
		133.4		
4	0.2	118.2		
D	57.4	82.0		
		12.4	58.4	B
		C		
		B		
		133.2		
		29.0	3.8	3
2	4.8	36.0		
		A		
		D		
		77.6		
1	4.6	18.2		
		A		

District : Krishnagiri

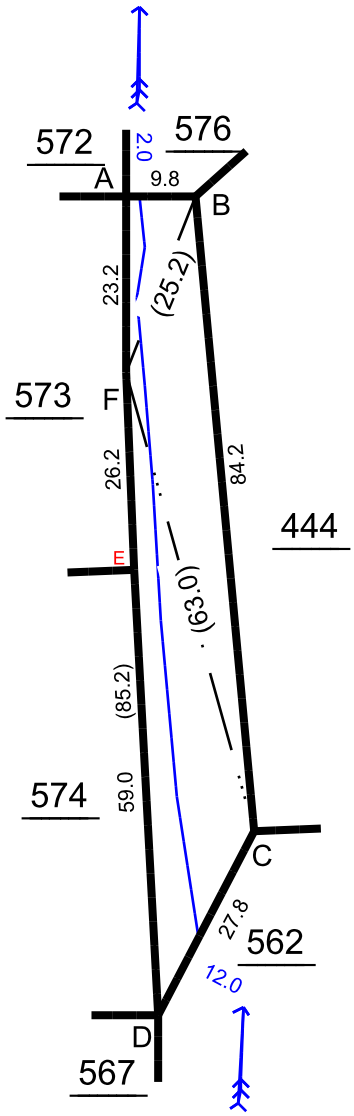
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 575

Area : Hect 00 Ares 11.50

Scale : 1 : 1000



Ladder

F	11.0	F 25.2 3.6 B 84.2 61.6 C B 9.8 A 23.2 F 85.2 59.0 D 27.8 C 63.0 F	9.0 LINE	A E

District : Krishnagiri

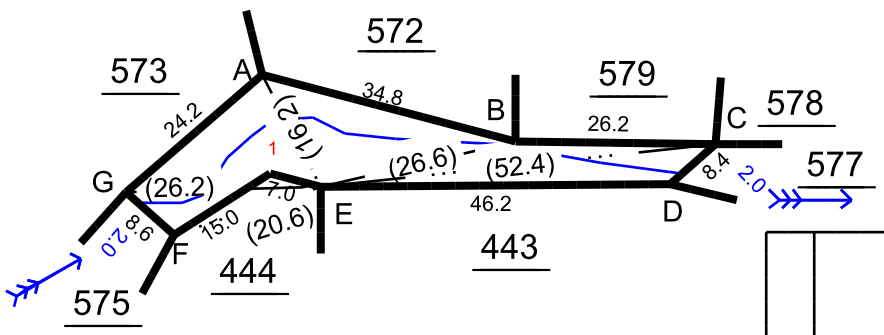
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 576

Area : Hect 00 Ares 7.50

Scale : 1 : 1000



Ladder

		F		
		20.6		
		6.0	3.8	1
		E		
		B		
		34.8		
		11.0	13.4	E
		A		
		G		
		26.2		
F	7.0	19.2		
		7.4	14.8	A
		E		
		52.4		
		26.2	5.0	B
D	4.8	6.4		
		C		
		8.4		
		D		
		46.2		
		E		
		26.6		
		B		
		26.2		
		C		
		E		
		16.2		
		A		
		24.2		
		G		
		8.6		
		F		

District : Krishnagiri

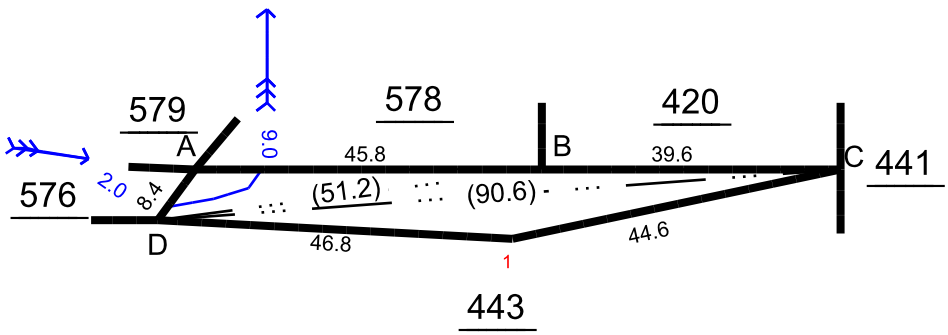
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 577

Area : Hect 00 Ares 6.00

Scale : 1 : 1000



Ladder

		C		
		90.6		
B	4.0	51.0		
		46.4	6.2	1
		D		
		51.2		
		45.6	6.0	A
		B		
		45.8		
		A		
		8.4		
		D		
		B		
		39.6		
		C		

NALLAH NUMBER – C12

District : Krishnagiri

Survey No : 419

Taluk : Hosur [9]

Area : Hect 00 Aces 50.71

Village : MUKONDAPALLI [88]

Scale : 1 : 1000

		Latitude		
		C		
		82.4		
11	3.9	82.0		
		E		
		B		
		82.0		
12	18.0	29.0		
11	18.9	11.0		
		E		
		A		
		103.2		
6	2.2	84.6		
7	6.5	79.0		
		79.0	6.6	6
5	12.0	83.0		
4	33.9	82.2		
		48.0	10.0	
		38.0	7.2	3
16	16.2	83.4		
		C		
		A		
		66.0		
10	7.2	36.0		
9	12.6	16.0		
		B		
		C		
		82.4		
		60.0	1.6	
		57.2	1.0	
		56.0	LINE	
		46.0	LINE	
		56.0	0.0	3
		E		
		70.4		
1	21.2	20.0		
		9.4	12.6	C
		83.0	3.2	14
10	1.2	60.0		
		D		
		C		
		15.0		
		D		
		E		
		61.4		
		A		

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District : Krishnagiri

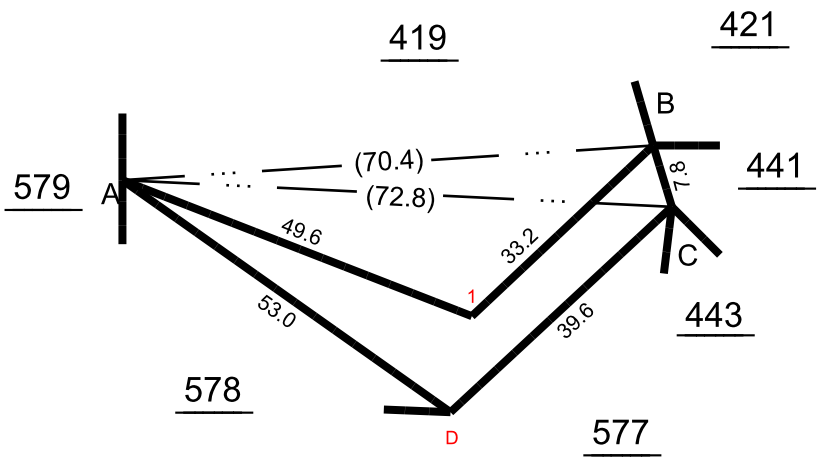
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 420

Area : Hect 00 Ares 6.00

Scale : 1 : 1000



Ladder

		A		
		70.4		
1	21.2	25.6		
		B		
		C		
		72.8		
B	8.2	70.2		
		45.2	28.4	D
		A		

District : Krishnagiri

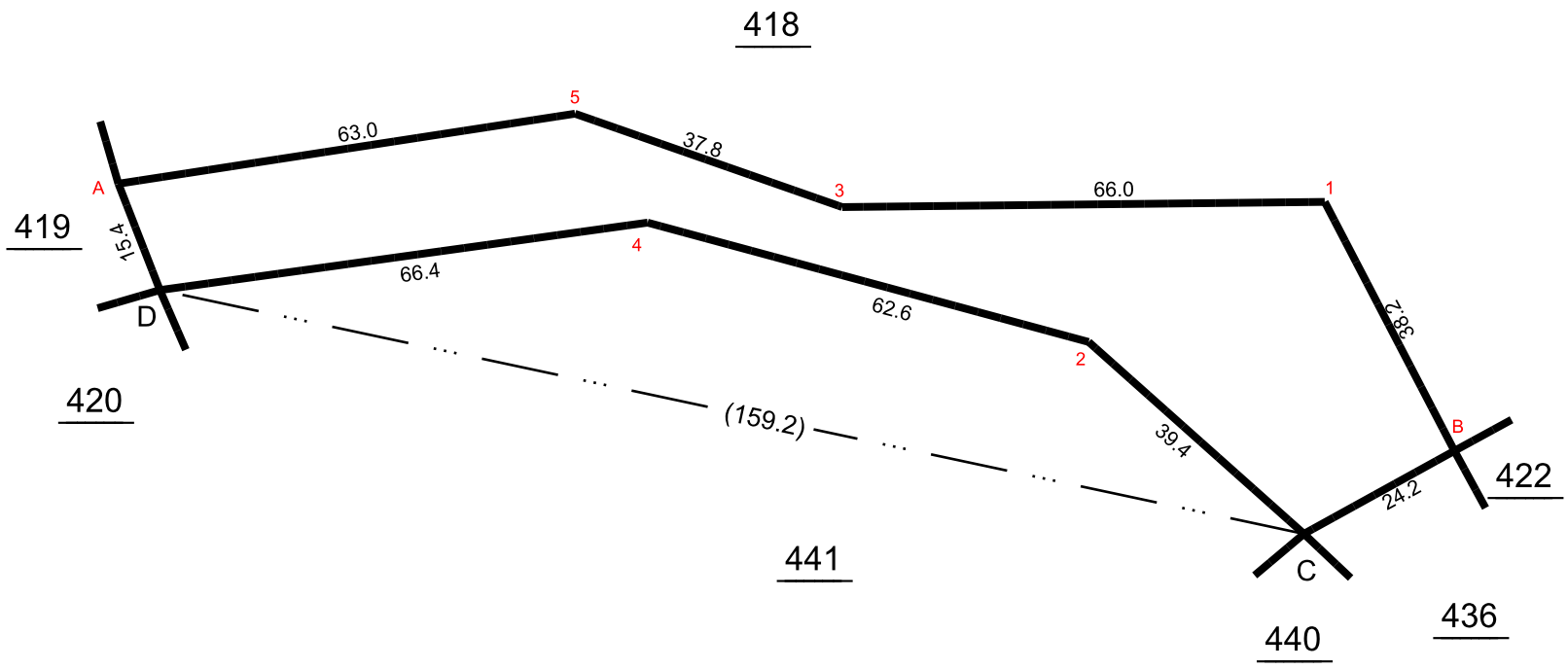
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 421

Area : Hect 00 Ares 33.50

Scale : 1 : 1000



Ladder

	PRO	8.4	13.0	A
		D		
		159.2		
		108.8	35.2	5
		96.2	22.8	4
		70.8	30.2	3
		34.2	19.4	2
		6.8	44.6	1
		C		
	BACK	18.0	15.4	B

District : Krishnagiri

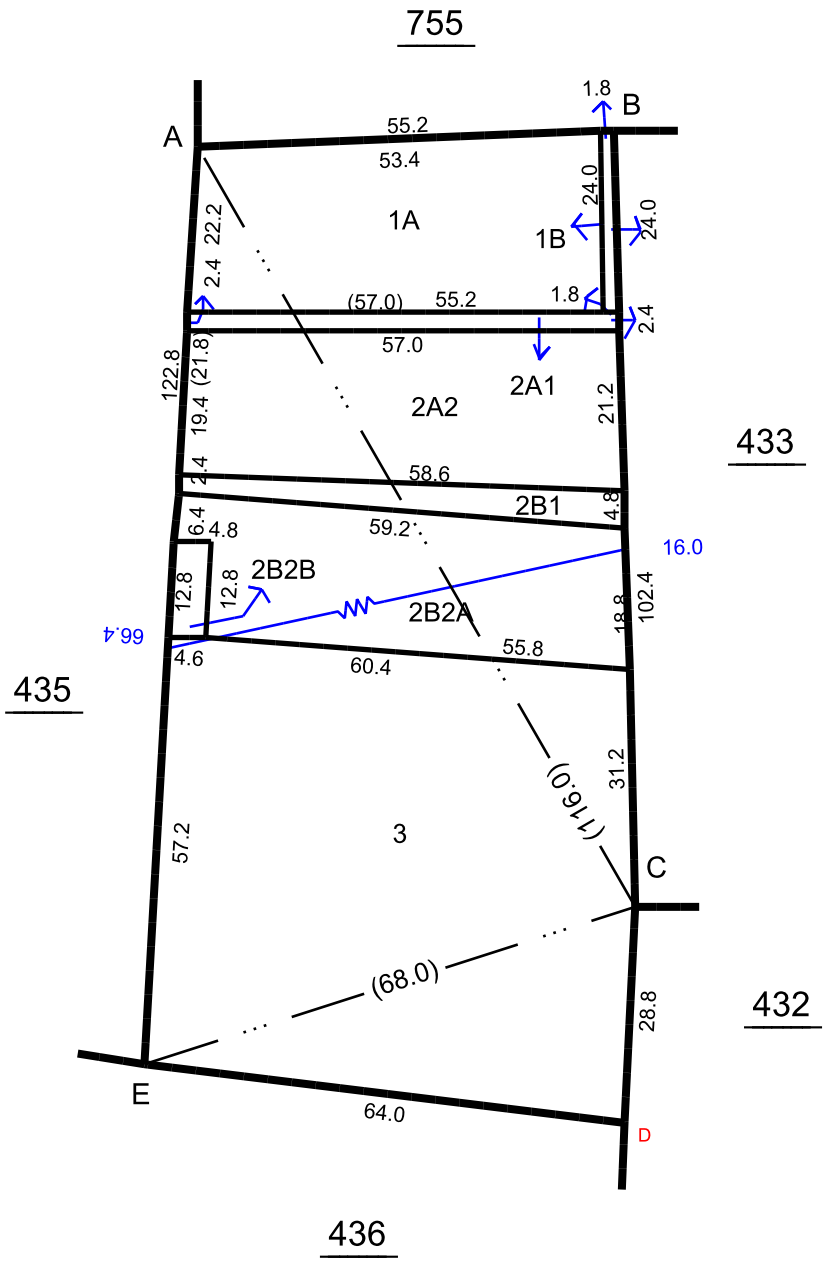
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 434

Area : Hect 01 Ares 52.69

Scale : 1 : 1000



		Ladder		
		C		
		68.0		
		58.0	26.8	D
		E		
		A		
		116.0		
		90.4	48.6	B
E	66.8	14.4		
		C		
		B		
		102.4		
		C		

District : Krishnagiri

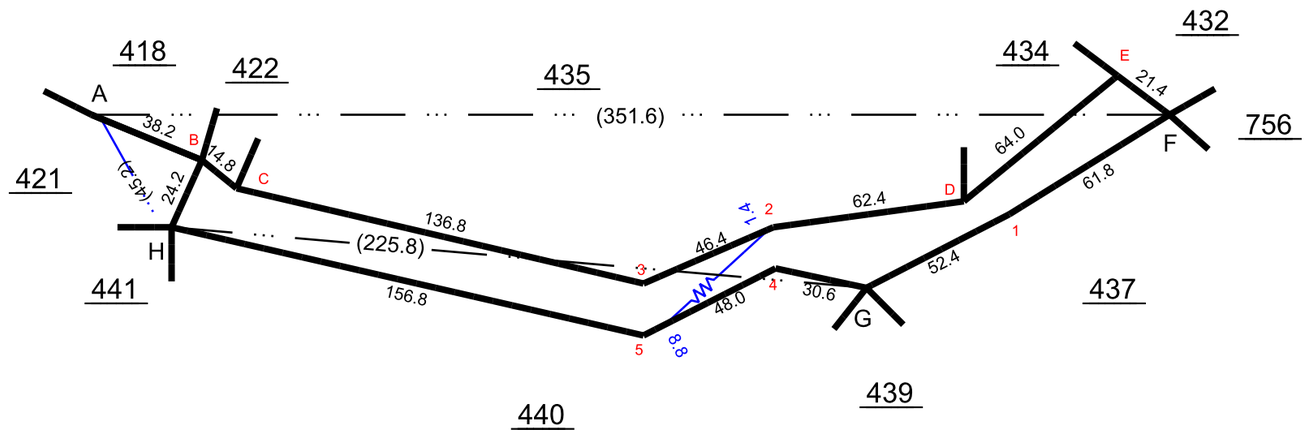
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 436

Area : Hect 00 Ares 53.00

Scale : 1 : 2000



		Ladder		
		H		
		225.8		
5	21.8	71.2		
		30.2	3.6	4
		G		
		A		
		351.6		
H	37.0	325.4		
B	15.0	316.0		
C	24.6	304.6		
3	55.2	171.6		
2	36.8	129.2		
G	56.6	99.2		
D	28.4	67.4		
1	32.8	52.6		
		17.4	12.6	E
		F		

District : Krishnagiri

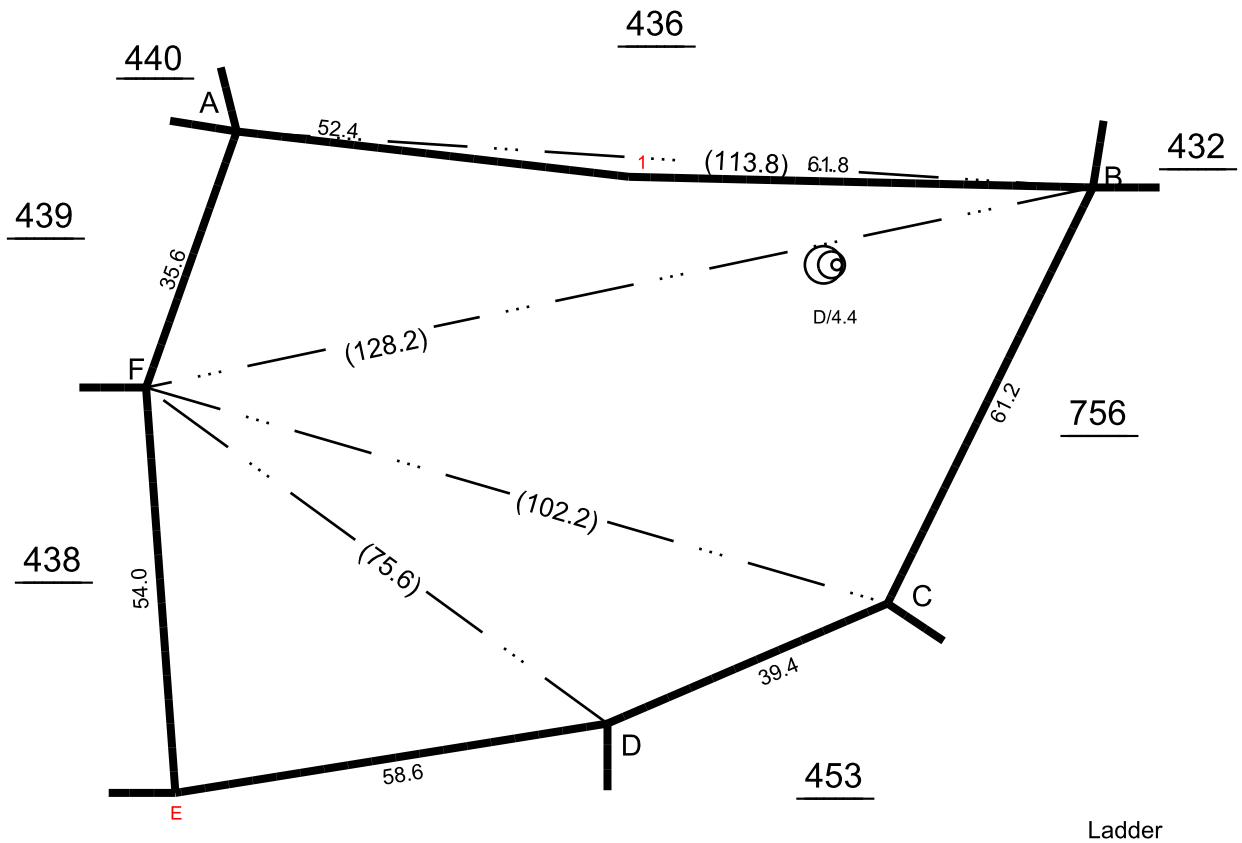
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 437

Area : Hect 00 Ares 77.50

Scale : 1 : 1000



Ladder

		F		
		75.6		
E	41.2	41.0		
		D		
		C		
		102.2		
		71.0	25.4	D
		F		
		128.2		
		109.6	30.6	A
C	48.4	38.2		
		B		
		A		
		113.8		
1	2.4	61.6		
		B		

District : Krishnagiri

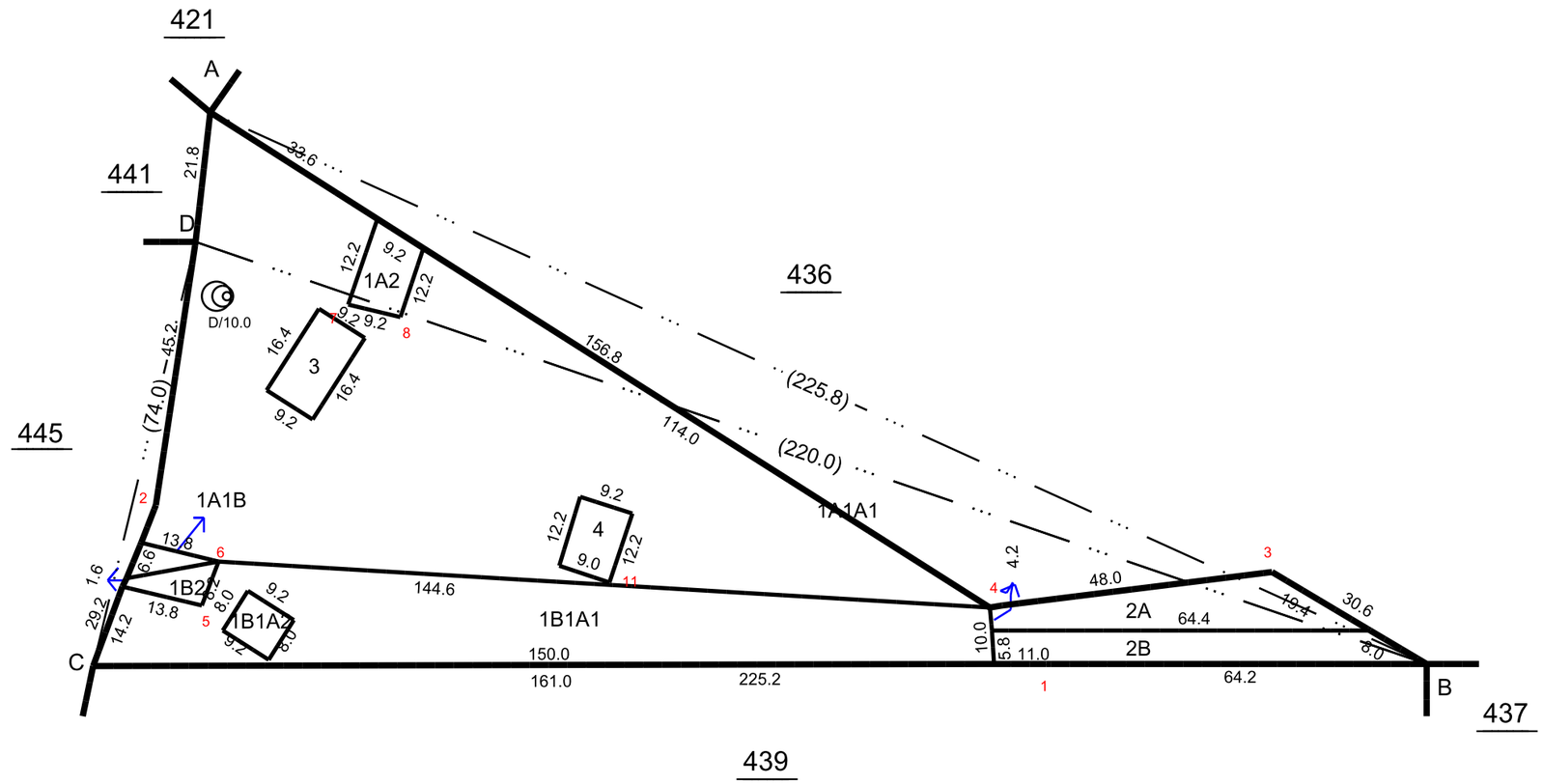
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 440

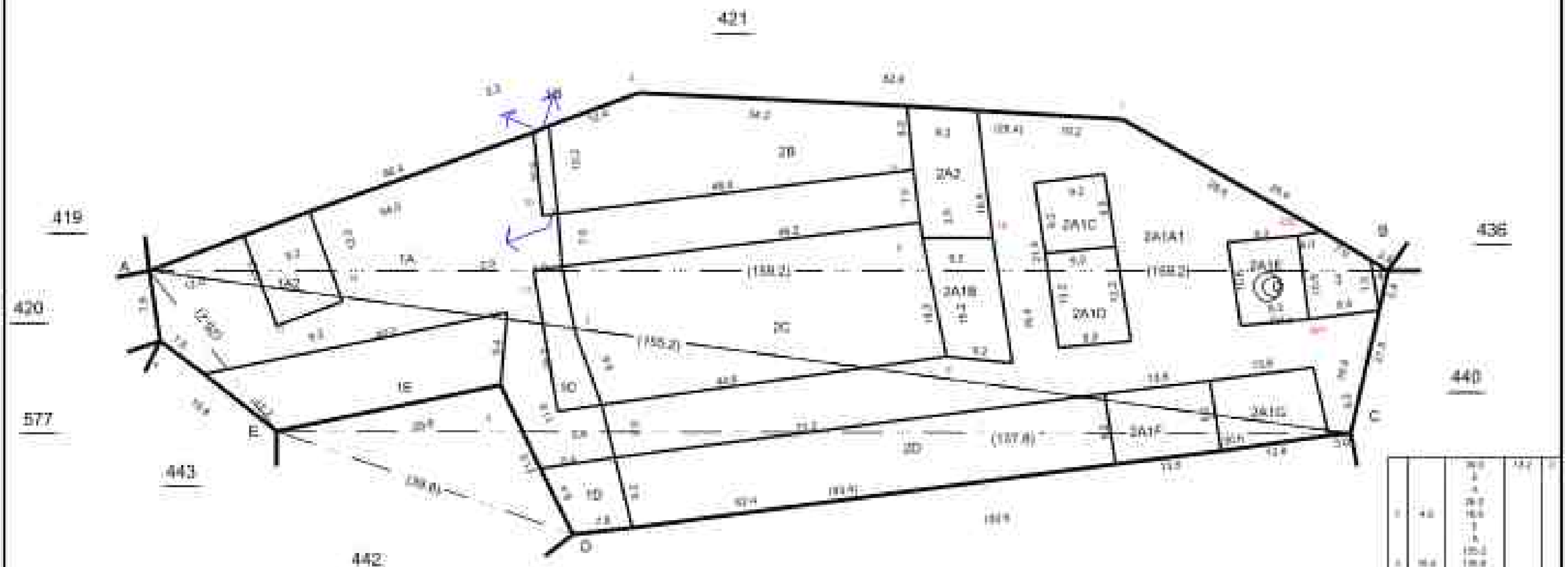
Area : Hect 00 Ares 86.98

Scale : 1 : 1000



Ladder

		B		
		220.0		
		36.8	0.8	8
		27.6	2.0	7
		D		
		B		
		225.2		
6	17.6	21.2		
5	10.0	18.4		
		C		
		A		
		225.8		
4	21.6	71.2		
		30.2	3.6	3
		B		
		220.0		
		11.6	10.6	
		84.8	31.8	11
		D		
		C		
		74.0		
2	4.0	45.0		
		D		
		B		
		225.2		
1	LINE	161.0		
A	93.2	20.0		
D	71.6	17.6		
		C		



District : Krishnagiri

Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 441

Area : Hect 00 Ares 57.35

Scale : 1 : 500

District : Krishnagiri

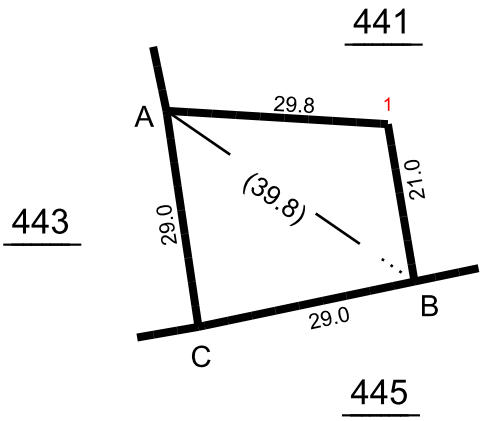
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 442

Area : Hect 00 Ares 7.50

Scale : 1 : 1000



Ladder

1	15.2	B 39.8 25.2 A B 29.0 C 29.0 A		

District : Krishnagiri

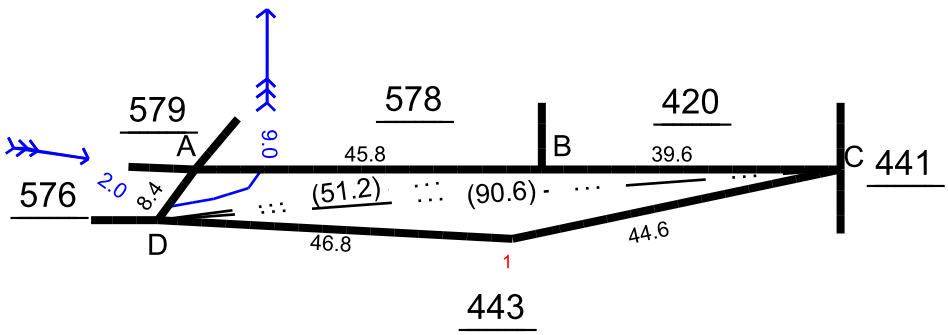
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 577

Area : Hect 00 Ares 6.00

Scale : 1 : 1000



Ladder

		C		
		90.6		
B	4.0	51.0		
		46.4	6.2	1
		D		
		51.2		
		45.6	6.0	A
		B		
		45.8		
		A		
		8.4		
		D		
		B		
		39.6		
		C		

District : Krishnagiri

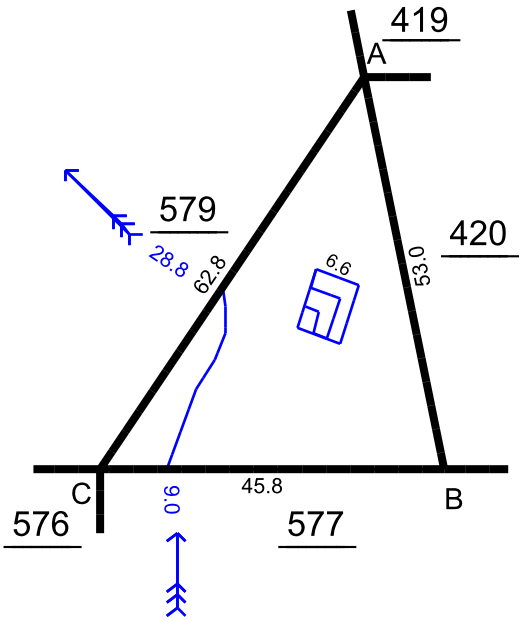
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 578

Area : Hect 00 Ares 11.50

Scale : 1 : 1000



Ladder

		A		
		62.8		
		33.6	9.0	
		27.6	10.8	
		C		
		45.8		
		10.6	51.8	A
		B		

District : Krishnagiri

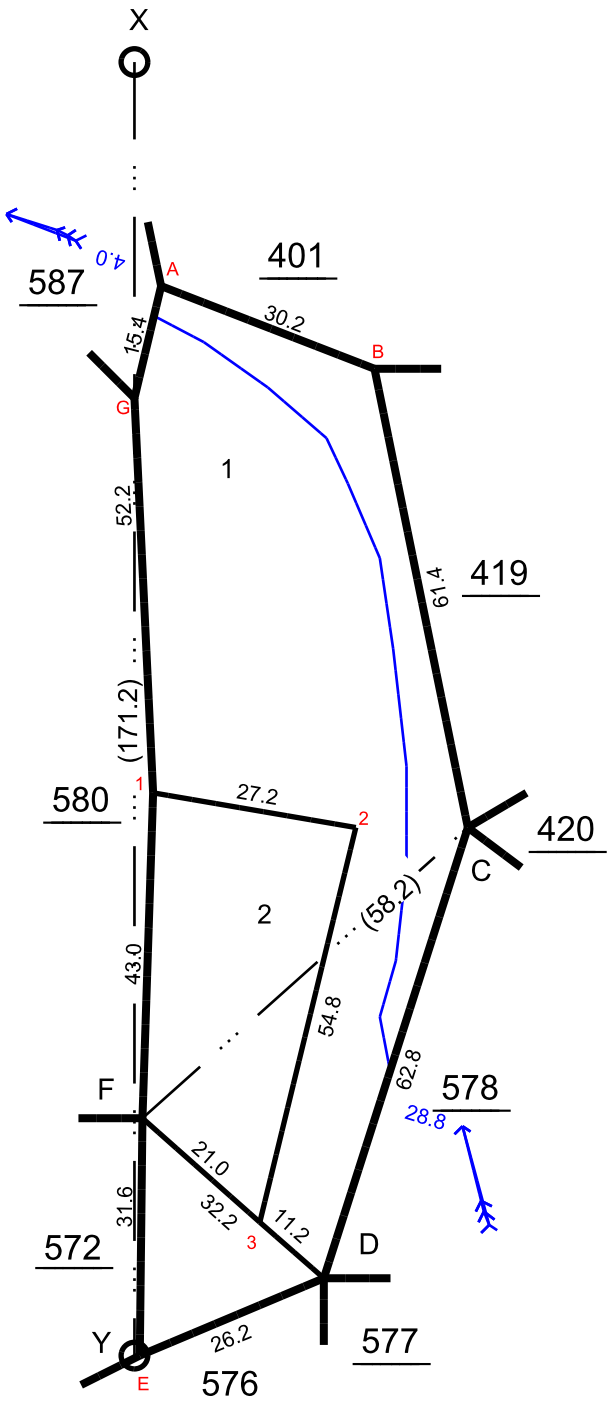
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 579

Area : Hect 00 Ares 45.50

Scale : 1 : 1000



Ladder

		D
		32.2
3	LINE	21.0
		F
		C
		58.2
2	9.8	46.6
		F
		Y
		171.2
E	0.8	171.2
D	25.2	161.2
F	1.2	139.8
C	44.4	101.4
1	2.8	97.0
G	LINE	44.8
B	31.8	40.6
A	3.8	29.8
		X

District : Krishnagiri

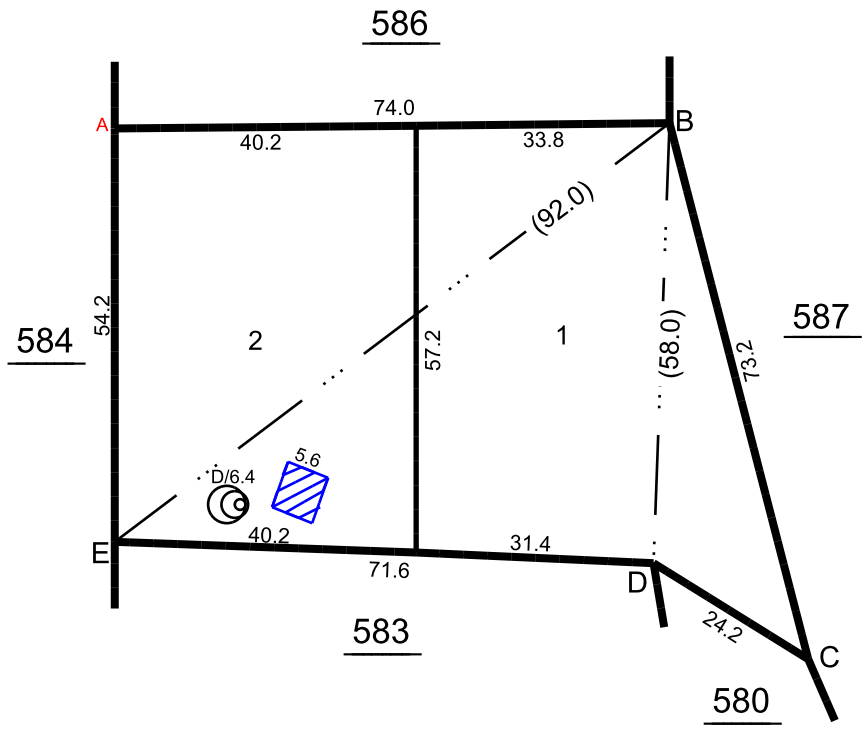
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 585

Area : Hect 00 Ares 48.00

Scale : 1 : 1000



Ladder

		B		
		92.0		
A	43.8	32.8		
		24.8	7.2	H
		20.8	10.4	H
		15.6	8.8	RW
		15.6	2.4	RW
		E		
		71.6		
		D		
		58.0		
		B		
		73.2		
		C		
		24.2		
		D		

District : Krishnagiri

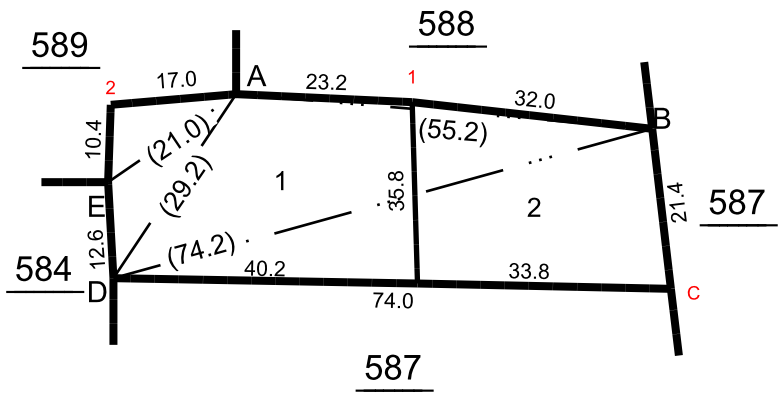
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 586

Area : Hect 00 Ares 17.00

Scale : 1 : 1000



		Ladder		
		A		
		21.0		
2	8.4	6.0		
		E		
		D		
		29.2		
		19.4	7.8	E
		A		
		D		
		74.2		
		51.6	18.8	A
C	21.4	3.2		
		B		
		55.2		
1	1.0	23.2		
		A		

District : Krishnagiri

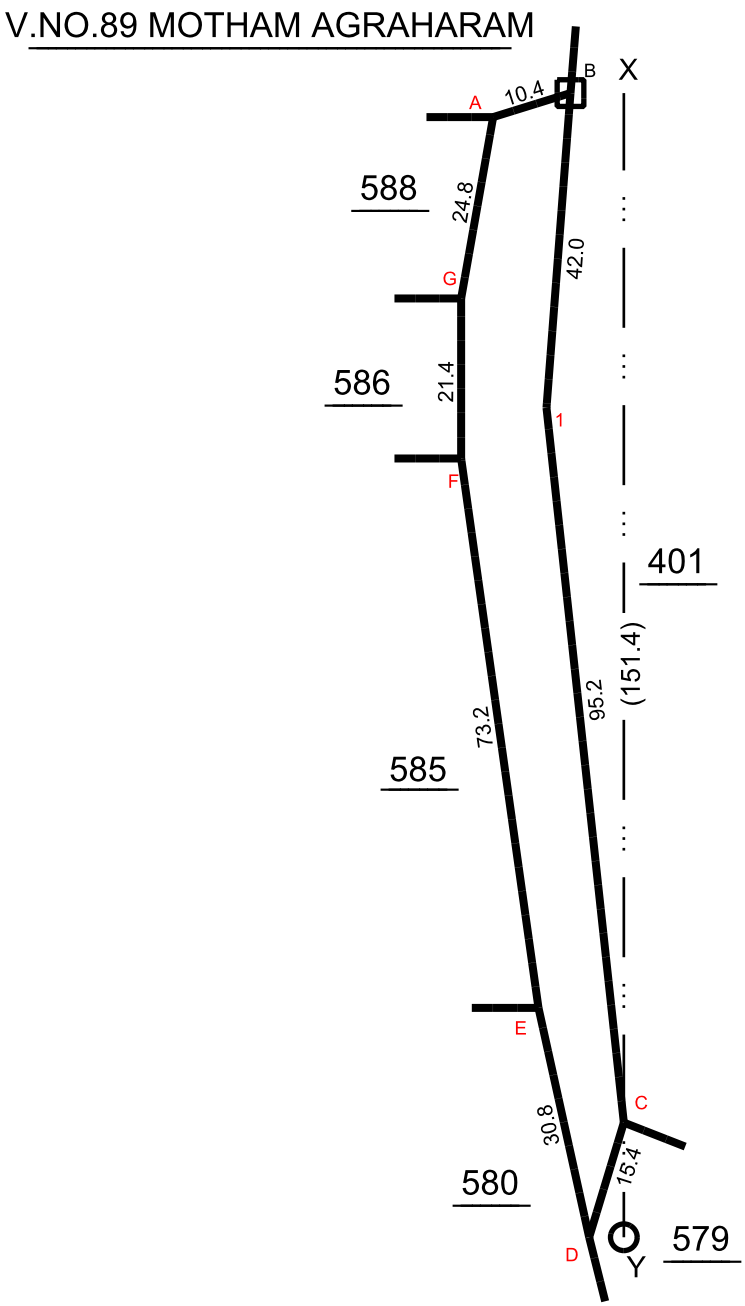
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 587

Area : Hect 00 Ares 15.00

Scale : 1 : 1000



Ladder

		Y		
		151.4		
		151.4	4.8	D
		136.4	LINE	C
		121.2	11.4	E
		48.6	21.8	F
		41.8	10.4	1
		27.4	21.6	G
		3.2	17.4	A
		0.0	7.4	B
		X		

District : Krishnagiri

Taluk : Hosur [9]

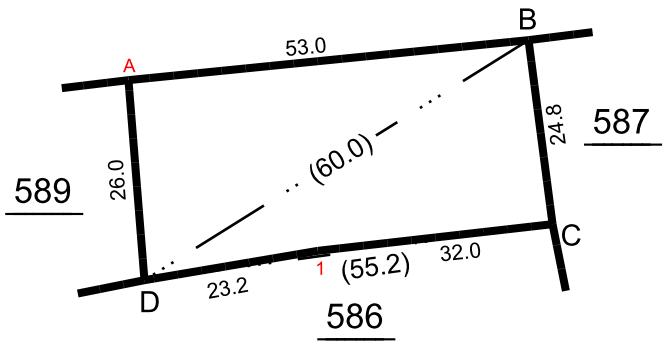
Village : MUKONDAPALLI [88]

Survey No : 588

Area : Hect 00 Ares 14.00

Scale : 1 : 1000

V.NO.89 MOTHAM AGRAHARAM



Ladder

		C		
		55.2		
1	1.0	23.2		
		D		
		60.0		
		47.6	23.6	A
C	22.4	10.0		
		B		

NALLAH NUMBER – C13

District : Krishnagiri

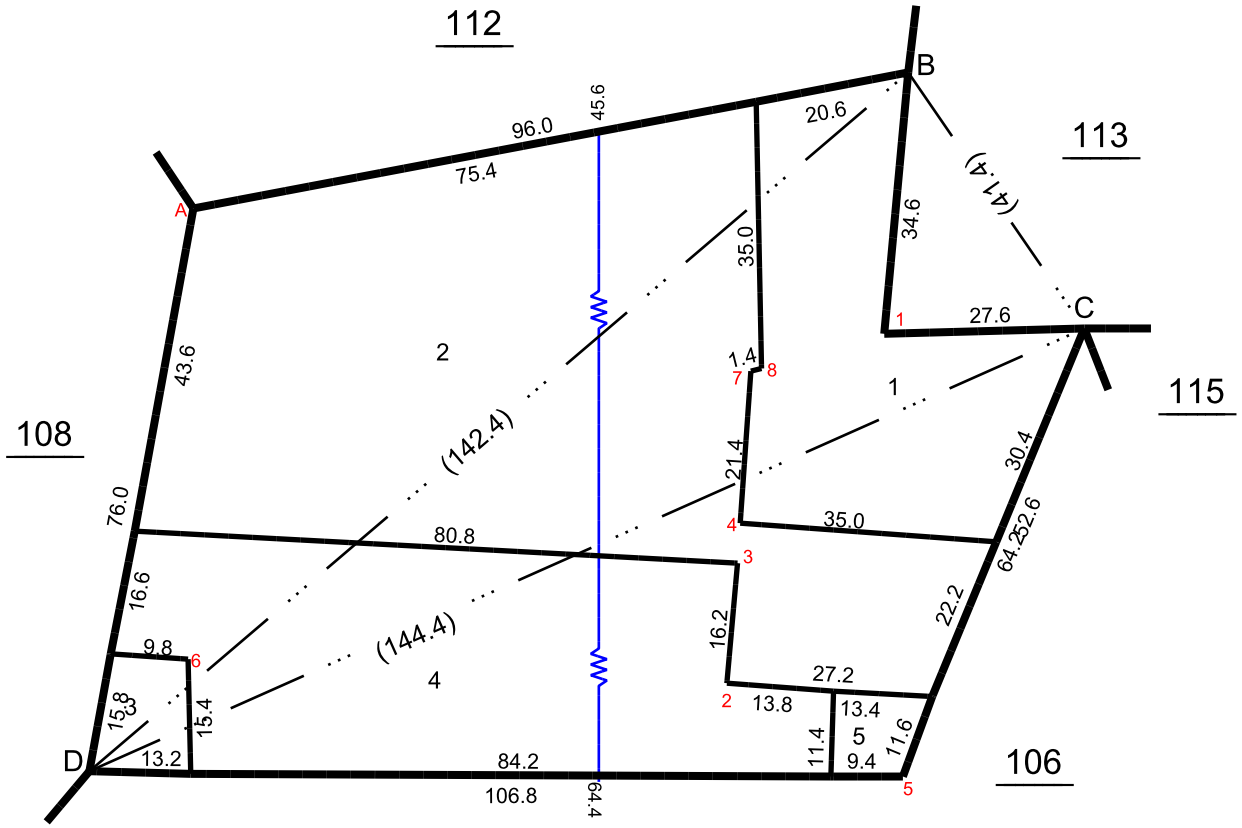
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 107

Area : Hect 00 Ares 91.50

Scale : 1 : 1000



Ladder

		B		
		142.4		
		102.2	17.0	8
		101.0	16.4	7
A	47.8	59.0		
6	2.8	19.6		
		D		
		C		
		144.4		
B	39.6	136.8		
		97.8	44.2	5
		92.0	4.8	4
		89.6	9.4	3
		81.8	23.6	2
		D		
		C		
		41.4		
		26.4	22.6	1
		B		

District : Krishnagiri

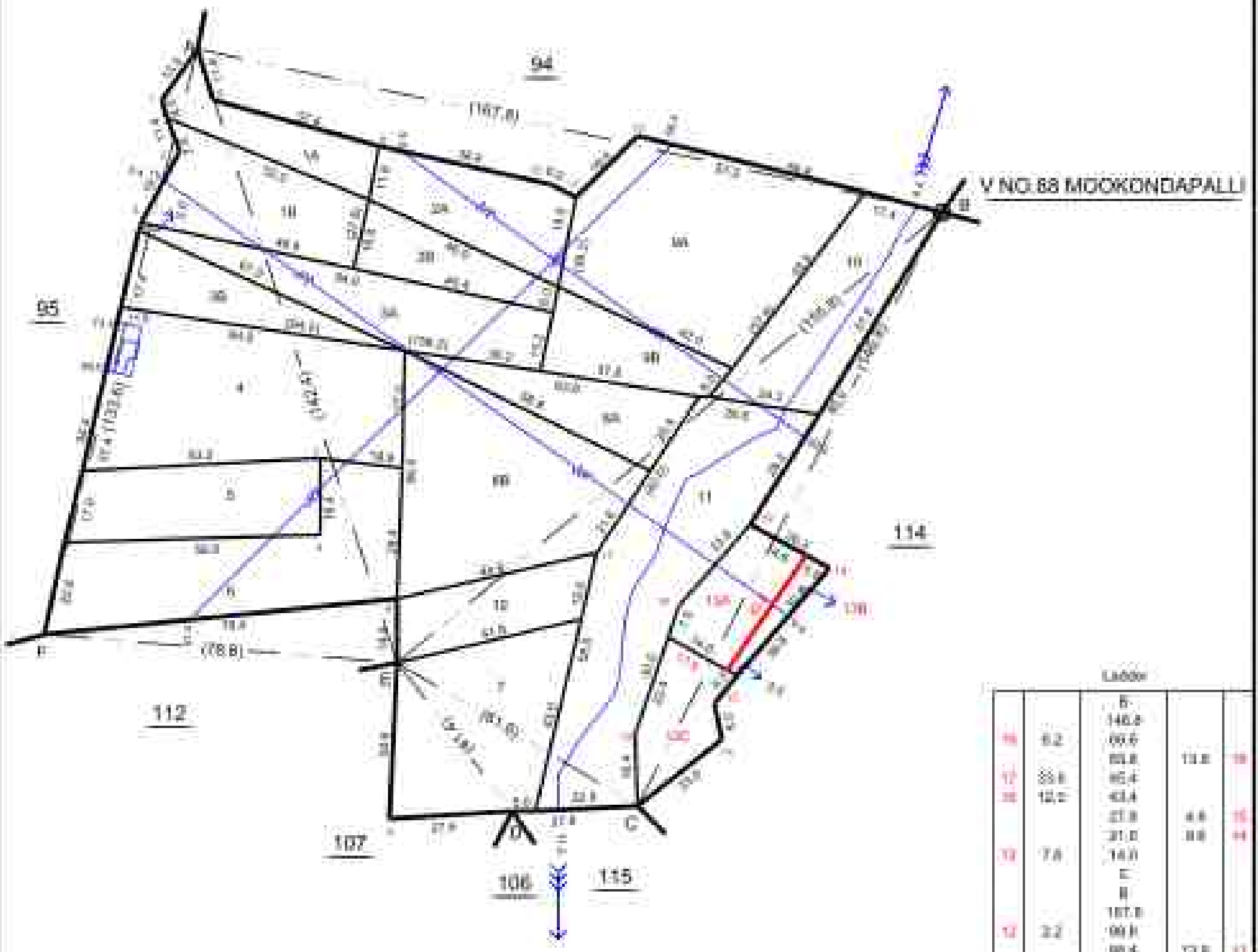
Survey No : 113

Taluk : Hosur [9]

Area : Hect 02 Area 0.50

Village : MOTHAM AGRAHARAM [89]

Scale : 1 : 1000



Ladder

		E 148.8		
16	9.2	89.6		
		89.8	13.8	16
17	33.8	86.4		
18	12.2	43.4		
		27.8	4.6	15
		31.0	8.8	14
13	7.8	14.0		
		E		
		B		
		187.8		
12	3.2	89.8		
		88.4	13.8	11
		82.2	12.8	10
		43.8	12.4	9
		5.8	10.4	8
		A		
		142.4		
7	3.8	46.2		
6	7.8	32.8		
		E		
		B		
		186.8		
		20.8	68.8	5
		E		
		C		
		81.8		
		39.6	10.2	3
		E		
		D		
		41.4		
		26.4	22.8	2
		E		
		19.8		
1	14.4	77.8		
		F		
		152.8		
		40.2	2.8	1
0	1.2	22.8		
		13.0	0.8	
		A		

District : Krishnagiri

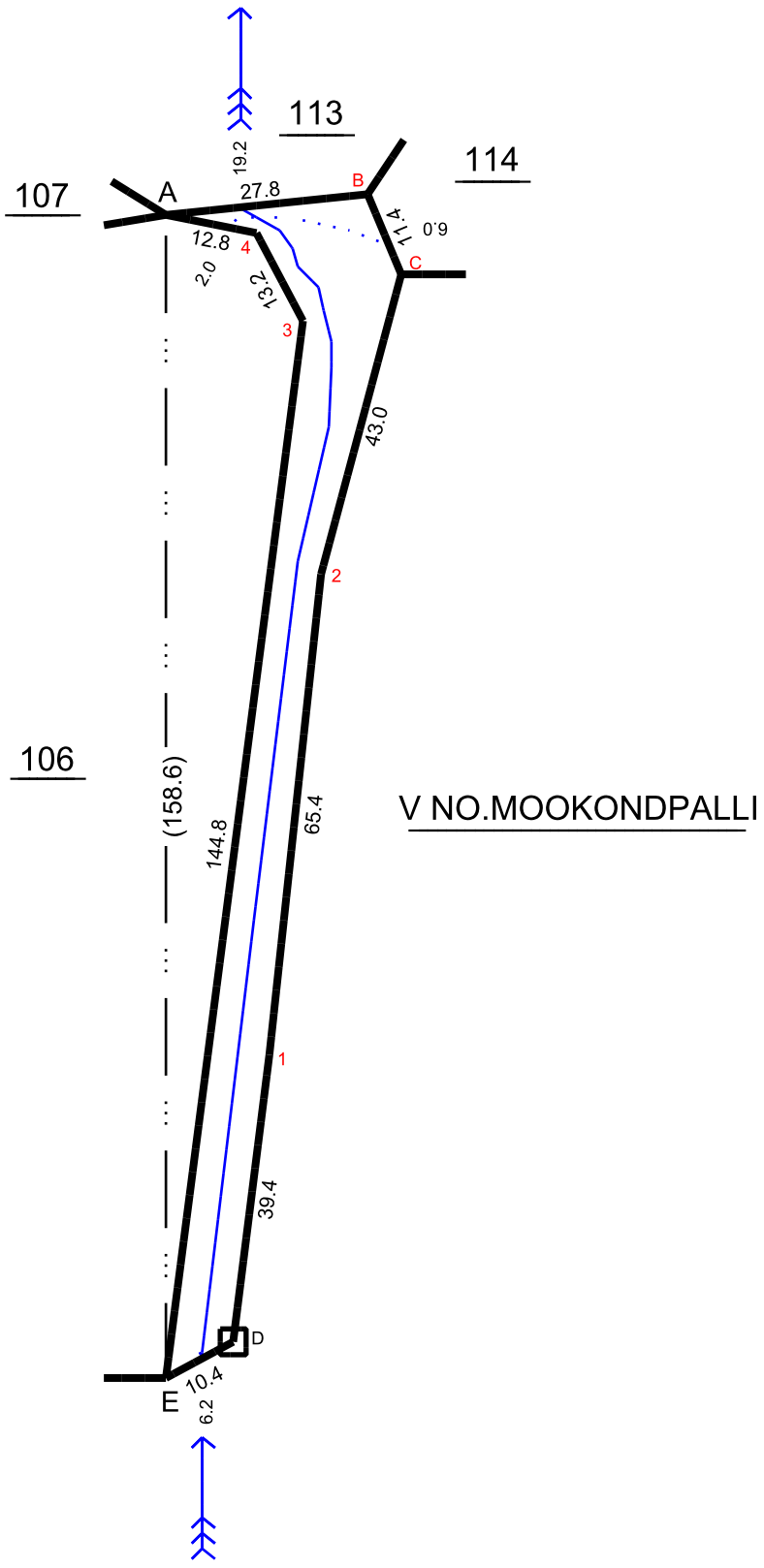
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 115

Area : Hect 00 Ares 14.00

Scale : 1 : 1000



NALLAH NUMBER – C15

District : Krishnagiri

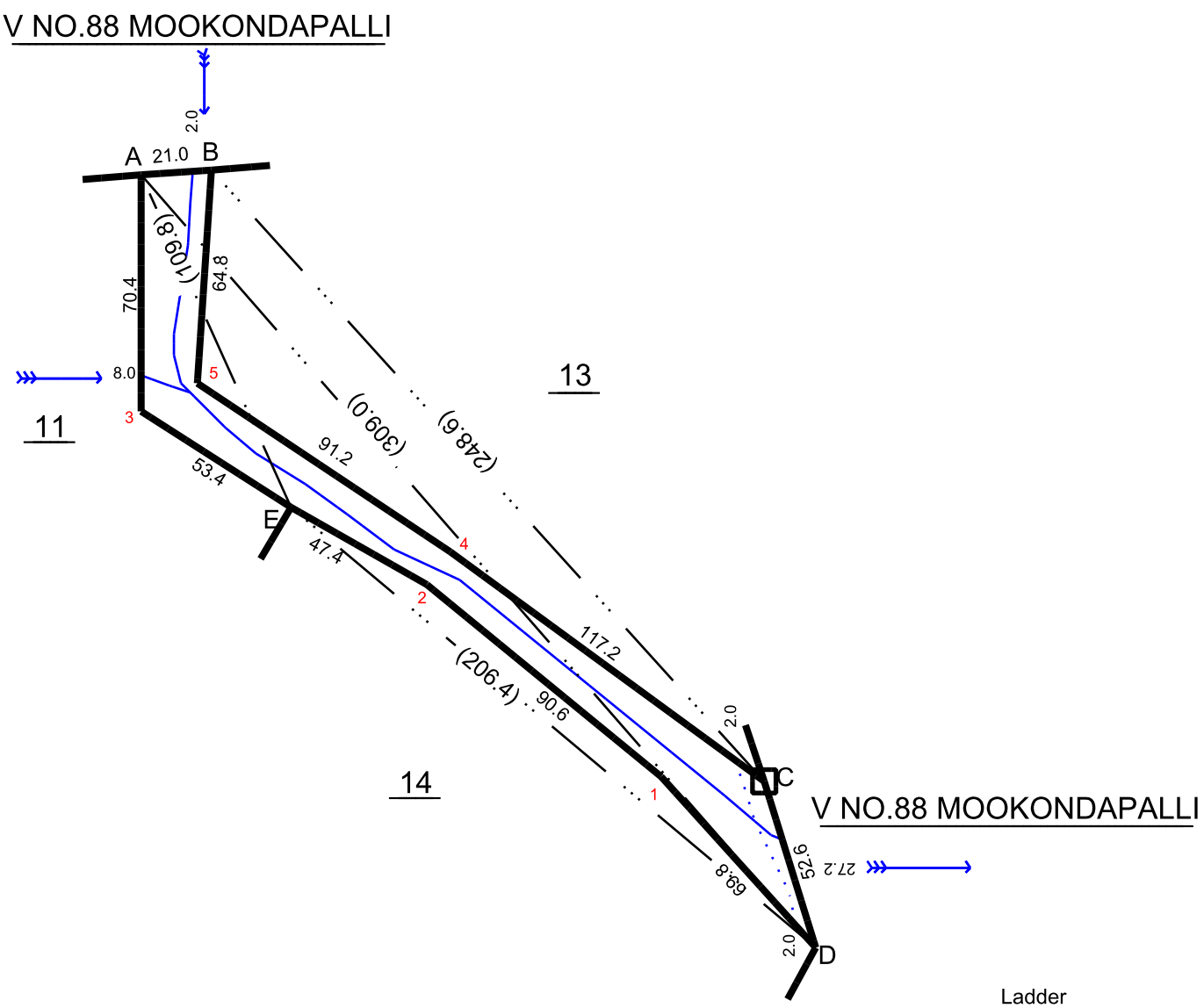
Taluk : Hosur [9]

Village : MOTHAM AGRAHARAM [89]

Survey No : 12

Area : Hect 00 Ares 52.00

Scale : 1 : 2000



Ladder

		D		
		309.0		
C	21.6	260.8		
		105.2	31.8	E
B	17.0	12.4		
		A		
		B		
		248.6		
5	46.2	203.4		
4	23.6	114.6		
		C		
		A		
		109.8		
3	29.2	45.0		
		E		
		206.4		
		160.0	8.6	2
		69.0	9.4	1
		D		

District : Krishnagiri

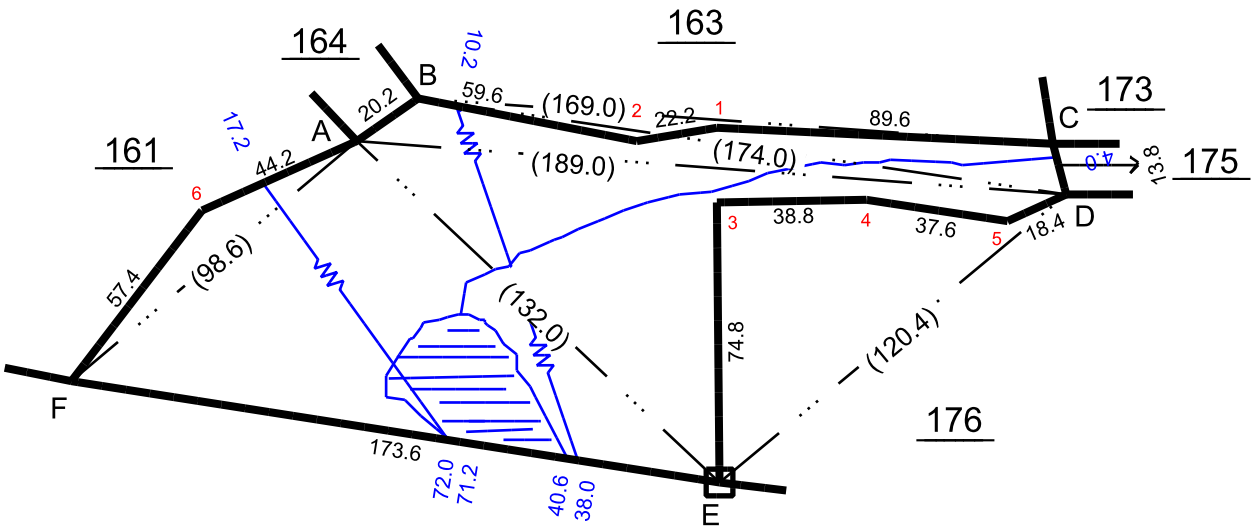
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 162

Area : Hect 00 Ares 37.00

Scale : 1 : 2000



V.NO,89 MOTHAM AGRAHARAM

Ladder

		F		
		98.6		
		42.6	12.6	6
		A		
		189.0		
		173.0	12.8	B
E	83.2	86.8		
		D		
		E		
		173.6		
dt	30.6	100.6		
dt	20.0	80.4		
A	74.4	64.8		
		F		
		D		
		120.4		
5	5.0	103.0		
4	33.2	77.8		
3	57.6	47.0		

		E		
		D		
		174.0		
C	12.4	167.8		
		B		
		169.0		
2	7.2	110.6		
1	2.6	89.4		
		C		
		A		
		132.0		
		E		
		A		
		20.2		
		B		
		C		
		13.8		
		D		

District : Krishnagiri

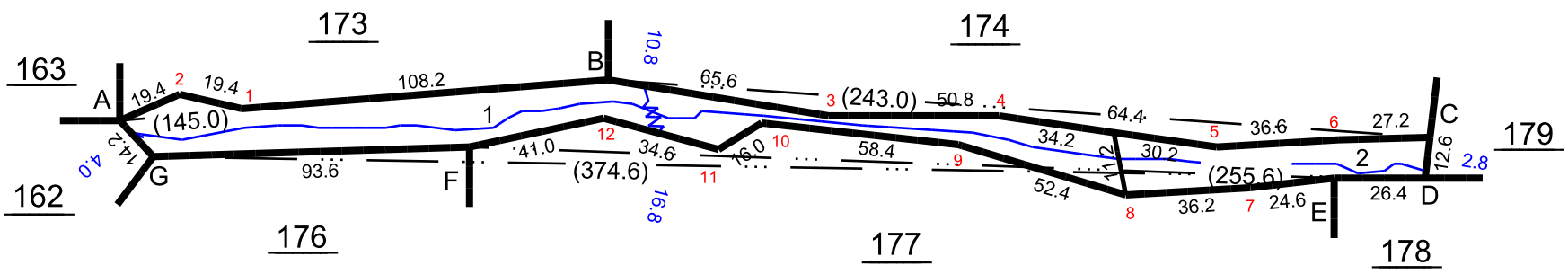
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 175

Area : Hect 00 Ares 54.00

Scale : 1 : 2000



Ladder

		F		
		255.6		
		215.8	9.8	12
		182.0	2.0	11
		169.6	10.4	10
		111.4	6.2	9
8	7.2	61.2		
7	3.2	25.2		
		E		
	PRO	9.8	10.2	A
		G		
		374.6		
		281.2	4.4	F
		241.0	25.0	B
E	0.4	26.4		
		D		
	BACK	1.8	12.6	C
		C		
		243.0		
		216.0	2.6	6
		180.2	7.2	5
		115.6	2.4	4
		65.2	6.2	3
		B		
		A		
		145.0		
		126.4	6.6	2
		108.0	0.8	1
		B		
		C		
		12.6		
		D		

District : Krishnagiri

Taluk : Hosur

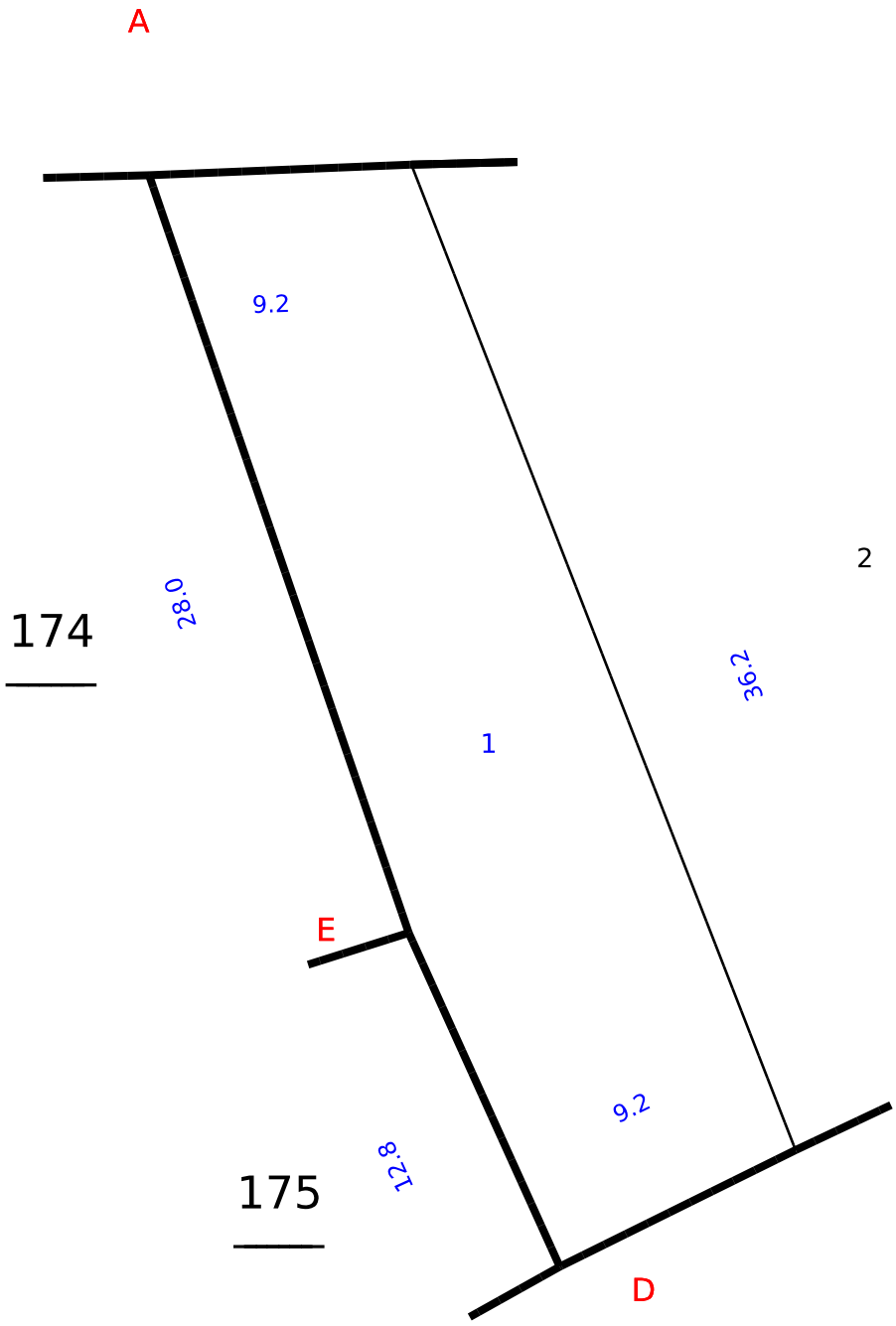
Village : Mookondapalli(R)

Survey No : 179/1

Area : Hect 00 Ares 3 Sqm 50

Scale : 1 : 262 mm

FMB Sketch



Date of Issue: 13-05-2025 12:03:43

Approved By Tahsildar

tahsildar

Date of Approved : 23-08-2017

Survey and Settlement Department, Government of TamilNadu

mv240 v270.001

District : Krishnagiri

Taluk : Hosur

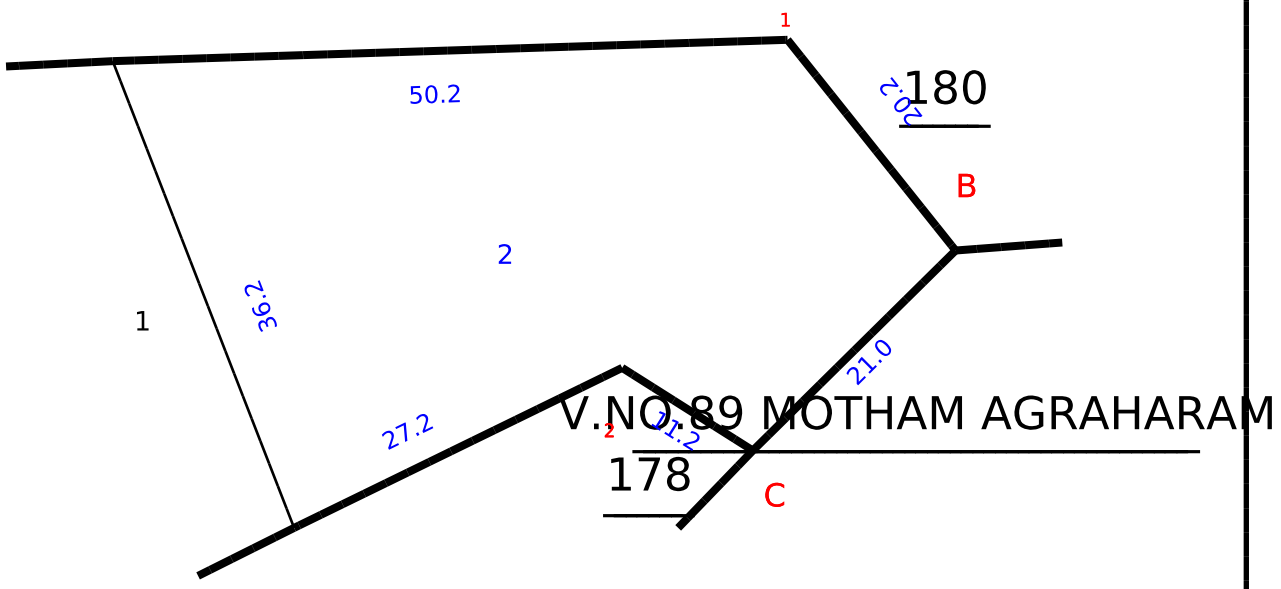
Village : Mookondapalli(R)

Survey No : 179/2

Area : Hect 00 Ares 14 Sqm 50

Scale : 1 : 558 mm

FMB Sketch



Approved By Tahsildar

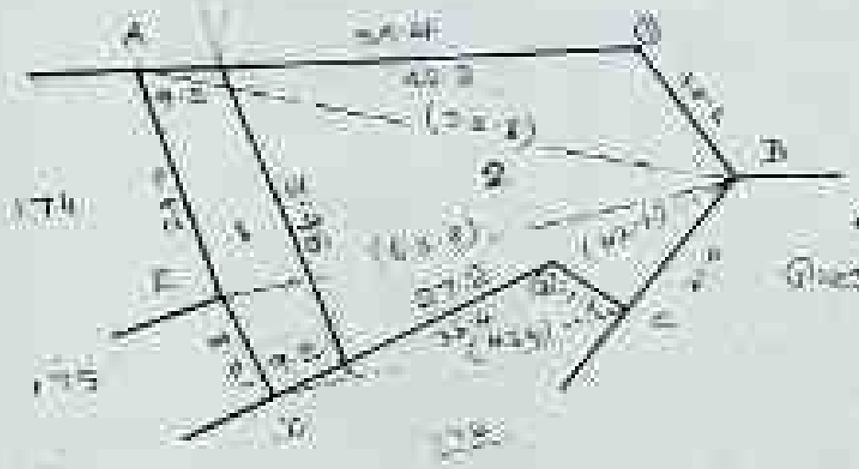
tahsildar

Date of Approved : 23-08-2017

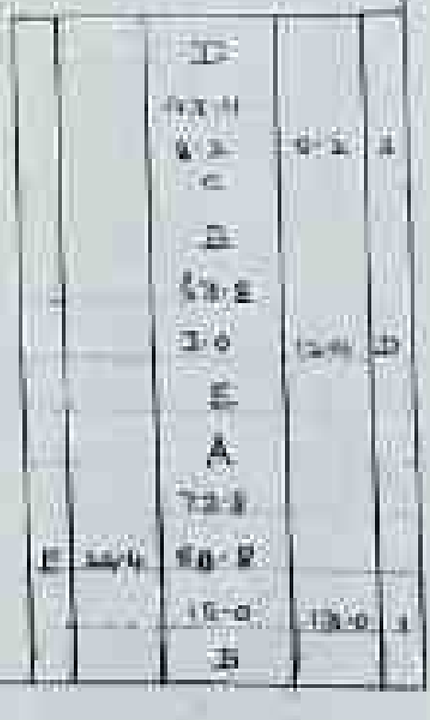
Date of Issue: 13-05-2025 11:38:53

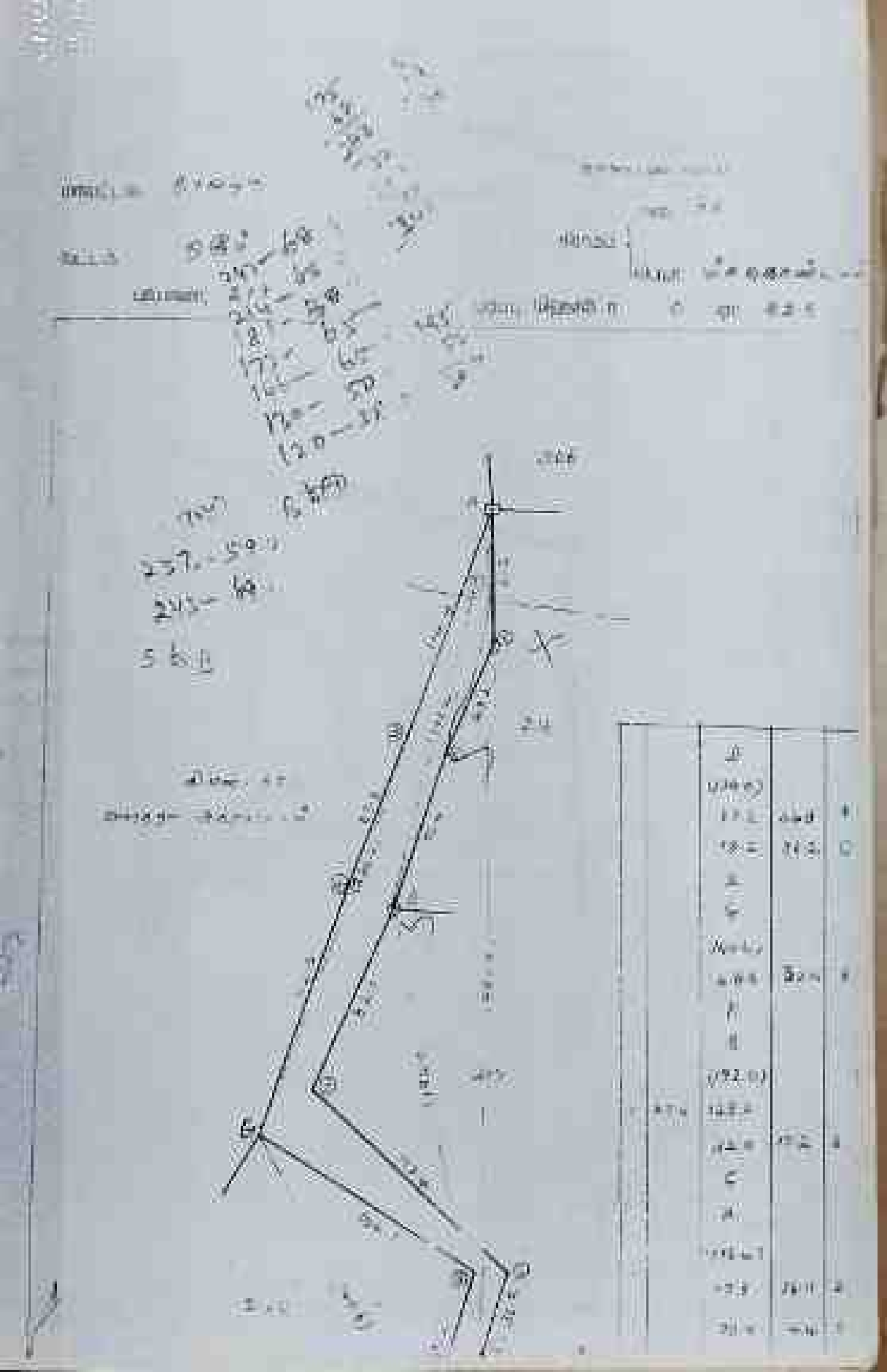
Survey and Settlement Department, Government of TamilNadu

mv240 v270.001



New Sub Div 1, 2 divided
by me on 24/11/87
Sd/- 24.11.87
(Sd) K. Ashwathappa





District : Krishnagiri

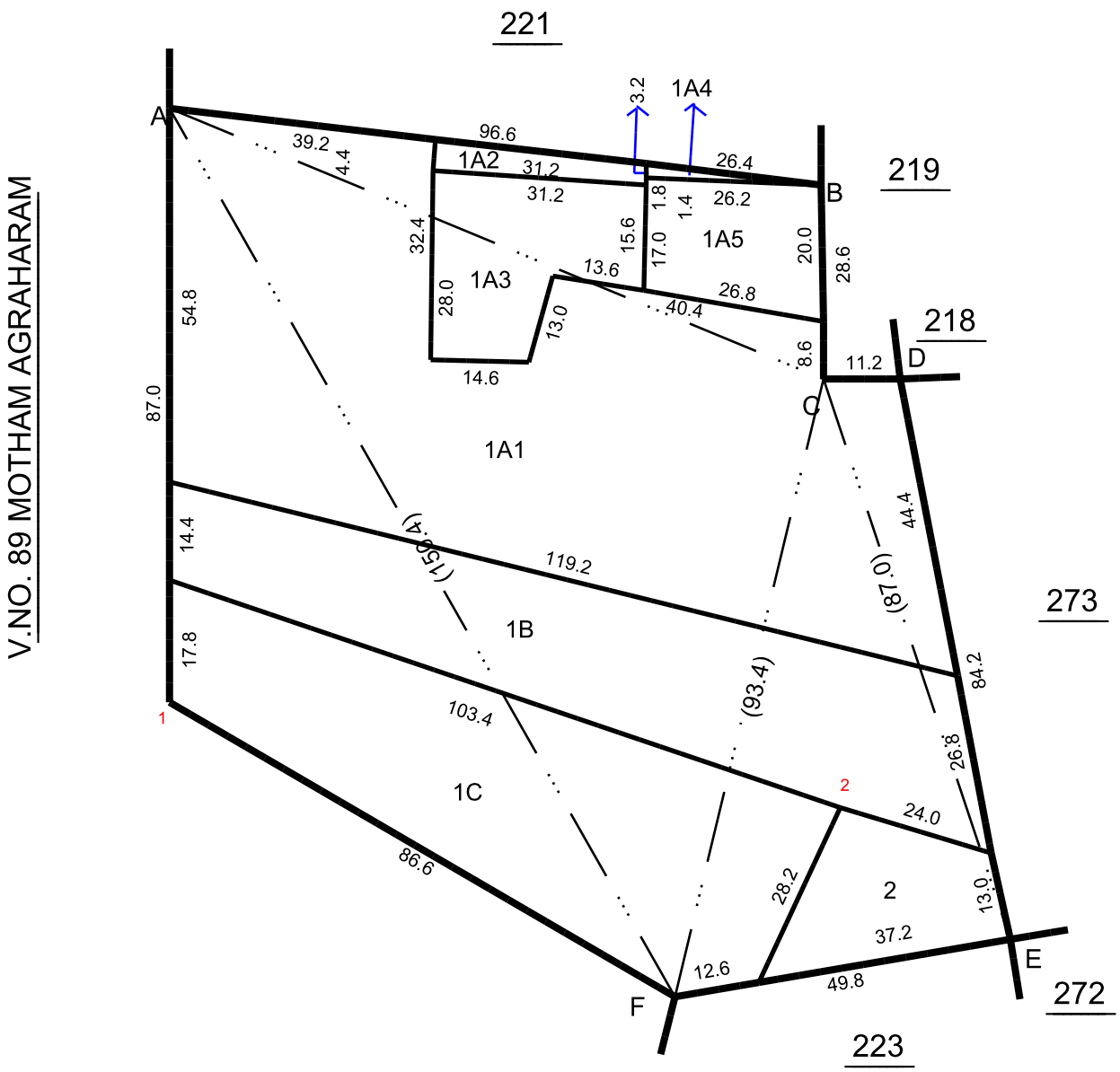
Taluk : Hosur [9]

Village : MUKONDAPALLI [88]

Survey No : 222

Area : Hect 01 Ares 22.00

Scale : 1 : 1000



Ladder

		C							
		93.4							
		32.8	17.0	2			104.2		
		F					A		
		A					96.6		
		150.4					B		
1	43.4	74.6					28.6		
		F					C		
		49.8					11.2		
		E					D		
		87.0					84.2		
		C					E		

District : Krishnagiri

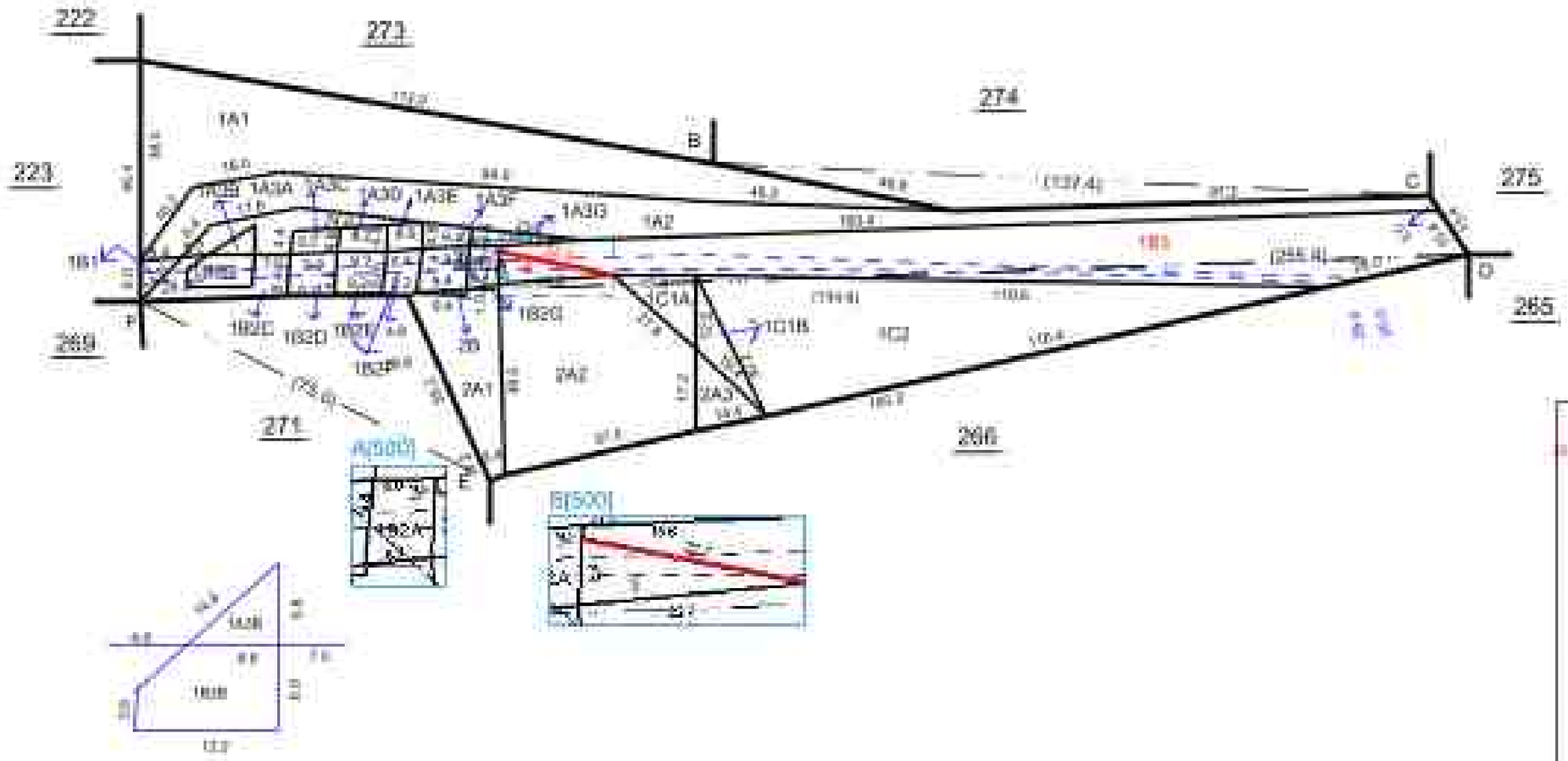
Survey No : 272

Taluk : Hosur [9]

Area : Hect 00 Ares 89.38

Village : MUKKANDAPALLI [88]

Scale : 1 : 1000



		E		
		10.0		
	19.6	42.2		
		F		
		F		
		269.4		
		284.8	21.8	9
		281.8	10.0	8
		288.2	14.0	7
		284.6	16.6	6
		155.8	5.4	5
		149.6	15.2	4
		D		
		C		
		197.4		
		46.4	6.2	
		B		
		F		
		455.4		
		253.8	46.4	A
3	3.4	264.4		
2	36.0	188.8		
		184.2	3.0	3
		144.8	32.8	2
		80.0	11.8	1
		7.6	11.2	
		246.2	2.2	13
		246.2	0.8	12
		254.0	3.0	11
		253.0	10.8	10
		228.8	12.8	9
11	11.0	183.8		
		C		

NALLAH NUMBER – C17